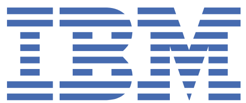
9.1

IBM MQ Developing Applications Reference



Note

Before using this information and the product it supports, read the information in “Notices” on page 2171.

This edition applies to version 9 release 1 of IBM® MQ and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Developing applications reference ... 7
MQI applications reference ... 7
Code examples ... 8
Constants ... 61
Data types used in the MQI ... 234
Function calls ... 615
Attributes of objects ... 786
Return codes ... 861
Rules for validating MQI options ... 862
Queued publish/subscribe command messages ... 865
Machine encodings ... 887
Report options and message flags ... 890
Data-conversion exit ... 894
Properties specified as MQRFH2 elements ... 917
Code page conversion ... 925
Coding standards on 64-bit platforms ... 980
IBM i Application Programming Reference (ILE/RPG) ... 984
Data type descriptions on IBM i ... 986
Function calls on IBM i ... 1236
Attributes of objects on IBM i ... 1353
Applications ... 1398
Return codes for IBM i (ILE RPG) ... 1411
Rules for validating MQI options for IBM i (ILE RPG) ... 1412
Machine encodings on IBM i ... 1415
Report options and message flags on IBM i ... 1418
Data conversion on IBM i ... 1421
Conversion processing on IBM i ... 1422
Processing conventions on IBM i ... 1423
Conversion of report messages on IBM i ... 1427
MQDXP (Data-conversion exit parameter) on IBM i ... 1428
MQXCNVC (Convert characters) on IBM i ... 1433
MQCONVX (Data conversion exit) on IBM i ... 1437
User exits, API exits, and installable services reference ... 1441
MQIEP structure ... 1441
Data-conversion exit reference ... 1445
MQ_PUBLISH_EXIT - Publish exit ... 1449
Channel-exit calls and data structures ... 1457
Cluster workload exit call and data structures ... 1520
API exit reference ... 1545
Installable services interface reference information ... 1605
Installable services interface reference information on IBM i ... 1668
The IBM MQ .NET classes and interfaces ... 1708
MQAsyncStatus.NET class ... 1708
MQAuthenticationInformationRecord.NET class ... 1709
MQDestination.NET class ... 1710
MQEnvironment.NET class ... 1712
MQException.NET class ... 1715
MQGetMessageOptions.NET class ... 1715
MQManagedObject.NET class ... 1718
MQMessage.NET class ... 1721
MQProcess.NET class ... 1733
MQPropertyDescriptor.NET class ... 1735

MQPutMessageOptions.NET class....1736
MQQueue.NET class....1739
MQQueueManager.NET class....1746
MQSubscription.NET class....1759
MQTopic.NET class....1760
IMQObjectTrigger.NET interface....1766
MQC.NET interface....1767
Character set identifiers for .NET applications....1767
IBM MQ C++ classes....1770
C++ and MQI cross-reference....1771
ImqAuthenticationRecord C++ class....1787
ImqBinary C++ class....1789
ImqCache C++ class....1791
ImqChannel C++ class....1794
ImqCICSBridgeHeader C++ class....1799
ImqDeadLetterHeader C++ class....1805
ImqDistributionList C++ class....1808
ImqError C++ class....1809
ImqGetMessageOptions C++ class....1810
ImqHeader C++ class....1814
ImqIMSBridgeHeader C++ class....1815
ImqItem C++ class....1818
ImqMessage C++ class....1820
ImqMessageTracker C++ class....1826
ImqNamelist C++ class....1829
ImqObject C++ class....1830
ImqProcess C++ class....1836
ImqPutMessageOptions C++ class....1837
ImqQueue C++ class....1840
ImqQueueManager C++ class....1850
ImqReferenceHeader C++ class....1866
ImqString C++ class....1869
ImqTrigger C++ class....1874
ImqWorkHeader C++ class....1877
Properties of IBM MQ classes for JMS objects....1879
Dependencies between properties of IBM MQ classes for JMS objects....1882
APPLICATIONNAME....1884
ASYNCEXCEPTION....1884
BROKERCCDURSUBQ....1885
BROKERCCSUBQ....1886
BROKERCONQ....1886
BROKERDURSUBQ....1887
BROKERPUBQ....1887
BROKERPUBQMGR....1888
BROKERQMGR....1888
BROKERSUBQ....1888
BROKERVER....1889
CCDTURL....1890
CCSID....1890
CHANNEL....1891
CLEANUP....1891
CLEANUPINT....1892
CONNECTIONNAMELIST....1892
CLIENTRECONNECTOPTIONS....1892
CLIENTRECONNECTTIMEOUT....1893
CLIENTID....1894
CLONESUPP....1894
COMPHDR....1895

COMPMSG.. 1895
CONNOPT.. 1896
CONNTAG.. 1897
DESCRIPTION.. 1897
DIRECTAUTH.. 1898
ENCODING.. 1898
EXPIRY.. 1899
FAILIFQUIESCE.. 1899
HOSTNAME.. 1900
LOCALADDRESS.. 1901
MAPNAMESTYLE.. 1901
MAXBUFFSIZE.. 1902
MDREAD.. 1902
MDWRITE.. 1903
MDMSGCTX.. 1903
MSGBATCHSZ.. 1904
MSGBODY.. 1904
MSGRETENTION.. 1905
MSGSELECTION.. 1905
MULTICAST.. 1906
OPTIMISTICPUBLICATION.. 1907
OUTCOMENOTIFICATION.. 1907
PERSISTENCE.. 1908
POLLINGINT.. 1908
PORT.. 1909
PRIORITY.. 1909
PROCESSDURATION.. 1910
PROVIDERVERSION.. 1910
PROXYHOSTNAME.. 1913
PROXYPORT.. 1913
PUBACKINT.. 1914
PUTASYNCALLOWED.. 1914
QMANAGER.. 1915
QUEUE.. 1915
READAHEADALLOWED.. 1916
READAHEADCLOSEPOLICY.. 1916
RECEIVECCSID.. 1917
RECEIVECONVERSION.. 1917
RECEIVEISOLATION.. 1918
RECEXIT.. 1918
RECEXITINIT.. 1919
REPLYTOSTYLE.. 1919
RESCANINT.. 1920
SECEXIT.. 1920
SECEXITINIT.. 1921
SENDCHECKCOUNT.. 1921
SENDEXIT.. 1922
SENDEXITINIT.. 1922
SHARECONVALLOWED.. 1923
SPARSESUBS.. 1923
SSLCIPHERSUITE.. 1924
SSLCRL.. 1924
SSLFIPSREQUIRED.. 1925
SSLPEERNAME.. 1925
SSLRESETCOUNT.. 1926
STATREFRESHINT.. 1926
SUBSTORE.. 1927
SYNCPOINTALLGETS.. 1927

TARGCLIENT........ 1928
TARGCLIENTMATCHING........ 1928
TEMPMODEL........ 1929
TEMPQPREFIX........ 1929
TEMPTOPICPREFIX........ 1930
TOPIC........ 1930
TRANSPORT........ 1930
WILDCARDFORMAT........ 1931
The ENCODING property........ 1932
TLS properties of JMS objects........ 1932
IBM Message Service Client for .NET reference........ 1933
.NET interfaces........ 1933
Properties of XMS objects........ 2014
Managed File Transfer developing applications reference........ 2080
Examples of using fteCreateTransfer to start programs........ 2080
fteAnt: run Ant tasks in MFT........ 2082
MFT user exits for customization reference........ 2106
Message formats for messages you can put on the MFT Agent command queue........ 2146
Messaging REST API reference........ 2146
REST API resources........ 2146

Notices........ 2171
Programming interface information........ 2172
Trademarks........ 2172

Developing applications reference

Use the links provided in this section to help you develop your IBM MQ applications.

- "MQI applications reference" on page 7
- IBM i "IBM i Application Programming Reference (ILE/RPG)" on page 984
- IBM i "Data conversion on IBM i" on page 1421
- "User exits, API exits, and installable services reference" on page 1441
- "The IBM MQ .NET classes and interfaces" on page 1708
- "IBM MQ C++ classes" on page 1770
- "Properties of IBM MQ classes for JMS objects" on page 1879
- V 9.1.0 "Messaging REST API reference" on page 2146

Related tasks

Developing applications

Related reference

IBM MQ classes for Java libraries

IBM MQ classes for JMS

MQI applications reference

Use the links provided in this section to help you develop your Message Queue Interface (MQI) applications.

- "Code examples" on page 8
- "Constants" on page 61
- "Data types used in the MQI" on page 234
- "Function calls" on page 615
- "Attributes of objects" on page 786
- "Return codes" on page 861
- "Rules for validating MQI options" on page 862
- "Machine encodings" on page 887
- "Report options and message flags" on page 890
- "Data-conversion exit" on page 894
- "Properties specified as MQRFH2 elements" on page 917
- "Code page conversion" on page 925

Related concepts

"User exits, API exits, and installable services reference" on page 1441

Use the linformation in this section to help you develop your User exits, API exits, and installable services applications:

Related tasks

Developing applications

Related reference

"The IBM MQ .NET classes and interfaces" on page 1708

IBM MQ .NET classes and interfaces are listed alphabetically. The properties, methods and constructors are described.

"IBM MQ C++ classes" on page 1770
The IBM MQ C++ classes encapsulate the IBM MQ Message Queue Interface (MQI). There is a single C++ header file, **imqi.hpp**, which covers all of these classes.

The IBM MQ Classes for Java libraries

IBM MQ Classes for JMS

Code examples

Use the reference information in this section to accomplish the tasks that address your business needs.

C language examples

This collection of topics is mostly taken from the IBM MQ for z/OS sample applications. They are applicable to all platforms, except where noted.

Connecting to a queue manager

This example demonstrates how to use the MQCONN call to connect a program to a queue manager in z/OS batch.

This extract is taken from the Browse sample application (program CSQ4BCA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
#include <cmqc.h>
⋮
static char Parm1[MQ_Q_MGR_NAME_LENGTH] ;

int  main(int argc, char *argv[] )
   {
   /*                                                  */
   /*     Variables for MQ calls                       */
   /*                                                  */
   MQHCONN Hconn;      /* Connection handle            */
   MQLONG  CompCode;   /* Completion code              */
   MQLONG  Reason;     /* Qualifying reason            */

   /* Copy the queue manager name, passed in the       */
   /* parm field, to Parm1                             */
   strncpy(Parm1,argv[1],MQ_Q_MGR_NAME_LENGTH);

   /*                                                  */
   /* Connect to the specified queue manager.          */
   /*   Test the output of the connect call.  If the   */
   /*   call fails, print an error message showing the */
   /*   completion code and reason code, then leave the */
   /*   program.                                       */
   /*                                                  */
   MQCONN(Parm1,
          &Hconn,
          &CompCode,
          &Reason);
   if ((CompCode != MQCC_OK) | (Reason != MQRC_NONE))
      {
      sprintf(pBuff, MESSAGE_4_E,
              ERROR_IN_MQCONN, CompCode, Reason);
      PrintLine(pBuff);
      RetCode = CSQ4_ERROR;
      goto AbnormalExit2;
      }
      ⋮
}
```

Disconnecting from a queue manager

This example demonstrates how to use the MQDISC call to disconnect a program from a queue manager in z/OS batch.

The variables used in this code extract are those that were set in "Connecting to a queue manager" on page 8. This extract is taken from the Browse sample application (program CSQ4BCA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
   /*                                                   */
   /*   Disconnect from the queue manager.  Test the     */
   /*   output of the disconnect call.  If the call      */
   /*   fails, print an error message showing the       */
   /*   completion code and reason code.                */
   /*                                                   */
   MQDISC(&Hconn,
          &CompCode,
          &Reason);
   if ((CompCode != MQCC_OK) || (Reason != MQRC_NONE))
      {
      sprintf(pBuff, MESSAGE_4_E,
              ERROR_IN_MQDISC, CompCode, Reason);
      PrintLine(pBuff);
      RetCode = CSQ4_ERROR;
      }
⋮
```

Creating a dynamic queue

This example demonstrates how to use the MQOPEN call to create a dynamic queue.

This extract is taken from the Mail Manager sample application (program CSQ4TCD1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
MQLONG  HCONN = 0;   /* Connection handle      */
MQHOBJ  HOBJ;        /* MailQ Object handle    */
MQHOBJ  HobjTempQ;   /* TempQ Object Handle    */
MQLONG  CompCode;    /* Completion code        */
MQLONG  Reason;      /* Qualifying reason      */
MQOD    ObjDesc = {MQOD_DEFAULT};
                     /* Object descriptor      */
MQLONG  OpenOptions; /* Options control MQOPEN */

   /*---------------------------------------- */
   /* Initialize the Object Descriptor (MQOD)  */
   /* control block.  (The remaining fields    */
   /* are already initialized.)                */
   /*-----------------------------------------*/
   strncpy( ObjDesc.ObjectName,
            SYSTEM_REPLY_MODEL,
            MQ_Q_NAME_LENGTH );
   strncpy( ObjDesc.DynamicQName,
            SYSTEM_REPLY_INITIAL,
            MQ_Q_NAME_LENGTH );
   OpenOptions = MQOO_INPUT_AS_Q_DEF;
   /*-----------------------------------------*/
   /* Open the model queue and, therefore,     */
   /* create and open a temporary dynamic      */
   /* queue                                    */
   /*-----------------------------------------*/
   MQOPEN( HCONN,
           &ObjDesc,
           OpenOptions,
           &HobjTempQ,
           &CompCode,
           &Reason );
   if ( CompCode == MQCC_OK ) {

   }
   else {
      /*-------------------------------------*/
```

```
      /* Build an error message to report the  */
      /* failure of the opening of the model   */
      /* queue                                 */
      /*-------------------------------------*/
      MQMErrorHandling( "OPEN TEMPQ", CompCode,
                        Reason );
      ErrorFound = TRUE;
   }
   return ErrorFound;
}
⋮
```

Opening an existing queue

This example demonstrates how to use the MQOPEN call to open a queue that has already been defined.

This extract is taken from the Browse sample application (program CSQ4BCA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
#include <cmqc.h>
⋮
static char Parm1[MQ_Q_MGR_NAME_LENGTH];
⋮
int  main(int argc, char *argv[] )
   {
   /*
   /*     Variables for MQ calls                         */
   /*
   MQHCONN Hconn ;            /* Connection handle       */
   MQLONG  CompCode;          /* Completion code         */
   MQLONG  Reason;            /* Qualifying reason       */
   MQOD    ObjDesc = { MQOD_DEFAULT };
                              /* Object descriptor       */
   MQLONG  OpenOptions;       /* Options that control    */
                              /*  the MQOPEN call        */
   MQHOBJ  Hobj;              /* Object handle           */
   ⋮
   /*  Copy the queue name, passed in the parm field,    */
   /*  to Parm2 strncpy(Parm2,argv[2],         */
   /*  MQ_Q_NAME_LENGTH);                                */
   ⋮
   /*                                                    */
   /*  Initialize the object descriptor (MQOD) control   */
   /*  block.  (The initialization default sets StrucId, */
   /*  Version, ObjectType, ObjectQMgrName,              */
   /*  DynamicQName, and AlternateUserid fields)         */
   /*                                                    */
   strncpy(ObjDesc.ObjectName,Parm2,MQ_Q_NAME_LENGTH);
   ⋮
   /*  Initialize the other fields required for the open */
   /*  call (Hobj is set by the MQCONN call).            */
   /*                                                    */
   OpenOptions  = MQOO_BROWSE;
   ⋮
   /*                                                    */
   /* Open the queue.                                    */
   /*   Test the output of the open call.  If the call   */
   /*   fails, print an error message showing the        */
   /*   completion code and reason code, then bypass     */
   /*   processing, disconnect and leave the program.    */
   /*                                                    */
   MQOPEN(Hconn,
          &ObjDesc,
          OpenOptions,
          &Hobj,
          &CompCode,
          &Reason);
```

```
   if ((CompCode != MQCC_OK) || (Reason != MQRC_NONE))
      {
      sprintf(pBuff, MESSAGE_4_E,
              ERROR_IN_MQOPEN, CompCode, Reason);
      PrintLine(pBuff);
      RetCode = CSQ4_ERROR;
      goto AbnormalExit1;       /* disconnect processing */
```

```
        }
    :
    } /* end of main */
```

Closing a queue

This example demonstrates how to use the MQCLOSE call to close a queue.

This extract is taken from the Browse sample application (program CSQ4BCA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
:
   /*                                                     */
   /*   Close the queue.                                  */
   /*   Test the output of the close call.  If the call   */
   /*   fails, print an error message showing the         */
   /*   completion code and reason code.                  */
   /*                                                     */
   MQCLOSE(Hconn,
           &Hobj,
           MQCO_NONE,
           &CompCode,
           &Reason);
   if ((CompCode != MQCC_OK) || (Reason != MQRC_NONE))
      {
      sprintf(pBuff, MESSAGE_4_E,
              ERROR_IN_MQCLOSE, CompCode, Reason);
      PrintLine(pBuff);
      RetCode = CSQ4_ERROR;
      }
:
```

Putting a message using MQPUT

This example demonstrates how to use the MQPUT call to put a message on a queue.

This extract is not taken from the sample applications supplied with IBM MQ. For the names and locations of the sample applications, see Sample procedural programs (platforms except z/OS) z/OS and Sample programs for IBM MQ for z/OS .

```
:
qput()
{
     MQMD    MsgDesc;
     MQPMO   PutMsgOpts;
     MQLONG  CompCode;
     MQLONG  Reason;
     MQHCONN Hconn;
     MQHOBJ  Hobj;
     char message_buffer[] = "MY MESSAGE";
    /*-------------------------------*/
    /*  Set up PMO structure.        */
    /*-------------------------------*/
     memset(&PutMsgOpts, '\0', sizeof(PutMsgOpts));
     memcpy(PutMsgOpts.StrucId, MQPMO_STRUC_ID,
            sizeof(PutMsgOpts.StrucId));
     PutMsgOpts.Version = MQPMO_VERSION_1;
     PutMsgOpts.Options = MQPMO_SYNCPOINT;

    /*-------------------------------*/
    /*  Set up MD structure.         */
    /*-------------------------------*/
    memset(&MsgDesc, '\0', sizeof(MsgDesc));
    memcpy(MsgDesc.StrucId, MQMD_STRUC_ID,
           sizeof(MsgDesc.StrucId));
    MsgDesc.Version     =  MQMD_VERSION_1;
    MsgDesc.Expiry      =  MQEI_UNLIMITED;
    MsgDesc.Report      =  MQRO_NONE;
    MsgDesc.MsgType     =  MQMT_DATAGRAM;
    MsgDesc.Priority    = 1;
    MsgDesc.Persistence = MQPER_PERSISTENT;
    memset(MsgDesc.ReplyToQ,
           '\0',
```

```
            sizeof(MsgDesc.ReplyToQ));
    /*-------------------------------------------------*/
    /*  Put the message.                                */
    /*-------------------------------------------------*/
    MQPUT(Hconn, Hobj, &MsgDesc, &PutMsgOpts,
          sizeof(message_buffer), message_buffer,
          &CompCode, &Reason);
```

```
    /*-------------------------------------*/
    /*  Check completion and reason codes. */
    /*-------------------------------------*/
    switch (CompCode)
        {
         case MQCC_OK:
             break;
         case MQCC_FAILED:
             switch (Reason)
                 {
                  case MQRC_Q_FULL:
                  case MQRC_MSG_TOO_BIG_FOR_Q:
                      break;
                  default:
                      break; /* Perform error processing */
                  }
             break;
         default:
             break;          /* Perform error processing */
        }
}
```

Putting a message using MQPUT1

This example demonstrates how to use the MQPUT1 call to open a queue, put a single message on the queue, then close the queue.

This extract is taken from the Credit Check sample application (program CSQ4CCB5) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
MQLONG   Hconn;              /* Connection handle        */
MQHOBJ   Hobj_CheckQ;        /* Object handle            */
MQLONG   CompCode;           /* Completion code          */
MQLONG   Reason;             /* Qualifying reason        */
MQOD     ObjDesc    = {MQOD_DEFAULT};
                             /* Object descriptor        */
MQMD     MsgDesc    = {MQMD_DEFAULT};
                             /* Message descriptor       */
MQLONG   OpenOptions;        /* Control the MQOPEN call  */

MQGMO    GetMsgOpts = {MQGMO_DEFAULT};
                             /* Get Message Options      */
MQLONG   MsgBuffLen;         /* Length of message buffer */
CSQ4BCAQ MsgBuffer;          /* Message structure        */
MQLONG   DataLen;            /* Length of message        */

MQPMO    PutMsgOpts = {MQPMO_DEFAULT};
                             /* Put Message Options      */
CSQ4BQRM PutBuffer;          /* Message structure        */
MQLONG   PutBuffLen = sizeof(PutBuffer);
                             /* Length of message buffer */
⋮
```

```
void Process_Query(void)
   {
   /*                                                    */
   /* Build the reply message                            */
   /*                                                    */
   ⋮
   /*                                                    */
   /* Set the object descriptor, message descriptor and  */
   /* put message options to the values required to      */
   /* create the reply message.                          */
   /*                                                    */
```

```
   strncpy(ObjDesc.ObjectName, MsgDesc.ReplyToQ,
           MQ_Q_NAME_LENGTH);
   strncpy(ObjDesc.ObjectQMgrName, MsgDesc.ReplyToQMgr,
           MQ_Q_MGR_NAME_LENGTH);
   MsgDesc.MsgType = MQMT_REPLY;
   MsgDesc.Report  = MQRO_NONE;
   memset(MsgDesc.ReplyToQ, ' ', MQ_Q_NAME_LENGTH);
   memset(MsgDesc.ReplyToQMgr, ' ', MQ_Q_MGR_NAME_LENGTH);
   memcpy(MsgDesc.MsgId, MQMI_NONE, sizeof(MsgDesc.MsgId));
   PutMsgOpts.Options = MQPMO_SYNCPOINT +
                        MQPMO_PASS_IDENTITY_CONTEXT;
   PutMsgOpts.Context = Hobj_CheckQ;
   PutBuffLen = sizeof(PutBuffer);
   MQPUT1(Hconn,
          &ObjDesc,
          &MsgDesc,
          &PutMsgOpts,
          PutBuffLen,
          &PutBuffer,
          &CompCode,
          &Reason);

   if (CompCode != MQCC_OK)
      {
      strncpy(TS_Operation, "MQPUT1",
              sizeof(TS_Operation));
      strncpy(TS_ObjName, ObjDesc.ObjectName,
              MQ_Q_NAME_LENGTH);
      Record_Call_Error();
      Forward_Msg_To_DLQ();
      }
   return;
   }
   ⋮
```

Getting a message

This example demonstrates how to use the MQGET call to remove a message from a queue.

This extract is taken from the Browse sample application (program CSQ4BCA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
#include "cmqc.h"
⋮
#define BUFFERLENGTH 80
⋮
int main(int argc, char *argv[] )
   {
   /*                                                    */
   /*     Variables for MQ calls                         */
   /*                                                    */
   MQHCONN Hconn ;             /* Connection handle       */
   MQLONG  CompCode;           /* Completion code         */
   MQLONG  Reason;             /* Qualifying reason       */
   MQHOBJ  Hobj;               /* Object handle           */
   MQMD    MsgDesc  = { MQMD_DEFAULT };
                               /* Message descriptor      */
   MQLONG  DataLength ;        /* Length of the message   */
   MQCHAR  Buffer[BUFFERLENGTH+1];
                               /* Area for message data   */
   MQGMO   GetMsgOpts = { MQGMO_DEFAULT };
                               /* Options which control   */
                               /*  the MQGET call         */
   MQLONG  BufferLength = BUFFERLENGTH ;
                               /* Length of buffer        */
   ⋮
   /*     No need to change the message descriptor       */
   /*     (MQMD) control block because initialization    */
   /*     default sets all the fields.                   */
   /*                                                    */
   /*     Initialize the get message options (MQGMO)     */
   /*     control block (the copy file initializes all   */
   /*     the other fields).                             */
   /*                                                    */
   GetMsgOpts.Options = MQGMO_NO_WAIT      +
                        MQGMO_BROWSE_FIRST +
                        MQGMO_ACCEPT_TRUNCATED_MSG;
```

```
   /*                                                    */
   /* Get the first message.                             */
   /*   Test for the output of the call is carried out   */
   /*   in the 'for' loop.                               */
   /*                                                    */
   MQGET(Hconn,
         Hobj,
         &MsgDesc,
         &GetMsgOpts,
         BufferLength,
         Buffer,
         &DataLength,
         &CompCode,
         &Reason);
```

```
   /*                                                    */
   /* Process the message and get the next message,      */
   /* until no messages remaining.                       */
   ⋮
   /*     If the call fails for any other reason,        */
   /*     print an error message showing the completion  */
   /*     code and reason code.                          */
   /*                                                    */
   if ( (CompCode == MQCC_FAILED) &&
        (Reason   == MQRC_NO_MSG_AVAILABLE) )
      {
      ⋮
      }
   else
      {
      sprintf(pBuff, MESSAGE_4_E,
              ERROR_IN_MQGET, CompCode, Reason);
      PrintLine(pBuff);
      RetCode = CSQ4_ERROR;
      }
      ⋮
   } /* end of main */
```

Getting a message using the wait option

This example demonstrates how to use the wait option of the MQGET call.

This code accepts truncated messages. This extract is taken from the Credit Check sample application (program CSQ4CCB5) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
MQLONG   Hconn;             /* Connection handle        */
MQHOBJ   Hobj_CheckQ;       /* Object handle            */
MQLONG   CompCode;          /* Completion code          */
MQLONG   Reason;            /* Qualifying reason        */
MQOD     ObjDesc    = {MQOD_DEFAULT};
                            /* Object descriptor        */
MQMD     MsgDesc    = {MQMD_DEFAULT};
                            /* Message descriptor       */
MQLONG   OpenOptions;
                            /* Control the MQOPEN call  */
MQGMO    GetMsgOpts = {MQGMO_DEFAULT};
                            /* Get Message Options      */
MQLONG   MsgBuffLen;        /* Length of message buffer */
CSQ4BCAQ MsgBuffer;         /* Message structure        */
MQLONG   DataLen;           /* Length of message        */
```

```
⋮
void main(void)
   {
   ⋮
   /*                                                    */
   /* Initialize options and open the queue for input    */
   /*                                                    */
   ⋮
      /*                                                 */
      /* Get and process messages                        */
      /*                                                 */
```

```
       GetMsgOpts.Options = MQGMO_WAIT +
                            MQGMO_ACCEPT_TRUNCATED_MSG +
                            MQGMO_SYNCPOINT;
       GetMsgOpts.WaitInterval = WAIT_INTERVAL;
       MsgBuffLen = sizeof(MsgBuffer);
       memcpy(MsgDesc.MsgId, MQMI_NONE,
              sizeof(MsgDesc.MsgId));
       memcpy(MsgDesc.CorrelId, MQCI_NONE,
              sizeof(MsgDesc.CorrelId));
       /*                                                 */
       /* Make the first MQGET call outside the loop      */
       /*                                                 */
       MQGET(Hconn,
             Hobj_CheckQ,
             &MsgDesc,
             &GetMsgOpts,
             MsgBuffLen,
             &MsgBuffer,
             &DataLen,
             &CompCode,
             &Reason);
       ⋮
       /*                                                 */
       /* Test the output of the MQGET call.  If the call */
       /* failed, send an error message showing the       */
       /* completion code and reason code, unless the     */
       /* reason code is NO_MSG AVAILABLE.                */
       /*                                                 */
       if (Reason != MQRC_NO_MSG_AVAILABLE)
          {
          strncpy(TS_Operation, "MQGET", sizeof(TS_Operation));
          strncpy(TS_ObjName, ObjDesc.ObjectName,
                  MQ_Q_NAME_LENGTH);
          Record_Call_Error();
          }
          ⋮
```

Getting a message using signaling

Signaling is available only with IBM MQ for z/OS .

This example demonstrates how to use the MQGET call to set a signal so that you are notified when a suitable message arrives on a queue. This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
get_set_signal()
{
     MQMD    MsgDesc;
     MQGMO   GetMsgOpts;
     MQLONG  CompCode;
     MQLONG  Reason;
     MQHCONN Hconn;
     MQHOBJ  Hobj;
     MQLONG  BufferLength;
     MQLONG  DataLength;
     char message_buffer[100];
     long  int q_ecb, work_ecb;
     short int signal_sw, endloop;
     long  int mask = 255;

     /*---------------------------*/
     /*  Set up GMO structure.    */
     /*---------------------------*/
     memset(&GetMsgOpts,'\0',sizeof(GetMsgOpts));
     memcpy(GetMsgOpts.StrucId, MQGMO_STRUC_ID,
            sizeof(GetMsgOpts.StrucId));
     GetMsgOpts.Version      = MQGMO_VERSION_1;
     GetMsgOpts.WaitInterval = 1000;
     GetMsgOpts.Options      = MQGMO_SET_SIGNAL +
                               MQGMO_BROWSE_FIRST;
     q_ecb             = 0;
     GetMsgOpts.Signal1      = &q_ecb;
     /*---------------------------*/
     /*  Set up MD structure.     */
     /*---------------------------*/
     memset(&MsgDesc,'\0',sizeof(MsgDesc));
     memcpy(MsgDesc.StrucId, MQMD_STRUC_ID,
```

```
        sizeof(MsgDesc.StrucId);
 MsgDesc.Version  = MQMD_VERSION_1;
 MsgDesc.Report   = MQRO_NONE;
 memcpy(MsgDesc.MsgId,MQMI_NONE,
        sizeof(MsgDesc.MsgId));
 memcpy(MsgDesc.CorrelId,MQCI_NONE,
        sizeof(MsgDesc.CorrelId));
```

```
/*-------------------------------------------------------*/
/*  Issue the MQGET call.                                */
/*-------------------------------------------------------*/
 BufferLength = sizeof(message_buffer);
 signal_sw   = 0;

 MQGET(Hconn, Hobj, &MsgDesc, &GetMsgOpts,
       BufferLength, message_buffer, &DataLength,
       &CompCode, &Reason);
/*------------------------------------*/
/*  Check completion and reason codes. */
/*------------------------------------*/
 switch (CompCode)
     {
      case (MQCC_OK):          /* Message retrieved  */
          break;
      case (MQCC_WARNING):
          switch (Reason)
          {
           case (MQRC_SIGNAL_REQUEST_ACCEPTED):
               signal_sw = 1;
               break;
           default:
               break;   /* Perform error processing  */
          }
          break;
      case (MQCC_FAILED):
          switch (Reason)
          {
           case (MQRC_Q_MGR_NOT_AVAILABLE):
           case (MQRC_CONNECTION_BROKEN):
           case (MQRC_Q_MGR_STOPPING):
               break;
           default:
               break;  /* Perform error processing.  */
          }
          break;
      default:
          break;       /* Perform error processing.  */
     }
/*-------------------------------------------------------*/
/* If the SET_SIGNAL was accepted, set up a loop to  */
/* check whether a message has arrived at one second */
/* intervals. The loop ends if a message arrives or  */
/* the wait interval specified in the MQGMO          */
/* structure has expired.                            */
/*                                                   */
/* If a message arrives on the queue, another MQGET  */
/* must be issued to retrieve the message. If other  */
/* MQM calls have been made in the intervening       */
/* period, this may necessitate reinitializing the   */
/* MQMD and MQGMO structures.                        */
/* In this code, no intervening calls                */
/* have been made, so the only change required to    */
/* the structures is to specify MQGMO_NO_WAIT,       */
/* since we now know the message is there.           */
/*                                                   */
/* This code uses the EXEC CICS DELAY command to     */
/* suspend the program for a second. A batch program */
/* may achieve the same effect by calling an         */
/* assembler language subroutine which issues a      */
/* z/OS STIMER macro.                                */
/*-------------------------------------------------------*/
```

```
if (signal_sw == 1)
   {
    endloop = 0;
    do
      {
       EXEC CICS DELAY FOR HOURS(0) MINUTES(0) SECONDS(1);
```

```
            work_ecb = q_ecb & mask;
            switch (work_ecb)
                {
                 case (MQEC_MSG_ARRIVED):
                     endloop = 1;
                     mqgmo_options = MQGMO_NO_WAIT;
                     MQGET(Hconn, Hobj, &MsgDesc, &GetMsgOpts,
                           BufferLength, message_buffer,
                           &DataLength, &CompCode, &Reason);
                     if (CompCode != MQCC_OK)
                         ;          /* Perform error processing. */
                     break;
                 case (MQEC_WAIT_INTERVAL_EXPIRED):
                 case (MQEC_WAIT_CANCELED):
                     endloop = 1;
                     break;
                 default:
                     break;
                }
           } while (endloop == 0);
        }
     return;
}
```

Inquiring about the attributes of an object

This example demonstrates how to use the MQINQ call to inquire about the attributes of a queue.

This extract is taken from the Queue Attributes sample application (program CSQ4CCC1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
#include <cmqc.h>      /* MQ API header file       */
⋮
#define NUMBEROFSELECTORS  2

const MQHCONN Hconn = MQHC_DEF_HCONN;
⋮
static void InquireGetAndPut(char   *Message,
                             PMQHOBJ pHobj,
                             char   *Object)
```

```
   {
   /*      Declare local variables                       */
   /*                                                    */
   MQLONG  SelectorCount = NUMBEROFSELECTORS;
                                 /* Number of selectors  */
   MQLONG  IntAttrCount  = NUMBEROFSELECTORS;
                                 /* Number of int attrs  */
   MQLONG  CharAttrLength = 0;
                     /* Length of char attribute buffer  */
   MQCHAR *CharAttrs ;
                     /* Character attribute buffer       */
   MQLONG  SelectorsTable[NUMBEROFSELECTORS];
                                 /* attribute selectors  */
   MQLONG  IntAttrsTable[NUMBEROFSELECTORS];
                                 /* integer attributes   */
   MQLONG  CompCode;             /* Completion code      */
   MQLONG  Reason;               /* Qualifying reason    */
   /*                                                    */
   /*     Open the queue.  If successful, do the inquire */
   /*     call.                                          */
   /*                                                    */
      /*                                                 */
      /*   Initialize the variables for the inquire      */
      /*   call:                                         */
      /*    - Set SelectorsTable to the attributes whose */
      /*      status is                                  */
      /*       required                                  */
      /*    - All other variables are already set        */
      /*                                                 */
      SelectorsTable[0] = MQIA_INHIBIT_GET;
      SelectorsTable[1] = MQIA_INHIBIT_PUT;
      /*                                                 */
      /*   Issue the inquire call                        */
      /*     Test the output of the inquire call. If the */
```

```
       /*     call failed, display an error message       */
       /*     showing the completion code and reason code,*/
       /*     otherwise display the status of the         */
       /*     INHIBIT-GET and INHIBIT-PUT attributes      */
       /*                                                 */
       MQINQ(Hconn,
             *pHobj,
             SelectorCount,
             SelectorsTable,
             IntAttrCount,
             IntAttrsTable,
             CharAttrLength,
             CharAttrs,
             &CompCode,
             &Reason);
       if (CompCode != MQCC_OK)
          {
          sprintf(Message, MESSAGE_4_E,
                  ERROR_IN_MQINQ, CompCode, Reason);
          SetMsg(Message);
          }
       else
          {
            /* Process the changes */
          } /* end if CompCode */
```

Setting the attributes of a queue

This example demonstrates how to use the MQSET call to change the attributes of a queue.

This extract is taken from the Queue Attributes sample application (program CSQ4CCC1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
#include <cmqc.h>      /* MQ API header file      */
⋮
#define NUMBEROFSELECTORS  2

const MQHCONN Hconn = MQHC_DEF_HCONN;

static void InhibitGetAndPut(char   *Message,
                             PMQHOBJ pHobj,
                             char   *Object)
   {
   /*                                                     */
   /*      Declare local variables                        */
   /*                                                     */
   MQLONG  SelectorCount = NUMBEROFSELECTORS;
                              /* Number of selectors  */
   MQLONG  IntAttrCount  = NUMBEROFSELECTORS;
                              /* Number of int attrs  */
   MQLONG  CharAttrLength = 0;
                  /* Length of char attribute buffer  */
   MQCHAR *CharAttrs ;
                  /* Character attribute buffer       */
   MQLONG  SelectorsTable[NUMBEROFSELECTORS];
                              /* attribute selectors  */
   MQLONG  IntAttrsTable[NUMBEROFSELECTORS];
                              /* integer attributes   */
   MQLONG  CompCode;          /* Completion code      */
   MQLONG  Reason;            /* Qualifying reason    */
   ⋮
   /*                                                     */
   /*     Open the queue.  If successful, do the          */
   /*     inquire call.                                   */
   /*                                                     */
   ⋮
      /*                                                  */
      /*   Initialize the variables for the set call:    */
      /*    - Set SelectorsTable to the attributes to be */
      /*      set                                         */
      /*    - Set IntAttrsTable to the required status   */
      /*    - All other variables are already set        */
      /*                                                  */
      SelectorsTable[0] = MQIA_INHIBIT_GET;
      SelectorsTable[1] = MQIA_INHIBIT_PUT;
      IntAttrsTable[0]  = MQQA_GET_INHIBITED;
```

```
    IntAttrsTable[1]  = MQQA_PUT_INHIBITED;
    ⋮
```

```
    /*                                                */
    /*   Issue the set call.                          */
    /*     Test the output of the set call.  If the   */
    /*     call fails, display an error message       */
    /*     showing the completion code and reason     */
    /*     code; otherwise move INHIBITED to the      */
    /*     relevant screen map fields                 */
    /*                                                */
    MQSET(Hconn,
          *pHobj,
          SelectorCount,
          SelectorsTable,
          IntAttrCount,
          IntAttrsTable,
          CharAttrLength,
          CharAttrs,
          &CompCode,
          &Reason);
    if (CompCode != MQCC_OK)
       {
       sprintf(Message, MESSAGE_4_E,
               ERROR_IN_MQSET, CompCode, Reason);
       SetMsg(Message);
       }
    else
       {
         /* Process the changes */
       } /* end if CompCode */
```

Retrieving status information with MQSTAT

This example demonstrates how to issue an asynchronous MQPUT and retrieve the status information with MQSTAT.

This extract is taken from the Calling MQSTAT sample application (program amqsapt0) supplied with IBM MQ for Windows systems. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
/********************************************************************/
/*                                                                  */
/* Program name: AMQSAPT0                                           */
/*                                                                  */
/* Description: Sample C program that asynchronously puts messages  */
/*              to a message queue (example using MQPUT & MQSTAT).  */
/*                                                                  */
/* Licensed Materials - Property of IBM                             */
/*                                                                  */
/* 63H9336                                                          */
/* (c) Copyright IBM Corp. 2006, 2024. All Rights Reserved.         */
/*                                                                  */
/* US Government Users Restricted Rights - Use, duplication or      */
/* disclosure restricted by GSA ADP Schedule Contract with          */
/* IBM Corp.                                                        */
/*                                                                  */
/********************************************************************/
/*                                                                  */
/* Function:                                                        */
/*                                                                  */
/*   AMQSAPT0 is a sample C program to put messages on a message    */
/*   queue with asynchronous response option, querying the success  */
/*   of the put operations with MQSTAT.                             */
/*                                                                  */
/*      -- messages are sent to the queue named by the parameter    */
/*                                                                  */
/*      -- gets lines from StdIn, and adds each to target           */
/*         queue, taking each line of text as the content           */
/*         of a datagram message; the sample stops when a null      */
/*         line (or EOF) is read.                                   */
/*         New-line characters are removed.                         */
/*         If a line is longer than 99 characters it is broken up   */
/*         into 99-character pieces. Each piece becomes the         */
/*         content of a datagram message.                           */
/*         If the length of a line is a multiple of 99 plus 1, for  */
```

```
/*         example, 199, the last piece will only contain a         */
/*         new-line character so will terminate the input.          */
/*                                                                  */
/*      -- writes a message for each MQI reason other than          */
/*         MQRC_NONE; stops if there is a MQI completion code       */
/*         of MQCC_FAILED                                           */
/*                                                                  */
/*      -- summarizes the overall success of the put operations     */
/*         through a call to MQSTAT to query MQSTAT_TYPE_ASYNC_ERROR*/
/*                                                                  */
/*    Program logic:                                                */
/*         MQOPEN target queue for OUTPUT                           */
/*         while end of input file not reached,                     */
/*         .  read next line of text                                */
/*         .  MQPUT datagram message with text line as data         */
/*         MQCLOSE target queue                                     */
/*         MQSTAT connection                                        */
/*                                                                  */
/*                                                                  */
/********************************************************************/
/*                                                                  */
/*   AMQSAPT0 has the following parameters                          */
/*       required:                                                  */
/*                 (1) The name of the target queue                 */
/*       optional:                                                  */
/*                 (2) Queue manager name                           */
/*                 (3) The open options                             */
/*                 (4) The close options                            */
/*                 (5) The name of the target queue manager         */
/*                 (6) The name of the dynamic queue                */
/*                                                                  */
/********************************************************************/
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
   /* includes for MQI */
#include <cmqc.h>

int main(int argc, char **argv)
{
  /*  Declare file and character for sample input                   */
  FILE *fp;

  /*   Declare MQI structures needed                                */
  MQOD     od = {MQOD_DEFAULT};    /* Object Descriptor             */
  MQMD     md = {MQMD_DEFAULT};    /* Message Descriptor            */
  MQPMO   pmo = {MQPMO_DEFAULT};   /* put message options           */
  MQSTS   sts = {MQSTS_DEFAULT};   /* status information            */
     /** note, sample uses defaults where it can **/
  MQHCONN  Hcon;                   /* connection handle             */
  MQHOBJ   Hobj;                   /* object handle                 */
  MQLONG   O_options;              /* MQOPEN options                */
  MQLONG   C_options;              /* MQCLOSE options               */
  MQLONG   CompCode;               /* completion code               */
  MQLONG   OpenCode;               /* MQOPEN completion code        */
  MQLONG   Reason;                 /* reason code                   */
  MQLONG   CReason;                /* reason code for MQCONN        */
  MQLONG   messlen;                /* message length                */
  char     buffer[100];            /* message buffer                */
  char     QMName[50];             /* queue manager name            */

  printf("Sample AMQSAPT0 start\n");
  if (argc < 2)
  {
    printf("Required parameter missing - queue name\n");
    exit(99);
  }

  /******************************************************************/
  /*                                                                */
  /*   Connect to queue manager                                     */
  /*                                                                */
  /******************************************************************/
  QMName[0] = 0;    /* default */
  if (argc > 2)
    strcpy(QMName, argv[2]);
  MQCONN(QMName,                  /* queue manager                  */
         &Hcon,                   /* connection handle              */
         &Compcode,               /* completion code                */
         &Reason);                /* reason code                    */
  /* report reason and stop if it failed     */
  if (CompCode == MQCC_FAILED)
```

```
  {
    printf("MQCONN ended with reason code %d\n", CReason);
    exit( (int)CReason );
  }

  /******************************************************************/
  /*                                                                */
  /*   Use parameter as the name of the target queue                */
  /*                                                                */
  /******************************************************************/
  strncpy(od.ObjectName, argv[1], (size_t)MQ_Q_NAME_LENGTH);
  printf("target queue is %s\n", od.ObjectName);

  if (argc > 5)
  {
    strncpy(od.ObjectQMgrName, argv[5], (size_t) MQ_Q_MGR_NAME_LENGTH);
    printf("target queue manager is %s\n", od.ObjectQMgrName);
  }

  if (argc > 6)
  {
    strncpy(od.DynamicQName, argv[6], (size_t) MQ_Q_NAME_LENGTH);
    printf("dynamic queue name is %s\n", od.DynamicQName);
  }

  /******************************************************************/
  /*                                                                */
  /*   Open the target message queue for output                     */
  /*                                                                */
  /******************************************************************/
  if (argc > 3)
  {
    O_options = atoi( argv[3] );
    printf("open  options are %d\n", O_options);
  }
  else
  {
    O_options = MQOO_OUTPUT            /* open queue for output     */
              | MQOO_FAIL_IF_QUIESCING /* but not if MQM stopping   */
              ;                        /* = 0x2010 = 8208 decimal   */
  }

  MQOPEN(Hcon,                      /* connection handle            */
         &od,                       /* object descriptor for queue  */
         O_options,                 /* open options                 */
         &Hobj,                     /* object handle                */
         &OpenCode,                 /* MQOPEN completion code       */
         &Reason);                  /* reason code                  */

  /* report reason, if any; stop if failed      */
  if (Reason != MQRC_NONE)
  {
    printf("MQOPEN ended with reason code %d\n", Reason);
  }

  if (OpenCode == MQCC_FAILED)
  {
    printf("unable to open queue for output\n");
  }

  /******************************************************************/
  /*                                                                */
  /*   Read lines from the file and put them to the message queue   */
  /*   Loop until null line or end of file, or there is a failure   */
  /*                                                                */
  /******************************************************************/
  CompCode = OpenCode;        /* use MQOPEN result for initial test */
  fp = stdin;

  memcpy(md.Format,           /* character string format            */
         MQFMT_STRING, (size_t)MQ_FORMAT_LENGTH);

  /******************************************************************/
  /* These options specify that put operation should occur          */
  /* asynchronously and the application will check the success      */
  /* using MQSTAT at a later time.                                  */
  /******************************************************************/
  md.Persistence = MQPER_NOT_PERSISTENT;
  pmo.Options |= MQPMO_ASYNC_RESPONSE;

  /******************************************************************/
  /* These options cause the MsgId and CorrelId to be replaced, so  */
```

```
/* that there is no need to reset them before each MQPUT          */
/******************************************************************/
pmo.Options |= MQPMO_NEW_MSG_ID;
pmo.Options |= MQPMO_NEW_CORREL_ID;

while (CompCode != MQCC_FAILED)
{
  if (fgets(buffer, sizeof(buffer), fp) != NULL)
  {
    messlen = (MQLONG)strlen(buffer); /* length without null      */
    if (buffer[messlen-1] == '\n')  /* last char is a new-line    */
    {
      buffer[messlen-1]  = '\0';    /* replace new-line with null */
      --messlen;                    /* reduce buffer length       */
    }
  }
  else messlen = 0;        /* treat EOF same as null line         */

  /****************************************************************/
  /*                                                              */
  /*   Put each buffer to the message queue                       */
  /*                                                              */
  /****************************************************************/
  if (messlen > 0)
  {
    MQPUT(Hcon,                /* connection handle               */
          Hobj,                /* object handle                   */
          &md,                 /* message descriptor              */
          &pmo,                /* default options (datagram)      */
          messlen,             /* message length                  */
          buffer,              /* message buffer                  */
          &CompCode,           /* completion code                 */
          &Reason);            /* reason code                     */

    /* report reason, if any */
    if (Reason != MQRC_NONE)
    {
      printf("MQPUT ended with reason code %d\n", Reason);
    }
  }
  else   /* satisfy end condition when empty line is read */
    CompCode = MQCC_FAILED;
}

/******************************************************************/
/*                                                                */
/*   Close the target queue (if it was opened)                    */
/*                                                                */
/******************************************************************/
if (OpenCode != MQCC_FAILED)
{
  if (argc > 4)
  {
    C_options = atoi( argv[4] );
    printf("close options are %d\n", C_options);
  }
  else
  {
    C_options = MQCO_NONE;        /* no close options             */
  }

  MQCLOSE(Hcon,                   /* connection handle            */
          &Hobj,                  /* object handle                */
          C_options,
          &CompCode,              /* completion code              */
          &Reason);               /* reason code                  */

  /* report reason, if any     */
  if (Reason != MQRC_NONE)
  {
    printf("MQCLOSE ended with reason code %d\n", Reason);
  }
}

/******************************************************************/
/*                                                                */
/*   Query how many asynchronous puts succeeded                   */
/*                                                                */
/******************************************************************/
MQSTAT(&Hcon,                    /* connection handle           */
       MQSTAT_TYPE_ASYNC_ERROR, /* status type                 */
       &Sts,                    /* MQSTS structure             */
```

```
          &CompCode,               /* completion code              */
          &Reason);                /* reason code                  */

   /* report reason, if any     */
   if (Reason != MQRC_NONE)
   {
     printf("MQSTAT ended with reason code %d\n", Reason);
   }
   else
   {
     /* Display results */
     printf("Succeeded putting %d messages\n",
            sts.PutSuccessCount);
     printf("%d messages were put with a warning\n",
            sts.PutWarningCount);
     printf("Failed to put %d messages\n",
            sts.PutFailureCount);

     if(sts.CompCode == MQCC_WARNING)
     {
       printf("The first warning that occurred had reason code %d\n",
              sts.Reason);
     }
     else if(sts.CompCode == MQCC_FAILED)
     {
       printf("The first error that occurred had reason code %d\n",
              sts.Reason);
     }
   }

   /******************************************************************/
   /*                                                                */
   /*   Disconnect from MQM if not already connected                 */
   /*                                                                */
   /******************************************************************/
   if (CReason != MQRC_ALREADY_CONNECTED)
   {
     MQDISC(&Hcon,                   /* connection handle            */
            &CompCode,               /* completion code              */
            &Reason);                /* reason code                  */

     /* report reason, if any     */
     if (Reason != MQRC_NONE)
     {
       printf("MQDISC ended with reason code %d\n", Reason);
     }
   }

   /******************************************************************/
   /*                                                                */
   /* END OF AMQSAPT0                                                */
   /*                                                                */
   /******************************************************************/
   printf("Sample AMQSAPT0 end\n");
   return(0);
 }
```

COBOL examples

This collection of topics is taken from the IBM MQ for z/OS sample applications. They are applicable to all platforms, except where noted.

Connecting to a queue manager

This example demonstrates how to use the MQCONN call to connect a program to a queue manager in z/OS batch.

This extract is taken from the Browse sample application (program CSQ4BVA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
* -------------------------------------------------------*
WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*    W02 - Data fields derived from the PARM field
 01  W02-MQM                     PIC X(48) VALUE SPACES.
```

```
*    W03 - MQM API fields
 01  W03-HCONN                   PIC S9(9) BINARY.
 01  W03-COMPCODE                PIC S9(9) BINARY.
 01  W03-REASON                  PIC S9(9) BINARY.
*
*    MQV contains constants (for filling in the control
*    blocks)
*    and return codes (for testing the result of a call)
*
 01  W05-MQM-CONSTANTS.
 COPY CMQV SUPPRESS.
 ⋮
*    Separate into the relevant fields any data passed
*    in the PARM statement
*
     UNSTRING PARM-STRING DELIMITED BY ALL ','
                            INTO W02-MQM
                                 W02-OBJECT.
     ⋮
*    Connect to the specified queue manager.
*
     CALL 'MQCONN' USING W02-MQM
                         W03-HCONN
                         W03-COMPCODE
                         W03-REASON.
*
*    Test the output of the connect call.  If the call
*    fails, print an error message showing the
*    completion code and reason code.
*
     IF (W03-COMPCODE NOT = MQCC-OK) THEN
     ⋮
     END-IF.
     ⋮
```

Disconnecting from a queue manager

This example demonstrates how to use the MQDISC call to disconnect a program from a queue manager in z/OS batch.

The variables used in this code extract are those that were set in "Connecting to a queue manager" on page 23. This extract is taken from the Browse sample application (program CSQ4BVA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
*
* Disconnect from the queue manager
*
     CALL 'MQDISC' USING W03-HCONN
                         W03-COMPCODE
                         W03-REASON.
*
*    Test the output of the disconnect call.  If the
*    call fails, print an error message showing the
*    completion code and reason code.
*
     IF (W03-COMPCODE NOT = MQCC-OK) THEN
⋮
           END-IF.
⋮
```

Creating a dynamic queue

This example demonstrates how to use the MQOPEN call to create a dynamic queue.

This extract is taken from the Credit Check sample application (program CSQ4CVB1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
* -------------------------------------------------------*
WORKING-STORAGE SECTION.
* -------------------------------------------------------*
```

```
*
*    W02 - Queues processed in this program
*
 01  W02-MODEL-QNAME        PIC X(48) VALUE
     'CSQ4SAMP.B1.MODEL                          '.
 01  W02-NAME-PREFIX        PIC X(48) VALUE
     'CSQ4SAMP.B1.*                              '.
 01  W02-TEMPORARY-Q         PIC X(48).
*
*    W03 - MQM API fields
*
 01  W03-HCONN       PIC S9(9) BINARY VALUE ZERO.
 01  W03-OPTIONS     PIC S9(9) BINARY.
 01  W03-HOBJ        PIC S9(9) BINARY.
 01  W03-COMPCODE    PIC S9(9) BINARY.
 01  W03-REASON      PIC S9(9) BINARY.
*
*    API control blocks
*
 01  MQM-OBJECT-DESCRIPTOR.
     COPY CMQODV.
*
*    CMQV contains constants (for setting or testing
*    field values) and return codes (for testing the
*    result of a call)
*
 01  MQM-CONSTANTS.
 COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 PROCEDURE DIVISION.
* -------------------------------------------------------*
⋮
* -------------------------------------------------------*
 OPEN-TEMP-RESPONSE-QUEUE SECTION.
* -------------------------------------------------------*
```

```

*
*  This section creates a temporary dynamic queue
*  using a model queue
*
* -------------------------------------------------------*
*
* Change three fields in the Object Descriptor (MQOD)
* control block.  (MQODV initializes the other fields)
*
     MOVE MQOT-Q           TO MQOD-OBJECTTYPE.
     MOVE W02-MODEL-QNAME  TO MQOD-OBJECTNAME.
     MOVE W02-NAME-PREFIX  TO MQOD-DYNAMICQNAME.
*
     COMPUTE W03-OPTIONS = MQOO-INPUT-EXCLUSIVE.
*
     CALL 'MQOPEN' USING W03-HCONN
                         MQOD
                         W03-OPTIONS
                         W03-HOBJ-MODEL
                         W03-COMPCODE
                         W03-REASON.
*
     IF W03-COMPCODE NOT = MQCC-OK
          MOVE 'MQOPEN'      TO M01-MSG4-OPERATION
          MOVE W03-COMPCODE  TO M01-MSG4-COMPCODE
          MOVE W03-REASON    TO M01-MSG4-REASON
          MOVE M01-MESSAGE-4 TO M00-MESSAGE
     ELSE
          MOVE MQOD-OBJECTNAME TO W02-TEMPORARY-Q
     END-IF.
*
 OPEN-TEMP-RESPONSE-QUEUE-EXIT.
*
*    Return to performing section.
*
     EXIT.
     EJECT
*
```

Opening an existing queue

This example demonstrates how to use the MQOPEN call to open an existing queue.

This extract is taken from the Browse sample application (program CSQ4BVA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
:
* -------------------------------------------------------*
 WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*
*    W01 - Fields derived from the command area input
*
 01  W01-OBJECT                  PIC X(48).
*
*    W02 - MQM API fields
*
 01  W02-HCONN        PIC S9(9) BINARY VALUE ZERO.
 01  W02-OPTIONS      PIC S9(9) BINARY.
 01  W02-HOBJ         PIC S9(9) BINARY.
 01  W02-COMPCODE     PIC S9(9) BINARY.
 01  W02-REASON       PIC S9(9) BINARY.
*
*    CMQODV defines the object descriptor (MQOD)
*
 01  MQM-OBJECT-DESCRIPTOR.
     COPY CMQODV.
*
* CMQV contains constants (for setting or testing
* field values) and return codes (for testing the
* result of a call)
*
 01  MQM-CONSTANTS.
 COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 E-OPEN-QUEUE SECTION.
* -------------------------------------------------------*
*                                                        *
* This section opens the queue                           *
*
*    Initialize the Object Descriptor (MQOD) control
*    block
*    (The copy file initializes the remaining fields.)
*
     MOVE MQOT-Q         TO MQOD-OBJECTTYPE.
     MOVE W01-OBJECT     TO MQOD-OBJECTNAME.
*
*    Initialize W02-OPTIONS to open the queue for both
*    inquiring about and setting attributes
*
     COMPUTE W02-OPTIONS = MQOO-INQUIRE + MQOO-SET.
```

```
*
*    Open the queue
*
     CALL 'MQOPEN' USING W02-HCONN
                         MQOD
                         W02-OPTIONS
                         W02-HOBJ
                         W02-COMPCODE
                         W02-REASON.
*
*    Test the output from the open
*
*    If the completion code is not OK, display a
*    separate error message for each of the following
*    errors:
*
*  Q-MGR-NOT-AVAILABLE - MQM is not available
*  CONNECTION-BROKEN   - MQM is no longer connected to CICS
*  UNKNOWN-OBJECT-NAME - The queue does not exist
*  NOT-AUTHORIZED      - The user is not authorized to open
*                        the queue
*
* For any other error, display an error message
```

```
* showing the completion and reason codes
*
  IF W02-COMPCODE NOT = MQCC-OK
     EVALUATE TRUE
*
       WHEN W02-REASON = MQRC-Q-MGR-NOT-AVAILABLE
            MOVE M01-MESSAGE-6 TO M00-MESSAGE
*
       WHEN W02-REASON = MQRC-CONNECTION-BROKEN
            MOVE M01-MESSAGE-6 TO M00-MESSAGE
*
       WHEN W02-REASON = MQRC-UNKNOWN-OBJECT-NAME
            MOVE M01-MESSAGE-2 TO M00-MESSAGE
*
       WHEN W02-REASON = MQRC-NOT-AUTHORIZED
            MOVE M01-MESSAGE-3 TO M00-MESSAGE
*
       WHEN OTHER
            MOVE 'MQOPEN'      TO M01-MSG4-OPERATION
            MOVE W02-COMPCODE  TO M01-MSG4-COMPCODE
            MOVE W02-REASON    TO M01-MSG4-REASON
            MOVE M01-MESSAGE-4 TO M00-MESSAGE
        END-EVALUATE
     END-IF.
 E-EXIT.
*
*    Return to performing section
*
     EXIT.
     EJECT
```

Closing a queue

This example demonstrates how to use the MQCLOSE call.

The variables used in this code extract are those that were set in “Connecting to a queue manager” on page 23. This extract is taken from the Browse sample application (program CSQ4BVA1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
*
*    Close the queue
*
     MOVE MQCO-NONE TO W03-OPTIONS.
*
     CALL 'MQCLOSE' USING W03-HCONN
                          W03-HOBJ
                          W03-OPTIONS
                          W03-COMPCODE
                          W03-REASON.
*
*    Test the output of the MQCLOSE call.  If the call
*    fails, print an error message showing the
*    completion code and reason code.
*
     IF (W03-COMPCODE NOT = MQCC-OK) THEN
        MOVE 'CLOSE'       TO W04-MSG4-TYPE
        MOVE W03-COMPCODE  TO W04-MSG4-COMPCODE
        MOVE W03-REASON    TO W04-MSG4-REASON
        MOVE W04-MESSAGE-4 TO W00-PRINT-DATA
        PERFORM PRINT-LINE
        MOVE W06-CSQ4-ERROR TO W00-RETURN-CODE
     END-IF.
*
```

Putting a message using MQPUT

This example demonstrates how to use the MQPUT call using context.

This extract is taken from the Credit Check sample application (program CSQ4CVB1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
```

```
* ------------------------------------------------------*
 WORKING-STORAGE SECTION.
* ------------------------------------------------------*
*
*    W02 - Queues processed in this program
*
 01  W02-TEMPORARY-Q             PIC X(48).
*
*    W03 - MQM API fields
*
 01  W03-HCONN           PIC S9(9) BINARY VALUE ZERO.
 01  W03-HOBJ-INQUIRY    PIC S9(9) BINARY.
 01  W03-OPTIONS         PIC S9(9) BINARY.
 01  W03-BUFFLEN         PIC S9(9) BINARY.
 01  W03-COMPCODE        PIC S9(9) BINARY.
 01  W03-REASON          PIC S9(9) BINARY.
*
 01  W03-PUT-BUFFER.
*
     05 W03-CSQ4BIIM.
     COPY CSQ4VB1.
*
*    API control blocks
*
 01  MQM-MESSAGE-DESCRIPTOR.
     COPY CMQMDV.
 01  MQM-PUT-MESSAGE-OPTIONS.
     COPY CMQPMOV.
*
*    MQV contains constants (for filling in the
*    control blocks) and return codes (for testing
*    the result of a call).
*
 01  MQM-CONSTANTS.
     COPY CMQV SUPPRESS.
* ------------------------------------------------------*
 PROCEDURE DIVISION.
* ------------------------------------------------------*
⋮
*    Open queue and build message.
⋮
```

```
*
* Set the message descriptor and put-message options to
* the values required to create the message.
* Set the length of the message.
*
  MOVE MQMT-REQUEST          TO MQMD-MSGTYPE.
  MOVE MQCI-NONE             TO MQMD-CORRELID.
  MOVE MQMI-NONE             TO MQMD-MSGID.
  MOVE W02-TEMPORARY-Q       TO MQMD-REPLYTOQ.
  MOVE SPACES                TO MQMD-REPLYTOQMGR.
  MOVE 5                     TO MQMD-PRIORITY.
  MOVE MQPER-NOT-PERSISTENT TO MQMD-PERSISTENCE.
  COMPUTE MQPMO-OPTIONS     =  MQPMO-NO-SYNCPOINT +
                               MQPMO-DEFAULT-CONTEXT.
  MOVE LENGTH OF CSQ4BIIM-MSG TO W03-BUFFLEN.
*
     CALL 'MQPUT' USING W03-HCONN
                        W03-HOBJ-INQUIRY
                        MQMD
                        MQPMO
                        W03-BUFFLEN
                        W03-PUT-BUFFER
                        W03-COMPCODE
                        W03-REASON.
     IF W03-COMPCODE NOT = MQCC-OK
     ⋮
     END-IF.
```

Putting a message using MQPUT1

This example demonstrates how to use the MQPUT1 call.

This extract is taken from the Credit Check sample application (program CSQ4CVB5) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
* ------------------------------------------------------*
 WORKING-STORAGE SECTION.
* ------------------------------------------------------*
*
*    W03 - MQM API fields
*
 01  W03-HCONN          PIC S9(9) BINARY VALUE ZERO.
 01  W03-OPTIONS        PIC S9(9) BINARY.
 01  W03-COMPCODE       PIC S9(9) BINARY.
 01  W03-REASON         PIC S9(9) BINARY.
 01  W03-BUFFLEN        PIC S9(9) BINARY.
*
 01  W03-PUT-BUFFER.
     05 W03-CSQ4BQRM.
     COPY CSQ4VB4.
```

```
*
*    API control blocks
*
 01  MQM-OBJECT-DESCRIPTOR.
     COPY CMQODV.
 01  MQM-MESSAGE-DESCRIPTOR.
     COPY CMQMDV.
 01  MQM-PUT-MESSAGE-OPTIONS.
     COPY CMQPMOV.
*
* CMQV contains constants (for filling in the
* control blocks) and return codes (for testing
* the result of a call).
*
 01  MQM-MQV.
 COPY CMQV SUPPRESS.
* ------------------------------------------------------*
 PROCEDURE DIVISION.
* ------------------------------------------------------*
⋮
*    Get the request message.
⋮
* ------------------------------------------------------*
 PROCESS-QUERY SECTION.
* ------------------------------------------------------*
⋮
*    Build the reply message.
⋮
*
* Set the object descriptor, message descriptor and
* put-message options to the values required to create
* the message.
* Set the length of the message.
*
  MOVE MQMD-REPLYTOQ    TO MQOD-OBJECTNAME.
  MOVE MQMD-REPLYTOQMGR TO MQOD-OBJECTQMGRNAME.
  MOVE MQMT-REPLY       TO MQMD-MSGTYPE.
  MOVE SPACES           TO MQMD-REPLYTOQ.
  MOVE SPACES           TO MQMD-REPLYTOQMGR.
  MOVE LOW-VALUES       TO MQMD-MSGID.
  COMPUTE MQPMO-OPTIONS = MQPMO-SYNCPOINT +
                          MQPMO-PASS-IDENTITY-CONTEXT.
  MOVE W03-HOBJ-CHECKQ  TO MQPMO-CONTEXT.
  MOVE LENGTH OF CSQ4BQRM-MSG TO W03-BUFFLEN.
*
     CALL 'MQPUT1' USING W03-HCONN
                         MQOD
                         MQMD
                         MQPMO
                         W03-BUFFLEN
                         W03-PUT-BUFFER
                         W03-COMPCODE
```

```
                        W03-REASON.
     IF W03-COMPCODE NOT = MQCC-OK
         MOVE 'MQPUT1'          TO M02-OPERATION
         MOVE MQOD-OBJECTNAME   TO M02-OBJECTNAME
         PERFORM RECORD-CALL-ERROR
         PERFORM FORWARD-MSG-TO-DLQ
     END-IF.
*
```

Getting a message

This example demonstrates how to use the MQGET call to remove a message from a queue.

This extract is taken from the Credit Check sample application (program CSQ4CVB1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
* -------------------------------------------------------*
 WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*
*    W03 - MQM API fields
*
 01  W03-HCONN            PIC S9(9) BINARY VALUE ZERO.
 01  W03-HOBJ-RESPONSE    PIC S9(9) BINARY.
 01  W03-OPTIONS          PIC S9(9) BINARY.
 01  W03-BUFFLEN          PIC S9(9) BINARY.
 01  W03-DATALEN          PIC S9(9) BINARY.
 01  W03-COMPCODE         PIC S9(9) BINARY.
 01  W03-REASON           PIC S9(9) BINARY.
*
 01  W03-GET-BUFFER.
     05 W03-CSQ4BAM.
     COPY CSQ4VB2.
*
*    API control blocks
*
 01  MQM-MESSAGE-DESCRIPTOR.
     COPY CMQMDV.
 01  MQM-GET-MESSAGE-OPTIONS.
     COPY CMQGMOV.
*
*    MQV contains constants (for filling in the
*    control blocks) and return codes (for testing
*    the result of a call).
*
 01  MQM-CONSTANTS.
     COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 A-MAIN SECTION.
* -------------------------------------------------------*
⋮
*    Open response queue.
⋮
* -------------------------------------------------------*
 PROCESS-RESPONSE-SCREEN SECTION.
* -------------------------------------------------------*
*                                                        *
*  This section gets a message from the response queue.  *
*                                                        *
*  When a correct response is received, it is            *
*  transferred to the map for display; otherwise         *
*  an error message is built.                            *
*                                                        *
* -------------------------------------------------------*
```

```
*
*    Set get-message options
*
  COMPUTE MQGMO-OPTIONS = MQGMO-SYNCPOINT +
                        MQGMO-ACCEPT-TRUNCATED-MSG +
                        MQGMO-NO-WAIT.
*
* Set msgid and correlid in MQMD to nulls so that any
* message will qualify.
```

```
* Set length to available buffer length.
*
     MOVE MQMI-NONE TO MQMD-MSGID.
     MOVE MQCI-NONE TO MQMD-CORRELID.
     MOVE LENGTH OF W03-GET-BUFFER TO W03-BUFFLEN.
*
     CALL 'MQGET' USING W03-HCONN
                        W03-HOBJ-RESPONSE
                        MQMD
                        MQGMO
                        W03-BUFFLEN
                        W03-GET-BUFFER
                        W03-DATALEN
                        W03-COMPCODE
                        W03-REASON.
     EVALUATE TRUE
         WHEN W03-COMPCODE NOT = MQCC-FAILED
         ⋮
*            Process the message
             ⋮
         WHEN (W03-COMPCODE = MQCC-FAILED AND
               W03-REASON = MQRC-NO-MSG-AVAILABLE)
                 MOVE M01-MESSAGE-9 TO M00-MESSAGE
                 PERFORM CLEAR-RESPONSE-SCREEN
*
         WHEN OTHER
             MOVE 'MQGET  '     TO M01-MSG4-OPERATION
             MOVE W03-COMPCODE  TO M01-MSG4-COMPCODE
             MOVE W03-REASON    TO M01-MSG4-REASON
             MOVE M01-MESSAGE-4 TO M00-MESSAGE
             PERFORM CLEAR-RESPONSE-SCREEN
     END-EVALUATE.
```

Getting a message using the wait option

This example demonstrates how to use the MQGET call with the wait option and accepting truncated messages.

This extract is taken from the Credit Check sample application (program CSQ4CVB5) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
* -------------------------------------------------------*
 WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*
*    W00 - General work fields
*
 01  W00-WAIT-INTERVAL   PIC S9(09) BINARY VALUE 30000.
*
*    W03 - MQM API fields
*
 01  W03-HCONN           PIC S9(9) BINARY VALUE ZERO.
 01  W03-OPTIONS         PIC S9(9) BINARY.
 01  W03-HOBJ-CHECKQ     PIC S9(9) BINARY.
 01  W03-COMPCODE        PIC S9(9) BINARY.
 01  W03-REASON          PIC S9(9) BINARY.
 01  W03-DATALEN         PIC S9(9) BINARY.
 01  W03-BUFFLEN         PIC S9(9) BINARY.
*
 01  W03-MSG-BUFFER.
     05 W03-CSQ4BCAQ.
     COPY CSQ4VB3.
*
*    API control blocks
*
 01  MQM-MESSAGE-DESCRIPTOR.
     COPY CMQMDV.
 01  MQM-GET-MESSAGE-OPTIONS.
     COPY CMQGMOV.
*
*    CMQV contains constants (for filling in the
*    control blocks) and return codes (for testing
*    the result of a call).
*
 01  MQM-MQV.
 COPY CMQV SUPPRESS.
```

```
* ------------------------------------------------------*
 PROCEDURE DIVISION.
* ------------------------------------------------------*
⋮
*    Open input queue.
⋮
```

```
*
*    Get and process messages.
*
  COMPUTE MQGMO-OPTIONS = MQGMO-WAIT +
                          MQGMO-ACCEPT-TRUNCATED-MSG +
                          MQGMO-SYNCPOINT.
  MOVE LENGTH OF W03-MSG-BUFFER TO W03-BUFFLEN.
  MOVE W00-WAIT-INTERVAL TO MQGMO-WAITINTERVAL.
  MOVE MQMI-NONE TO MQMD-MSGID.
  MOVE MQCI-NONE TO MQMD-CORRELID.
*
*    Make the first MQGET call outside the loop.
*
     CALL 'MQGET' USING W03-HCONN
                        W03-HOBJ-CHECKQ
                        MQMD
                        MQGMO
                        W03-BUFFLEN
                        W03-MSG-BUFFER
                        W03-DATALEN
                        W03-COMPCODE
                        W03-REASON.
*
*    Test the output of the MQGET call using the
*    PERFORM loop that follows.
*
*    Perform whilst no failure occurs
*      - process this message
*      - reset the call parameters
*      - get another message
*    End-perform
*

*
*    Test the output of the MQGET call.  If the call
*    fails, send an error message showing the
*    completion code and reason code, unless the
*    completion code is NO-MSG-AVAILABLE.
*
     IF (W03-COMPCODE NOT = MQCC-FAILED) OR
        (W03-REASON NOT = MQRC-NO-MSG-AVAILABLE)
         MOVE 'MQGET '          TO M02-OPERATION
         MOVE MQOD-OBJECTNAME   TO M02-OBJECTNAME
               PERFORM RECORD-CALL-ERROR
     END-IF.
⋮
```

Getting a message using signaling

This example demonstrates how to use the MQGET call with signaling. This extract is taken from the Credit Check sample application (program CSQ4CVB2) supplied with IBM MQ for z/OS.

Signaling is available only with IBM MQ for z/OS .

```
⋮
* ------------------------------------------------------*
 WORKING-STORAGE SECTION.
* ------------------------------------------------------*
*
*    W00 - General work fields
 ⋮
 01  W00-WAIT-INTERVAL    PIC S9(09) BINARY VALUE 30000.
*
*    W03 - MQM API fields
*
 01  W03-HCONN            PIC S9(9) BINARY VALUE ZERO.
 01  W03-HOBJ-REPLYQ      PIC S9(9) BINARY.
 01  W03-COMPCODE         PIC S9(9) BINARY.
```

```
 01  W03-REASON           PIC S9(9) BINARY.
 01  W03-DATALEN          PIC S9(9) BINARY.
 01  W03-BUFFLEN          PIC S9(9) BINARY.
 ⋮
 01  W03-GET-BUFFER.
     05 W03-CSQ4BQRM.
     COPY CSQ4VB4.
*
     05 W03-CSQ4BIIM REDEFINES W03-CSQ4BQRM.
     COPY CSQ4VB1.
*
     05 W03-CSQ4BPGM REDEFINES W03-CSQ4BIIM.
     COPY CSQ4VB5.
     ⋮
*    API control blocks
*
 01  MQM-MESSAGE-DESCRIPTOR.
     COPY CMQMDV.
 01  MQM-GET-MESSAGE-OPTIONS.
     COPY CMQGMOV.
     ⋮
*    MQV contains constants (for filling in the
*    control blocks) and return codes (for testing
*    the result of a call).
*
 01  MQM-MQV.
 COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 LINKAGE SECTION.
* -------------------------------------------------------*
 01  L01-ECB-ADDR-LIST.
     05  L01-ECB-ADDR1        POINTER.
     05  L01-ECB-ADDR2        POINTER.
```

```
*
 01  L02-ECBS.
     05  L02-INQUIRY-ECB1     PIC S9(09) BINARY.
     05  L02-REPLY-ECB2       PIC S9(09) BINARY.
 01  REDEFINES L02-ECBS.
     05                       PIC  X(02).
     05  L02-INQUIRY-ECB1-CC  PIC S9(04) BINARY.
     05                       PIC  X(02).
     05  L02-REPLY-ECB2-CC    PIC S9(04) BINARY.
*
* -------------------------------------------------------*
 PROCEDURE DIVISION.
* -------------------------------------------------------*
⋮
* Initialize variables, open queues, set signal on
* inquiry queue.
⋮
* -------------------------------------------------------*
 PROCESS-SIGNAL-ACCEPTED SECTION.
* -------------------------------------------------------*
*  This section gets a message with signal.  If a        *
*  message is received, process it.  If the signal       *
*  is set or is already set, the program goes into       *
*  an operating system wait.                             *
*  Otherwise an error is reported and call error set.    *
* -------------------------------------------------------*
*
  PERFORM REPLYQ-GETSIGNAL.
*
  EVALUATE TRUE
      WHEN (W03-COMPCODE = MQCC-OK AND
              W03-REASON = MQRC-NONE)
          PERFORM PROCESS-REPLYQ-MESSAGE
*
      WHEN (W03-COMPCODE = MQCC-WARNING AND
              W03-REASON = MQRC-SIGNAL-REQUEST-ACCEPTED)
           OR
           (W03-COMPCODE = MQCC-FAILED AND
              W03-REASON = MQRC-SIGNAL-OUTSTANDING)
          PERFORM EXTERNAL-WAIT
*
      WHEN OTHER
          MOVE 'MQGET SIGNAL'  TO M02-OPERATION
          MOVE MQOD-OBJECTNAME TO M02-OBJECTNAME
          PERFORM RECORD-CALL-ERROR
          MOVE W06-CALL-ERROR  TO W06-CALL-STATUS
```

```
  END-EVALUATE.
*
 PROCESS-SIGNAL-ACCEPTED-EXIT.
*    Return to performing section
     EXIT.
     EJECT
*
```

```
* -------------------------------------------------------*
 EXTERNAL-WAIT SECTION.
* -------------------------------------------------------*
*  This section performs an external CICS wait on two    *
*  ECBs until at least one is posted.  It then calls     *
*  the sections to handle the posted ECB.                *
* -------------------------------------------------------*
     EXEC CICS WAIT EXTERNAL
         ECBLIST(W04-ECB-ADDR-LIST-PTR)
         NUMEVENTS(2)
     END-EXEC.
*
* At least one ECB must have been posted to get to this
* point. Test which ECB has been posted and perform
* the appropriate section.
*
     IF L02-INQUIRY-ECB1 NOT = 0
         PERFORM TEST-INQUIRYQ-ECB
     ELSE
         PERFORM TEST-REPLYQ-ECB
     END-IF.
*
 EXTERNAL-WAIT-EXIT.
*
*    Return to performing section.
*
     EXIT.
     EJECT
     ⋮
* -------------------------------------------------------*
 REPLYQ-GETSIGNAL SECTION.
* -------------------------------------------------------*
*                                                        *
* This section performs an MQGET call (in syncpoint with *
* signal) on the reply queue.  The signal field in the   *
* MQGMO is set to the address of the ECB.                *
* Response handling is done by the performing section.   *
*                                                        *
* -------------------------------------------------------*
*
     COMPUTE MQGMO-OPTIONS         =  MQGMO-SYNCPOINT +
                                      MQGMO-SET-SIGNAL.
     MOVE W00-WAIT-INTERVAL        TO MQGMO-WAITINTERVAL.
     MOVE LENGTH OF W03-GET-BUFFER TO W03-BUFFLEN.
*
     MOVE ZEROS                    TO L02-REPLY-ECB2.
     SET MQGMO-SIGNAL1 TO ADDRESS OF L02-REPLY-ECB2.
```

```
*
*    Set msgid and correlid to nulls so that any message
*    will qualify.
*
     MOVE MQMI-NONE TO MQMD-MSGID.
     MOVE MQCI-NONE TO MQMD-CORRELID.
*
     CALL 'MQGET' USING W03-HCONN
                        W03-HOBJ-REPLYQ
                        MQMD
                        MQGMO
                        W03-BUFFLEN
                        W03-GET-BUFFER
                        W03-DATALEN
                        W03-COMPCODE
                        W03-REASON.
*
 REPLYQ-GETSIGNAL-EXIT.
*
*    Return to performing section.
*
     EXIT.
```

```
     EJECT
*
     ⋮
```

Inquiring about the attributes of an object

This example demonstrates how to use the MQINQ call to inquire about the attributes of a queue.

This extract is taken from the Queue Attributes sample application (program CSQ4CVC1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS).

```
⋮
* -------------------------------------------------------*
 WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*
*    W02 - MQM API fields
*
 01  W02-SELECTORCOUNT    PIC S9(9) BINARY VALUE 2.
 01  W02-INTATTRCOUNT     PIC S9(9) BINARY VALUE 2.
 01  W02-CHARATTRLENGTH   PIC S9(9) BINARY VALUE ZERO.
 01  W02-CHARATTRS        PIC X     VALUE LOW-VALUES.
 01  W02-HCONN            PIC S9(9) BINARY VALUE ZERO.
 01  W02-HOBJ             PIC S9(9) BINARY.
 01  W02-COMPCODE         PIC S9(9) BINARY.
 01  W02-REASON           PIC S9(9) BINARY.
 01  W02-SELECTORS-TABLE.
     05  W02-SELECTORS    PIC S9(9) BINARY OCCURS 2 TIMES
 01  W02-INTATTRS-TABLE.
     05  W02-INTATTRS     PIC S9(9) BINARY OCCURS 2 TIMES
*
*    CMQODV defines the object descriptor (MQOD).
*
 01  MQM-OBJECT-DESCRIPTOR.
     COPY CMQODV.
*
* CMQV contains constants (for setting or testing field
* values) and return codes (for testing the result of a
* call).
*
 01  MQM-CONSTANTS.
 COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 PROCEDURE DIVISION.
* -------------------------------------------------------*
*
*    Get the queue name and open the queue.
*
     ⋮
*
*    Initialize the variables for the inquiry call:
*     - Set W02-SELECTORS-TABLE to the attributes whose
*    status is required
*     - All other variables are already set
*
     MOVE MQIA-INHIBIT-GET TO W02-SELECTORS(1).
     MOVE MQIA-INHIBIT-PUT TO W02-SELECTORS(2).
```

```
*
*    Inquire about the attributes.
*
     CALL 'MQINQ' USING W02-HCONN,
                        W02-HOBJ,
                        W02-SELECTORCOUNT,
                        W02-SELECTORS-TABLE,
                        W02-INTATTRCOUNT,
                        W02-INTATTRS-TABLE,
                        W02-CHARATTRLENGTH,
                        W02-CHARATTRS,
                        W02-COMPCODE,
                        W02-REASON.
*
* Test the output from the inquiry:
*
* - If the completion code is not OK, display an error
```

```
*   message showing the completion and reason codes
*
* - Otherwise, move the correct attribute status into
*   the relevant screen map fields
*
     IF W02-COMPCODE NOT = MQCC-OK
        MOVE 'MQINQ'       TO M01-MSG4-OPERATION
        MOVE W02-COMPCODE  TO M01-MSG4-COMPCODE
        MOVE W02-REASON    TO M01-MSG4-REASON
        MOVE M01-MESSAGE-4 TO M00-MESSAGE
*
     ELSE
*       Process the changes.
        ⋮
           END-IF.
        ⋮
```

Setting the attributes of a queue

This example demonstrates how to use the MQSET call to change the attributes of a queue.

This extract is taken from the Queue Attributes sample application (program CSQ4CVC1) supplied with IBM MQ for z/OS. For the names and locations of the sample applications on other platforms, see Sample procedural programs (platforms except z/OS)

```
⋮
* -------------------------------------------------------*
 WORKING-STORAGE SECTION.
* -------------------------------------------------------*
*
*    W02 - MQM API fields
*
 01  W02-SELECTORCOUNT    PIC S9(9) BINARY VALUE 2.
 01  W02-INTATTRCOUNT     PIC S9(9) BINARY VALUE 2.
 01  W02-CHARATTRLENGTH   PIC S9(9) BINARY VALUE ZERO.
 01  W02-CHARATTRS        PIC X     VALUE LOW-VALUES.
 01  W02-HCONN            PIC S9(9) BINARY VALUE ZERO.
 01  W02-HOBJ             PIC S9(9) BINARY.
 01  W02-COMPCODE         PIC S9(9) BINARY.
 01  W02-REASON           PIC S9(9) BINARY.
 01  W02-SELECTORS-TABLE.
     05  W02-SELECTORS    PIC S9(9) BINARY OCCURS 2 TIMES.
 01  W02-INTATTRS-TABLE.
     05  W02-INTATTRS     PIC S9(9) BINARY OCCURS 2 TIMES.
*
*    CMQODV defines the object descriptor (MQOD).
*
 01  MQM-OBJECT-DESCRIPTOR.
     COPY CMQODV.
*
* CMQV contains constants (for setting or testing
* field values) and return codes (for testing the
* result of a call).
*
 01  MQM-CONSTANTS.
 COPY CMQV SUPPRESS.
* -------------------------------------------------------*
 PROCEDURE DIVISION.
* -------------------------------------------------------*
```

```
*
*    Get the queue name and open the queue.
*
⋮
*
*
* Initialize the variables required for the set call:
* - Set W02-SELECTORS-TABLE to the attributes to be set
* - Set W02-INTATTRS-TABLE to the required status
* - All other variables are already set
*
     MOVE MQIA-INHIBIT-GET   TO W02-SELECTORS(1).
     MOVE MQIA-INHIBIT-PUT   TO W02-SELECTORS(2).
     MOVE MQQA-GET-INHIBITED TO W02-INTATTRS(1).
     MOVE MQQA-PUT-INHIBITED TO W02-INTATTRS(2).
*
```

```
*    Set the attributes.
*
     CALL 'MQSET' USING W02-HCONN,
                        W02-HOBJ,
                        W02-SELECTORCOUNT,
                        W02-SELECTORS-TABLE,
                        W02-INTATTRCOUNT,
                        W02-INTATTRS-TABLE,
                        W02-CHARATTRLENGTH,
                        W02-CHARATTRS,
                        W02-COMPCODE,
                        W02-REASON.
*
* Test the output from the call:
*
*  - If the completion code is not OK, display an error
*    message showing the completion and reason codes
*
*  - Otherwise, move 'INHIBITED' into the relevant
*    screen map fields
*
     IF W02-COMPCODE NOT = MQCC-OK
        MOVE 'MQSET'       TO M01-MSG4-OPERATION
        MOVE W02-COMPCODE  TO M01-MSG4-COMPCODE
        MOVE W02-REASON    TO M01-MSG4-REASON
        MOVE M01-MESSAGE-4 TO M00-MESSAGE
     ELSE
*
*       Process the changes.
⋮
     END-IF.
```

System/390 assembler-language examples

This collection of topics is mostly taken from the IBM MQ for z/OS sample applications.

Connecting to a queue manager

This example demonstrates how to use the MQCONN call to connect a program to a queue manager in z/OS batch.

This extract is taken from the Browse sample program (CSQ4BAA1) supplied with IBM MQ for z/OS.

```
⋮
WORKAREA DSECT
*
PARMLIST CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
COMPCODE DS    F               Completion code
REASON   DS    F               Reason code
HCONN    DS    F               Connection handle
         ORG
PARMADDR DS    F               Address of parm field
PARMLEN  DS    H               Length of parm field
*
MQMNAME  DS    CL48            Queue manager name
*
*
**********************************************************
*  SECTION NAME : MAINPARM                               *
**********************************************************
MAINPARM DS    0H
         MVI   MQMNAME,X'40'
         MVC   MQMNAME+1(L'MQMNAME-1),MQMNAME
*
* Space out first byte and initialize
*
*
* Code to address and verify parameters passed omitted
*
*
PARM1MVE DS    0H
         SR    R1,R3            Length of data
         LA    R4,MQMNAME       Address for target
         BCTR  R1,R0            Reduce for execute
         EX    R1,MOVEPARM      Move the data
*
```

```
*********************************************************
* EXECUTES                                              *
*********************************************************
MOVEPARM MVC   0(*-*,R4),0(R3)
*
         EJECT
```

```
*********************************************************
*  SECTION NAME : MAINCONN                              *
*********************************************************
*
*
MAINCONN DS    0H
         XC    HCONN,HCONN       Null connection handle
*
         CALL  MQCONN,                        X
               (MQMNAME,                      X
               HCONN,                         X
               COMPCODE,                      X
               REASON),                       X
               MF=(E,PARMLIST),VL
*
         LA    R0,MQCC_OK       Expected compcode
         C     R0,COMPCODE      As expected?
         BER   R6               Yes .. return to caller
*
         MVC   INF4_TYP,=CL10'CONNECT   '
         BAL   R7,ERRCODE            Translate error
         LA    R0,8                  Set exit code
         ST    R0,EXITCODE           to 8
         B     ENDPROG               End the program
*
```

Disconnecting from a queue manager

This example demonstrates how to use the MQDISC call to disconnect a program from a queue manager in z/OS batch.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*        ISSUE MQI DISC REQUEST USING REENTRANT FORM
*        OF CALL MACRO
*
*        HCONN WAS SET BY A PREVIOUS MQCONN REQUEST
*        R5 = WORK REGISTER
*
DISC     DS    0H
         CALL  MQDISC,                     X
               (HCONN,                     X
               COMPCODE,                   X
               REASON),                    X
               VL,MF=(E,CALLLST)
*
         LA    R5,MQCC_OK
         C     R5,COMPCODE
         BNE   BADCALL
         ⋮
```

```
BADCALL  DS    0H
⋮
*                   CONSTANTS
*
         CMQA
*
*        WORKING STORAGE (RE-ENTRANT)
*
WEG3     DSECT
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
HCONN    DS   F
COMPCODE DS   F
REASON   DS   F
```

```
*
*
LEG3     EQU  *-WKEG3
         END
```

Creating a dynamic queue

This example demonstrates how to use the MQOPEN call to create a dynamic queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*    R5 = WORK REGISTER.
*
OPEN     DS   0H
*
         MVC  WOD_AREA,MQOD_AREA INITIALIZE WORKING VERSION OF
*                                      MQOD WITH DEFAULTS
         MVC  WOD_OBJECTNAME,MOD_Q    COPY IN THE MODEL Q NAME
         MVC  WOD_DYNAMICQNAME,DYN_Q  COPY IN THE DYNAMIC Q NAME
         L    R5,=AL4(MQOO_OUTPUT)    OPEN FOR OUTPUT AND
         A    R5,=AL4(MQOO_INQUIRE)   INQUIRE
         ST   R5,OPTIONS
```

```
*
* ISSUE MQI OPEN REQUEST USING REENTRANT
* FORM OF CALL MACRO
*
         CALL MQOPEN,                          X
               (HCONN,                         X
               WOD,                            X
               OPTIONS,                        X
               HOBJ,                           X
               COMPCODE,                       X
               REASON),VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK                CHECK THE COMPLETION CODE
         C   R5,COMPCODE               FROM THE REQUEST AND BRANCH
         BNE BADCALL                   TO ERROR ROUTINE IF NOT MQCC_OK
*
         MVC  TEMP_Q,WOD_OBJECTNAME  SAVE NAME OF TEMPORARY Q
*                            CREATED BY OPEN OF MODEL Q
*
⋮
BADCALL  DS   0H
⋮
*
*
*   CONSTANTS:
*
MOD_Q  DC   CL48'QUERY.REPLY.MODEL'  MODEL QUEUE NAME
DYN_Q  DC   CL48'QUERY.TEMPQ.*'      DYNAMIC QUEUE NAME
*
       CMQODA DSECT=NO,LIST=YES  CONSTANT VERSION OF MQOD
       CMQA                      MQI VALUE EQUATES
*
*   WORKING STORAGE
*
         DFHEISTG
HCONN    DS F                      CONNECTION HANDLE
OPTIONS  DS F                      OPEN OPTIONS
HOBJ     DS F                      OBJECT HANDLE
COMPCODE DS F                      MQI COMPLETION CODE
REASON   DS F                      MQI REASON CODE
TEMP_Q   DS CL(MQ_Q_NAME_LENGTH)   SAVED QNAME AFTER OPEN
*
WOD      CMQODA DSECT=NO,LIST=YES  WORKING VERSION OF MQOD
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L  LIST FORM
                                                 OF CALL
*                                                 MACRO
         ⋮
         END
```

Opening an existing queue

This example demonstrates how to use the MQOPEN call to open a queue that has already been defined.

It shows how to specify two options. This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*    R5 = WORK REGISTER.
*
OPEN     DS   0H
*
         MVC  WOD_AREA,MQOD_AREA  INITIALIZE WORKING VERSION OF
*                               MQOD WITH DEFAULTS
         MVC  WOD_OBJECTNAME,Q_NAME    SPECIFY Q NAME TO OPEN
         LA   R5,MQOO_INPUT_EXCLUSIVE  OPEN FOR MQGET CALLS
*
         ST   R5,OPTIONS
*
* ISSUE MQI OPEN REQUEST USING REENTRANT FORM
* OF CALL MACRO
*
         CALL MQOPEN,                          X
               (HCONN,                         X
               WOD,                            X
               OPTIONS,                        X
               HOBJ,                           X
               COMPCODE,                       X
               REASON),VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK         CHECK THE COMPLETION CODE
         C   R5,COMPCODE        FROM THE REQUEST AND BRANCH
         BNE BADCALL            TO ERROR ROUTINE IF NOT MQCC_OK
*
         ⋮
BADCALL  DS   0H
⋮
*
*
*   CONSTANTS:
*
Q_NAME   DC   CL48'REQUEST.QUEUE'  NAME OF QUEUE TO OPEN
*
         CMQODA DSECT=NO,LIST=YES  CONSTANT VERSION OF MQOD
         CMQA                      MQI VALUE EQUATES
*
*   WORKING STORAGE
*
         DFHEISTG
HCONN    DS F           CONNECTION HANDLE
OPTIONS  DS F           OPEN OPTIONS
HOBJ     DS F           OBJECT HANDLE
COMPCODE DS F           MQI COMPLETION CODE
REASON   DS F           MQI REASON CODE
*
WOD  CMQODA DSECT=NO,LIST=YES  WORKING VERSION OF MQOD
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L  LIST FORM
                                                 OF CALL
*                                                 MACRO
         ⋮
         END
```

Closing a queue

This example demonstrates how to use the MQCLOSE call to close a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
* ISSUE MQI CLOSE REQUEST USING REENTRANT FROM OF
* CALL MACRO
*
*        HCONN WAS SET BY A PREVIOUS MQCONN REQUEST
*        HOBJ  WAS SET BY A PREVIOUS MQOPEN REQUEST
```

```
*        R5 = WORK REGISTER
*
CLOSE    DS    0H
         LA    R5,MQCO_NONE        NO SPECIAL CLOSE OPTIONS
         ST    R5,OPTIONS              ARE REQUIRED.
*
         CALL  MQCLOSE,                         X
               (HCONN,                          X
               HOBJ,                            X
               OPTIONS,                         X
               COMPCODE,                        X
               REASON),                         X
               VL,MF=(E,CALLLST)
*
         LA    R5,MQCC_OK
         C     R5,COMPCODE
         BNE   BADCALL
*
         ⋮
BADCALL  DS    0H
         ⋮
*                   CONSTANTS
*
         CMQA
*
*        WORKING STORAGE (REENTRANT)
*
WEG4     DSECT
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
HCONN    DS   F
HOBJ     DS   F
OPTIONS  DS   F
COMPCODE DS   F
REASON   DS   F
*
*
LEG4     EQU  *-WKEG4
         END
```

Putting a message using MQPUT

This example demonstrates how to use the MQPUT call to put a message on a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*     CONNECT TO QUEUE MANAGER
*
CONN    DS  0H
⋮
*
*     OPEN A QUEUE
*
OPEN    DS  0H
⋮
*
*     R4,R5,R6,R7 = WORK REGISTER.
*
PUT  DS  0H
     LA   R4,MQMD           SET UP ADDRESSES AND
     LA   R5,MQMD_LENGTH    LENGTH FOR USE BY MVCL
     LA   R6,WMD            INSTRUCTION, AS MQMD IS
     LA   R7,WMD_LENGTH     OVER 256 BYES LONG.
     MVCL R6,R4             INITIALIZE WORKING VERSION
*                           OF MESSAGE DESCRIPTOR
*
     MVC  WPMO_AREA,MQPMO_AREA  INITIALIZE WORKING MQPMO
*

     LA   R5,BUFFER_LEN   RETRIEVE THE BUFFER LENGTH
     ST   R5,BUFFLEN      AND SAVE IT FOR MQM USE
*
     MVC  BUFFER,TEST_MSG    SET THE MESSAGE TO BE PUT
*
*    ISSUE MQI PUT REQUEST USING REENTRANT FORM
*    OF CALL MACRO
*
```

```
*        HCONN WAS SET BY PREVIOUS MQCONN REQUEST
*        HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST
*
         CALL MQPUT,                          X
               (HCONN,                        X
               HOBJ,                          X
               WMD,                           X
               WPMO,                          X
               BUFFLEN,                       X
               BUFFER,                        X
               COMPCODE,                      X
               REASON),VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK
         C   R5,COMPCODE
         BNE BADCALL
*
         ⋮
BADCALL DS  0H
⋮
```

```
*
*   CONSTANTS
*
CMQMDA DSECT=NO,LIST=YES,PERSISTENCE=MQPER_PERSISTENT
CMQPMOA DSECT=NO,LIST=YES
CMQA
TEST_MSG DC CL80'THIS IS A TEST MESSAGE'
*
*   WORKING STORAGE DSECT
*
WORKSTG DSECT
*
COMPCODE DS F
REASON  DS F
BUFFLEN DS F
OPTIONS DS F
HCONN  DS F
HOBJ   DS F
*
BUFFER  DS CL80
BUFFER_LEN EQU *-BUFFER
*
WMD   CMQMDA DSECT=NO,LIST=NO
WPMO   CMQPMOA DSECT=NO,LIST=NO
*
CALLLST CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
⋮
END
```

Putting a message using MQPUT1

This example demonstrates how to use the MQPUT1 call to open a queue, put a single message on the queue, then close the queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*     CONNECT TO QUEUE MANAGER
*
CONN    DS  0H
⋮
*
*     R4,R5,R6,R7 = WORK REGISTER.
*
PUT      DS  0H
*
         MVC  WOD_AREA,MQOD_AREA     INITIALIZE WORKING VERSION OF
*                                    MQOD WITH DEFAULTS
         MVC  WOD_OBJECTNAME,Q_NAME  SPECIFY Q NAME FOR PUT1
*
         LA   R4,MQMD           SET UP ADDRESSES AND
         LA   R5,MQMD_LENGTH    LENGTH FOR USE BY MVCL
         LA   R6,WMD            INSTRUCTION, AS MQMD IS
         LA   R7,WMD_LENGTH     OVER 256 BYES LONG.
```

```
         MVCL R6,R4              INITIALIZE WORKING VERSION
*                                OF MESSAGE DESCRIPTOR
```

```
*
         MVC  WPMO_AREA,MQPMO_AREA       INITIALIZE WORKING MQPMO
*

         LA   R5,BUFFER_LEN           RETRIEVE THE BUFFER LENGTH
         ST   R5,BUFFLEN              AND SAVE IT FOR MQM USE
*
         MVC  BUFFER,TEST_MSG         SET THE MESSAGE TO BE PUT
*
* ISSUE MQI PUT REQUEST USING REENTRANT FORM OF CALL MACRO
*
*        HCONN WAS SET BY PREVIOUS MQCONN REQUEST
*        HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST
*
         CALL MQPUT1,                                X
                (HCONN,                              X
                 LMQOD,                              X
                 LMQMD,                              X
                 LMQPMO,                             X
                 BUFFERLENGTH,                       X
                 BUFFER,                             X
                 COMPCODE,                           X
                 REASON),VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK
         C   R5,COMPCODE
         BNE BADCALL
*
         ⋮
BADCALL DS  0H
⋮
*
```

```
*      CONSTANTS
*
  CMQMDA DSECT=NO,LIST=YES,PERSISTENCE=MQPER_PERSISTENT
  CMQPMOA DSECT=NO,LIST=YES
  CMQODA DSECT=NO,LIST=YES
  CMQA
*
TEST_MSG DC CL80'THIS IS ANOTHER TEST MESSAGE'
Q_NAME   DC CL48'TEST.QUEUE.NAME'
*
*      WORKING STORAGE DSECT
*
WORKSTG  DSECT
*
COMPCODE DS F
REASON   DS F
BUFFLEN  DS F
OPTIONS  DS F
HCONN    DS F
HOBJ     DS F
*
BUFFER   DS CL80
BUFFER_LEN EQU *-BUFFER
*
WOD      CMQODA DSECT=NO,LIST=YES    WORKING VERSION OF MQOD
WMD      CMQMDA DSECT=NO,LIST=NO
WPMO     CMQPMOA DSECT=NO,LIST=NO
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
         ⋮
         END
```

Getting a message

This example demonstrates how to use the MQGET call to remove a message from a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*   CONNECT TO QUEUE MANAGER
*
CONN    DS  0H
⋮
*
*     OPEN A QUEUE FOR GET
*
OPEN    DS  0H
⋮
*
*     R4,R5,R6,R7 = WORK REGISTER.
*
GET  DS  0H
     LA   R4,MQMD                SET UP ADDRESSES AND
     LA   R5,MQMD_LENGTH         LENGTH FOR USE BY MVCL
     LA   R6,WMD                 INSTRUCTION, AS MQMD IS
     LA   R7,WMD_LENGTH          OVER 256 BYES LONG.
     MVCL R6,R4                  INITIALIZE WORKING VERSION
*                                   OF MESSAGE DESCRIPTOR
*
     MVC  WGMO_AREA,MQGMO_AREA   INITIALIZE WORKING MQGMO
*

     LA   R5,BUFFER_LEN          RETRIEVE THE BUFFER LENGTH
     ST   R5,BUFFLEN             AND SAVE IT FOR MQM USE
*
*
* ISSUE MQI GET REQUEST USING REENTRANT FORM OF CALL MACRO
*
*        HCONN WAS SET BY PREVIOUS MQCONN REQUEST
*        HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST
*
         CALL  MQGET,                          X
               (HCONN,                         X
               HOBJ,                           X
               WMD,                            X
               WGMO,                           X
               BUFFLEN,                        X
               BUFFER,                         X
               DATALEN,                        X
               COMPCODE,                       X
               REASON),                        X
               VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK
         C   R5,COMPCODE
         BNE BADCALL
*
         ⋮
BADCALL DS  0H
⋮
```

```
*
*      CONSTANTS
*
         CMQMDA DSECT=NO,LIST=YES
         CMQGMOA DSECT=NO,LIST=YES
         CMQA
*
*      WORKING STORAGE DSECT
*
WORKSTG  DSECT
*
COMPCODE DS F
REASON   DS F
BUFFLEN  DS F
DATALEN  DS F
OPTIONS  DS F
HCONN    DS F
HOBJ     DS F
```

```
*
BUFFER   DS CL80
BUFFER_LEN EQU *-BUFFER
*
WMD      CMQMDA DSECT=NO,LIST=NO
WGMO     CMQGMOA DSECT=NO,LIST=NO
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
⋮
END
```

Getting a message using the wait option

This example demonstrates how to use the wait option of the MQGET call.

This code accepts truncated messages. This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*     CONNECT TO QUEUE MANAGER
CONN    DS  0H
⋮
*     OPEN A QUEUE FOR GET
OPEN    DS  0H
⋮
*     R4,R5,R6,R7 = WORK REGISTER.
GET  DS  0H
     LA   R4,MQMD              SET UP ADDRESSES AND
     LA   R5,MQMD_LENGTH       LENGTH FOR USE BY MVCL
     LA   R6,WMD               INSTRUCTION, AS MQMD IS
     LA   R7,WMD_LENGTH        OVER 256 BYES LONG.
     MVCL R6,R4                INITIALIZE WORKING VERSION
*                                  OF MESSAGE DESCRIPTOR
```

```
*
     MVC  WGMO_AREA,MQGMO_AREA   INITIALIZE WORKING MQGMO
     L    R5,=AL4(MQGMO_WAIT)
     A    R5,=AL4(MQGMO_ACCEPT_TRUNCATED_MSG)
     ST   R5,WGMO_OPTIONS
     MVC  WGMO_WAITINTERVAL,TWO_MINUTES   WAIT UP TO TWO
                                          MINUTES BEFORE
                                          FAILING THE
                                          CALL
*
     LA   R5,BUFFER_LEN     RETRIEVE THE BUFFER LENGTH
     ST   R5,BUFFLEN        AND SAVE IT FOR MQM USE
*
*  ISSUE MQI GET REQUEST USING REENTRANT FORM OF CALL MACRO
*
*        HCONN WAS SET BY PREVIOUS MQCONN REQUEST
*        HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST
*
         CALL  MQGET,                            X
               (HCONN,                           X
               HOBJ,                             X
               WMD,                              X
               WGMO,                             X
               BUFFLEN,                          X
               BUFFER,                           X
               DATALEN,                          X
               COMPCODE,                         X
               REASON),                          X
               VL,MF=(E,CALLLST)
*
  LA  R5,MQCC_OK                  DID THE MQGET REQUEST
  C   R5,COMPCODE                   WORK OK?
  BE  GETOK                       YES, SO GO AND PROCESS.
  LA  R5,MQCC_WARNING             NO, SO CHECK FOR A WARNING.
  C   R5,COMPCODE                 IS THIS A WARNING?
  BE  CHECK_W                     YES, SO CHECK THE REASON.
*
  LA  R5,MQRC_NO_MSG_AVAILABLE   IT MUST BE AN ERROR.
                                 IS IT DUE TO AN EMPTY
  C   R5,REASON                  QUEUE?
  BE  NOMSG                      YES, SO HANDLE THE ERROR
  B   BADCALL                    NO, SO GO TO ERROR ROUTINE
```

```
*
CHECK_W  DS  0H
         LA  R5,MQRC_TRUNCATED_MSG_ACCEPTED   IS THIS A
                                              TRUNCATED
         C   R5,REASON                        MESSAGE?
         BE  GETOK                   YES, SO GO AND PROCESS.
         B   BADCALL                 NO, SOME OTHER WARNING
*
NOMSG    DS  0H
         ⋮
GETOK    DS  0H
         ⋮
```

```
BADCALL DS  0H
⋮
*
*      CONSTANTS
*
         CMQMDA DSECT=NO,LIST=YES
         CMQGMOA DSECT=NO,LIST=YES
         CMQA
*
TWO_MINUTES DC F'120000'       GET WAIT INTERVAL
*
*      WORKING STORAGE DSECT
```

```
*
WORKSTG  DSECT
*
COMPCODE DS F
REASON   DS F
BUFFLEN  DS F
DATALEN  DS F
OPTIONS  DS F
HCONN    DS F
HOBJ     DS F
*
BUFFER   DS CL80
BUFFER_LEN EQU *-BUFFER
*
WMD      CMQMDA DSECT=NO,LIST=NO
WGMO     CMQGMOA DSECT=NO,LIST=NO
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
         ⋮
         END
```

Getting a message using signaling

This example demonstrates how to use the MQGET call to set a signal so that you are notified when a suitable message arrives on a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
⋮
*
*     CONNECT TO QUEUE MANAGER
*
CONN    DS  0H
        ⋮
*
*     OPEN A QUEUE FOR GET
*
OPEN    DS  0H
        ⋮
*
*     R4,R5,R6,R7 = WORK REGISTER.
*
GET  DS  0H
     LA   R4,MQMD                SET UP ADDRESSES AND
     LA   R5,MQMD_LENGTH         LENGTH FOR USE BY MVCL
     LA   R6,WMD                 INSTRUCTION, AS MQMD IS
     LA   R7,WMD_LENGTH          OVER 256 BYES LONG.
```

```
     MVCL R6,R4                    INITIALIZE WORKING VERSION
*                                     OF MESSAGE DESCRIPTOR
```

```
*
     MVC  WGMO_AREA,MQGMO_AREA   INITIALIZE WORKING MQGMO
     LA   R5,MQGMO_SET_SIGNAL
     ST   R5,WGMO_OPTIONS
     MVC  WGMO_WAITINTERVAL,FIVE_MINUTES   WAIT UP TO FIVE
                                           MINUTES BEFORE
*                                          FAILING THE CALL
*
     XC   SIG_ECB,SIG_ECB   CLEAR THE ECB
     LA   R5,SIG_ECB        GET THE ADDRESS OF THE ECB
     ST   R5,WGMO_SIGNAL1   AND PUT IT IN THE WORKING
*                                    MQGMO
*
     LA   R5,BUFFER_LEN     RETRIEVE THE BUFFER LENGTH
     ST   R5,BUFFLEN        AND SAVE IT FOR MQM USE
*
*
*    ISSUE MQI GET REQUEST USING REENTRANT FORM OF CALL MACRO
*
*        HCONN WAS SET BY PREVIOUS MQCONN REQUEST
*        HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST
*
         CALL  MQGET,                            X
               (HCONN,                           X
               HOBJ,                             X
               WMD,                              X
               WGMO,                             X
               BUFFLEN,                          X
               BUFFER,                           X
               DATALEN,                          X
               COMPCODE,                         X
               REASON),                          X
               VL,MF=(E,CALLLST)
*
         LA  R5,MQCC_OK        DID THE MQGET REQUEST
         C   R5,COMPCODE       WORK OK?
         BE  GETOK             YES, SO GO AND PROCESS.
         LA  R5,MQCC_WARNING   NO, SO CHECK FOR A WARNING.
         C   R5,COMPCODE       IS THIS A WARNING?
         BE  CHECK_W           YES, SO CHECK THE REASON.
         B   BADCALL           NO, SO GO TO ERROR ROUTINE
*
```

```
CHECK_W  DS  0H
         LA  R5,MQRC_SIGNAL_REQUEST_ACCEPTED
         C   R5,REASON   SIGNAL REQUEST SIGNAL SET?
         BNE BADCALL     NO, SOME ERROR OCCURRED
         B   DOWORK      YES, SO DO SOMETHING
*                          ELSE
*
CHECKSIG DS  0H
         CLC SIG_ECB+1(3),=AL3(MQEC_MSG_ARRIVED)
                               IS A MESSAGE AVAILABLE?
         BE  GET               YES, SO GO AND GET IT
*
         CLC SIG_ECB+1(3),=AL3(MQEC_WAIT_INTERVAL_EXPIRED)
                         HAVE WE WAITED LONG ENOUGH?
         BE  NOMSG       YES, SO SAY NO MSG AVAILABLE
         B   BADCALL     IF IT'S ANYTHING ELSE
*                        GO TO ERROR ROUTINE.
*
DOWORK   DS  0H
         ⋮
         TM  SIG_ECB,X'40'   HAS THE SIGNAL ECB BEEN POSTED?
         BO  CHECKSIG        YES, SO GO AND CHECK WHY
         B   DOWORK          NO, SO GO AND DO MORE WORK
*
NOMSG    DS  0H
         ⋮
GETOK    DS  0H
         ⋮
BADCALL DS  0H
        ⋮
*
```

```
*      CONSTANTS
*
         CMQMDA DSECT=NO,LIST=YES
         CMQGMOA DSECT=NO,LIST=YES
         CMQA
*
FIVE_MINUTES DC F'300000'        GET SIGNAL INTERVAL
*
*      WORKING STORAGE DSECT
*
WORKSTG  DSECT
*
COMPCODE DS F
REASON   DS F
BUFFLEN  DS F
DATALEN  DS F
OPTIONS  DS F
HCONN    DS F
HOBJ     DS F
SIG_ECB  DS F
```

```
*
BUFFER   DS CL80
BUFFER_LEN EQU *-BUFFER
*
WMD      CMQMDA DSECT=NO,LIST=NO
WGMO     CMQGMOA DSECT=NO,LIST=NO
*
CALLLST  CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
*
:
END
```

Inquiring about and setting the attributes of a queue

This example demonstrates how to use the MQINQ call to inquire about the attributes of a queue and to use the MQSET call to change the attributes of a queue.

This extract is taken from the Queue Attributes sample application (program CSQ4CAC1) supplied with IBM MQ for z/OS.

```
:
DFHEISTG DSECT
         :
OBJDESC  CMQODA LIST=YES   Working object descriptor
*
SELECTORCOUNT   DS F       Number of selectors
INTATTRCOUNT    DS F       Number of integer attributes
CHARATTRLENGTH  DS F       char attributes length
CHARATTRS       DS C       Area for char attributes
*
OPTIONS  DS   F            Command options
HCONN    DS   F            Handle of connection
HOBJ     DS   F            Handle of object
COMPCODE DS   F            Completion code
REASON   DS   F            Reason code
SELECTOR DS   2F           Array of selectors
INTATTRS DS   2F           Array of integer attributes
         :
OBJECT   DS   CL(MQ_Q_NAME_LENGTH)   Name of queue
         :
CALLLIST CALL ,(0,0,0,0,0,0,0,0,0,0,0),VL,MF=L
**********************************************************
*                   PROGRAM EXECUTION STARTS HERE        *
:
CSQ4CAC1 DFHEIENT CODEREG=(R3),DATAREG=(R13)
         :
*        Initialize the variables for the set call
*
         SR   R0,R0               Clear register zero
         ST   R0,CHARATTRLENGTH   Set char length to zero
         LA   R0,2                Load to set
         ST   R0,SELECTORCOUNT    selectors add
         ST   R0,INTATTRCOUNT     integer attributes
*
         LA   R0,MQIA_INHIBIT_GET Load q attribute selector
```

```
         ST   R0,SELECTOR+0       Place in field
         LA   R0,MQIA_INHIBIT_PUT Load q attribute selector
         ST   R0,SELECTOR+4       Place in field
*
UPDTEST  DS   0H
         CLC  ACTION,CINHIB       Are we inhibiting?
         BE   UPDINHBT            Yes branch to section
*
         CLC  ACTION,CALLOW       Are we allowing?
         BE   UPDALLOW            Yes branch to section
*
         MVC  M00_MSG,M01_MSG1    Invalid request
         BR   R6                  Return to caller
*
```

```
UPDINHBT DS   0H
         MVC  UPDTYPE,CINHIBIT      Indicate action type
         LA   R0,MQQA_GET_INHIBITED Load attribute value
         ST   R0,INTATTRS+0         Place in field
         LA   R0,MQQA_PUT_INHIBITED Load attribute value
         ST   R0,INTATTRS+4         Place in field
         B    UPDCALL               Go and do call
*
UPDALLOW DS   0H
         MVC  UPDTYPE,CALLOWED      Indicate action type
         LA   R0,MQQA_GET_ALLOWED   Load attribute value
         ST   R0,INTATTRS+0         Place in field
         LA   R0,MQQA_PUT_ALLOWED   Load attribute value
         ST   R0,INTATTRS+4         Place in field
         B    UPDCALL               Go and do call
*
UPDCALL  DS   0H
         CALL MQSET,                          C
               (HCONN,                        C
               HOBJ,                          C
               SELECTORCOUNT,                 C
               SELECTOR,                      C
               INTATTRCOUNT,                  C
               INTATTRS,                      C
               CHARATTRLENGTH,                C
               CHARATTRS,                     C
               COMPCODE,                      C
               REASON),                       C
               VL,MF=(E,CALLLIST)
*
         LA   R0,MQCC_OK    Load expected compcode
         C    R0,COMPCODE   Was set successful?
         ⋮
*  SECTION NAME : INQUIRE                              *
*  FUNCTION     : Inquires on the objects attributes     *
*  CALLED BY    : PROCESS                              *
*  CALLS        : OPEN, CLOSE, CODES                   *
*  RETURN       : To Register 6                        *
INQUIRE  DS   0H
         ⋮
```

```
*        Initialize the variables for the inquire call
*
         SR   R0,R0               Clear register zero
         ST   R0,CHARATTRLENGTH   Set char length to zero
         LA   R0,2                Load to set
         ST   R0,SELECTORCOUNT    selectors add
         ST   R0,INTATTRCOUNT     integer attributes
*
         LA   R0,MQIA_INHIBIT_GET Load attribute value
         ST   R0,SELECTOR+0       Place in field
         LA   R0,MQIA_INHIBIT_PUT Load attribute value
         ST   R0,SELECTOR+4       Place in field
         CALL MQINQ,                          C
               (HCONN,                        C
               HOBJ,                          C
               SELECTORCOUNT,                 C
               SELECTOR,                      C
               INTATTRCOUNT,                  C
               INTATTRS,                      C
               CHARATTRLENGTH,                C
               CHARATTRS,                     C
               COMPCODE,                      C
```

```
              REASON),                        C
              VL,MF=(E,CALLLIST)
         LA   R0,MQCC_OK        Load expected compcode
         C    R0,COMPCODE       Was inquire successful?
         ⋮
```

PL/I examples

The use of PL/I is supported by z/OS only. This collection of topics demonstrates techniques using PL/I examples.

Connecting to a queue manager

This example demonstrates how to use the MQCONN call to connect a program to a queue manager in z/OS batch.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQP);
%INCLUDE SYSLIB(CMQEPP);
:
/****************************************************/
/* STRUCTURE BASED ON PARAMETER INPUT AREA (PARAM)  */
/****************************************************/
DCL 1 INPUT_PARAM      BASED(ADDR(PARAM)),
      2 PARAM_LENGTH   FIXED BIN(15),
      2 PARAM_MQMNAME  CHAR(48);
      ⋮
/****************************************************/
/* WORKING STORAGE DECLARATIONS                     */
/****************************************************/
DCL MQMNAME                   CHAR(48);
DCL COMPCODE                  BINARY FIXED (31);
DCL REASON                    BINARY FIXED (31);
DCL HCONN                     BINARY FIXED (31);
⋮
/****************************************************/
/* COPY QUEUE MANAGER NAME PARAMETER                */
/* TO LOCAL STORAGE                                 */
/****************************************************/
MQMNAME = ' ';
MQMNAME = SUBSTR(PARAM_MQMNAME,1,PARAM_LENGTH);
⋮
/****************************************************/
/* CONNECT FROM THE QUEUE MANAGER                   */
/****************************************************/
CALL MQCONN (MQMNAME,     /* MQM SYSTEM NAME        */
             HCONN,       /* CONNECTION HANDLE      */
             COMPCODE,    /* COMPLETION CODE        */
             REASON);     /* REASON CODE            */

/****************************************************/
/* TEST THE COMPLETION CODE OF THE CONNECT CALL.    */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE    */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE. */
/****************************************************/
IF COMPCODE ¬= MQCC_OK
   THEN DO;
     ⋮
     CALL ERROR_ROUTINE;
   END;
```

Disconnecting from a queue manager

This example demonstrates how to use the MQDISC call to disconnect a program from a queue manager in z/OS batch.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQP);
%INCLUDE SYSLIB(CMQEPP);
:
/****************************************************/
/* WORKING STORAGE DECLARATIONS                     */
```

```
     /**************************************************/
     DCL COMPCODE                  BINARY FIXED (31);
     DCL REASON                    BINARY FIXED (31);
     DCL HCONN                     BINARY FIXED (31);
 :
     /**************************************************/
     /* DISCONNECT FROM THE QUEUE MANAGER              */
     /**************************************************/
     CALL MQDISC (HCONN,       /* CONNECTION HANDLE      */
                  COMPCODE,    /* COMPLETION CODE        */
                  REASON);     /* REASON CODE            */

/**************************************************************/
/* TEST THE COMPLETION CODE OF THE DISCONNECT CALL.           */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE              */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.           */
/**************************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          :
          CALL ERROR_ROUTINE;
        END;
```

Creating a dynamic queue

This example demonstrates how to use the MQOPEN call to create a dynamic queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```

     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     :
/*********************************************************/
/* WORKING STORAGE DECLARATIONS                          */
/*********************************************************/
DCL COMPCODE                  BINARY FIXED (31);
DCL REASON                    BINARY FIXED (31);
DCL HCONN                     BINARY FIXED (31);
DCL HOBJ                      BINARY FIXED (31);
DCL OPTIONS                   BINARY FIXED (31);
:
DCL MODEL_QUEUE_NAME     CHAR(48) INIT('PL1.REPLY.MODEL');
DCL DYNAMIC_NAME_PREFIX  CHAR(48) INIT('PL1.TEMPQ.*');
DCL DYNAMIC_QUEUE_NAME   CHAR(48) INIT(' ');
:
/*********************************************************/
/* LOCAL COPY OF OBJECT DESCRIPTOR                       */
/*********************************************************/
DCL 1 LMQOD  LIKE MQOD;
:
/*********************************************************/
/* SET UP OBJECT DESCRIPTOR FOR OPEN OF REPLY QUEUE      */
/*********************************************************/
LMQOD.OBJECTTYPE =MQOT_Q;
LMQOD.OBJECTNAME = MODEL_QUEUE_NAME;
LMQOD.DYNAMICQNAME = DYNAMIC_NAME_PREFIX;
OPTIONS = MQOO_INPUT_EXCLUSIVE;

     CALL MQOPEN (HCONN,
                  LMQOD,
                  OPTIONS,
                  HOBJ,
                  COMPCODE,
                  REASON);

/*********************************************************/
/* TEST THE COMPLETION CODE OF THE OPEN CALL.            */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE         */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.      */
/* IF THE CALL HAS SUCCEEDED THEN EXTRACT THE NAME OF    */
/* THE NEWLY CREATED DYNAMIC QUEUE FROM THE OBJECT       */
/* DESCRIPTOR.                                           */
/*********************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          :
          CALL ERROR_ROUTINE;
        END;
```

```
        ELSE
          DYNAMIC_QUEUE_NAME = LMQOD_OBJECTNAME;
```

Opening an existing queue

This example demonstrates how to use the MQOPEN call to open an existing queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQP);
%INCLUDE SYSLIB(CMQEPP);
:
/*********************************************************/
/* WORKING STORAGE DECLARATIONS                          */
/*********************************************************/
DCL COMPCODE            BINARY FIXED (31);
DCL REASON              BINARY FIXED (31);
DCL HCONN               BINARY FIXED (31);
DCL HOBJ                BINARY FIXED (31);
DCL OPTIONS             BINARY FIXED (31);
⋮
DCL QUEUE_NAME          CHAR(48) INIT('PL1.LOCAL.QUEUE');
⋮
/*********************************************************/
/* LOCAL COPY OF OBJECT DESCRIPTOR                       */
/*********************************************************/
DCL 1 LMQOD  LIKE MQOD;
⋮
/*********************************************************/
/* SET UP OBJECT DESCRIPTOR FOR OPEN OF REPLY QUEUE      */
/*********************************************************/
LMQOD.OBJECTTYPE = MQOT_Q;
LMQOD.OBJECTNAME = QUEUE_NAME;
OPTIONS = MQOO_INPUT_EXCLUSIVE;

CALL MQOPEN (HCONN,
             LMQOD,
             OPTIONS,
             HOBJ,
             COMPCODE,
             REASON);

/*********************************************************/
/* TEST THE COMPLETION CODE OF THE OPEN CALL.            */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE         */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.      */
/*********************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Closing a queue

This example demonstrates how to use the MQCLOSE call.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQP);
%INCLUDE SYSLIB(CMQEPP);
:
/*********************************************************/
/* WORKING STORAGE DECLARATIONS                          */
/*********************************************************/
DCL COMPCODE                   BINARY FIXED (31);
DCL REASON                     BINARY FIXED (31);
DCL HCONN                      BINARY FIXED (31);
DCL HOBJ                       BINARY FIXED (31);
DCL OPTIONS                    BINARY FIXED (31);
⋮
/*********************************************************/
/* SET CLOSE OPTIONS                                     */
/*********************************************************/
OPTIONS=MQCO_NONE;

/*********************************************************/
```

```
/* CLOSE QUEUE                                            */
/**********************************************************/
   CALL MQCLOSE (HCONN,      /* CONNECTION HANDLE        */
                 HOBJ,       /* OBJECT HANDLE            */
                 OPTIONS,    /* CLOSE OPTIONS            */
                 COMPCODE,   /* COMPLETION CODE          */
                 REASON);    /* REASON CODE              */

/**********************************************************/
/* TEST THE COMPLETION CODE OF THE CLOSE CALL.            */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE          */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.       */
/**********************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Putting a message using MQPUT

This example demonstrates how to use the MQPUT call using context.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQP);
%INCLUDE SYSLIB(CMQEPP);
:
/**********************************************************/
/* WORKING STORAGE DECLARATIONS                           */
/**********************************************************/
DCL COMPCODE                  BINARY FIXED (31);
DCL REASON                    BINARY FIXED (31);
DCL HCONN                     BINARY FIXED (31);
DCL HOBJ                      BINARY FIXED (31);
DCL OPTIONS                   BINARY FIXED (31);
DCL BUFFLEN                   BINARY FIXED (31);
DCL BUFFER                    CHAR(80);
⋮
DCL PL1_TEST_MESSAGE          CHAR(80)
INIT('*****     THIS IS A TEST MESSAGE     *****');
⋮
**********************************************************/
/* LOCAL COPY OF MESSAGE DESCRIPTOR                       */
/* AND PUT MESSAGE OPTIONS                                */
/**********************************************************/
DCL 1 LMQMD  LIKE MQMD;
DCL 1 LMQPMO LIKE MQPMO;
⋮
/**********************************************************/
/* SET UP MESSAGE DESCRIPTOR                              */
/**********************************************************/
LMQMD.MSGTYPE = MQMT_DATAGRAM;
LMQMD.PRIORITY = 1;
LMQMD.PERSISTENCE = MQPER_PERSISTENT;
LMQMD.REPLYTOQ = ' ';
LMQMD.REPLYTOQMGR = ' ';
LMQMD.MSGID = MQMI_NONE;
LMQMD.CORRELID = MQCI_NONE;

/**********************************************************/
/* SET UP PUT MESSAGE OPTIONS                             */
/**********************************************************/
LMQPMO.OPTIONS = MQPMO_NO_SYNCPOINT;

/**********************************************************/
/* SET UP LENGTH OF MESSAGE BUFFER AND THE MESSAGE        */
/**********************************************************/
BUFFLEN = LENGTH(BUFFER);
BUFFER = PL1_TEST_MESSAGE;
/**********************************************************/
/*                                                        */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.              */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.               */
/*                                                        */
/**********************************************************/
CALL MQPUT (HCONN,
            HOBJ,
            LMQMD,
```

```
            LMQPMO,
            BUFFLEN,
            BUFFER,
            COMPCODE,
            REASON);
```

```
/**********************************************************/
/* TEST THE COMPLETION CODE OF THE PUT CALL.              */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE          */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.       */
/**********************************************************/
    IF COMPCODE ¬= MQCC_OK
       THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Putting a message using MQPUT1

This example demonstrates how to use the MQPUT1 call.

This extract is not taken from the sample applications supplied with IBM MQ.

```
%INCLUDE SYSLIB(CMQEPP);
%INCLUDE SYSLIB(CMQP);
⋮
/**********************************************************/
/* WORKING STORAGE DECLARATIONS             */
/**********************************************************/
DCL COMPCODE      BINARY FIXED (31);
DCL REASON       BINARY FIXED (31);
DCL HCONN        BINARY FIXED (31);
DCL OPTIONS       BINARY FIXED (31);
DCL BUFFLEN       BINARY FIXED (31);
DCL BUFFER       CHAR(80);
⋮
DCL REPLY_TO_QUEUE   CHAR(48) INIT('PL1.REPLY.QUEUE');
DCL QUEUE_NAME     CHAR(48) INIT('PL1.LOCAL.QUEUE');
DCL PL1_TEST_MESSAGE  CHAR(80)
INIT('***** THIS IS ANOTHER TEST MESSAGE *****');
⋮
/**********************************************************/
/* LOCAL COPY OF OBJECT DESCRIPTOR, MESSAGE DESCRIPTOR  */
/* AND PUT MESSAGE OPTIONS                */
/**********************************************************/
DCL 1 LMQOD LIKE MQOD;
DCL 1 LMQMD LIKE MQMD;
DCL 1 LMQPMO LIKE MQPMO;
⋮
/**********************************************************/
/* SET UP OBJECT DESCRIPTOR AS REQUIRED.         */
/**********************************************************/
LMQOD.OBJECTTYPE = MQOT_Q;
LMQOD.OBJECTNAME = QUEUE_NAME;

/**********************************************************/
/* SET UP MESSAGE DESCRIPTOR AS REQUIRED.        */
/**********************************************************/
LMQMD.MSGTYPE = MQMT_REQUEST;
LMQMD.PRIORITY = 5;
LMQMD.PERSISTENCE = MQPER_PERSISTENT;
LMQMD.REPLYTOQ = REPLY_TO_QUEUE;
LMQMD.REPLYTOQMGR = ' ';
LMQMD.MSGID = MQMI_NONE;
LMQMD.CORRELID = MQCI_NONE;
```

```
/**********************************************************/
/* SET UP PUT MESSAGE OPTIONS AS REQUIRED        */
/**********************************************************/
LMQPMO.OPTIONS = MQPMO_NO_SYNCPOINT;

/**********************************************************/
/* SET UP LENGTH OF MESSAGE BUFFER AND THE MESSAGE    */
/**********************************************************/
BUFFLEN = LENGTH(BUFFER);
```

```
BUFFER = PL1_TEST_MESSAGE;

CALL MQPUT1 (HCONN,
LMQOD,
LMQMD,
LMQPMO,
BUFFLEN,
BUFFER,
COMPCODE,
REASON);

/*********************************************************/
/* TEST THE COMPLETION CODE OF THE PUT1 CALL.      */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE SHOWING */
/* THE COMPLETION CODE AND THE REASON CODE.       */
/*********************************************************/
IF COMPCODE ¬= MQCC_OK
THEN DO;
⋮
CALL ERROR_ROUTINE;
END;
```

Getting a message

This example demonstrates how to use the MQGET call to remove a message from a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     ⋮
/*********************************************************/
/* WORKING STORAGE DECLARATIONS                          */
/*********************************************************/
     DCL COMPCODE                  BINARY FIXED (31);
     DCL REASON                    BINARY FIXED (31);
     DCL HCONN                     BINARY FIXED (31);
     DCL HOBJ                      BINARY FIXED (31);
     DCL BUFFLEN                   BINARY FIXED (31);
     DCL DATALEN                   BINARY FIXED (31);
     DCL BUFFER                    CHAR(80);
⋮
```

```
/*********************************************************/
/* LOCAL COPY OF MESSAGE DESCRIPTOR AND                  */
/* GET MESSAGE OPTIONS                                   */
/*********************************************************/
     DCL 1 LMQMD  LIKE MQMD;
     DCL 1 LMQGMO LIKE MQGMO;
     ⋮
/*********************************************************/
/* SET UP MESSAGE DESCRIPTOR AS REQUIRED.                */
/* MSGID AND CORRELID IN MQMD SET TO NULLS SO FIRST      */
/* AVAILABLE MESSAGE WILL BE RETRIEVED.                  */
/*********************************************************/
     LMQMD.MSGID = MQMI_NONE;
     LMQMD.CORRELID = MQCI_NONE;

/*********************************************************/
/* SET UP GET MESSAGE OPTIONS AS REQUIRED.               */
/*********************************************************/
     LMQGMO.OPTIONS = MQGMO_NO_SYNCPOINT;

/*********************************************************/
/* SET UP LENGTH OF MESSAGE BUFFER.                      */
/*********************************************************/
     BUFFLEN = LENGTH(BUFFER);
/*********************************************************/
/*                                                       */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.             */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.              */
/*                                                       */
/*********************************************************/

     CALL MQGET (HCONN,
                 HOBJ,
                 LMQMD,
```

```
                 LMQGMO,
                 BUFFERLEN,
                 BUFFER,
                 DATALEN,
                 COMPCODE,
                 REASON);

/**********************************************************/
/* TEST THE COMPLETION CODE OF THE GET CALL.              */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE          */
/* SHOWING THE COMPLETION CODE AND THE REASON CODE.       */
/**********************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Getting a message using the wait option

This example demonstrates how to use the MQGET call with the wait option and accepting truncated messages.

This extract is not taken from the sample applications supplied with IBM MQ.

```
     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     ⋮
/**********************************************************/
/* WORKING STORAGE DECLARATIONS                           */
/**********************************************************/
     DCL COMPCODE                  BINARY FIXED (31);
     DCL REASON                    BINARY FIXED (31);
     DCL HCONN                     BINARY FIXED (31);
     DCL HOBJ                      BINARY FIXED (31);
     DCL BUFFLEN                   BINARY FIXED (31);
     DCL DATALEN                   BINARY FIXED (31);
     DCL BUFFER                    CHAR(80);
     ⋮
/**********************************************************/
/* LOCAL COPY OF MESSAGE DESCRIPTOR AND GET MESSAGE       */
/* OPTIONS                                                */
/**********************************************************/
     DCL 1 LMQMD  LIKE MQMD;
     DCL 1 LMQGMO LIKE MQGMO;
     ⋮
/**********************************************************/
/* SET UP MESSAGE DESCRIPTOR AS REQUIRED.                 */
/* MSGID AND CORRELID IN MQMD SET TO NULLS SO FIRST       */
/* AVAILABLE MESSAGE WILL BE RETRIEVED.                   */
/**********************************************************/
     LMQMD.MSGID = MQMI_NONE;
     LMQMD.CORRELID = MQCI_NONE;

/**********************************************************/
/* SET UP GET MESSAGE OPTIONS AS REQUIRED.                */
/* WAIT INTERVAL SET TO ONE MINUTE.                       */
/**********************************************************/
     LMQGMO.OPTIONS = MQGMO_WAIT +
                      MQGMO_ACCEPT_TRUNCATED_MSG +
                      MQGMO_NO_SYNCPOINT;
     LMQGMO.WAITINTERVAL=60000;

/**********************************************************/
/* SET UP LENGTH OF MESSAGE BUFFER.                       */
/**********************************************************/
     BUFFLEN = LENGTH(BUFFER);
```

```
/**********************************************************/
/*                                                        */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.              */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.               */
/*                                                        */
/**********************************************************/

     CALL MQGET (HCONN,
                 HOBJ,
```

```
                  LMQMD,
                  LMQGMO,
                  BUFFERLEN,
                  BUFFER,
                  DATALEN,
                  COMPCODE,
                  REASON);

/**********************************************************/
/* TEST THE COMPLETION CODE OF THE GET CALL.              */
/* TAKE APPROPRIATE ACTION BASED ON COMPLETION CODE AND   */
/* REASON CODE.                                           */
/**********************************************************/

     SELECT(COMPCODE);
       WHEN (MQCC_OK) DO;   /* GET WAS SUCCESSFUL */
       ⋮
       END;
       WHEN (MQCC_WARNING) DO;
         IF REASON = MQRC_TRUNCATED_MSG_ACCEPTED
           THEN DO;         /* GET WAS SUCCESSFUL */
           ⋮
           END;
           ELSE DO;
             ⋮
             CALL ERROR_ROUTINE;
           END;
       END;
       WHEN (MQCC_FAILED) DO;
           ⋮
           CALL ERROR_ROUTINE;
         END;
       END;
       OTHERWISE;
     END;
```

Getting a message using signaling

A code extract that demonstrates how to use the MQGET call with signaling.

Signaling is available only with IBM MQ for z/OS .

This extract is not taken from the sample applications supplied with IBM MQ.

```
     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     :
/**********************************************************/
/* WORKING STORAGE DECLARATIONS                           */
/**********************************************************/
     DCL COMPCODE                  BINARY FIXED (31);
     DCL REASON                    BINARY FIXED (31);
     DCL HCONN                     BINARY FIXED (31);
     DCL HOBJ                      BINARY FIXED (31);
     DCL DATALEN                   BINARY FIXED (31);
     DCL BUFFLEN                   BINARY FIXED (31);
     DCL BUFFER                    CHAR(80);
     ⋮
     DCL ECB_FIXED           FIXED BIN(31);
     DCL 1 ECB_OVERLAY BASED(ADDR(ECB_FIXED)),
           3 ECB_WAIT    BIT,
           3 ECB_POSTED  BIT,
           3 ECB_FLAG3_8 BIT(6),
           3 ECB_CODE  PIC'999';
     ⋮
/**********************************************************/
/* LOCAL COPY OF MESSAGE DESCRIPTOR AND GET MESSAGE       */
/* OPTIONS                                                */
/**********************************************************/
     DCL 1 LMQMD  LIKE MQMD;
     DCL 1 LMQGMO LIKE MQGMO;
     ⋮
/**********************************************************/
/* CLEAR ECB FIELD.                                       */
/**********************************************************/
     ECB_FIXED = 0;
     ⋮
/**********************************************************/
/* SET UP MESSAGE DESCRIPTOR AS REQUIRED.                 */
```

```
/* MSGID AND CORRELID IN MQMD SET TO NULLS SO FIRST      */
/* AVAILABLE MESSAGE WILL BE RETRIEVED.                  */
/*******************************************************/
     LMQMD.MSGID = MQMI_NONE;
     LMQMD.CORRELID = MQCI_NONE;
/*******************************************************/
/* SET UP GET MESSAGE OPTIONS AS REQUIRED.               */
/* WAIT INTERVAL SET TO ONE MINUTE.                      */
/*******************************************************/
     LMQGMO.OPTIONS = MQGMO_SET_SIGNAL +
                      MQGMO_NO_SYNCPOINT;
     LMQGMO.WAITINTERVAL=60000;
     LMQGMO.SIGNAL1 = ADDR(ECB_FIXED);
```

```
/*******************************************************/
/* SET UP LENGTH OF MESSAGE BUFFER.                      */
/* CALL MESSAGE RETRIEVAL ROUTINE.                       */
/*******************************************************/
     BUFFLEN = LENGTH(BUFFER);
     CALL GET_MSG;

/*******************************************************/
/* TEST THE COMPLETION CODE OF THE GET CALL.             */
/* TAKE APPROPRIATE ACTION BASED ON COMPLETION CODE AND  */
/* REASON CODE.                                          */
/*******************************************************/

     SELECT;
       WHEN ((COMPCODE = MQCC_OK) &
             (REASON = MQCC_NONE)) DO
         :
         CALL MSG_ROUTINE;
         :
       END;
       WHEN ((COMPCODE = MQCC_WARNING) &
             (REASON = MQRC_SIGNAL_REQUEST_ACCEPTED)) DO;
         :
         CALL DO_WORK;
         :
       END;
       WHEN  ((COMPCODE = MQCC_FAILED) &
             (REASON = MQRC_SIGNAL_OUTSTANDING)) DO;
         :
         CALL DO_WORK;
         :
       END;
       OTHERWISE DO;        /* FAILURE CASE */
/*******************************************************/
/* ISSUE AN ERROR MESSAGE SHOWING THE COMPLETION CODE    */
/* AND THE REASON CODE.                                  */
/*******************************************************/
          :
          CALL ERROR_ROUTINE;
          :
       END;
     END;
     :
```

```
 DO_WORK: PROC;
     :
     IF ECB_POSTED
        THEN DO;
          SELECT(ECB_CODE);
            WHEN(MQEC_MSG_ARRIVED) DO;
              :
              CALL GET_MSG;
              :
            END;
            WHEN(MQEC_WAIT_INTERVAL_EXPIRED) DO;
              :
              CALL NO_MSG;
              :
            END;
            OTHERWISE DO;        /* FAILURE CASE */
/*****************************************************/
/* ISSUE AN ERROR MESSAGE SHOWING THE COMPLETION CODE  */
/* AND THE REASON CODE.                                */
```

```
/*******************************************************/
              :
              CALL ERROR_ROUTINE;
              :
           END;

          END;

        END;
      :
 END DO_WORK;

 GET_MSG: PROC;
```

```
/*********************************************************/
/*                                                       */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.             */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.              */
/* MD AND GMO SET UP AS REQUIRED.                        */
/*                                                       */
/*********************************************************/

     CALL MQGET (HCONN,
                 HOBJ,
                 LMQMD,
                 LMQGMO,
                 BUFFLEN,
                 BUFFER,
                 DATALEN,
                 COMPCODE,
                 REASON);

 END GET_MSG;

 NO_MSG: PROC;
 :
 END NO_MSG;
```

Inquiring about the attributes of an object

This example demonstrates how to use the MQINQ call to inquire about the attributes of a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     :
/*********************************************************/
/* WORKING STORAGE DECLARATIONS                          */
/*********************************************************/
     DCL COMPCODE                 BINARY FIXED (31);
     DCL REASON                   BINARY FIXED (31);
     DCL HCONN                    BINARY FIXED (31);
     DCL HOBJ                     BINARY FIXED (31);
     DCL OPTIONS                  BINARY FIXED (31);
     DCL SELECTORCOUNT            BINARY FIXED (31);
     DCL INTATTRCOUNT             BINARY FIXED (31);
     DCL 1 SELECTOR_TABLE,
         3 SELECTORS(5)           BINARY FIXED (31);
     DCL 1 INTATTR_TABLE,
         3 INTATTRS(5)            BINARY FIXED (31);
     DCL CHARATTRLENGTH           BINARY FIXED (31);
     DCL CHARATTRS                CHAR(100);
     :

/*********************************************************/
/* SET VARIABLES FOR INQUIRE CALL                        */
/* INQUIRE ON THE CURRENT QUEUE DEPTH                    */
/*********************************************************/

     SELECTORS(01) = MQIA_CURRENT_Q_DEPTH;

     SELECTORCOUNT  = 1;
     INTATTRCOUNT   = 1;

     CHARATTRLENGTH = 0;
/*********************************************************/
```

```
/*                                                      */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.            */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.             */
/*                                                      */
/********************************************************/
     CALL MQINQ (HCONN,
                 HOBJ,
                 SELECTORCOUNT,
                 SELECTORS,
                 INTATTRCOUNT,
                 INTATTRS,
                 CHARATTRLENGTH,
                 CHARATTRS,
                 COMPCODE,
                 REASON);
```

```
/********************************************************/
/* TEST THE COMPLETION CODE OF THE INQUIRE CALL.        */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE SHOWING */
/* THE COMPLETION CODE AND THE REASON CODE.             */
/********************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Setting the attributes of a queue

This example demonstrates how to use the MQSET call to change the attributes of a queue.

This extract is not taken from the sample applications supplied with IBM MQ.

```
     %INCLUDE SYSLIB(CMQP);
     %INCLUDE SYSLIB(CMQEPP);
     :
/********************************************************/
/* WORKING STORAGE DECLARATIONS                         */
/********************************************************/
     DCL COMPCODE                  BINARY FIXED (31);
     DCL REASON                    BINARY FIXED (31);
     DCL HCONN                     BINARY FIXED (31);
     DCL HOBJ                      BINARY FIXED (31);
     DCL OPTIONS                   BINARY FIXED (31);
     DCL SELECTORCOUNT             BINARY FIXED (31);
     DCL INTATTRCOUNT              BINARY FIXED (31);
     DCL 1 SELECTOR_TABLE,
         3 SELECTORS(5)            BINARY FIXED (31);
     DCL 1 INTATTR_TABLE,
         3 INTATTRS(5)             BINARY FIXED (31);
     DCL CHARATTRLENGTH            BINARY FIXED (31);
     DCL CHARATTRS                 CHAR(100);
     ⋮

/********************************************************/
/* SET VARIABLES FOR SET CALL                           */
/* SET GET AND PUT INHIBITED                            */
/********************************************************/

     SELECTORS(01) = MQIA_INHIBIT_GET;
     SELECTORS(02) = MQIA_INHIBIT_PUT;

     INTATTRS(01) = MQQA_GET_INHIBITED;
     INTATTRS(02) = MQQA_PUT_INHIBITED;

     SELECTORCOUNT  = 2;
     INTATTRCOUNT   = 2;

     CHARATTRLENGTH = 0;
```

```
/********************************************************/
/*                                                      */
/* HCONN WAS SET BY PREVIOUS MQCONN REQUEST.            */
/* HOBJ WAS SET BY PREVIOUS MQOPEN REQUEST.             */
/*                                                      */
```

```
/*******************************************************/
     CALL MQSET (HCONN,
                 HOBJ,
                 SELECTORCOUNT,
                 SELECTORS,
                 INTATTRCOUNT,
                 INTATTRS,
                 CHARATTRLENGTH,
                 CHARATTRS,
                 COMPCODE,
                 REASON);

/*******************************************************/
/* TEST THE COMPLETION CODE OF THE SET CALL.           */
/* IF THE CALL HAS FAILED ISSUE AN ERROR MESSAGE SHOWING */
/* THE COMPLETION CODE AND THE REASON CODE.            */
/*******************************************************/
     IF COMPCODE ¬= MQCC_OK
        THEN DO;
          ⋮
          CALL ERROR_ROUTINE;
        END;
```

Constants

Use the reference information in this section to accomplish the tasks that address your business needs.

IBM MQ COPY, header, include, and module files

This information is general-use programming interface information.

This section contains information to help you use the MQI for various programming languages, as follows.

C header files

Header files are provided to help you write C application programs that use the MQI.

The C header files are summarized in the following table:

Table 1. C header files - call prototypes, data types, return codes, constants, and structures

File name	Description	IBM i	UNIX and Linux® systems	Windows	z/OS
Call prototypes, data types, return codes, constants, and structures					
CMQC	MQI definitions	C	C	C	C
CMQBC	MQAI definitions	C	C	C	
CMQEC	Interface Entry Points definition (includes CMQC, CMQXC and CMQZC)		C	C	
CMQCFC	PCF definitions	C	C	C	C
CMQPSC	Publish/Subscribe definitions	C	C	C	C
CMQXC	Channel and exit definitions	C	C	C	C
CMQZC	Installable services definitions	C	C	C	
Key: C= Files provided					

COBOL COPY files

Various COPY files are provided to help you write COBOL application programs that use the MQI.

Table 2. COBOL copy files - return codes, constants, and structures

File name	Description	IBM i	UNIX	Windows	z/OS
Return codes and constants					
CMQx	MQI definitions	V	V	V	V
CMQCFx	PCF definitions	V	V	V	V
CMQPSx	Publish/Subscribe definitions	V	V	V	V
CMQXx	Channel and exit definitions	V	V	V	V
Structures					
CMQAIRx	MQAIR - Authentication information record		V L	V L	
CMQBOx	MQBO - Begin options	V L	V L	V L	
CMQCDx	MQCD - Channel definition	V L	V L	V L	V L
CMQCFBFx	MQCFBF - PCF byte string filter parameter	V L	V L	V L	V L
CMQCFBSx	MQCFBS - PCF byte string parameter	V L	V L	V L	V L
CMQCFGRx	MQCFGR - PCF group parameter	V L	V L	V L	V L
CMQCFHx	MQCFH - PCF header	V L	V L	V L	V L
CMQCFIFx	MQCFIF - PCF integer filter parameter	V L	V L	V L	V L
CMQCFILx	MQCFIL - PCF integer list parameter	V L	V L	V L	V L
CMQCFINx	MQCFIN - PCF integer parameter	V L	V L	V L	V L
CMQCFSFx	MQCFSF - PCF string filter parameter	V L	V L	V L	V L
CMQCFSLx	MQCFSL - PCF string list parameter	V L	V L	V L	V L
CMQCFSTx	MQCFST - PCF string parameter	V L	V L	V L	V L
CMQCFXLx	MQCFIL64 - PCF 64-bit integer list parameter	V L	V L	V L	V L
CMQCFXNx	MQCFIN64 - PCF 64-bit integer parameter	V L	V L	V L	V L
CMQCHRVx	MQCHARV - Variable length string	V L	V L	V L	V L
CMQCIHx	MQCIH - CICS® bridge header	V L	V L	V L	V L
CMQCNOx	MQCNO - Connect options	V L	V L	V L	V L
CMQCSPx	MQCSP - Security parameters	V L	V L	V L	V L
CMQCXPx	MQCXP - Channel exit parameters	V L			V L
CMQDHx	MQDH - Distribution header	V L	V L	V L	V L
CMQDLHx	MQDLH - Dead-letter header	V L	V L	V L	V L

File name	Description	IBM i	UNIX	Windows	z/OS
CMQDXPx	MQDXP - Data conversion exit parameters	V L		V L	
CMQEPHx	MQEPH - Embedded PCF header	V L	V L	V L	V L
CMQGMOx	MQGMO - Get message options	V L	V L	V L	V L
CMQIIHx	MQIIH - IMS information header	V L	V L	V L	V L
CMQMDx	MQMD - Message descriptor	V L	V L	V L	V L
CMQMD1x	MQMD1 - Message descriptor version 1	V L	V L	V L	V L
CMQMD2x	MQMD2 - Message descriptor version 2	V L	V L	V L	V L
CMQMDEx	MQMDE - Message descriptor extended	V L	V L	V L	V L
CMQODx	MQOD - Object descriptor	V L	V L	V L	V L
CMQORx	MQOR - Object record	V L	V L	V L	V L
CMQPMOx	MQPMO - Put message options	V L	V L	V L	V L
CMQRFHx	MQRFH - Rules and formatting header	V L	V L	V L	V L
CMQRFH2x	MQRFH2 - Rules and formatting header 2	V L	V L	V L	V L
CMQRMHx	MQRMH - Reference message header	V L	V L	V L	V L
CMQRRx	MQRR - Response record	V L	V L	V L	
CMQSCOx	MQSCO - TLS configuraton options		V L	V L	
CMQTMx	MQTM - Trigger message	V L		V L	V L
CMQTMCx	MQTMC - Trigger message character	V L	V L		
CMQTMC2x	MQTMC2 - Trigger message 2 character	V L	V L	V L	V L
CMQWIHx	MQWIH - Work information header	V L	V L	V L	V L
CMQXQHx	MQXQH - Transmission queue header	V L	V L	V L	V L

Table 2. COBOL copy files - return codes, constants, and structures (continued)

Key:

- Files with initial values provided, x=V
- Files without initial values provided, x=L

z/OS PL/I include files

A number of INCLUDE files are provided for the PL/I programming language. These files are available on z/OS only.

Table 3. PL/I include files - data types, return codes, constants, and structures

File name	Description	IBM i	UNIX	Windows	z/OS
Data types, return codes, constants, and structures					
CMQP	MQI definitions				P
CMQCFP	PCF definitions				P
CMQEPP	Entry point definitions				P
CMQPSP	Publish/Subscribe definitions				P
CMQXP	Channel and exit definitions				P
Key: P= File provided					

IBM i RPG copy files

The RPG COPY files are provided for the RPG programming language. These files are available only on IBM i.

Table 4. RPG copy files - return codes, constants, and structures

File name	Description	IBM i	UNIX	Windows	z/OS
Return codes and constants					
CMQx	MQI definitions	G R			
CMQCFx	PCF definitions	G			
CMQPSx	Publish/Subscribe definitions	G			
CMQXx	Channel and exit definitions	G R			
Structures					
CMQBOx	MQBO - Begin options	G H			
CMQCDx	MQCD - Channel definition	G H R			
CMQCFBFx	MQCFBF - PCF byte string filter parameter	G H			
CMQCFBSx	MQCFBS - PCF byte string parameter	G H			
CMQCFGRx	MQCFGR - PCF group parameter	G H			
CMQCFHx	MQCFH - PCF header	G H			
CMQCFIFx	MQCFIF - PCF integer filter parameter	G H			
CMQCFILx	MQCFIL - PCF integer list parameter	G H			
CMQCFINx	MQCFIN - PCF integer parameter	G H			
CMQCFSFx	MQCFSF - PCF string filter parameter	G H			
CMQCFSLx	MQCFSL - PCF string list parameter	G H			

File name	Description	IBM i	UNIX	Windows	z/OS
CMQCFSTx	MQCFST - PCF string parameter	G H			
CMQCFXLx	MQCFIL64 - PCF 64-bit integer list parameter	G H			
CMQCFXNx	MQCFIN64 - PCF 64-bit integer parameter	G H			
CMQCHARVx	MQCHARV - Variable length string	G H			
CMQCIHx	MQCIH - CICS bridge header	G H			
CMQCNOx	MQCNO - Connect options	G H			
CMQCSPx	MQCSP - Security parameters	G H			
CMQCXPx	MQCXP - Channel exit parameters	G H R			
CMQDHx	MQDH - Distribution header	G H R			
CMQDLHx	MQDLH - Dead-letter header	G H R			
CMQDXPx	MQDXP - Data conversion exit parameters	G H R			
CMQEPHx	MQEPH - Embedded PCF header	G H			
CMQGMOx	MQGMO - Get message options	G H R			
CMQIIHx	MQIIH - IMS information header	G H R			
CMQMDx	MQMD - Message descriptor	G H R			
CMQMD1x	MQMD1 - Message descriptor version 1	G H R			
CMQMD2x	MQMD2 - Message descriptor version 2	G H			
CMQMDEx	MQMDE - Message descriptor extended	G H R			
CMQODx	MQOD - Object descriptor	G H R			
CMQORx	MQOR - Object record	G H R			
CMQPMOx	MQPMO - Put message options	G H R			
CMQPXPx	MQPXP - Publish/Subscribe routing exit parameters	G H			
CMQRFHx	MQRFH - Rules and formatting header	G H			
CMQRFH2x	MQRFH2 - Rules and formatting header 2	G H			
CMQRMHx	MQRMH - Reference message header	G H R			
CMQRRx	MQRR - Response record	G H R			
CMQTMx	MQTM - Trigger message	G H R			
CMQTMCx	MQTMC - Trigger message character	G H R			

Table 4. RPG copy files - return codes, constants, and structures (continued)					
File name	**Description**	**IBM i**	**UNIX**	**Windows**	**z/OS**
CMQTMC2x	MQTMC2 - Trigger message 2 character	G H R			
CMQWIHx	MQWIH - Work information header	G H			
CMQXQHx	MQXQH - Transmission queue header	G H R			
Key: • File for static linkage, initialized, provided x=G • File for static linkage, not initialized, provided x=H • File for dynamic linkage, initialized, provided, x=R					

Windows *Visual Basic module files*

Header (or form) files are provided to help you write Visual Basic application programs that use the MQI. These header files are supplied in 32-bit versions only.

Table 5. Visual Basic module files - call declarations, data types, return codes, constants, and structures					
File name	**Description**	**IBM i**	**UNIX and Linux systems**	**Windows**	**z/OS**
Call declarations, data types, return codes, constants, and structures					
CMQB	MQI definitions			B	
CMQBB	MQAI definitions			B	
CMQCFB	PCF definitions			B	
CMQXB	Channel and exit definitions			B	
Key: B= File provided					

z/OS *z/OS Assembler COPY files*

Various COPY files are provided to help you write z/OS Assembler application programs that use the MQI.

Table 6. z/OS Assembler copy files - data types, return codes, constants, and structures					
File name	**Description**	**IBM i**	**UNIX**	**Windows**	**z/OS**
Data types, return codes, and constants					
CMQA	MQI definitions				A
CMQCFA	PCF definitions				A
CMQPSA	Publish/Subscribe definitions				A
CMQVERA	Structure version control				A
CMQXA	Channel and exit definitions				A
Structures					
CMQCDA	MQCD - Channel definition				

File name	Description	IBM i	UNIX	Windows	z/OS
CMQCFBFA	MQCFBF - PCF byte string filter parameter				
CMQCFBSA	MQCFBS - PCF byte string parameter				A
CMQCFGRA	MQCFGR - PCF group parameter				A
CMQCFHA	MQCFH - PCF header				A
CMQCFIFA	MQCFIF - PCF integer filter parameter				A
CMQCFILA	MQCFIL - PCF integer list parameter				A
CMQCFINA	MQCFIN - PCF integer parameter				A
CMQCFSFA	MQCFSF - PCF string filter parameter				A
CMQCFSLA	MQCFSL - PCF string list parameter				A
CMQCFSTA	MQCFST - PCF string parameter				A
CMQCFXLA	MQCFIL64 - PCF 64-bit integer list parameter				A
CMQCFXNA	MQCFIN64 - PCF 64-bit integer parameter				A
CMQCHARVA	MQCHARV - Variable length string				A
CMQCIHA	MQCIH - CICS bridge header				A
CMQCNOA	MQCNO - Connect options				A
CMQCSPA	MQCSP - Security parameters				A
CMQCXPA	MQCXP - Channel exit parameters				A
CMQDHA	MQDH - Distribution header				A
CMQDLHA	MQDLH - Dead-letter header				A
CMQDXPA	MQDXP - Data conversion exit parameters				A
CMQEPHA	MQEPH - Embedded PCF header				A
CMQGMOA	MQGMO - Get message options				A
CMQIIHA	MQIIH - IMS information header				A
CMQMDA	MQMD - Message descriptor				A
CMQMD1A	MQMD1 - Message descriptor version 1				A
CMQMD2A	MQMD2 - Message descriptor version 2				A
CMQMDEA	MQMDE - Message descriptor extended				A
CMQODA	MQOD - Object descriptor				A

Table 6. z/OS Assembler copy files - data types, return codes, constants, and structures (continued)

Table 6. z/OS Assembler copy files - data types, return codes, constants, and structures (continued)					
File name	**Description**	**IBM i**	**UNIX**	**Windows**	**z/OS**
CMQORA	MQOR - Object record				A
CMQPMOA	MQPMO - Put message options				A
CMQRFHA	MQRFH - Rules and formatting header				A
CMQRFH2A	MQRFH2 - Rules and formatting header 2				A
CMQRMHA	MQRMH - Reference message header				A
CMQTMA	MQTM - Trigger message				A
CMQTMC2A	MQTMC2 - Trigger message 2 character				A
CMQWCRA	MQWCR - Cluster workload cluster record				A
CMQWDRA	MQWDR - Cluster workload destination record				A
CMQWDR1A	MQWDR1 - Cluster workload destination record version 1				A
CMQWDR2A	MQWDR2 - Cluster workload destination record version 2				A
CMQWIHA	MQWIH - Work information header				A
CMQWQRA	MQWQR - Cluster workload queue record				A
CMQWQR1A	MQWQR1 - Cluster workload queue record version 1				A
CMQWQR2A	MQWQR2 - Cluster workload queue record version 2				A
CMQWXPA	MQWXP - Cluster workload exit parameters				A
CMQWXP1A	MQWXP1 - Cluster workload exit parameters version 1				A
CMQWXP2A	MQWXP2 - Cluster workload exit parameters version 2				A
CMQWXP3A	MQWXP3 - Cluster workload exit parameters version 3				A
CMQXPA	MQXP - CICS API-crossing exit parameters				A
CMQXQHA	MQXQH - Transmission queue header				A
CMQXWDA	MQXWD - Exit wait descriptor				A
Key: A= File provided					

MQ_* (String Lengths)

Table 7. Values of constants

Name	Decimal value	Hexadecimal value
MQ_ABEND_CODE_LENGTH	4	X'00000004'
MQ_ACCOUNTING_TOKEN_LENGTH	32	X'00000020'
MQ_APPL_FUNCTION_NAME_LENGTH	10	X'0000000A'
MQ_APPL_IDENTITY_DATA_LENGTH	32	X'00000020'
MQ_APPL_NAME_LENGTH	28	X'0000001C'
MQ_APPL_ORIGIN_DATA_LENGTH	4	X'00000004'
MQ_APPL_TAG_LENGTH	28	X'0000001C'
MQ_ARM_SUFFIX_LENGTH	2	X'00000002'
MQ_ATTENTION_ID_LENGTH	4	X'00000004'
MQ_AUTH_INFO_CONN_NAME_LENGTH	264	X'00000108'
MQ_AUTH_INFO_DESC_LENGTH	64	X'00000040'
MQ_AUTH_INFO_NAME_LENGTH	48	X'00000030'
MQ_AUTH_INFO_OCSP_URL_LENGTH	256	X'00000100'
MQ_AUTHENTICATOR_LENGTH	8	X'00000008'
MQ_AUTO_REORG_CATALOG_LENGTH	44	X'0000002C'
MQ_AUTO_REORG_TIME_LENGTH	4	X'00000004'
MQ_BATCH_INTERFACE_ID_LENGTH	8	X'00000008'
MQ_BRIDGE_NAME_LENGTH	24	X'00000018'
MQ_CANCEL_CODE_LENGTH	4	X'00000004'
MQ_CF_STRUC_DESC_LENGTH	64	X'00000040'
MQ_CF_STRUC_NAME_LENGTH	12	X'0000000C'
MQ_CHANNEL_DATE_LENGTH	12	X'0000000C'
MQ_CHANNEL_DESC_LENGTH	64	X'00000040'
MQ_CHANNEL_NAME_LENGTH	20	X'00000014'
MQ_CHANNEL_TIME_LENGTH	8	X'00000008'
MQ_CHINIT_SERVICE_PARM_LENGTH	32	X'00000020'
MQ_CICS_FILE_NAME_LENGTH	8	X'00000008'
MQ_CLIENT_ID_LENGTH	23	X'00000017'
MQ_CLUSTER_NAME_LENGTH	48	X'00000030'
MQ_CONN_NAME_LENGTH	264	X'00000108'
MQ_CONN_TAG_LENGTH	128	X'00000080'
MQ_CONNECTION_ID_LENGTH	24	X'00000018'
MQ_CORREL_ID_LENGTH	24	X'00000018'
MQ_CREATION_DATE_LENGTH	12	X'0000000C'
MQ_CREATION_TIME_LENGTH	8	X'00000008'
MQ_DATE_LENGTH	12	X'0000000C'
MQ_DISTINGUISHED_NAME_LENGTH	1024	X'00000400'
MQ_DNS_GROUP_NAME_LENGTH	18	X'00000012'

Table 7. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQ_EXIT_DATA_LENGTH	32	X'00000020'
MQ_EXIT_INFO_NAME_LENGTH	48	X'00000030'
MQ_EXIT_NAME_LENGTH	(value differs by platform or version)	
MQ_EXIT_PD_AREA_LENGTH	48	X'00000030'
MQ_EXIT_USER_AREA_LENGTH	16	X'00000010'
MQ_FACILITY_LENGTH	8	X'00000008'
MQ_FACILITY_LIKE_LENGTH	4	X'00000004'
MQ_FORMAT_LENGTH	8	X'00000008'
MQ_FUNCTION_LENGTH	4	X'00000004'
MQ_GROUP_ID_LENGTH	24	X'00000018'
MQ_LDAP_PASSWORD_LENGTH	32	X'00000020'
MQ_LISTENER_NAME_LENGTH	48	X'00000030'
MQ_LISTENER_DESC_LENGTH	64	X'00000040'
MQ_LOCAL_ADDRESS_LENGTH	48	X'00000030'
MQ_LTERM_OVERRIDE_LENGTH	8	X'00000008'
MQ_LU_NAME_LENGTH	8	X'00000008'
MQ_LUWID_LENGTH	16	X'00000010'
MQ_MAX_EXIT_NAME_LENGTH	128	X'00000080'
MQ_MAX_MCA_USER_ID_LENGTH	64	X'00000040'
MQ_MAX_PROPERTY_NAME_LENGTH	4095	X'00000FFF'
MQ_MAX_USER_ID_LENGTH	64	X'00000040'
MQ_MCA_JOB_NAME_LENGTH	28	X'0000001C'
MQ_MCA_NAME_LENGTH	20	X'00000014'
MQ_MCA_USER_DATA_LENGTH	32	X'00000020'
MQ_MCA_USER_ID_LENGTH	(value differs by platform or version)	(value differs by platform or version)
MQ_MFS_MAP_NAME_LENGTH	8	X'00000008'
MQ_MODE_NAME_LENGTH	8	X'00000008'
MQ_MSG_HEADER_LENGTH	4000	X'00000FA0'
MQ_MSG_ID_LENGTH	24	X'00000018'
MQ_MSG_TOKEN_LENGTH	16	X'00000010'
MQ_NAMELIST_DESC_LENGTH	64	X'00000040'
MQ_NAMELIST_NAME_LENGTH	48	X'00000030'
MQ_OBJECT_INSTANCE_ID_LENGTH	24	X'00000018'
MQ_OBJECT_NAME_LENGTH	48	X'00000030'
MQ_PASS_TICKET_APPL_LENGTH	8	X'00000008'
MQ_PASSWORD_LENGTH	12	X'0000000C'
MQ_PROCESS_APPL_ID_LENGTH	256	X'00000100'
MQ_PROCESS_DESC_LENGTH	64	X'00000040'
MQ_PROCESS_ENV_DATA_LENGTH	128	X'00000080'

Table 7. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQ_PROCESS_NAME_LENGTH	48	X'00000030'
MQ_PROCESS_USER_DATA_LENGTH	128	X'00000080'
MQ_PROGRAM_NAME_LENGTH	20	X'00000014'
MQ_PUT_APPL_NAME_LENGTH	28	X'0000001C'
MQ_PUT_DATE_LENGTH	8	X'00000008'
MQ_PUT_TIME_LENGTH	8	X'00000008'
MQ_Q_DESC_LENGTH	64	X'00000040'
MQ_Q_MGR_DESC_LENGTH	64	X'00000040'
MQ_Q_MGR_IDENTIFIER_LENGTH	48	X'00000030'
MQ_Q_MGR_NAME_LENGTH	48	X'00000030'
MQ_Q_NAME_LENGTH	48	X'00000030'
MQ_QSG_NAME_LENGTH	4	X'00000004'
MQ_REMOTE_SYS_ID_LENGTH	4	X'00000004'
MQ_SECURITY_ID_LENGTH	40	X'00000028'
MQ_SELECTOR_LENGTH	10240	X'00002800'
MQ_SERVICE_ARGS_LENGTH	255	X'000000FF'
MQ_SERVICE_COMMAND_LENGTH	255	X'000000FF'
MQ_SERVICE_DESC_LENGTH	64	X'00000040'
MQ_SERVICE_NAME_LENGTH	32	X'00000020'
MQ_SERVICE_PATH_LENGTH	255	X'000000FF'
MQ_SERVICE_STEP_LENGTH	8	X'00000008'
MQ_SHORT_CONN_NAME_LENGTH	20	X'00000014'
MQ_SHORT_DNAME_LENGTH	256	X'00000100'
MQ_SSL_CIPHER_SPEC_LENGTH	32	X'00000020'
MQ_SSL_CRYPTO_HARDWARE_LENGTH	256	X'00000100'
MQ_SSL_HANDSHAKE_STAGE_LENGTH	32	X'00000020'
MQ_SSL_KEY_LIBRARY_LENGTH	44	X'0000002C'
MQ_SSL_KEY_MEMBER_LENGTH	8	X'00000008'
MQ_SSL_KEY_REPOSITORY_LENGTH	256	X'00000100'
MQ_SSL_PEER_NAME_LENGTH	1024	X'00000400'
MQ_SSL_SHORT_PEER_NAME_LENGTH	256	X'00000100'
MQ_START_CODE_LENGTH	4	X'00000004'
MQ_STORAGE_CLASS_DESC_LENGTH	64	X'00000040'
MQ_STORAGE_CLASS_LENGTH	8	X'00000008'
MQ_SUB_IDENTITY_LENGTH	128	X'00000080'
MQ_SUB_POINT_LENGTH	128	X'00000080'
MQ_SUITE_B_128_BIT	2	X'00000002'
MQ_SUITE_B_192_BIT	4	X'00000004'
MQ_SUITE_B_NONE	1	X'00000001'

Name	Decimal value	Hexadecimal value
MQ_SUITE_B_NOT_AVAILABLE	0	X'00000000'
MQ_TCP_NAME_LENGTH	8	X'00000008'
MQ_TIME_LENGTH	8	X'00000008'
MQ_TOPIC_DESC_LENGTH	64	X'00000040'
MQ_TOPIC_NAME_LENGTH	48	X'00000030'
MQ_TOPIC_STR_LENGTH	10240	X'00002800'
MQ_TOTAL_EXIT_DATA_LENGTH	999	X'000003E7'
MQ_TOTAL_EXIT_NAME_LENGTH	999	X'000003E7'
MQ_TP_NAME_LENGTH	64	X'00000040'
MQ_TPIPE_NAME_LENGTH	8	X'00000008'
MQ_TRAN_INSTANCE_ID_LENGTH	16	X'00000010'
MQ_TRANSACTION_ID_LENGTH	4	X'00000004'
MQ_TRIGGER_DATA_LENGTH	64	X'00000040'
MQ_TRIGGER_PROGRAM_NAME_LENGTH	8	X'00000008'
MQ_TRIGGER_TERM_ID_LENGTH	4	X'00000004'
MQ_TRIGGER_TRANS_ID_LENGTH	4	X'00000004'
MQ_USER_ID_LENGTH	12	X'0000000C'
MQ_VERSION_LENGTH	8	X'00000008'
MQ_XCF_GROUP_NAME_LENGTH	8	X'00000008'
MQ_XCF_MEMBER_NAME_LENGTH	16	X'00000010'

Table 7. Values of constants (continued)

MQ_* (Command format String Lengths)

Table 8. Values of constants

Name	Decimal value	Hexadecimal value
MQ_ARCHIVE_PFX_LENGTH	36	X'00000024'
MQ_ARCHIVE_UNIT_LENGTH	8	X'00000008'
MQ_ASID_LENGTH	4	X'00000004'
MQ_AUTH_PROFILE_NAME_LENGTH	48	X'00000030'
MQ_CF_LEID_LENGTH	12	X'0000000C'
MQ_COMMAND_MQSC_LENGTH	32768	X'00008000'
MQ_DATA_SET_NAME_LENGTH	44	X'0000002C'
MQ_DB2_NAME_LENGTH	4	X'00000004'
MQ_DSG_NAME_LENGTH	8	X'00000008'
MQ_ENTITY_NAME_LENGTH	1024	X'00000400'
MQ_ENV_INFO_LENGTH	96	X'00000060'
MQ_IP_ADDRESS_LENGTH	48	X'00000030'
MQ_LOG_CORREL_ID_LENGTH	8	X'00000008'
MQ_LOG_EXTENT_NAME_LENGTH	24	X'00000018'
MQ_LOG_PATH_LENGTH	1024	X'00000400'
MQ_LRSN_LENGTH	12	X'0000000C'

Table 8. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQ_ORIGIN_NAME_LENGTH	8	X'00000008'
MQ_PSB_NAME_LENGTH	8	X'00000008'
MQ_PST_ID_LENGTH	8	X'00000008'
MQ_Q_MGR_CPF_LENGTH	4	X'00000004'
MQ_RESPONSE_ID_LENGTH	24	X'00000018'
MQ_RBA_LENGTH	16	X'00000010'
MQ_SECURITY_PROFILE_LENGTH	40	X'00000028'
MQ_SERVICE_COMPONENT_LENGTH	48	X'00000030'
MQ_SUB_NAME_LENGTH	10240	X'00002800'
MQ_SYSP_SERVICE_LENGTH	32	X'00000020'
MQ_SYSTEM_NAME_LENGTH	8	X'00000008'
MQ_TASK_NUMBER_LENGTH	8	X'00000008'
MQ_TPIPE_PFX_LENGTH	4	X'00000004'
MQ_UOW_ID_LENGTH	256	X'00000100'
MQ_USER_DATA_LENGTH	10240	X'00002800'
MQ_VOLSER_LENGTH	6	X'00000006'

MQACH_* (API exit chain area header structure)

Table 9. Structures of constants	
Name	**Structure**
MQACH_STRUC_ID	"ACH¬"
MQACH_STRUC_ID_ARRAY	'A','C','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 10. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQACH_VERSION_1	1	X'00000001'
MQACH_CURRENT_VERSION	1	X'00000001'
MQACH_LENGTH_1	(value differs by platform or version)	(value differs by platform or version)
MQACH_CURRENT_LENGTH	(value differs by platform or version)	(value differs by platform or version)

MQACT_* (Accounting Token)

Table 11. Constant names and values	
Name	**Value**
MQACT_NONE	X'00...00' (32 nulls)
MQACT_NONE_ARRAY	'\0','\0',... (32 nulls)

MQACT_* (Command format Action Options)

Table 12. Values of constants

Name	Decimal value	Hexadecimal value
MQACT_FORCE_REMOVE	1	X'00000001'
MQACT_ADVANCE_LOG	2	X'00000002'
MQACT_COLLECT_STATISTICS	3	X'00000003'
MQACT_PUBSUB	4	X'00000004'

MQACTP_* (Action)

Table 13. Values of constants

Name	Decimal value	Hexadecimal value
MQACTP_NEW	0	X'00000000'
MQACTP_FORWARD	1	X'00000001'
MQACTP_REPLY	2	X'00000002'
MQACTP_REPORT	3	X'00000003'

MQACTT_* (Accounting Token Types)

Table 14. Values of constants

Name	Hexadecimal value
MQACTT_UNKNOWN	X'00'
MQACTT_CICS_LUOW_ID	X'01'
MQACTT_OS2_DEFAULT	X'04'
MQACTT_DOS_DEFAULT	X'05'
MQACTT_UNIX_NUMERIC_ID	X'06'
MQACTT_OS400_ACCOUNT_TOKEN	X'08'
MQACTT_WINDOWS_DEFAULT	X'09'
MQACTT_NT_SECURITY_ID	X'0B'
MQACTT_USER	X'19'

MQADOPT_* (Adopt New MCA Checks and Adopt New MCA Types)

Adopt New MCA Checks

Table 15. Values of constants

Name	Decimal value	Hexadecimal value
MQADOPT_CHECK_NONE	0	X'00000000'
MQADOPT_CHECK_ALL	1	X'00000001'
MQADOPT_CHECK_Q_MGR_NAME	2	X'00000002'
MQADOPT_CHECK_NET_ADDR	4	X'00000004'

Adopt New MCA Types

Table 16. Values of constants

Name	Decimal value	Hexadecimal value
MQADOPT_TYPE_NO	0	X'00000000'
MQADOPT_TYPE_ALL	1	X'00000001'
MQADOPT_TYPE_SVR	2	X'00000002'
MQADOPT_TYPE_SDR	4	X'00000004'
MQADOPT_TYPE_RCVR	8	X'00000008'
MQADOPT_TYPE_CLUSRCVR	16	X'00000010'

MQAIR_* (Authentication information record structure)

Table 17. Structures of constants

Name	Structure
MQAIR_STRUC_ID	"AIR¬"
MQAIR_STRUC_ID_ARRAY	'A','I','R','¬'

Note: The symbol ¬ represents a single blank character.

Table 18. Values of constants

Name	Decimal value	Hexadecimal value
MQAIR_VERSION_1	1	X'00000001'
MQAIR_VERSION_2	2	X'00000002'
MQAIR_CURRENT_VERSION	2	X'00000002'

MQAIT_* (Authentication Information Type)

Table 19. Values of constants

Name	Decimal value	Hexadecimal value
MQAIT_ALL	0	X'00000000'
MQAIT_CRL_LDAP	1	X'00000001'
MQAIT_OCSP	2	X'00000002'
MQAIT_IDPW_OS	3	X'00000003'
MQAIT_IDPW_LDAP	4	X'00000004'

MQAS_* (Command format Asynchronous State Values)

Table 20. Values of constants

Name	Decimal value	Hexadecimal value
MQAS_NONE	0	X'00000000'
MQAS_STARTED	1	X'00000001'
MQAS_START_WAIT	2	X'00000002'
MQAS_STOPPED	3	X'00000003'
MQAS_SUSPENDED	4	X'00000004'
MQAS_SUSPENDED_TEMPORARY	5	X'00000005'
MQAS_ACTIVE	6	X'00000006'

Table 20. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQAS_INACTIVE	7	X'00000007'

MQAT_* (Put Application Types)

Table 21. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQAT_UNKNOWN	-1	X'FFFFFFFF'
MQAT_NO_CONTEXT	0	X'00000000'
MQAT_CICS	1	X'00000001'
MQAT_MVS	2	X'00000002'
MQAT_OS390	2	X'00000002'
MQAT_ZOS	2	X'00000002'
MQAT_IMS	3	X'00000003'
MQAT_OS2	4	X'00000004'
MQAT_DOS	5	X'00000005'
MQAT_AIX®	6	X'00000006'
MQAT_UNIX	6	X'00000006'
MQAT_QMGR	7	X'00000007'
MQAT_OS400	8	X'00000008'
MQAT_WINDOWS	9	X'00000009'
MQAT_CICS_VSE	10	X'0000000A'
MQAT_WINDOWS_NT	11	X'0000000B'
MQAT_VMS	12	X'0000000C'
MQAT_GUARDIAN	13	X'0000000D'
MQAT_NSK	13	X'0000000D'
MQAT_VOS	14	X'0000000E'
MQAT_OPEN_TP1	15	X'0000000F'
MQAT_VM	18	X'00000012'
MQAT_IMS_BRIDGE	19	X'00000013'
MQAT_XCF	20	X'00000014'
MQAT_CICS_BRIDGE	21	X'00000015'
MQAT_NOTES_AGENT	22	X'00000016'
MQAT_TPF	23	X'00000017'
MQAT_USER	25	X'00000019'
MQAT_BROKER	26	X'0000001A'
MQAT_QMGR_PUBLISH	26	X'0000001A'
MQAT_JAVA	28	X'0000001C'
MQAT_DQM	29	X'0000001D'
MQAT_CHANNEL_INITIATOR	30	X'0000001E'
MQAT_WLM	31	X'0000001F'

Name	Decimal value	Hexadecimal value
MQAT_BATCH	32	X'00000020'
MQAT_RRS_BATCH	33	X'00000021'
MQAT_SIB	34	X'00000022'
MQAT_DEFAULT	(value differs by platform or version)	(value differs by platform or version)
MQAT_USER_FIRST	65536	X'00010000'
MQAT_USER_LAST	999999999	X'3B9AC9FF'

Table 21. Values of constants (continued)

MQAUTH_* (Command format Authority Values)

Table 22. Values of constants

Name	Decimal value	Hexadecimal value
MQAUTH_NONE	0	X'00000000'
MQAUTH_ALT_USER_AUTHORITY	1	X'00000001'
MQAUTH_BROWSE	2	X'00000002'
MQAUTH_CHANGE	3	X'00000003'
MQAUTH_CLEAR	4	X'00000004'
MQAUTH_CONNECT	5	X'00000005'
MQAUTH_CREATE	6	X'00000006'
MQAUTH_DELETE	7	X'00000007'
MQAUTH_DISPLAY	8	X'00000008'
MQAUTH_INPUT	9	X'00000009'
MQAUTH_INQUIRE	10	X'0000000A'
MQAUTH_OUTPUT	11	X'0000000B'
MQAUTH_PASS_ALL_CONTEXT	12	X'0000000C'
MQAUTH_PASS_IDENTITY_CONTEXT	13	X'0000000D'
MQAUTH_SET	14	X'0000000E'
MQAUTH_SET_ALL_CONTEXT	15	X'0000000F'
MQAUTH_SET_IDENTITY_CONTEXT	16	X'00000010'
MQAUTH_CONTROL	17	X'00000011'
MQAUTH_CONTROL_EXTENDED	18	X'00000012'
MQAUTH_PUBLISH	19	X'00000013'
MQAUTH_SUBSCRIBE	20	X'00000014'
MQAUTH_RESUME	21	X'00000015'
MQAUTH_SYSTEM	22	X'00000016'

MQAUTHOPT_* (Command format Authority Options)

Table 23. Values of constants

Name	Decimal value	Hexadecimal value
MQAUTHOPT_CUMULATIVE	256	X'00000100'
MQAUTHOPT_ENTITY_EXPLICIT	1	X'00000001'

Table 23. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQAUTHOPT_ENTITY_SET	2	X'00000002'
MQAUTHOPT_NAME_ALL_MATCHING	32	X'00000020'
MQAUTHOPT_NAME_AS_WILDCARD	64	X'00000040'
MQAUTHOPT_NAME_EXPLICIT	16	X'00000010'

MQAXC_* (API exit context structure)

Table 24. Structures of constants	
Name	**Structure**
MQAXC_STRUC_ID	"AXC¬"
MQAXC_STRUC_ID_ARRAY	'A','X','C','¬'

Note: The symbol ¬ represents a single blank character.

Table 25. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQAXC_VERSION_1	1	X'00000001'
MQAXC_CURRENT_VERSION	1	X'00000001'

MQAXP_* (API exit parameter structure)

Table 26. Structures of constants	
Name	**Structure**
MQAXP_STRUC_ID	"AXP¬"
MQAXP_STRUC_ID_ARRAY	'A','X','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 27. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQAXP_VERSION_1	1	X'00000001'
MQAXP_VERSION_2	2	X'00000002'
MQAXP_CURRENT_VERSION	2	X'00000002'

MQBA_* (Byte Attribute Selectors)

Table 28. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQBA_FIRST	6001	X'00001771'
MQBA_LAST	8000	X'00001F40'

MQBACF_* (Command format Byte Parameter Types)

Table 29. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQBACF_FIRST	7001	X'00001B59'

Table 29. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQBACF_EVENT_ACCOUNTING_TOKEN	7001	X'00001B59'
MQBACF_EVENT_SECURITY_ID	7002	X'00001B5A'
MQBACF_RESPONSE_SET	7003	X'00001B5B'
MQBACF_RESPONSE_ID	7004	X'00001B5C'
MQBACF_EXTERNAL_UOW_ID	7005	X'00001B5D'
MQBACF_CONNECTION_ID	7006	X'00001B5E'
MQBACF_GENERIC_CONNECTION_ID	7007	X'00001B5F'
MQBACF_ORIGIN_UOW_ID	7008	X'00001B60'
MQBACF_Q_MGR_UOW_ID	7009	X'00001B61'
MQBACF_ACCOUNTING_TOKEN	7010	X'00001B62'
MQBACF_CORREL_ID	7011	X'00001B63'
MQBACF_GROUP_ID	7012	X'00001B64'
MQBACF_MSG_ID	7013	X'00001B65'
MQBACF_CF_LEID	7014	X'00001B66'
MQBACF_DESTINATION_CORREL_ID	7015	X'00001B67'
MQBACF_SUB_ID	7016	X'00001B68'
MQBACF_LAST_USED	7016	X'00001B68'

MQBL_* (Buffer Length for mqAddString and mqSetString)

Table 30. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQBL_NULL_TERMINATED	-1	X'FFFFFFFF'

MQBMHO_* (Buffer to message handle options and structure)

Buffer to message handle options structure

Table 31. Structures of constants	
Name	**Structure**
MQBMHO_STRUC_ID	"BMHO"
MQBMHO_STRUC_ID_ARRAY	'B','M','H','O'

Note: The symbol ¬ represents a single blank character.

Table 32. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQBMHO_VERSION_1	1	X'00000001'
MQBMHO_CURRENT_VERSION	1	X'00000001'

Buffer To Message Handle Options

Table 33. Values of constants

Name	Decimal value	Hexadecimal value
MQBMHO_NONE	0	X'00000000'
MQBMHO_DELETE_PROPERTIES	1	X'00000001'

MQBND_* (Default Bindings)

Table 34. Values of constants

Name	Decimal value	Hexadecimal value
MQBND_BIND_ON_OPEN	0	X'00000000'
MQBND_BIND_NOT_FIXED	1	X'00000001'
MQBND_BIND_ON_GROUP	2	X'00000002'

MQBO_* (Begin options and structure)

Begin options structure

Table 35. Structures of constants

Name	Structure
MQBO_STRUC_ID	"BO¬¬"
MQBO_STRUC_ID_ARRAY	'B','O','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 36. Values of constants

Name	Decimal value	Hexadecimal value
MQBO_VERSION_1	1	X'00000001'
MQBO_CURRENT_VERSION	1	X'00000001'

Begin Options

Table 37. Values of constants

Name	Decimal value	Hexadecimal value
MQBO_NONE	0	X'00000000'

MQBT_* (Command format Bridge Types)

Table 38. Values of constants

Name	Decimal value	Hexadecimal value
MQBT_OTMA	1	X'00000001'

MQCA_* (Character Attribute Selectors)

Table 39. Values of constants

Name	Decimal value	Hexadecimal value
MQCA_ADMIN_TOPIC_NAME	2105	X'00000839'
MQCA_ALTERATION_DATE	2027	X'000007EB'

Name	Decimal value	Hexadecimal value
MQCA_ALTERATION_TIME	2028	X'000007EC'
MQCA_APPL_ID	2001	X'000007D1'
MQCA_AUTH_INFO_CONN_NAME	2053	X'00000805'
MQCA_AUTH_INFO_DESC	2046	X'000007FE'
MQCA_AUTH_INFO_NAME	2045	X'000007FD'
MQCA_AUTH_INFO_OCSP_URL	2109	X'0000083D'
MQCA_AUTO_REORG_CATALOG	2091	X'0000082B'
MQCA_AUTO_REORG_START_TIME	2090	X'0000082A'
MQCA_BACKOUT_REQ_Q_NAME	2019	X'000007E3'
MQCA_BASE_OBJECT_NAME	2002	X'000007D2'
MQCA_BASE_Q_NAME	2002	X'000007D2'
MQCA_BATCH_INTERFACE_ID	2068	X'00000814'
MQCA_CF_STRUC_DESC	2052	X'00000804'
MQCA_CF_STRUC_NAME	2039	X'000007F7'
MQCA_CHANNEL_AUTO_DEF_EXIT	2026	X'000007EA'
MQCA_CHILD	2101	X'00000835'
MQCA_CHINIT_SERVICE_PARM	2076	X'0000081C'
MQCA_CICS_FILE_NAME	2060	X'0000080C'
MQCA_CLUS_CHL_NAME	2124	X'0000084C'
MQCA_CLUSTER_DATE	2037	X'000007F5'
MQCA_CLUSTER_NAME	2029	X'000007ED'
MQCA_CLUSTER_NAMELIST	2030	X'000007EE'
MQCA_CLUSTER_Q_MGR_NAME	2031	X'000007EF'
MQCA_CLUSTER_TIME	2038	X'000007F6'
MQCA_CLUSTER_WORKLOAD_DATA	2034	X'000007F2'
MQCA_CLUSTER_WORKLOAD_EXIT	2033	X'000007F1'
MQCA_COMMAND_INPUT_Q_NAME	2003	X'000007D3'
MQCA_COMMAND_REPLY_Q_NAME	2067	X'00000813'
MQCA_CREATION_DATE	2004	X'000007D4'
MQCA_CREATION_TIME	2005	X'000007D5'
MQCA_DEAD_LETTER_Q_NAME	2006	X'000007D6'
MQCA_DEF_XMIT_Q_NAME	2025	X'000007E9'
MQCA_DNS_GROUP	2071	X'00000817'
MQCA_ENV_DATA	2007	X'000007D7'
MQCA_FIRST	2001	X'000007D1'
MQCA_IGQ_USER_ID	2041	X'000007F9'
MQCA_INITIATION_Q_NAME	2008	X'000007D8'
MQCA_LAST	4000	X'00000FA0'
MQCA_LAST_USED	2109	X'0000083D'

Table 39. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQCA_LDAP_PASSWORD	2048	X'00000800'
MQCA_LDAP_USER_NAME	2047	X'000007FF'
MQCA_LU_GROUP_NAME	2072	X'00000818'
MQCA_LU_NAME	2073	X'00000819'
MQCA_LU62_ARM_SUFFIX	2074	X'0000081A'
MQCA_MODEL_DURABLE_Q	2096	X'00000830'
MQCA_MODEL_NON_DURABLE_Q	2097	X'00000831'
MQCA_MONITOR_Q_NAME	2066	X'00000812'
MQCA_NAMELIST_DESC	2009	X'000007D9'
MQCA_NAMELIST_NAME	2010	X'000007DA'
MQCA_NAMES	2020	X'000007E4'
MQCA_PARENT	2102	X'00000836'
MQCA_PASS_TICKET_APPL	2086	X'00000826'
MQCA_PROCESS_DESC	2011	X'000007DB'
MQCA_PROCESS_NAME	2012	X'000007DC'
MQCA_Q_DESC	2013	X'000007DD'
MQCA_Q_MGR_DESC	2014	X'000007DE'
MQCA_Q_MGR_IDENTIFIER	2032	X'000007F0'
MQCA_Q_MGR_NAME	2015	X'000007DF'
MQCA_Q_NAME	2016	X'000007E0'
MQCA_QSG_NAME	2040	X'000007F8'
MQCA_REMOTE_Q_MGR_NAME	2017	X'000007E1'
MQCA_REMOTE_Q_NAME	2018	X'000007E2'
MQCA_REPOSITORY_NAME	2035	X'000007F3'
MQCA_REPOSITORY_NAMELIST	2036	X'000007F4'
MQCA_RESUME_DATE	2098	X'00000832'
MQCA_RESUME_TIME	2099	X'00000833'
MQCA_SERVICE_DESC	2078	X'0000081E'
MQCA_SERVICE_NAME	2077	X'0000081D'
MQCA_SERVICE_START_ARGS	2080	X'00000820'
MQCA_SERVICE_START_COMMAND	2079	X'0000081F'
MQCA_SERVICE_STOP_ARGS	2082	X'00000822'
MQCA_SERVICE_STOP_COMMAND	2081	X'00000821'
MQCA_STDERR_DESTINATION	2084	X'00000824'
MQCA_STDOUT_DESTINATION	2083	X'00000823'
MQCA_SSL_CRL_NAMELIST	2050	X'00000802'
MQCA_SSL_CRYPTO_HARDWARE	2051	X'00000803'
MQCA_SSL_KEY_LIBRARY	2069	X'00000815'
MQCA_SSL_KEY_MEMBER	2070	X'00000816'

Table 39. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCA_SSL_KEY_REPOSITORY	2049	X'00000801'
MQCA_STORAGE_CLASS	2022	X'000007E6'
MQCA_STORAGE_CLASS_DESC	2042	X'000007FA'
MQCA_SYSTEM_LOG_Q_NAME	2065	X'00000811'
MQCA_TCP_NAME	2075	X'0000081B'
MQCA_TOPIC_DESC	2093	X'0000082D'
MQCA_TOPIC_NAME	2092	X'0000082C'
MQCA_TOPIC_STRING_FILTER	2108	X'0000083C'
MQCA_TOPIC_STRING	2094	X'0000082E'
MQCA_TPIPE_NAME	2085	X'00000825'
MQCA_TRIGGER_CHANNEL_NAME	2064	X'00000810'
MQCA_TRIGGER_DATA	2023	X'000007E7'
MQCA_TRIGGER_PROGRAM_NAME	2062	X'0000080E'
MQCA_TRIGGER_TERM_ID	2063	X'0000080F'
MQCA_TRIGGER_TRANS_ID	2061	X'0000080D'
MQCA_USER_DATA	2021	X'000007E5'
MQCA_USER_LIST	4000	X'00000FA0'
MQCA_VERSION	2120	X'00000848'
MQCA_XCF_GROUP_NAME	2043	X'000007FB'
MQCA_XCF_MEMBER_NAME	2044	X'000007FC'
MQCA_XMIT_Q_NAME	2024	X'000007E8'

MQCACF_* (Command format Character Parameter Types)

Table 40. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCACF_FIRST	3001	X'00000BB9'
MQCACF_FROM_Q_NAME	3001	X'00000BB9'
MQCACF_TO_Q_NAME	3002	X'00000BBA'
MQCACF_FROM_PROCESS_NAME	3003	X'00000BBB'
MQCACF_TO_PROCESS_NAME	3004	X'00000BBC'
MQCACF_FROM_NAMELIST_NAME	3005	X'00000BBD'
MQCACF_TO_NAMELIST_NAME	3006	X'00000BBE'
MQCACF_FROM_CHANNEL_NAME	3007	X'00000BBF'
MQCACF_TO_CHANNEL_NAME	3008	X'00000BC0'
MQCACF_FROM_AUTH_INFO_NAME	3009	X'00000BC1'
MQCACF_TO_AUTH_INFO_NAME	3010	X'00000BC2'
MQCACF_Q_NAMES	3011	X'00000BC3'
MQCACF_PROCESS_NAMES	3012	X'00000BC4'
MQCACF_NAMELIST_NAMES	3013	X'00000BC5'

Table 40. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQCACF_ESCAPE_TEXT	3014	X'00000BC6'
MQCACF_LOCAL_Q_NAMES	3015	X'00000BC7'
MQCACF_MODEL_Q_NAMES	3016	X'00000BC8'
MQCACF_ALIAS_Q_NAMES	3017	X'00000BC9'
MQCACF_REMOTE_Q_NAMES	3018	X'00000BCA'
MQCACF_SENDER_CHANNEL_NAMES	3019	X'00000BCB'
MQCACF_SERVER_CHANNEL_NAMES	3020	X'00000BCC'
MQCACF_REQUESTER_CHANNEL_NAMES	3021	X'00000BCD'
MQCACF_RECEIVER_CHANNEL_NAMES	3022	X'00000BCE'
MQCACF_OBJECT_Q_MGR_NAME	3023	X'00000BCF'
MQCACF_APPL_NAME	3024	X'00000BD0'
MQCACF_USER_IDENTIFIER	3025	X'00000BD1'
MQCACF_AUX_ERROR_DATA_STR_1	3026	X'00000BD2'
MQCACF_AUX_ERROR_DATA_STR_2	3027	X'00000BD3'
MQCACF_AUX_ERROR_DATA_STR_3	3028	X'00000BD4'
MQCACF_BRIDGE_NAME	3029	X'00000BD5'
MQCACF_STREAM_NAME	3030	X'00000BD6'
MQCACF_TOPIC	3031	X'00000BD7'
MQCACF_PARENT_Q_MGR_NAME	3032	X'00000BD8'
MQCACF_CORREL_ID	3033	X'00000BD9'
MQCACF_PUBLISH_TIMESTAMP	3034	X'00000BDA'
MQCACF_STRING_DATA	3035	X'00000BDB'
MQCACF_SUPPORTED_STREAM_NAME	3036	X'00000BDC'
MQCACF_REG_TOPIC	3037	X'00000BDD'
MQCACF_REG_TIME	3038	X'00000BDE'
MQCACF_REG_USER_ID	3039	X'00000BDF'
MQCACF_CHILD_Q_MGR_NAME	3040	X'00000BE0'
MQCACF_REG_STREAM_NAME	3041	X'00000BE1'
MQCACF_REG_Q_MGR_NAME	3042	X'00000BE2'
MQCACF_REG_Q_NAME	3043	X'00000BE3'
MQCACF_REG_CORREL_ID	3044	X'00000BE4'
MQCACF_EVENT_USER_ID	3045	X'00000BE5'
MQCACF_OBJECT_NAME	3046	X'00000BE6'
MQCACF_EVENT_Q_MGR	3047	X'00000BE7'
MQCACF_AUTH_INFO_NAMES	3048	X'00000BE8'
MQCACF_EVENT_APPL_IDENTITY	3049	X'00000BE9'
MQCACF_EVENT_APPL_NAME	3050	X'00000BEA'
MQCACF_EVENT_APPL_ORIGIN	3051	X'00000BEB'
MQCACF_SUBSCRIPTION_NAME	3052	X'00000BEC'

Table 40. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQCACF_REG_SUB_NAME	3053	X'00000BED'
MQCACF_SUBSCRIPTION_IDENTITY	3054	X'00000BEE'
MQCACF_REG_SUB_IDENTITY	3055	X'00000BEF'
MQCACF_SUBSCRIPTION_USER_DATA	3056	X'00000BF0'
MQCACF_REG_SUB_USER_DATA	3057	X'00000BF1'
MQCACF_APPL_TAG	3058	X'00000BF2'
MQCACF_DATA_SET_NAME	3059	X'00000BF3'
MQCACF_UOW_START_DATE	3060	X'00000BF4'
MQCACF_UOW_START_TIME	3061	X'00000BF5'
MQCACF_UOW_LOG_START_DATE	3062	X'00000BF6'
MQCACF_UOW_LOG_START_TIME	3063	X'00000BF7'
MQCACF_UOW_LOG_EXTENT_NAME	3064	X'00000BF8'
MQCACF_PRINCIPAL_ENTITY_NAMES	3065	X'00000BF9'
MQCACF_GROUP_ENTITY_NAMES	3066	X'00000BFA'
MQCACF_AUTH_PROFILE_NAME	3067	X'00000BFB'
MQCACF_ENTITY_NAME	3068	X'00000BFC'
MQCACF_SERVICE_COMPONENT	3069	X'00000BFD'
MQCACF_RESPONSE_Q_MGR_NAME	3070	X'00000BFE'
MQCACF_CURRENT_LOG_EXTENT_NAME	3071	X'00000BFF'
MQCACF_RESTART_LOG_EXTENT_NAME	3072	X'00000C00'
MQCACF_MEDIA_LOG_EXTENT_NAME	3073	X'00000C01'
MQCACF_LOG_PATH	3074	X'00000C02'
MQCACF_COMMAND_MQSC	3075	X'00000C03'
MQCACF_Q_MGR_CPF	3076	X'00000C04'
MQCACF_USAGE_LOG_RBA	3078	X'00000C06'
MQCACF_USAGE_LOG_LRSN	3079	X'00000C07'
MQCACF_COMMAND_SCOPE	3080	X'00000C08'
MQCACF_ASID	3081	X'00000C09'
MQCACF_PSB_NAME	3082	X'00000C0A'
MQCACF_PST_ID	3083	X'00000C0B'
MQCACF_TASK_NUMBER	3084	X'00000C0C'
MQCACF_TRANSACTION_ID	3085	X'00000C0D'
MQCACF_Q_MGR_UOW_ID	3086	X'00000C0E'
MQCACF_ORIGIN_NAME	3088	X'00000C10'
MQCACF_ENV_INFO	3089	X'00000C11'
MQCACF_SECURITY_PROFILE	3090	X'00000C12'
MQCACF_CONFIGURATION_DATE	3091	X'00000C13'
MQCACF_CONFIGURATION_TIME	3092	X'00000C14'
MQCACF_FROM_CF_STRUC_NAME	3093	X'00000C15'

Table 40. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCACF_TO_CF_STRUC_NAME	3094	X'00000C16'
MQCACF_CF_STRUC_NAMES	3095	X'00000C17'
MQCACF_FAIL_DATE	3096	X'00000C18'
MQCACF_FAIL_TIME	3097	X'00000C19'
MQCACF_BACKUP_DATE	3098	X'00000C1A'
MQCACF_BACKUP_TIME	3099	X'00000C1B'
MQCACF_SYSTEM_NAME	3100	X'00000C1C'
MQCACF_CF_STRUC_BACKUP_START	3101	X'00000C1D'
MQCACF_CF_STRUC_BACKUP_END	3102	X'00000C1E'
MQCACF_CF_STRUC_LOG_Q_MGRS	3103	X'00000C1F'
MQCACF_FROM_STORAGE_CLASS	3104	X'00000C20'
MQCACF_TO_STORAGE_CLASS	3105	X'00000C21'
MQCACF_STORAGE_CLASS_NAMES	3106	X'00000C22'
MQCACF_DSG_NAME	3108	X'00000C24'
MQCACF_DB2_NAME	3109	X'00000C25'
MQCACF_SYSP_CMD_USER_ID	3110	X'00000C26'
MQCACF_SYSP_OTMA_GROUP	3111	X'00000C27'
MQCACF_SYSP_OTMA_MEMBER	3112	X'00000C28'
MQCACF_SYSP_OTMA_DRU_EXIT	3113	X'00000C29'
MQCACF_SYSP_OTMA_TPIPE_PFX	3114	X'00000C2A'
MQCACF_SYSP_ARCHIVE_PFX1	3115	X'00000C2B'
MQCACF_SYSP_ARCHIVE_UNIT1	3116	X'00000C2C'
MQCACF_SYSP_LOG_CORREL_ID	3117	X'00000C2D'
MQCACF_SYSP_UNIT_VOLSER	3118	X'00000C2E'
MQCACF_SYSP_Q_MGR_TIME	3119	X'00000C2F'
MQCACF_SYSP_Q_MGR_DATE	3120	X'00000C30'
MQCACF_SYSP_Q_MGR_RBA	3121	X'00000C31'
MQCACF_SYSP_LOG_RBA	3122	X'00000C32'
MQCACF_SYSP_SERVICE	3123	X'00000C33'
MQCACF_FROM_LISTENER_NAME	3124	X'00000C34'
MQCACF_TO_LISTENER_NAME	3125	X'00000C35'
MQCACF_FROM_SERVICE_NAME	3126	X'00000C36'
MQCACF_TO_SERVICE_NAME	3127	X'00000C37'
MQCACF_LAST_PUT_DATE	3128	X'00000C38'
MQCACF_LAST_PUT_TIME	3129	X'00000C39'
MQCACF_LAST_GET_DATE	3130	X'00000C3A'
MQCACF_LAST_GET_TIME	3131	X'00000C3B'
MQCACF_OPERATION_DATE	3132	X'00000C3C'
MQCACF_OPERATION_TIME	3133	X'00000C3D'

Name	Decimal value	Hexadecimal value
MQCACF_ACTIVITY_DESC	3134	X'00000C3E'
MQCACF_APPL_IDENTITY_DATA	3135	X'00000C3F'
MQCACF_APPL_ORIGIN_DATA	3136	X'00000C40'
MQCACF_PUT_DATE	3137	X'00000C41'
MQCACF_PUT_TIME	3138	X'00000C42'
MQCACF_REPLY_TO_Q	3139	X'00000C43'
MQCACF_REPLY_TO_Q_MGR	3140	X'00000C44'
MQCACF_RESOLVED_Q_NAME	3141	X'00000C45'
MQCACF_STRUC_ID	3142	X'00000C46'
MQCACF_VALUE_NAME	3143	X'00000C47'
MQCACF_SERVICE_START_DATE	3144	X'00000C48'
MQCACF_SERVICE_START_TIME	3145	X'00000C49'
MQCACF_SYSP_OFFLINE_RBA	3146	X'00000C4A'
MQCACF_SYSP_ARCHIVE_PFX2	3147	X'00000C4B'
MQCACF_SYSP_ARCHIVE_UNIT2	3148	X'00000C4C'
MQCACF_TO_TOPIC_NAME	3149	X'00000C4D'
MQCACF_FROM_TOPIC_NAME	3150	X'00000C4E'
MQCACF_TOPIC_NAMES	3151	X'00000C4F'
MQCACF_SUB_NAME	3152	X'00000C50'
MQCACF_DESTINATION_Q_MGR	3153	X'00000C51'
MQCACF_DESTINATION	3154	X'00000C52'
MQCACF_SUB_USER_ID	3156	X'00000C54'
MQCACF_SUB_USER_DATA	3159	X'00000C57'
MQCACF_SUB_SELECTOR	3160	X'00000C58'
MQCACF_LAST_PUB_DATE	3161	X'00000C59'
MQCACF_LAST_PUB_TIME	3162	X'00000C5A'
MQCACF_FROM_SUB_NAME	3163	X'00000C5B'
MQCACF_TO_SUB_NAME	3164	X'00000C5C'
MQCACF_LAST_MSG_TIME	3167	X'00000C5F'
MQCACF_LAST_MSG_DATE	3168	X'00000C60'
MQCACF_SUBSCRIPTION_POINT	3169	X'00000C61'
MQCACF_FILTER	3170	X'00000C62'
MQCACF_NONE	3171	X'00000C63'
MQCACF_ADMIN_TOPIC_NAMES	3172	X'00000C64'
MQCACF_LAST_USED	3172	X'00000C64'

MQCACH_* (Command format Character Channel Parameter Types)

Table 41. Values of constants

Name	Decimal value	Hexadecimal value
MQCACH_FIRST	3501	X'00000DAD'
MQCACH_CHANNEL_NAME	3501	X'00000DAD'
MQCACH_DESC	3502	X'00000DAE'
MQCACH_MODE_NAME	3503	X'00000DAF'
MQCACH_TP_NAME	3504	X'00000DB0'
MQCACH_XMIT_Q_NAME	3505	X'00000DB1'
MQCACH_CONNECTION_NAME	3506	X'00000DB2'
MQCACH_MCA_NAME	3507	X'00000DB3'
MQCACH_SEC_EXIT_NAME	3508	X'00000DB4'
MQCACH_MSG_EXIT_NAME	3509	X'00000DB5'
MQCACH_SEND_EXIT_NAME	3510	X'00000DB6'
MQCACH_RCV_EXIT_NAME	3511	X'00000DB7'
MQCACH_CHANNEL_NAMES	3512	X'00000DB8'
MQCACH_SEC_EXIT_USER_DATA	3513	X'00000DB9'
MQCACH_MSG_EXIT_USER_DATA	3514	X'00000DBA'
MQCACH_SEND_EXIT_USER_DATA	3515	X'00000DBB'
MQCACH_RCV_EXIT_USER_DATA	3516	X'00000DBC'
MQCACH_USER_ID	3517	X'00000DBD'
MQCACH_PASSWORD	3518	X'00000DBE'
MQCACH_LOCAL_ADDRESS	3520	X'00000DC0'
MQCACH_LOCAL_NAME	3521	X'00000DC1'
MQCACH_LAST_MSG_TIME	3524	X'00000DC4'
MQCACH_LAST_MSG_DATE	3525	X'00000DC5'
MQCACH_MCA_USER_ID	3527	X'00000DC7'
MQCACH_CHANNEL_START_TIME	3528	X'00000DC8'
MQCACH_CHANNEL_START_DATE	3529	X'00000DC9'
MQCACH_MCA_JOB_NAME	3530	X'00000DCA'
MQCACH_LAST_LUWID	3531	X'00000DCB'
MQCACH_CURRENT_LUWID	3532	X'00000DCC'
MQCACH_FORMAT_NAME	3533	X'00000DCD'
MQCACH_MR_EXIT_NAME	3534	X'00000DCE'
MQCACH_MR_EXIT_USER_DATA	3535	X'00000DCF'
MQCACH_SSL_CIPHER_SPEC	3544	X'00000DD8'
MQCACH_SSL_PEER_NAME	3545	X'00000DD9'
MQCACH_SSL_HANDSHAKE_STAGE	3546	X'00000DDA'
MQCACH_SSL_SHORT_PEER_NAME	3547	X'00000DDB'
MQCACH_REMOTE_APPL_TAG	3548	X'00000DDC'
MQCACH_SSL_CERT_USER_ID	3549	X'00000DDD'

Table 41. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCACH_SSL_CERT_ISSUER_NAME	3550	X'00000DDE'
MQCACH_LU_NAME	3551	X'00000DDF'
MQCACH_IP_ADDRESS	3552	X'00000DE0'
MQCACH_TCP_NAME	3553	X'00000DE1'
MQCACH_LISTENER_NAME	3554	X'00000DE2'
MQCACH_LISTENER_DESC	3555	X'00000DE3'
MQCACH_LISTENER_START_DATE	3556	X'00000DE4'
MQCACH_LISTENER_START_TIME	3557	X'00000DE5'
MQCACH_SSL_KEY_RESET_DATE	3558	X'00000DE6'
MQCACH_SSL_KEY_RESET_TIME	3559	X'00000DE7'
MQCACH_LAST_USED	3559	X'00000DE7'

MQCADSD_* (CICS information header ADS Descriptors)

Table 42. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCADSD_NONE	0	X'00000000'
MQCADSD_SEND	1	X'00000001'
MQCADSD_RECV	16	X'00000010'
MQCADSD_MSGFORMAT	256	X'00000100'

MQCAFTY_* (Connection Affinity Values)

Table 43. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCAFTY_NONE	0	X'00000000'
MQCAFTY_PREFERRED	1	X'00000001'

MQCAMO_* (Command format Character Monitoring Parameter Types)

Table 44. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCAMO_FIRST	2701	X'00000A8D'
MQCAMO_CLOSE_DATE	2701	X'00000A8D'
MQCAMO_CLOSE_TIME	2702	X'00000A8E'
MQCAMO_CONN_DATE	2703	X'00000A8F'
MQCAMO_CONN_TIME	2704	X'00000A90'
MQCAMO_DISC_DATE	2705	X'00000A91'
MQCAMO_DISC_TIME	2706	X'00000A92'
MQCAMO_END_DATE	2707	X'00000A93'
MQCAMO_END_TIME	2708	X'00000A94'
MQCAMO_OPEN_DATE	2709	X'00000A95'
MQCAMO_OPEN_TIME	2710	X'00000A96'

Table 44. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
MQCAMO_START_DATE	2711	X'00000A97'
MQCAMO_START_TIME	2712	X'00000A98'
MQCAMO_LAST_USED	2712	X'00000A98'

MQCBC_* (MQCBC constants structure)

Table 45. Structures of constants	
Name	Structure
MQCBC_STRUC_ID	"CBC¬"
MQCBC_STRUC_ID_ARRAY	'C','B','C','¬'

Note: The symbol ¬ represents a single blank character.

Table 46. Values of constants		
Name	Decimal value	Hexadecimal value
MQCBC_VERSION_1	1	X'00000001'
MQCBC_CURRENT_VERSION	1	X'00000001'

MQCBCF_* (MQCBC constants Flags)

Table 47. Values of constants		
Name	Decimal value	Hexadecimal value
MQCBCF_NONE	0	X'00000000'
MQCBCF_READA_BUFFER_EMPTY	1	X'00000001'

MQCBCT_* (MQCBC constants Callback type)

Table 48. Values of constants		
Name	Decimal value	Hexadecimal value
MQCBCT_START_CALL	1	X'00000001'
MQCBCT_STOP_CALL	2	X'00000002'
MQCBCT_REGISTER_CALL	3	X'00000003'
MQCBCT_DEREGISTER_CALL	4	X'00000004'
MQCBCT_EVENT_CALL	5	X'00000005'
MQCBCT_MSG_REMOVED	6	X'00000006'
MQCBCT_MSG_NOT_REMOVED	7	X'00000007'

MQCBD_* (MQCBD constants structure)

Table 49. Structures of constants	
Name	Structure
MQCBD_STRUC_ID	"CBD¬"
MQCBD_STRUC_ID_ARRAY	'C','B','D','¬'

Note: The symbol ¬ represents a single blank character.

Table 50. Values of constants

Name	Decimal value	Hexadecimal value
MQCBD_VERSION_1	1	X'00000001'
MQCBD_CURRENT_VERSION	1	X'00000001'

MQCBDO_* (MQCBD constants Callback Options)

Table 51. Values of constants

Name	Decimal value	Hexadecimal value
MQCBDO_NONE	0	X'00000000'
MQCBDO_START_CALL	1	X'00000001'
MQCBDO_STOP_CALL	4	X'00000004'
MQCBDO_REGISTER_CALL	256	X'00000100'
MQCBDO_DEREGISTER_CALL	512	X'00000200'
MQCBDO_FAIL_IF_QUIESCING	8192	X'00002000'

MQCBO_* (Create-Bag Options for mqCreateBag)

Table 52. Values of constants

Name	Decimal value	Hexadecimal value
MQCBO_NONE	0	X'00000000'
MQCBO_USER_BAG	0	X'00000000'
MQCBO_ADMIN_BAG	1	X'00000001'
MQCBO_COMMAND_BAG	16	X'00000010'
MQCBO_SYSTEM_BAG	32	X'00000020'
MQCBO_GROUP_BAG	64	X'00000040'
MQCBO_LIST_FORM_ALLOWED	2	X'00000002'
MQCBO_LIST_FORM_INHIBITED	0	X'00000000'
MQCBO_REORDER_AS_REQUIRED	4	X'00000004'
MQCBO_DO_NOT_REORDER	0	X'00000000'
MQCBO_CHECK_SELECTORS	8	X'00000008'
MQCBO_DO_NOT_CHECK_SELECTORS	0	X'00000000'

MQCBT_* (MQCBD constants This is the type of the Callback Function)

Table 53. Values of constants

Name	Decimal value	Hexadecimal value
MQCBT_MESSAGE_CONSUMER	1	X'00000001'
MQCBT_EVENT_HANDLER	2	X'00000002'

MQCC_* (completion codes)

Table 54. Values of constants

Name	Decimal value	Hexadecimal value
MQCC_OK	0	X'00000000'
MQCC_WARNING	1	X'00000001'

Table 54. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
MQCC_FAILED	2	X'00000002'
MQCC_UNKNOWN	-1	X'FFFFFFFF'

MQCCSI_* (Coded Character Set Identifiers)

Table 55. Values of constants		
Name	Decimal value	Hexadecimal value
MQCCSI_UNDEFINED	0	X'00000000'
MQCCSI_DEFAULT	0	X'00000000'
MQCCSI_Q_MGR	0	X'00000000'
MQCCSI_INHERIT	-2	X'FFFFFFFE'
MQCCSI_EMBEDDED	-1	X'FFFFFFFF'
MQCCSI_APPL	-3	X'FFFFFFFD'

MQCCT_* (CICS information header Conversational Task Options)

Table 56. Values of constants		
Name	Decimal value	Hexadecimal value
MQCCT_YES	1	X'00000001'
MQCCT_NO	0	X'00000000'

MQCD_* (Channel definition structure)

Table 57. Values of constants		
Name	Decimal value	Hexadecimal value
MQCD_VERSION_1	1	X'00000001'
MQCD_VERSION_2	2	X'00000002'
MQCD_VERSION_3	3	X'00000003'
MQCD_VERSION_4	4	X'00000004'
MQCD_VERSION_5	5	X'00000005'
MQCD_VERSION_6	6	X'00000006'
MQCD_VERSION_7	7	X'00000007'
MQCD_VERSION_8	8	X'00000008'
MQCD_VERSION_9	9	X'00000009'
MQCD_VERSION_10	10	X'0000000A'
Multi MQCD_VERSION_11	11	X'0000000B'
Multi MQCD_CURRENT_VERSION	11	X'0000000B'
z/OS V 9.1.3 MQCD_VERSION_12	12	X'0000000C'
z/OS V 9.1.3 MQCD_CURRENT_VERSION	12	X'0000000C'
MQCD_LENGTH_4	(value differs by platform or version)	(value differs by platform or version)

Table 57. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCD_LENGTH_5	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_6	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_7	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_8	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_9	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_10	(value differs by platform or version)	(value differs by platform or version)
MQCD_LENGTH_11	(value differs by platform or version)	(value differs by platform or version)
z/OS V 9.1.3 MQCD_LENGTH_12	(value differs by platform or version)	(value differs by platform or version)
MQCD_CURRENT_LENGTH	(value differs by platform or version)	(value differs by platform or version)

MQCDC_* (Channel Data Conversion)

Table 58. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCDC_SENDER_CONVERSION	1	X'00000001'
MQCDC_NO_SENDER_CONVERSION	0	X'00000000'

MQCERT_* (Certificate Validation Policy Type)

MQ_CERT_VAL_POLICY_DEFAULT	0	X'00000000'
MQ_CERT_VAL_POLICY_ANY	0	X'00000000'
MQ_CERT_VAL_POLICY_RFC5280	1	X'00000001'

MQCF_* (Capability Flags)

Table 59. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCF_NONE	0	X'00000000'
MQCF_DIST_LISTS	1	X'00000001'

MQCFAC_* (CICS information header Facility)

Table 60. Constant names and values	
Name	**Hexadecimal value**
MQCFAC_NONE	X'00...00' (8 nulls)
MQCFAC_NONE_ARRAY	'\0','\0',... (8 nulls)

MQCFBF_* (Command format byte string filter parameter structure)

Table 61. Values of constants

Name	Decimal value	Hexadecimal value
MQCFBF_STRUC_LENGTH_FIXED	20	X'00000014'

MQCFBS_* (Command format byte string parameter structure)

Table 62. Values of constants

Name	Decimal value	Hexadecimal value
MQCFBS_STRUC_LENGTH_FIXED	16	X'00000010'

MQCFC_* (Command format header Control Options)

Table 63. Values of constants

Name	Decimal value	Hexadecimal value
MQCFC_LAST	1	X'00000001'
MQCFC_NOT_LAST	0	X'00000000'

MQCFGR_* (Command format group parameter structure)

Table 64. Values of constants

Name	Decimal value	Hexadecimal value
MQCFGR_STRUC_LENGTH	16	X'00000010'

MQCFH_* (Command format header structure)

Table 65. Values of constants

Name	Decimal value	Hexadecimal value
MQCFH_STRUC_LENGTH	36	X'00000024'
MQCFH_VERSION_1	1	X'00000001'
MQCFH_VERSION_2	2	X'00000002'
MQCFH_VERSION_3	3	X'00000003'
MQCFH_CURRENT_VERSION	3	X'00000003'

MQCFIF_* (Command format integer filter parameter structure)

Table 66. Values of constants

Name	Decimal value	Hexadecimal value
MQCFIF_STRUC_LENGTH	20	X'00000014'

MQCFIL_* (Command format integer list parameter structure)

Table 67. Values of constants

Name	Decimal value	Hexadecimal value
MQCFIL_STRUC_LENGTH_FIXED	16	X'00000010'

MQCFIL64_* (Command format 64-bit integer list parameter structure)

Table 68. Values of constants

Name	Decimal value	Hexadecimal value
MQCFIL64_STRUC_LENGTH_FIXED	16	X'00000010'

MQCFIN_* (Command format integer parameter structure)

Table 69. Values of constants

Name	Decimal value	Hexadecimal value
MQCFIN_STRUC_LENGTH	16	X'00000010'

MQCFIN64_* (Command format 64-bit integer parameter structure)

Table 70. Values of constants

Name	Decimal value	Hexadecimal value
MQCFIN64_STRUC_LENGTH	24	X'00000018'

MQCFO_* (Command format Refresh Repository Options and Command format Remove Queues Options)

Command format Refresh Repository Options

Table 71. Values of constants

Name	Decimal value	Hexadecimal value
MQCFO_REFRESH_REPOSITORY_YES	1	X'00000001'
MQCFO_REFRESH_REPOSITORY_NO	0	X'00000000'

Command format Remove Queues Options

Table 72. Values of constants

Name	Decimal value	Hexadecimal value
MQCFO_REMOVE_QUEUES_YES	1	X'00000001'
MQCFO_REMOVE_QUEUES_NO	0	X'00000000'

MQCFOP_* (Command format Filter Operators)

Table 73. Values of constants

Name	Decimal value	Hexadecimal value
MQCFOP_LESS	1	X'00000001'
MQCFOP_EQUAL	2	X'00000002'
MQCFOP_GREATER	4	X'00000004'
MQCFOP_NOT_LESS	6	X'00000006'
MQCFOP_NOT_EQUAL	5	X'00000005'
MQCFOP_NOT_GREATER	3	X'00000003'
MQCFOP_LIKE	18	X'00000012'
MQCFOP_NOT_LIKE	21	X'00000015'
MQCFOP_CONTAINS	10	X'0000000A'

Table 73. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCFOP_EXCLUDES	13	X'0000000D'
MQCFOP_CONTAINS_GEN	26	X'0000001A'
MQCFOP_EXCLUDES_GEN	29	X'0000001D'

MQCFR_* (CF Recoverability)

Table 74. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFR_YES	1	X'00000001'
MQCFR_NO	0	X'00000000'

MQCFSF_* (Command format string filter parameter structure)

Table 75. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFSF_STRUC_LENGTH_FIXED	24	X'00000018'

MQCFSL_* (Command format string list parameter structure)

Table 76. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFSL_STRUC_LENGTH_FIXED	24	X'00000018'

MQCFST_* (Command format string parameter structure)

Table 77. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFST_STRUC_LENGTH_FIXED	20	X'00000014'

MQCFSTATUS_* (Command format CF Status)

Table 78. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFSTATUS_NOT_FOUND	0	X'00000000'
MQCFSTATUS_ACTIVE	1	X'00000001'
MQCFSTATUS_IN_RECOVER	2	X'00000002'
MQCFSTATUS_IN_BACKUP	3	X'00000003'
MQCFSTATUS_FAILED	4	X'00000004'
MQCFSTATUS_NONE	5	X'00000005'
MQCFSTATUS_UNKNOWN	6	X'00000006'
MQCFSTATUS_ADMIN_INCOMPLETE	20	X'00000014'
MQCFSTATUS_NEVER_USED	21	X'00000015'
MQCFSTATUS_NO_BACKUP	22	X'00000016'
MQCFSTATUS_NOT_FAILED	23	X'00000017'
MQCFSTATUS_NOT_RECOVERABLE	24	X'00000018'

Table 78. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCFSTATUS_XES_ERROR	25	X'00000019'

MQCFT_* (Command format Types of Structure)

Table 79. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFT_NONE	0	X'00000000'
MQCFT_COMMAND	1	X'00000001'
MQCFT_RESPONSE	2	X'00000002'
MQCFT_INTEGER	3	X'00000003'
MQCFT_STRING	4	X'00000004'
MQCFT_INTEGER_LIST	5	X'00000005'
MQCFT_STRING_LIST	6	X'00000006'
MQCFT_EVENT	7	X'00000007'
MQCFT_USER	8	X'00000008'
MQCFT_BYTE_STRING	9	X'00000009'
MQCFT_TRACE_ROUTE	10	X'0000000A'
MQCFT_REPORT	12	X'0000000C'
MQCFT_INTEGER_FILTER	13	X'0000000D'
MQCFT_STRING_FILTER	14	X'0000000E'
MQCFT_BYTE_STRING_FILTER	15	X'0000000F'
MQCFT_COMMAND_XR	16	X'00000010'
MQCFT_XR_MSG	17	X'00000011'
MQCFT_XR_ITEM	18	X'00000012'
MQCFT_XR_SUMMARY	19	X'00000013'
MQCFT_GROUP	20	X'00000014'
MQCFT_STATISTICS	21	X'00000015'
MQCFT_ACCOUNTING	22	X'00000016'
MQCFT_INTEGER64	23	X'00000017'
MQCFT_INTEGER64_LIST	25	X'00000019'

MQCFTYPE_* (Command format CF Types)

Table 80. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCFTYPE_APPL	0	X'00000000'
MQCFTYPE_ADMIN	1	X'00000001'

MQCFUNC_* (CICS information header Functions)

Table 81. Structures of constants	
Name	**Structure**
MQCFUNC_MQCONN	"CONN"
MQCFUNC_MQGET	"GET¬"
MQCFUNC_MQINQ	"INQ¬"
MQCFUNC_MQOPEN	"OPEN"
MQCFUNC_MQPUT	"PUT¬"
MQCFUNC_MQPUT1	"PUT1"
MQCFUNC_NONE	"¬¬¬¬"
MQCFUNC_MQCONN_ARRAY	'C','O','N','N'
MQCFUNC_MQGET_ARRAY	'G','E','T','¬'
MQCFUNC_MQINQ_ARRAY	'I','N','Q','¬'
MQCFUNC_MQOPEN_ARRAY	'O','P','E','N'
MQCFUNC_MQPUT_ARRAY	'P','U','T','¬'
MQCFUNC_MQPUT1_ARRAY	'P','U','T','1'
MQCFUNC_NONE_ARRAY	'¬','¬','¬','¬'

Note: The symbol ¬ represents a single blank character.

MQCGWI_* (CICS information header Get Wait Interval)

Table 82. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCGWI_DEFAULT	-2	X'FFFFFFFE'

MQCHAD_* (Channel Auto Definition)

Table 83. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHAD_DISABLED	0	X'00000000'
MQCHAD_ENABLED	1	X'00000001'

MQCHIDS_* (Command format Indoubt Status)

Table 84. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHIDS_NOT_INDOUBT	0	X'00000000'
MQCHIDS_INDOUBT	1	X'00000001'

MQCHLD_* (Command format Channel Dispositions)

Table 85. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHLD_ALL	-1	X'FFFFFFFF'
MQCHLD_DEFAULT	1	X'00000001'

Table 85. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCHLD_SHARED	2	X'00000002'
MQCHLD_PRIVATE	4	X'00000004'
MQCHLD_FIXSHARED	5	X'00000005'

MQCHS_* (Command format Channel Status)

Table 86. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHS_INACTIVE	0	X'00000000'
MQCHS_BINDING	1	X'00000001'
MQCHS_STARTING	2	X'00000002'
MQCHS_RUNNING	3	X'00000003'
MQCHS_STOPPING	4	X'00000004'
MQCHS_RETRYING	5	X'00000005'
MQCHS_STOPPED	6	X'00000006'
MQCHS_REQUESTING	7	X'00000007'
MQCHS_PAUSED	8	X'00000008'
MQCHS_INITIALIZING	13	X'0000000D'
MQCHS_SWITCHING	14	X'0000000E'

MQCHSH_* (Command format Channel Shared Restart Options)

Table 87. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHSH_RESTART_NO	0	X'00000000'
MQCHSH_RESTART_YES	1	X'00000001'

MQCHSR_* (Command format Channel Stop Options)

Table 88. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHSR_STOP_NOT_REQUESTED	0	X'00000000'
MQCHSR_STOP_REQUESTED	1	X'00000001'

MQCHSSTATE_* (Command format Channel Substates)

Table 89. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCHSSTATE_OTHER	0	X'00000000'
MQCHSSTATE_END_OF_BATCH	100	X'00000064'
MQCHSSTATE_SENDING	200	X'000000C8'
MQCHSSTATE_RECEIVING	300	X'0000012C'
MQCHSSTATE_SERIALIZING	400	X'00000190'
MQCHSSTATE_RESYNCHING	500	X'000001F4'

Name	Decimal value	Hexadecimal value
MQCHSSTATE_HEARTBEATING	600	X'00000258'
MQCHSSTATE_IN_SCYEXIT	700	X'000002BC'
MQCHSSTATE_IN_RCVEXIT	800	X'00000320'
MQCHSSTATE_IN_SENDEXIT	900	X'00000384'
MQCHSSTATE_IN_MSGEXIT	1000	X'000003E8'
MQCHSSTATE_IN_MREXIT	1100	X'0000044C'
MQCHSSTATE_IN_CHADEXIT	1200	X'000004B0'
MQCHSSTATE_NET_CONNECTING	1250	X'000004E2'
MQCHSSTATE_SSL_HANDSHAKING	1300	X'00000514'
MQCHSSTATE_NAME_SERVER	1400	X'00000578'
MQCHSSTATE_IN_MQPUT	1500	X'000005DC'
MQCHSSTATE_IN_MQGET	1600	X'00000640'
MQCHSSTATE_IN_MQI_CALL	1700	X'000006A4'
MQCHSSTATE_COMPRESSING	1800	X'00000708'

Table 89. Values of constants (continued)

MQCHT_* (Channel Types)

Table 90. Values of constants

Name	Decimal value	Hexadecimal value
MQCHT_SENDER	1	X'00000001'
MQCHT_SERVER	2	X'00000002'
MQCHT_RECEIVER	3	X'00000003'
MQCHT_REQUESTER	4	X'00000004'
MQCHT_ALL	5	X'00000005'
MQCHT_CLNTCONN	6	X'00000006'
MQCHT_SVRCONN	7	X'00000007'
MQCHT_CLUSRCVR	8	X'00000008'
MQCHT_CLUSSDR	9	X'00000009'

MQCHTAB_* (Command format Channel Table Types)

Table 91. Values of constants

Name	Decimal value	Hexadecimal value
MQCHTAB_Q_MGR	1	X'00000001'
MQCHTAB_CLNTCONN	2	X'00000002'

MQCI_* (Correlation Identifier)

Table 92. Constant names and values

Name	Value
MQCI_NONE	X'00...00' (24 nulls)
MQCI_NONE_ARRAY	'\0','\0',... (24 nulls)
MQCI_NEW_SESSION	X'414D5121...'

Table 92. Constant names and values (continued)	
Name	**Value**
MQCI_NEW_SESSION_ARRAY	'\x41','\x4D','\51','\x21',...

MQCIH_* (CICS information header structure and Flags)

CICS information header structure

Table 93. Structures of constants	
Name	**Structure**
MQCIH_STRUC_ID	"CIH¬"
MQCIH_STRUC_ID_ARRAY	'C','I','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 94. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCIH_VERSION_1	1	X'00000001'
MQCIH_VERSION_2	2	X'00000002'
MQCIH_CURRENT_VERSION	2	X'00000002'
MQCIH_LENGTH_1	164	X'000000A4'
MQCIH_LENGTH_2	180	X'000000B4'
MQCIH_CURRENT_LENGTH	180	X'000000B4'

CICS information header Flags

Table 95. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCIH_NONE	0	X'00000000'
MQCIH_PASS_EXPIRATION	1	X'00000001'
MQCIH_UNLIMITED_EXPIRATION	0	X'00000000'
MQCIH_REPLY_WITHOUT_NULLS	2	X'00000002'
MQCIH_REPLY_WITH_NULLS	0	X'00000000'
MQCIH_SYNC_ON_RETURN	4	X'00000004'
MQCIH_NO_SYNC_ON_RETURN	0	X'00000000'

MQCLCT_* (Cluster Cache Types)

Table 96. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLCT_STATIC	0	X'00000000'
MQCLCT_DYNAMIC	1	X'00000001'

MQCLRS_* (Command format Clear Topic String Scope)

Table 97. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLRS_LOCAL	1	X'00000001'
MQCLRS_GLOBAL	2	X'00000002'

MQCLRT_* (Command format Clear Topic String Type)

Table 98. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLRT_RETAINED	1	X'00000001'

MQCLT_* (CICS information header Link Types)

Table 99. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLT_PROGRAM	1	X'00000001'
MQCLT_TRANSACTION	2	X'00000002'

MQCLWL_* (Cluster Workload)

Table 100. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLWL_USEQ_LOCAL	0	X'00000000'
MQCLWL_USEQ_ANY	1	X'00000001'
MQCLWL_USEQ_AS_Q_MGR	-3	X'FFFFFFFD'

MQCLXQ_* (Cluster transmission queue type)

MQCLXQ_* are the values you can set in the DEFCLXQ queue manager attribute. The **DEFCLXQ** attribute controls which transmission queue is selected by default by cluster-sender channels to get messages from, to send the messages to cluster-receiver channels.

Table 101. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCLXQ_SCTQ	0	X'00000000'
MQCLXQ_CHANNEL	1	X'00000001'

Related reference

"DefClusterXmitQueueType (MQLONG)" on page 804
The DefClusterXmitQueueType attribute controls which transmission queue is selected by default by cluster-sender channels to get messages from, to send the messages to cluster-receiver channels.

Change Queue Manager
Inquire Queue Manager
Inquire Queue Manager (Response)
"MQINQ - Inquire object attributes" on page 694

The MQINQ call returns an array of integers and a set of character strings containing the attributes of an object.

MQCMD_* (Command Codes)

Table 102. Values of constants

Name	Decimal value	Hexadecimal value
MQCMD_NONE	0	X'00000000'
MQCMD_CHANGE_Q_MGR	1	X'00000001'
MQCMD_INQUIRE_Q_MGR	2	X'00000002'
MQCMD_CHANGE_PROCESS	3	X'00000003'
MQCMD_COPY_PROCESS	4	X'00000004'
MQCMD_CREATE_PROCESS	5	X'00000005'
MQCMD_DELETE_PROCESS	6	X'00000006'
MQCMD_INQUIRE_PROCESS	7	X'00000007'
MQCMD_CHANGE_Q	8	X'00000008'
MQCMD_CLEAR_Q	9	X'00000009'
MQCMD_COPY_Q	10	X'0000000A'
MQCMD_CREATE_Q	11	X'0000000B'
MQCMD_DELETE_Q	12	X'0000000C'
MQCMD_INQUIRE_Q	13	X'0000000D'
MQCMD_REFRESH_Q_MGR	16	X'00000010'
MQCMD_RESET_Q_STATS	17	X'00000011'
MQCMD_INQUIRE_Q_NAMES	18	X'00000012'
MQCMD_INQUIRE_PROCESS_NAMES	19	X'00000013'
MQCMD_INQUIRE_CHANNEL_NAMES	20	X'00000014'
MQCMD_CHANGE_CHANNEL	21	X'00000015'
MQCMD_COPY_CHANNEL	22	X'00000016'
MQCMD_CREATE_CHANNEL	23	X'00000017'
MQCMD_DELETE_CHANNEL	24	X'00000018'
MQCMD_INQUIRE_CHANNEL	25	X'00000019'
MQCMD_PING_CHANNEL	26	X'0000001A'
MQCMD_RESET_CHANNEL	27	X'0000001B'
MQCMD_START_CHANNEL	28	X'0000001C'
MQCMD_STOP_CHANNEL	29	X'0000001D'
MQCMD_START_CHANNEL_INIT	30	X'0000001E'
MQCMD_START_CHANNEL_LISTENER	31	X'0000001F'
MQCMD_CHANGE_NAMELIST	32	X'00000020'
MQCMD_COPY_NAMELIST	33	X'00000021'
MQCMD_CREATE_NAMELIST	34	X'00000022'
MQCMD_DELETE_NAMELIST	35	X'00000023'
MQCMD_INQUIRE_NAMELIST	36	X'00000024'
MQCMD_INQUIRE_NAMELIST_NAMES	37	X'00000025'

Table 102. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQCMD_ESCAPE	38	X'00000026'
MQCMD_RESOLVE_CHANNEL	39	X'00000027'
MQCMD_PING_Q_MGR	40	X'00000028'
MQCMD_INQUIRE_Q_STATUS	41	X'00000029'
MQCMD_INQUIRE_CHANNEL_STATUS	42	X'0000002A'
MQCMD_CONFIG_EVENT	43	X'0000002B'
MQCMD_Q_MGR_EVENT	44	X'0000002C'
MQCMD_PERFM_EVENT	45	X'0000002D'
MQCMD_CHANNEL_EVENT	46	X'0000002E'
MQCMD_DELETE_PUBLICATION	60	X'0000003C'
MQCMD_DEREGISTER_PUBLISHER	61	X'0000003D'
MQCMD_DEREGISTER_SUBSCRIBER	62	X'0000003E'
MQCMD_PUBLISH	63	X'0000003F'
MQCMD_REGISTER_PUBLISHER	64	X'00000040'
MQCMD_REGISTER_SUBSCRIBER	65	X'00000041'
MQCMD_REQUEST_UPDATE	66	X'00000042'
MQCMD_BROKER_INTERNAL	67	X'00000043'
MQCMD_ACTIVITY_MSG	69	X'00000045'
MQCMD_INQUIRE_CLUSTER_Q_MGR	70	X'00000046'
MQCMD_RESUME_Q_MGR_CLUSTER	71	X'00000047'
MQCMD_SUSPEND_Q_MGR_CLUSTER	72	X'00000048'
MQCMD_REFRESH_CLUSTER	73	X'00000049'
MQCMD_RESET_CLUSTER	74	X'0000004A'
MQCMD_TRACE_ROUTE	75	X'0000004B'
MQCMD_REFRESH_SECURITY	78	X'0000004E'
MQCMD_CHANGE_AUTH_INFO	79	X'0000004F'
MQCMD_COPY_AUTH_INFO	80	X'00000050'
MQCMD_CREATE_AUTH_INFO	81	X'00000051'
MQCMD_DELETE_AUTH_INFO	82	X'00000052'
MQCMD_INQUIRE_AUTH_INFO	83	X'00000053'
MQCMD_INQUIRE_AUTH_INFO_NAMES	84	X'00000054'
MQCMD_INQUIRE_CONNECTION	85	X'00000055'
MQCMD_STOP_CONNECTION	86	X'00000056'
MQCMD_INQUIRE_AUTH_RECS	87	X'00000057'
MQCMD_INQUIRE_ENTITY_AUTH	88	X'00000058'
MQCMD_DELETE_AUTH_REC	89	X'00000059'
MQCMD_SET_AUTH_REC	90	X'0000005A'
MQCMD_LOGGER_EVENT	91	X'0000005B'
MQCMD_RESET_Q_MGR	92	X'0000005C'

Table 102. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQCMD_CHANGE_LISTENER	93	X'0000005D'
MQCMD_COPY_LISTENER	94	X'0000005E'
MQCMD_CREATE_LISTENER	95	X'0000005F'
MQCMD_DELETE_LISTENER	96	X'00000060'
MQCMD_INQUIRE_LISTENER	97	X'00000061'
MQCMD_INQUIRE_LISTENER_STATUS	98	X'00000062'
MQCMD_COMMAND_EVENT	99	X'00000063'
MQCMD_CHANGE_SECURITY	100	X'00000064'
MQCMD_CHANGE_CF_STRUC	101	X'00000065'
MQCMD_CHANGE_STG_CLASS	102	X'00000066'
MQCMD_CHANGE_TRACE	103	X'00000067'
MQCMD_ARCHIVE_LOG	104	X'00000068'
MQCMD_BACKUP_CF_STRUC	105	X'00000069'
MQCMD_CREATE_BUFFER_POOL	106	X'0000006A'
MQCMD_CREATE_PAGE_SET	107	X'0000006B'
MQCMD_CREATE_CF_STRUC	108	X'0000006C'
MQCMD_CREATE_STG_CLASS	109	X'0000006D'
MQCMD_COPY_CF_STRUC	110	X'0000006E'
MQCMD_COPY_STG_CLASS	111	X'0000006F'
MQCMD_DELETE_CF_STRUC	112	X'00000070'
MQCMD_DELETE_STG_CLASS	113	X'00000071'
MQCMD_INQUIRE_ARCHIVE	114	X'00000072'
MQCMD_INQUIRE_CF_STRUC	115	X'00000073'
MQCMD_INQUIRE_CF_STRUC_STATUS	116	X'00000074'
MQCMD_INQUIRE_CMD_SERVER	117	X'00000075'
MQCMD_INQUIRE_CHANNEL_INIT	118	X'00000076'
MQCMD_INQUIRE_QSG	119	X'00000077'
MQCMD_INQUIRE_LOG	120	X'00000078'
MQCMD_INQUIRE_SECURITY	121	X'00000079'
MQCMD_INQUIRE_STG_CLASS	122	X'0000007A'
MQCMD_INQUIRE_SYSTEM	123	X'0000007B'
MQCMD_INQUIRE_THREAD	124	X'0000007C'
MQCMD_INQUIRE_TRACE	125	X'0000007D'
MQCMD_INQUIRE_USAGE	126	X'0000007E'
MQCMD_MOVE_Q	127	X'0000007F'
MQCMD_RECOVER_BSDS	128	X'00000080'
MQCMD_RECOVER_CF_STRUC	129	X'00000081'
MQCMD_RESET_TPIPE	130	X'00000082'
MQCMD_RESOLVE_INDOUBT	131	X'00000083'

Table 102. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCMD_RESUME_Q_MGR	132	X'00000084'
MQCMD_REVERIFY_SECURITY	133	X'00000085'
MQCMD_SET_ARCHIVE	134	X'00000086'
MQCMD_SET_LOG	136	X'00000088'
MQCMD_SET_SYSTEM	137	X'00000089'
MQCMD_START_CMD_SERVER	138	X'0000008A'
MQCMD_START_Q_MGR	139	X'0000008B'
MQCMD_START_TRACE	140	X'0000008C'
MQCMD_STOP_CHANNEL_INIT	141	X'0000008D'
MQCMD_STOP_CHANNEL_LISTENER	142	X'0000008E'
MQCMD_STOP_CMD_SERVER	143	X'0000008F'
MQCMD_STOP_Q_MGR	144	X'00000090'
MQCMD_STOP_TRACE	145	X'00000091'
MQCMD_SUSPEND_Q_MGR	146	X'00000092'
MQCMD_INQUIRE_CF_STRUC_NAMES	147	X'00000093'
MQCMD_INQUIRE_STG_CLASS_NAMES	148	X'00000094'
MQCMD_CHANGE_SERVICE	149	X'00000095'
MQCMD_COPY_SERVICE	150	X'00000096'
MQCMD_CREATE_SERVICE	151	X'00000097'
MQCMD_DELETE_SERVICE	152	X'00000098'
MQCMD_INQUIRE_SERVICE	153	X'00000099'
MQCMD_INQUIRE_SERVICE_STATUS	154	X'0000009A'
MQCMD_START_SERVICE	155	X'0000009B'
MQCMD_STOP_SERVICE	156	X'0000009C'
MQCMD_DELETE_BUFFER_POOL	157	X'0000009D'
MQCMD_DELETE_PAGE_SET	158	X'0000009E'
MQCMD_CHANGE_BUFFER_POOL	159	X'0000009F'
MQCMD_CHANGE_PAGE_SET	160	X'000000A0'
MQCMD_INQUIRE_Q_MGR_STATUS	161	X'000000A1'
MQCMD_CREATE_LOG	162	X'000000A2'
MQCMD_STATISTICS_MQI	164	X'000000A4'
MQCMD_STATISTICS_Q	165	X'000000A5'
MQCMD_STATISTICS_CHANNEL	166	X'000000A6'
MQCMD_ACCOUNTING_MQI	167	X'000000A7'
MQCMD_ACCOUNTING_Q	168	X'000000A8'
MQCMD_INQUIRE_AUTH_SERVICE	169	X'000000A9'
MQCMD_CHANGE_TOPIC	170	X'000000AA'
MQCMD_COPY_TOPIC	171	X'000000AB'
MQCMD_CREATE_TOPIC	172	X'000000AC'

Table 102. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCMD_DELETE_TOPIC	173	X'000000AD'
MQCMD_INQUIRE_TOPIC	174	X'000000AE'
MQCMD_INQUIRE_TOPIC_NAMES	175	X'000000AF'
MQCMD_INQUIRE_SUBSCRIPTION	176	X'000000B0'
MQCMD_CREATE_SUBSCRIPTION	177	X'000000B1'
MQCMD_CHANGE_SUBSCRIPTION	178	X'000000B2'
MQCMD_DELETE_SUBSCRIPTION	179	X'000000B3'
MQCMD_COPY_SUBSCRIPTION	181	X'000000B5'
MQCMD_INQUIRE_SUB_STATUS	182	X'000000B6'
MQCMD_INQUIRE_TOPIC_STATUS	183	X'000000B7'
MQCMD_CLEAR_TOPIC_STRING	184	X'000000B8'
MQCMD_INQUIRE_PUBSUB_STATUS	185	X'000000B9'
MQCMD_PURGE_CHANNEL	195	X'000000C3'

MQCMDI_* (Command format Command Information Values)

Table 103. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCMDI_CMDSCOPE_ACCEPTED	1	X'00000001'
MQCMDI_CMDSCOPE_GENERATED	2	X'00000002'
MQCMDI_CMDSCOPE_COMPLETED	3	X'00000003'
MQCMDI_QSG_DISP_COMPLETED	4	X'00000004'
MQCMDI_COMMAND_ACCEPTED	5	X'00000005'
MQCMDI_CLUSTER_REQUEST_QUEUED	6	X'00000006'
MQCMDI_CHANNEL_INIT_STARTED	7	X'00000007'
MQCMDI_RECOVER_STARTED	11	X'0000000B'
MQCMDI_BACKUP_STARTED	12	X'0000000C'
MQCMDI_RECOVER_COMPLETED	13	X'0000000D'
MQCMDI_SEC_TIMER_ZERO	14	X'0000000E'
MQCMDI_REFRESH_CONFIGURATION	16	X'00000010'
MQCMDI_SEC_SIGNOFF_ERROR	17	X'00000011'
MQCMDI_IMS_BRIDGE_SUSPENDED	18	X'00000012'
MQCMDI_DB2_SUSPENDED	19	X'00000013'
MQCMDI_DB2_OBSOLETE_MSGS	20	X'00000014'
MQCMDI_SEC_UPPERCASE	21	X'00000015'
MQCMDI_SEC_MIXEDCASE	22	X'00000016'

MQCMDL_* (Command Levels)

Table 104. Constant names and values	
Name	**Value**
MQCMDL_LEVEL_800	800

Table 104. Constant names and values (continued)	
Name	**Value**
MQCMDL_LEVEL_801	801
MQCMDL_LEVEL_802	802
MQCMDL_LEVEL_900	900
MQCMDL_LEVEL_901	901
MQCMDL_LEVEL_902	902
MQCMDL_LEVEL_903	903
MQCMDL_LEVEL_904	904
MQCMDL_LEVEL_905	905
MQCMDL_LEVEL_910	910
MQCMDL_LEVEL_912	912
MQCMDL_LEVEL_913	913
MQCMDL_LEVEL_914	914
MQCMDL_LEVEL_915	915

MQCMHO_* (Create message handle options and structure)

Create message handle options structure

Table 105. Structures of constants	
Name	**Structure**
MQCMHO_STRUC_ID	"CMHO"
MQCMHO_STRUC_ID_ARRAY	'C','M','H','O'

Note: The symbol ¬ represents a single blank character.

Table 106. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCMHO_VERSION_1	1	X'00000001'
MQCMHO_CURRENT_VERSION	1	X'00000001'

Create Message Handle Options

Table 107. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCMHO_DEFAULT_VALIDATION	0	X'00000000'
MQCMHO_NO_VALIDATION	1	X'00000001'
MQCMHO_VALIDATE	2	X'00000002'
MQCMHO_NONE	0	X'00000000'

MQCNO_* (Connect options and structure)

Connect options structure

Table 108. Structures of constants	
Name	**Structure**
MQCNO_STRUC_ID	"CNO¬"
MQCNO_STRUC_ID_ARRAY	'C','N','O','¬'

Note: The symbol ¬ represents a single blank character.

Table 109. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCNO_VERSION_1	1	X'00000001'
MQCNO_VERSION_2	2	X'00000002'
MQCNO_VERSION_3	3	X'00000003'
MQCNO_VERSION_4	4	X'00000004'
MQCNO_VERSION_5	5	X'00000005'
MQCNO_CURRENT_VERSION	5	X'00000005'

Connect Options

Table 110. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCNO_STANDARD_BINDING	0	X'00000000'
MQCNO_FASTPATH_BINDING	1	X'00000001'
MQCNO_SERIALIZE_CONN_TAG_Q_MGR	2	X'00000002'
MQCNO_SERIALIZE_CONN_TAG_QSG	4	X'00000004'
MQCNO_RESTRICT_CONN_TAG_Q_MGR	8	X'00000008'
MQCNO_RESTRICT_CONN_TAG_QSG	16	X'00000010'
MQCNO_HANDLE_SHARE_NONE	32	X'00000020'
MQCNO_HANDLE_SHARE_BLOCK	64	X'00000040'
MQCNO_HANDLE_SHARE_NO_BLOCK	128	X'00000080'
MQCNO_SHARED_BINDING	256	X'00000100'
MQCNO_ISOLATED_BINDING	512	X'00000200'
MQCNO_LOCAL_BINDING	1024	X'00000400'
MQCNO_CLIENT_BINDING	2048	X'00000800'
MQCNO_ACCOUNTING_MQI_ENABLED	4096	X'00001000'
MQCNO_ACCOUNTING_MQI_DISABLED	8192	X'00002000'
MQCNO_ACCOUNTING_Q_ENABLED	16384	X'00004000'
MQCNO_ACCOUNTING_Q_DISABLED	32768	X'00008000'
MQCNO_NO_CONV_SHARING	65536	X'00010000'
MQCNO_ALL_CONVS_SHARE	262144	X'00040000'
MQCNO_CD_FOR_OUTPUT_ONLY	524288	X'00080000'
MQCNO_USE_CD_SELECTION	1048576	X'00100000'

Table 110. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCNO_RECONNECT	16777216	X'01000000'
MQCNO_RECONNECT_AS_DEF	0	X'00000000'
MQCNO_RECONNECT_DISABLED	33554432	X'02000000'
MQCNO_RECONNECT_Q_MGR	67108864	X'04000000'
MQCNO_ACTIVITY_TRACE_ENABLED	134217728	X'08000000'
MQCNO_ACTIVITY_TRACE_DISABLED	268435456	X'10000000'
MQCNO_NONE	0	X'00000000'

MQCO_* (Close Options)

Table 111. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCO_IMMEDIATE	0	X'00000000'
MQCO_NONE	0	X'00000000'
MQCO_DELETE	1	X'00000001'
MQCO_DELETE_PURGE	2	X'00000002'
MQCO_KEEP_SUB	4	X'00000004'
MQCO_REMOVE_SUB	8	X'00000008'
MQCO_QUIESCE	32	X'00000020'

MQCODL_* (CICS information header Output Data Length)

Table 112. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCODL_AS_INPUT	-1	X'FFFFFFFF'

MQCOMPRESS_* (Channel Compression)

Table 113. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCOMPRESS_NOT_AVAILABLE	-1	X'FFFFFFFF'
MQCOMPRESS_NONE	0	X'00000000'
MQCOMPRESS_RLE	1	X'00000001'
MQCOMPRESS_ZLIBFAST	2	X'00000002'
MQCOMPRESS_ZLIBHIGH	4	X'00000004'
MQCOMPRESS_SYSTEM	8	X'00000008'
MQCOMPRESS_ANY	268435455	X'0FFFFFFF'

MQCONNID_* (Connection Identifier)

Table 114. Constant names and values	
Name	**Value**
MQCONNID_NONE	X'00...00' (24 nulls)
MQCONNID_NONE_ARRAY	'\0','\0',... (24 nulls)

MQCOPY_* (Property Copy Options)

Table 115. Values of constants

Name	Decimal value	Hexadecimal value
MQCOPY_NONE	0	X'00000000'
MQCOPY_ALL	1	X'00000001'
MQCOPY_FORWARD	2	X'00000002'
MQCOPY_PUBLISH	4	X'00000004'
MQCOPY_REPLY	8	X'00000008'
MQCOPY_REPORT	16	X'00000010'
MQCOPY_DEFAULT	22	X'00000016'

MQCQT_* (Cluster Queue Types)

Table 116. Values of constants

Name	Decimal value	Hexadecimal value
MQCQT_LOCAL_Q	1	X'00000001'
MQCQT_ALIAS_Q	2	X'00000002'
MQCQT_REMOTE_Q	3	X'00000003'
MQCQT_Q_MGR_ALIAS	4	X'00000004'

MQCRC_* (CICS information header Return Codes)

Table 117. Values of constants

Name	Decimal value	Hexadecimal value
MQCRC_OK	0	X'00000000'
MQCRC_CICS_EXEC_ERROR	1	X'00000001'
MQCRC_MQ_API_ERROR	2	X'00000002'
MQCRC_BRIDGE_ERROR	3	X'00000003'
MQCRC_BRIDGE_ABEND	4	X'00000004'
MQCRC_APPLICATION_ABEND	5	X'00000005'
MQCRC_SECURITY_ERROR	6	X'00000006'
MQCRC_PROGRAM_NOT_AVAILABLE	7	X'00000007'
MQCRC_BRIDGE_TIMEOUT	8	X'00000008'
MQCRC_TRANSID_NOT_AVAILABLE	9	X'00000009'

MQCS_* (MQCBC constants Consumer state)

Table 118. Values of constants

Name	Decimal value	Hexadecimal value
MQCS_NONE	0	X'00000000'
MQCS_SUSPENDED_TEMPORARY	1	X'00000001'
MQCS_SUSPENDED_USER_ACTION	2	X'00000002'
MQCS_SUSPENDED	3	X'00000003'
MQCS_STOPPED	4	X'00000004'

MQCSC_* (CICS information header Start Codes)

Table 119. Structures of constants	
Name	**Structure**
MQCSC_START	"S¬¬¬"
MQCSC_STARTDATA	"SD¬¬"
MQCSC_TERMINPUT	"TD¬¬"
MQCSC_NONE	"¬¬¬¬"
MQCSC_START_ARRAY	'S','¬','¬','¬'
MQCSC_STARTDATA_ARRAY	'S','D','¬','¬'
MQCSC_TERMINPUT_ARRAY	'T','D','¬','¬'
MQCSC_NONE_ARRAY	'¬','¬','¬','¬'

Note: The symbol ¬ represents a single blank character.

MQCSP_* (Connection security parameters structure and Authentication Types)

Connection security parameters structure

Table 120. Structures of constants	
Name	**Structure**
MQCSP_STRUC_ID	"CSP¬"
MQCSP_STRUC_ID_ARRAY	'C','S','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 121. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCSP_VERSION_1	1	X'00000001'
MQCSP_CURRENT_VERSION	1	X'00000001'

Connection security parameters Authentication Types

Table 122. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCSP_AUTH_NONE	0	X'00000000'
MQCSP_AUTH_USER_ID_AND_PWD	1	X'00000001'

MQCSRV_* (Command Server Options)

Table 123. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCSRV_CONVERT_NO	0	X'00000000'
MQCSRV_CONVERT_YES	1	X'00000001'
MQCSRV_DLQ_NO	0	X'00000000'
MQCSRV_DLQ_YES	1	X'00000001'

MQCT_* (Queue Manager Connection Tag)

Table 124. Constant names and values	
Name	**Value**
MQCT_NONE	X'00...00' (128 nulls)
MQCT_NONE_ARRAY	'\0','\0',... (128 nulls)

MQCTES_* (CICS information header Task End Status)

Table 125. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCTES_NOSYNC	0	X'00000000'
MQCTES_COMMIT	256	X'00000100'
MQCTES_BACKOUT	4352	X'00001100'
MQCTES_ENDTASK	65536	X'00010000'

MQCTLO_* (MQCTL options structure and Consumer Control Options)

MQCTL options structure

Table 126. Structures of constants	
Name	**Structure**
MQCTLO_STRUC_ID	"CTLO"
MQCTLO_STRUC_ID_ARRAY	'C','T','L','O'

Note: The symbol ¬ represents a single blank character.

Table 127. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCTLO_VERSION_1	1	X'00000001'
MQCTLO_CURRENT_VERSION	1	X'00000001'

MQCTL options Consumer Control Options

Table 128. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCTLO_NONE	0	X'00000000'
MQCTLO_THREAD_AFFINITY	1	X'00000001'
MQCTLO_FAIL_IF_QUIESCING	8192	X'00002000'

MQCUOWC_* (CICS information header Unit-of-Work Controls)

Table 129. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCUOWC_ONLY	273	X'00000111'
MQCUOWC_CONTINUE	65536	X'00010000'
MQCUOWC_FIRST	17	X'00000011'
MQCUOWC_MIDDLE	16	X'00000010'

Table 129. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQCUOWC_LAST	272	X'00000110'
MQCUOWC_COMMIT	256	X'00000100'
MQCUOWC_BACKOUT	4352	X'00001100'

MQCXP_* (Channel exit parameter structure)

Table 130. Structures of constants	
Name	**Structure**
MQCXP_STRUC_ID	"CXP¬"
MQCXP_STRUC_ID_ARRAY	'C','X','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 131. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQCXP_VERSION_1	1	X'00000001'
MQCXP_VERSION_2	2	X'00000002'
MQCXP_VERSION_3	3	X'00000003'
MQCXP_VERSION_4	4	X'00000004'
MQCXP_VERSION_5	5	X'00000005'
MQCXP_VERSION_6	6	X'00000006'
MQCXP_VERSION_7	7	X'00000007'
MQCXP_VERSION_8	8	X'00000008'
MQCXP_VERSION_9	9	X'00000009'
MQCXP_CURRENT_VERSION	9	X'00000009'

MQDC_* (Destination Class)

Table 132. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDC_MANAGED	1	X'00000001'
MQDC_PROVIDED	2	X'00000002'

MQDCC_* (Conversion Options, and Masks and Factors)

Conversion Options

Table 133. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDCC_DEFAULT_CONVERSION	1	X'00000001'
MQDCC_FILL_TARGET_BUFFER	2	X'00000002'
MQDCC_INT_DEFAULT_CONVERSION	4	X'00000004'
MQDCC_SOURCE_ENC_NATIVE	(value differs by platform or version)	(value differs by platform or version)

Table 133. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQDCC_SOURCE_ENC_NORMAL	16	X'00000010'
MQDCC_SOURCE_ENC_REVERSED	32	X'00000020'
MQDCC_SOURCE_ENC_UNDEFINED	0	X'00000000'
MQDCC_TARGET_ENC_NATIVE	(value differs by platform or version)	(value differs by platform or version)
MQDCC_TARGET_ENC_NORMAL	256	X'00000100'
MQDCC_TARGET_ENC_REVERSED	512	X'00000200'
MQDCC_TARGET_ENC_UNDEFINED	0	X'00000000'
MQDCC_NONE	0	X'00000000'

Conversion Options Masks and Factors

Table 134. Values of constants

Name	Decimal value	Hexadecimal value
MQDCC_SOURCE_ENC_MASK	240	X'000000F0'
MQDCC_TARGET_ENC_MASK	3840	X'00000F00'
MQDCC_SOURCE_ENC_FACTOR	16	X'00000010'
MQDCC_TARGET_ENC_FACTOR	256	X'00000100'

MQDELO_* (Publish/Subscribe Delete Options)

Table 135. Values of constants

Name	Decimal value	Hexadecimal value
MQDELO_NONE	0	X'00000000'
MQDELO_LOCAL	4	X'00000004'

MQDH_* (Distribution header structure)

Table 136. Structures of constants

Name	Structure
MQDH_STRUC_ID	"DH¬¬"
MQDH_STRUC_ID_ARRAY	'D','H','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 137. Values of constants

Name	Decimal value	Hexadecimal value
MQDH_VERSION_1	1	X'00000001'
MQDH_CURRENT_VERSION	1	X'00000001'

MQDHF_* (Distribution header Flags)

Table 138. Values of constants

Name	Decimal value	Hexadecimal value
MQDHF_NEW_MSG_IDS	1	X'00000001'

Table 138. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQDHF_NONE	0	X'00000000'

MQDISCONNECT_* (Command format Disconnect Types)

Table 139. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDISCONNECT_NORMAL	0	X'00000000'
MQDISCONNECT_IMPLICIT	1	X'00000001'
MQDISCONNECT_Q_MGR	2	X'00000002'

MQDL_* (Distribution Lists)

Table 140. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDL_SUPPORTED	1	X'00000001'
MQDL_NOT_SUPPORTED	0	X'00000000'

MQDLH_* (Dead-letter header structure)

Table 141. Structures of constants	
Name	**Structure**
MQDLH_STRUC_ID	"DLH¬"
MQDLH_STRUC_ID_ARRAY	'D','L','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 142. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDLH_VERSION_1	1	X'00000001'
MQDLH_CURRENT_VERSION	1	X'00000001'

MQDLV_* (Persistent/Non-persistent Message Delivery)

Table 143. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDLV_AS_PARENT	0	X'00000000'
MQDLV_ALL	1	X'00000001'
MQDLV_ALL_DUR	2	X'00000002'
MQDLV_ALL_AVAIL	3	X'00000003'

MQDMHO_* (Delete message handle options and structure)

Delete message handle options structure

Table 144. Structures of constants	
Name	**Structure**
MQDMHO_STRUC_ID	"DMHO"
MQDMHO_STRUC_ID_ARRAY	'D','M','H','O'

Note: The symbol ¬ represents a single blank character.

Table 145. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDMHO_VERSION_1	1	X'00000001'
MQDMHO_CURRENT_VERSION	1	X'00000001'

Delete Message Handle Options

Table 146. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDMHO_NONE	0	X'00000000'

MQDMPO_* (Delete message property options and structure)

Delete message property options structure

Table 147. Structures of constants	
Name	**Structure**
MQDMPO_STRUC_ID	"DMPO"
MQDMPO_STRUC_ID_ARRAY	'D','M','P','O'

Note: The symbol ¬ represents a single blank character.

Table 148. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDMPO_VERSION_1	1	X'00000001'
MQDMPO_CURRENT_VERSION	1	X'00000001'

Delete Message Property Options

Table 149. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDMPO_DEL_FIRST	0	X'00000000'
MQDMPO_DEL_PROP_UNDER_CURSOR	1	X'00000001'
MQDMPO_NONE	0	X'00000000'

MQDNSWLM_* (DNS WLM)

Table 150. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDNSWLM_NO	0	X'00000000'
MQDNSWLM_YES	1	X'00000001'

MQDT_* (Destination Types)

Table 151. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDT_APPL	1	X'00000001'
MQDT_BROKER	2	X'00000002'

MQDXP_* (Conversion exit parameter structure)

Table 152. Structures of constants	
Name	**Structure**
MQDXP_STRUC_ID	"DXP¬"
MQDXP_STRUC_ID_ARRAY	'D','X','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 153. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQDXP_VERSION_1	1	X'00000001'
MQDXP_VERSION_2	2	X'00000002'
MQDXP_CURRENT_VERSION	2	X'00000002'

MQEC_* (Signal Values)

Table 154. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQEC_MSG_ARRIVED	2	X'00000002'
MQEC_WAIT_INTERVAL_EXPIRED	3	X'00000003'
MQEC_WAIT_CANCELED	4	X'00000004'
MQEC_Q_MGR_QUIESCING	5	X'00000005'
MQEC_CONNECTION_QUIESCING	6	X'00000006'

MQEI_* (Expiry)

Table 155. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQEI_UNLIMITED	-1	X'FFFFFFFF'

MQENC_* (Encoding)

MQENC_* (Encoding)

Table 156. Values of constants by platform			
Name	**Platform**	**Decimal value**	**Hexadecimal value**
MQENC_NATIVE	IBM i	273	X'00000111'
	Linux	546	X'00000222'
	Linux on SPARC	273	X'00000111'
	Linux on x86	546	X'00000222'
	Solaris on SPARC	273	X'00000111'
	UNIX	273	X'00000111'
	Windows	546	X'00000222'
	Micro Focus COBOL on Windows	17	X'00000011'
	z/OS	785	X'00000311'

Table 157. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQENC_INTEGER_MASK	15	X'0000000F'
MQENC_DECIMAL_MASK	240	X'000000F0'
MQENC_FLOAT_MASK	3840	X'00000F00'
MQENC_RESERVED_MASK	-4096	X'FFFFF000'

MQENC_* (Encodings for Binary Integers)

Table 158. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQENC_INTEGER_UNDEFINED	0	X'00000000'
MQENC_INTEGER_NORMAL	1	X'00000001'
MQENC_INTEGER_REVERSED	2	X'00000002'

MQENC_* (Encodings for Packed Decimal Integers)

Table 159. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQENC_DECIMAL_UNDEFINED	0	X'00000000'
MQENC_DECIMAL_NORMAL	16	X'00000010'
MQENC_DECIMAL_REVERSED	32	X'00000020'

MQENC_* (Encodings for Floating Point Numbers)

Table 160. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQENC_FLOAT_UNDEFINED	0	X'00000000'
MQENC_FLOAT_IEEE_NORMAL	256	X'00000100'
MQENC_FLOAT_IEEE_REVERSED	512	X'00000200'

Table 160. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQENC_FLOAT_S390	768	X'00000300'
MQENC_FLOAT_TNS	1024	X'00000400'

MQEPH_* (Embedded command format header structure and Flags)

Embedded command format header structure

Table 161. Structures of constants	
Name	**Structure**
MQEPH_STRUC_ID	"EPH¬"
MQEPH_STRUC_ID_ARRAY	'E','P','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 162. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQEPH_STRUC_LENGTH_FIXED	68	X'00000044'
MQEPH_VERSION_1	1	X'00000001'
MQEPH_CURRENT_VERSION	1	X'00000001'

Embedded command format header Flags

Table 163. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQEPH_NONE	0	X'00000000'
MQEPH_CCSID_EMBEDDED	1	X'00000001'

MQET_* (Command format Escape Types)

Table 164. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQET_MQSC	1	X'00000001'

MQEVO_* (Command format Event Origins)

Table 165. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQEVO_OTHER	0	X'00000000'
MQEVO_CONSOLE	1	X'00000001'
MQEVO_INIT	2	X'00000002'
MQEVO_MSG	3	X'00000003'
MQEVO_MQSET	4	X'00000004'
MQEVO_INTERNAL	5	X'00000005'
MQEVO_MQSUB	6	X'00000006'
MQEVO_CTLMSG	7	X'00000007'

Table 165. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
V 9.1.0 V 9.1.0 MQEVO_REST	8	X'00000008'

MQEVR_* (Command format Event Recording)

Table 166. Values of constants		
Name	Decimal value	Hexadecimal value
MQEVR_DISABLED	0	X'00000000'
MQEVR_ENABLED	1	X'00000001'
MQEVR_EXCEPTION	2	X'00000002'
MQEVR_NO_DISPLAY	3	X'00000003'

MQEXPI_* (Expiration Scan Interval)

Table 167. Values of constants		
Name	Decimal value	Hexadecimal value
MQEXPI_OFF	0	X'00000000'

MQFB_* (Feedback Values)

Table 168. Values of constants		
Name	Decimal value	Hexadecimal value
MQFB_NONE	0	X'00000000'
MQFB_SYSTEM_FIRST	1	X'00000001'
MQFB_QUIT	256	X'00000100'
MQFB_EXPIRATION	258	X'00000102'
MQFB_COA	259	X'00000103'
MQFB_COD	260	X'00000104'
MQFB_CHANNEL_COMPLETED	262	X'00000106'
MQFB_CHANNEL_FAIL_RETRY	263	X'00000107'
MQFB_CHANNEL_FAIL	264	X'00000108'
MQFB_APPL_CANNOT_BE_STARTED	265	X'00000109'
MQFB_TM_ERROR	266	X'0000010A'
MQFB_APPL_TYPE_ERROR	267	X'0000010B'
MQFB_STOPPED_BY_MSG_EXIT	268	X'0000010C'
MQFB_ACTIVITY	269	X'0000010D'
MQFB_XMIT_Q_MSG_ERROR	271	X'0000010F'
MQFB_PAN	275	X'00000113'
MQFB_NAN	276	X'00000114'
MQFB_STOPPED_BY_CHAD_EXIT	277	X'00000115'
MQFB_STOPPED_BY_PUBSUB_EXIT	279	X'00000117'
MQFB_NOT_A_REPOSITORY_MSG	280	X'00000118'
MQFB_BIND_OPEN_CLUSRCVR_DEL	281	X'00000119'

Name	Decimal value	Hexadecimal value
MQFB_MAX_ACTIVITIES	282	X'0000011A'
MQFB_NOT_FORWARDED	283	X'0000011B'
MQFB_NOT_DELIVERED	284	X'0000011C'
MQFB_UNSUPPORTED_FORWARDING	285	X'0000011D'
MQFB_UNSUPPORTED_DELIVERY	286	X'0000011E'
MQFB_DATA_LENGTH_ZERO	291	X'00000123'
MQFB_DATA_LENGTH_NEGATIVE	292	X'00000124'
MQFB_DATA_LENGTH_TOO_BIG	293	X'00000125'
MQFB_BUFFER_OVERFLOW	294	X'00000126'
MQFB_LENGTH_OFF_BY_ONE	295	X'00000127'
MQFB_IIH_ERROR	296	X'00000128'
MQFB_NOT_AUTHORIZED_FOR_IMS	298	X'0000012A'
MQFB_IMS_ERROR	300	X'0000012C'
MQFB_IMS_FIRST	301	X'0000012D'
MQFB_IMS_LAST	399	X'0000018F'
MQFB_CICS_INTERNAL_ERROR	401	X'00000191'
MQFB_CICS_NOT_AUTHORIZED	402	X'00000192'
MQFB_CICS_BRIDGE_FAILURE	403	X'00000193'
MQFB_CICS_CORREL_ID_ERROR	404	X'00000194'
MQFB_CICS_CCSID_ERROR	405	X'00000195'
MQFB_CICS_ENCODING_ERROR	406	X'00000196'
MQFB_CICS_CIH_ERROR	407	X'00000197'
MQFB_CICS_UOW_ERROR	408	X'00000198'
MQFB_CICS_COMMAREA_ERROR	409	X'00000199'
MQFB_CICS_APPL_NOT_STARTED	410	X'0000019A'
MQFB_CICS_APPL_ABENDED	411	X'0000019B'
MQFB_CICS_DLQ_ERROR	412	X'0000019C'
MQFB_CICS_UOW_BACKED_OUT	413	X'0000019D'
MQFB_PUBLICATIONS_ON_REQUEST	501	X'000001F5'
MQFB_SUBSCRIBER_IS_PUBLISHER	502	X'000001F6'
MQFB_MSG_SCOPE_MISMATCH	503	X'000001F7'
MQFB_SELECTOR_MISMATCH	504	X'000001F8'
MQFB_IMS_NACK_1A_REASON_FIRST	600	X'00000258'
MQFB_IMS_NACK_1A_REASON_LAST	855	X'00000357'
MQFB_SYSTEM_LAST	65535	X'0000FFFF'
MQFB_APPL_FIRST	65536	X'00010000'
MQFB_APPL_LAST	999999999	X'3B9AC9FF'

Table 168. Values of constants (continued)

MQFC_* (Command format Force Options)

Table 169. Values of constants

Name	Decimal value	Hexadecimal value
MQFC_YES	1	X'00000001'
MQFC_NO	0	X'00000000'

MQFMT_* (Formats)

Table 170. Constant names and values

Name	Value
MQFMT_NONE	"¬¬¬¬¬¬¬¬"
MQFMT_ADMIN	"MQADMIN¬"
MQFMT_CHANNEL_COMPLETED	"MQCHCOM¬"
MQFMT_CICS	"MQCICS¬¬"
MQFMT_COMMAND_1	"MQCMD1¬¬"
MQFMT_COMMAND_2	"MQCMD2¬¬"
MQFMT_DEAD_LETTER_HEADER	"MQDEAD¬¬"
MQFMT_DIST_HEADER	"MQHDIST¬"
MQFMT_EMBEDDED_PCF	"MQHEPCF¬"
MQFMT_EVENT	"MQEVENT¬"
MQFMT_IMS	"MQIMS¬¬¬"
MQFMT_IMS_VAR_STRING	"MQIMSVS¬"
MQFMT_MD_EXTENSION	"MQHMDE¬¬"
MQFMT_PCF	"MQPCF¬¬¬"
MQFMT_REF_MSG_HEADER	"MQHREF¬¬"
MQFMT_RF_HEADER	"MQHRF¬¬¬"
MQFMT_RF_HEADER_1	"MQHRF¬¬¬"
MQFMT_RF_HEADER_2	"MQHRF2¬¬"
MQFMT_STRING	"MQSTR¬¬¬"
MQFMT_TRIGGER	"MQTRIG¬¬"
MQFMT_WORK_INFO_HEADER	"MQHWIH¬¬"
MQFMT_XMIT_Q_HEADER	"MQXMIT¬¬"
MQFMT_NONE_ARRAY	'¬','¬','¬','¬','¬','¬','¬','¬'
MQFMT_ADMIN_ARRAY	'M','Q','A','D','M','I','N','¬'
MQFMT_CHANNEL_COMPLETED_ARRAY	'M','Q','C','H','C','O','M','¬'
MQFMT_CICS_ARRAY	'M','Q','C','I','C','S','¬','¬'
MQFMT_COMMAND_1_ARRAY	'M','Q','C','M','D','1','¬','¬'
MQFMT_COMMAND_2_ARRAY	'M','Q','C','M','D','2','¬','¬'
MQFMT_DEAD_LETTER_HEADER_ARRAY	'M','Q','D','E','A','D','¬','¬'
MQFMT_DIST_HEADER_ARRAY	'M','Q','H','D','I','S','T','¬'
MQFMT_EMBEDDED_PCF_ARRAY	'M','Q','H','E','P','C','F','¬'
MQFMT_EVENT_ARRAY	'M','Q','E','V','E','N','T','¬'

Table 170. Constant names and values (continued)	
Name	**Value**
MQFMT_IMS_ARRAY	'M','Q','I','M','S','¬','¬','¬'
MQFMT_IMS_VAR_STRING_ARRAY	'M','Q','I','M','S','V','S','¬'
MQFMT_MD_EXTENSION_ARRAY	'M','Q','H','M','D','E','¬','¬'
MQFMT_PCF_ARRAY	'M','Q','P','C','F','¬','¬','¬'
MQFMT_REF_MSG_HEADER_ARRAY	'M','Q','H','R','E','F','¬','¬'
MQFMT_RF_HEADER_ARRAY	'M','Q','H','R','F','¬','¬','¬'
MQFMT_RF_HEADER_1_ARRAY	'M','Q','H','R','F','¬','¬','¬'
MQFMT_RF_HEADER_2_ARRAY	'M','Q','H','R','F','2','¬','¬'
MQFMT_STRING_ARRAY	'M','Q','S','T','R','¬','¬','¬'
MQFMT_TRIGGER_ARRAY	'M','Q','T','R','I','G','¬','¬'
MQFMT_WORK_INFO_HEADER_ARRAY	'M','Q','H','W','I','H','¬','¬'
MQFMT_XMIT_Q_HEADER_ARRAY	'M','Q','X','M','I','T','¬','¬'

Note: The symbol ¬ represents a single blank character.

MQFUN_* (Application Function Types)

Table 171. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQFUN_TYPE_UNKNOWN	0	X'00000000'
MQFUN_TYPE_JVM	1	X'00000001'
MQFUN_TYPE_PROGRAM	2	X'00000002'
MQFUN_TYPE_PROCEDURE	3	X'00000003'
MQFUN_TYPE_USERDEF	4	X'00000004'
MQFUN_TYPE_COMMAND	5	X'00000005'

MQGA_* (Group Attribute Selectors)

Table 172. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQGA_FIRST	8001	X'00001F41'
MQGA_LAST	9000	X'00002328'

MQGACF_* (Command format Group Parameter Types)

Table 173. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQGACF_FIRST	8001	X'00001F41'
MQGACF_COMMAND_CONTEXT	8001	X'00001F41'
MQGACF_COMMAND_DATA	8002	X'00001F42'
MQGACF_TRACE_ROUTE	8003	X'00001F43'
MQGACF_OPERATION	8004	X'00001F44'
MQGACF_ACTIVITY	8005	X'00001F45'

Table 173. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQGACF_EMBEDDED_MQMD	8006	X'00001F46'
MQGACF_MESSAGE	8007	X'00001F47'
MQGACF_MQMD	8008	X'00001F48'
MQGACF_VALUE_NAMING	8009	X'00001F49'
MQGACF_Q_ACCOUNTING_DATA	8010	X'00001F4A'
MQGACF_Q_STATISTICS_DATA	8011	X'00001F4B'
MQGACF_CHL_STATISTICS_DATA	8012	X'00001F4C'
MQGACF_LAST_USED	8012	X'00001F4C'

MQGI_* (Group Identifier)

Table 174. Constant names and values	
Name	**Value**
MQGI_NONE	X'00...00' (24 nulls)
MQGI_NONE_ARRAY	'\0','\0',... (24 nulls)

MQGMO_* (Get message options and structure)

Get message options structure

Table 175. Structures of constants	
Name	**Structure**
MQGMO_STRUC_ID	"GMO¬"
MQGMO_STRUC_ID_ARRAY	'G','M','O','¬'

Note: The symbol ¬ represents a single blank character.

Table 176. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQGMO_VERSION_1	1	X'00000001'
MQGMO_VERSION_2	2	X'00000002'
MQGMO_VERSION_3	3	X'00000003'
MQGMO_VERSION_4	4	X'00000004'
MQGMO_CURRENT_VERSION	4	X'00000004'

Get Message Options

Table 177. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQGMO_WAIT	1	X'00000001'
MQGMO_NO_WAIT	0	X'00000000'
MQGMO_SET_SIGNAL	8	X'00000008'
MQGMO_FAIL_IF_QUIESCING	8192	X'00002000'
MQGMO_SYNCPOINT	2	X'00000002'

Table 177. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQGMO_SYNCPOINT_IF_PERSISTENT	4096	X'00001000'
MQGMO_NO_SYNCPOINT	4	X'00000004'
MQGMO_MARK_SKIP_BACKOUT	128	X'00000080'
MQGMO_BROWSE_FIRST	16	X'00000010'
MQGMO_BROWSE_NEXT	32	X'00000020'
MQGMO_BROWSE_MSG_UNDER_CURSOR	2048	X'00000800'
MQGMO_BROWSE_HANDLE	17825808	X'01100010'
MQGMO_BROWSE_CO_OP	18874384	X'01200010'
MQGMO_MSG_UNDER_CURSOR	256	X'00000100'
MQGMO_LOCK	512	X'00000200'
MQGMO_UNLOCK	1024	X'00000400'
MQGMO_ACCEPT_TRUNCATED_MSG	64	X'00000040'
MQGMO_CONVERT	16384	X'00004000'
MQGMO_LOGICAL_ORDER	32768	X'00008000'
MQGMO_COMPLETE_MSG	65536	X'00010000'
MQGMO_ALL_MSGS_AVAILABLE	131072	X'00020000'
MQGMO_ALL_SEGMENTS_AVAILABLE	262144	X'00040000'
MQGMO_MARK_BROWSE_HANDLE	1048576	X'00100000'
MQGMO_MARK_BROWSE_CO_OP	2097152	X'00200000'
MQGMO_UNMARK_BROWSE_CO_OP	4194304	X'00400000'
MQGMO_UNMARK_BROWSE_HANDLE	8388608	X'00800000'
MQGMO_UNMARKED_BROWSE_MSG	16777216	X'01000000'
MQGMO_PROPERTIES_FORCE_MQRFH2	33554432	X'02000000'
MQGMO_NO_PROPERTIES	67108864	X'04000000'
MQGMO_PROPERTIES_IN_HANDLE	134217728	X'08000000'
MQGMO_PROPERTIES_COMPATIBILITY	268435456	X'10000000'
MQGMO_PROPERTIES_AS_Q_DEF	0	X'00000000'
MQGMO_NONE	0	X'00000000'

MQGS_* (Group Status)

Table 178. Constant names and values	
Name	**Value**
MQGS_NOT_IN_GROUP	'¬'
MQGS_MSG_IN_GROUP	'G'
MQGS_LAST_MSG_IN_GROUP	'L'

Note: The symbol ¬ represents a single blank character.

MQHA_* (Handle Selectors)

Table 179. Values of constants

Name	Decimal value	Hexadecimal value
MQHA_FIRST	4001	X'00000FA1'
MQHA_BAG_HANDLE	4001	X'00000FA1'
MQHA_LAST_USED	4001	X'00000FA1'
MQHA_LAST	6000	X'00001770'

MQHB_* (Bag Handles)

Table 180. Values of constants

Name	Decimal value	Hexadecimal value
MQHB_UNUSABLE_HBAG	-1	X'FFFFFFFF'
MQHB_NONE	-2	X'FFFFFFFE'

MQHC_* (Connection Handles)

Table 181. Values of constants

Name	Decimal value	Hexadecimal value
MQHC_DEF_HCONN	0	X'00000000'
MQHC_UNUSABLE_HCONN	-1	X'FFFFFFFF'
MQHC_UNASSOCIATED_HCONN	-3	X'FFFFFFFD'

MQHM_* (Message handle)

Table 182. Values of constants

Name	Decimal value	Hexadecimal value
MQHM_UNUSABLE_HMSG	-1	X'FFFFFFFF'
MQHM_NONE	0	X'00000000'

MQHO_* (Object Handle)

Table 183. Values of constants

Name	Decimal value	Hexadecimal value
MQHO_UNUSABLE_HOBJ	-1	X'FFFFFFFF'
MQHO_NONE	0	X'00000000'

MQHSTATE_* (Command format Handle States)

Table 184. Values of constants

Name	Decimal value	Hexadecimal value
MQHSTATE_INACTIVE	0	X'00000000'
MQHSTATE_ACTIVE	1	X'00000001'

MQIA_* (Integer Attribute Selectors)

Table 185. Values of constants

Name	Decimal value	Hexadecimal value
MQIA_ACCOUNTING_CONN_OVERRIDE	136	X'00000088'
MQIA_ACCOUNTING_INTERVAL	135	X'00000087'
MQIA_ACCOUNTING_MQI	133	X'00000085'
MQIA_ACCOUNTING_Q	134	X'00000086'
MQIA_ACTIVE_CHANNELS	100	X'00000064'
MQIA_ACTIVITY_CONN_OVERRIDE	239	X'000000EF'
MQIA_ACTIVITY_RECORDING	138	X'0000008A'
MQIA_ACTIVITY_TRACE	240	X'000000F0'
MQIA_ADOPTNEWMCA_CHECK	102	X'00000066'
MQIA_ADOPTNEWMCA_INTERVAL	104	X'00000068'
MQIA_ADOPTNEWMCA_TYPE	103	X'00000067'
MQIA_ADOPT_CONTEXT	260	X'00000104'
MQ Adv. VUE V 9.1.0 MQ Adv. VUE V 9.1.0 MQIA_ADVANCED_CAPABILITY	273	X'00000111'
MQIA_AMQP_CAPABILITY	265	X'00000109'
MQIA_APPL_TYPE	1	X'00000001'
MQIA_ARCHIVE	60	X'0000003C'
MQIA_AUTHENTICATION_FAIL_DELAY	259	X'00000103'
MQIA_AUTHENTICATION_METHOD	266	X'0000010A'
MQIA_AUTH_INFO_TYPE	66	X'00000042'
MQIA_AUTHORITY_EVENT	47	X'0000002F'
MQIA_AUTO_REORG_INTERVAL	174	X'000000AE'
MQIA_AUTO_REORGANIZATION	173	X'000000AD'
MQIA_BACKOUT_THRESHOLD	22	X'00000016'
MQIA_BASE_TYPE	193	X'000000C1'
MQIA_BATCH_INTERFACE_AUTO	86	X'00000056'
MQIA_BRIDGE_EVENT	74	X'0000004A'
MQIA_CF_LEVEL	70	X'00000046'
MQIA_CF_RECOVER	71	X'00000047'
MQIA_CHANNEL_AUTO_DEF	55	X'00000037'
MQIA_CHANNEL_AUTO_DEF_EVENT	56	X'00000038'
MQIA_CHANNEL_EVENT	73	X'00000049'
MQIA_CHECK_CLIENT_BINDING	258	X'00000102'
MQIA_CHECK_LOCAL_BINDING	257	X'00000101'
MQIA_CHINIT_ADAPTERS	101	X'00000065'
MQIA_CHINIT_CONTROL	119	X'00000077'
MQIA_CHINIT_DISPATCHERS	105	X'00000069'
MQIA_CHINIT_TRACE_AUTO_START	117	X'00000075'

Name	Decimal value	Hexadecimal value
MQIA_CHINIT_TRACE_TABLE_SIZE	118	X'00000076'
MQIA_CLUSTER_OBJECT_STATE	256	X'00000100'
MQIA_CLUSTER_PUB_ROUTE	255	X'000000FF'
MQIA_CLUSTER_Q_TYPE	59	X'0000003B'
MQIA_CLUSTER_WORKLOAD_LENGTH	58	X'0000003A'
MQIA_CLWL_MRU_CHANNELS	97	X'00000061'
MQIA_CLWL_Q_RANK	95	X'0000005F'
MQIA_CLWL_Q_PRIORITY	96	X'00000060'
MQIA_CLWL_USEQ	98	X'00000062'
MQIA_CMD_SERVER_AUTO	87	X'00000057'
MQIA_CMD_SERVER_CONTROL	120	X'00000078'
MQIA_CMD_SERVER_CONVERT_MSG	88	X'00000058'
MQIA_CMD_SERVER_DLQ_MSG	89	X'00000059'
MQIA_CODED_CHAR_SET_ID	2	X'00000002'
MQIA_COMM_EVENT	232	X'000000E8'
MQIA_COMMAND_EVENT	99	X'00000063'
MQIA_COMMAND_LEVEL	31	X'0000001F'
MQIA_CONFIGURATION_EVENT	51	X'00000033'
MQIA_CPI_LEVEL	27	X'0000001B'
MQIA_CURRENT_Q_DEPTH	3	X'00000003'
MQIA_DEF_BIND	61	X'0000003D'
MQIA_DEF_CLUSTER_XMIT_Q_TYPE	250	X'000000FA'
MQIA_DEF_INPUT_OPEN_OPTION	4	X'00000004'
MQIA_DEF_PERSISTENCE	5	X'00000005'
MQIA_DEF_PRIORITY	6	X'00000006'
MQIA_DEF_PUT_RESPONSE_TYPE	184	X'000000B8'
MQIA_DEF_READ_AHEAD	188	X'000000BC'
MQIA_DEFINITION_TYPE	7	X'00000007'
MQIA_DISPLAY_TYPE	262	X'00000106'
MQIA_DIST_LISTS	34	X'00000022'
MQIA_DNS_WLM	106	X'0000006A'
MQIA_DURABLE_SUB	175	X'000000AF'
MQIA_EXPIRY_INTERVAL	39	X'00000027'
MQIA_FIRST	1	X'00000001'
MQIA_GROUP_UR	221	X'000000DD'
MQIA_HARDEN_GET_BACKOUT	8	X'00000008'
MQIA_HIGH_Q_DEPTH	36	X'00000024'
MQIA_IGQ_PUT_AUTHORITY	65	X'00000041'
MQIA_INDEX_TYPE	57	X'00000039'

Table 185. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIA_INHIBIT_EVENT	48	X'00000030'
MQIA_INHIBIT_GET	9	X'00000009'
MQIA_INHIBIT_PUB	181	X'000000B5'
MQIA_INHIBIT_PUT	10	X'0000000A'
MQIA_INHIBIT_SUB	182	X'000000B6'
MQIA_INTRA_GROUP_queuing	64	X'00000040'
MQIA_IP_ADDRESS_VERSION	93	X'0000005D'
MQIA_KEY_REUSE_COUNT	267	X'0000010B'
MQIA_LAST	2000	X'000007D0'
MQIA_LAST_USED	267	X'0000010B'
MQIA_LDAP_AUTHORMD	263	X'00000107'
MQIA_LDAP_NESTGRP	264	X'00000108'
MQIA_LDAP_SECURE_COMM	261	X'00000105'
MQIA_LISTENER_PORT_NUMBER	85	X'00000055'
MQIA_LISTENER_TIMER	107	X'0000006B'
MQIA_LOGGER_EVENT	94	X'0000005E'
MQIA_LU62_CHANNELS	108	X'0000006C'
MQIA_LOCAL_EVENT	49	X'00000031'
MQIA_MSG_MARK_BROWSE_INTERVAL	68	X'00000044'
MQIA_MAX_CHANNELS	109	X'0000006D'
MQIA_MAX_CLIENTS	172	X'000000AC'
MQIA_MAX_GLOBAL_LOCKS	83	X'00000053'
MQIA_MAX_HANDLES	11	X'0000000B'
MQIA_MAX_LOCAL_LOCKS	84	X'00000054'
MQIA_MAX_MSG_LENGTH	13	X'0000000D'
MQIA_MAX_OPEN_Q	80	X'00000050'
MQIA_MAX_PRIORITY	14	X'0000000E'
MQIA_MAX_PROPERTIES_LENGTH	192	X'000000C0'
MQIA_MAX_Q_DEPTH	15	X'0000000F'
MQIA_MAX_Q_TRIGGERS	90	X'0000005A'
MQIA_MAX_RECOVERY_TASKS	171	X'000000AB'
MQIA_MAX_UNCOMMITTED_MSGS	33	X'00000021'
MQIA_MCAST_BRIDGE	233	X'000000E9'
MQIA_MONITOR_INTERVAL	81	X'00000051'
MQIA_MONITORING_AUTO_CLUSSDR	124	X'0000007C'
MQIA_MONITORING_CHANNEL	122	X'0000007A'
MQIA_MONITORING_Q	123	X'0000007B'
MQIA_MSG_DELIVERY_SEQUENCE	16	X'00000010'
MQIA_MSG_DEQ_COUNT	38	X'00000026'

Table 185. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIA_MSG_ENQ_COUNT	37	X'00000025'
MQIA_NAME_COUNT	19	X'00000013'
MQIA_NAMELIST_TYPE	72	X'00000048'
MQIA_NPM_CLASS	78	X'0000004E'
MQIA_NPM_DELIVERY	196	X'000000C4'
MQIA_OPEN_INPUT_COUNT	17	X'00000011'
MQIA_OPEN_OUTPUT_COUNT	18	X'00000012'
MQIA_OUTBOUND_PORT_MAX	140	X'0000008C'
MQIA_OUTBOUND_PORT_MIN	110	X'0000006E'
MQIA_PAGESET_ID	62	X'0000003E'
MQIA_PERFORMANCE_EVENT	53	X'00000035'
MQIA_PLATFORM	32	X'00000020'
MQIA_PM_DELIVERY	195	X'000000C3'
MQIA_PROPERTY_CONTROL	190	X'000000BE'
MQIA_PROT_POLICY_CAPABILITY	251	X'000000FB'
MQIA_PROXY_SUB	199	X'000000C7'
MQIA_PUB_COUNT	215	X'000000D7'
MQIA_PUB_SCOPE	219	X'000000DB'
MQIA_PUBSUB_CLUSTER	249	X'000000F9'
MQIA_PUBSUB_MAXMSG_RETRY_COUNT	206	X'000000CE'
MQIA_PUBSUB_MODE	187	X'000000BB'
MQIA_PUBSUB_NP_MSG	203	X'000000CB'
MQIA_PUBSUB_NP_RESP	205	X'000000CD'
MQIA_PUBSUB_SYNC_PT	207	X'000000CF'
MQIA_Q_DEPTH_HIGH_EVENT	43	X'0000002B'
MQIA_Q_DEPTH_HIGH_LIMIT	40	X'00000028'
MQIA_Q_DEPTH_LOW_EVENT	44	X'0000002C'
MQIA_Q_DEPTH_LOW_LIMIT	41	X'00000029'
MQIA_Q_DEPTH_MAX_EVENT	42	X'0000002A'
MQIA_Q_SERVICE_INTERVAL	54	X'00000036'
MQIA_Q_SERVICE_INTERVAL_EVENT	46	X'0000002E'
MQIA_Q_TYPE	20	X'00000014'
MQIA_Q_USERS	82	X'00000052'
MQIA_QMGR_CFCONLOS	245	X'000000F5'
MQIA_QMOPT_CONS_COMMS_MSGS	155	X'0000009B'
MQIA_QMOPT_CONS_CRITICAL_MSGS	154	X'0000009A'
MQIA_QMOPT_CONS_ERROR_MSGS	153	X'00000099'
MQIA_QMOPT_CONS_INFO_MSGS	151	X'00000097'
MQIA_QMOPT_CONS_REORG_MSGS	156	X'0000009C'

Name	Decimal value	Hexadecimal value
MQIA_QMOPT_CONS_SYSTEM_MSGS	157	X'0000009D'
MQIA_QMOPT_CONS_WARNING_MSGS	152	X'00000098'
MQIA_QMOPT_CSMT_ON_ERROR	150	X'00000096'
MQIA_QMOPT_INTERNAL_DUMP	170	X'000000AA'
MQIA_QMOPT_LOG_COMMS_MSGS	162	X'000000A2'
MQIA_QMOPT_LOG_CRITICAL_MSGS	161	X'000000A1'
MQIA_QMOPT_LOG_ERROR_MSGS	160	X'000000A0'
MQIA_QMOPT_LOG_INFO_MSGS	158	X'0000009E'
MQIA_QMOPT_LOG_REORG_MSGS	163	X'000000A3'
MQIA_QMOPT_LOG_SYSTEM_MSGS	164	X'000000A4'
MQIA_QMOPT_LOG_WARNING_MSGS	159	X'0000009F'
MQIA_QMOPT_TRACE_COMMS	166	X'000000A6'
MQIA_QMOPT_TRACE_CONVERSION	168	X'000000A8'
MQIA_QMOPT_TRACE_REORG	167	X'000000A7'
MQIA_QMOPT_TRACE_MQI_CALLS	165	X'000000A5'
MQIA_QMOPT_TRACE_SYSTEM	169	X'000000A9'
MQIA_QSG_DISP	63	X'0000003F'
MQIA_READ_AHEAD	189	X'000000BD'
MQIA_RECEIVE_TIMEOUT	111	X'0000006F'
MQIA_RECEIVE_TIMEOUT_MIN	113	X'00000071'
MQIA_RECEIVE_TIMEOUT_TYPE	112	X'00000070'
MQIA_REMOTE_EVENT	50	X'00000032'
MQIA_RETENTION_INTERVAL	21	X'00000015'
MQIA_REVERSE_DNS_LOOKUP	254	X'000000FE'
MQIA_SCOPE	45	X'0000002D'
MQIA_SECURITY_CASE	141	X'0000008D'
MQIA_SERVICE_CONTROL	139	X'0000008B'
MQIA_SERVICE_TYPE	121	X'00000079'
MQIA_SHAREABILITY	23	X'00000017'
MQIA_SHARED_Q_Q_MGR_NAME	77	X'0000004D'
MQIA_SSL_EVENT	75	X'0000004B'
MQIA_SSL_FIPS_REQUIRED	92	X'0000005C'
MQIA_SSL_RESET_COUNT	76	X'0000004C'
MQIA_SSL_TASKS	69	X'00000045'
MQIA_START_STOP_EVENT	52	X'00000034'
MQIA_STATISTICS_CHANNEL	129	X'00000081'
MQIA_STATISTICS_AUTO_CLUSSDR	130	X'00000082'
MQIA_STATISTICS_INTERVAL	131	X'00000083'
MQIA_STATISTICS_MQI	127	X'0000007F'

Table 185. Values of constants (continued)

Table 185. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
MQIA_STATISTICS_Q	128	X'00000080'
MQIA_SUB_COUNT	204	X'000000CC'
MQIA_SUB_SCOPE	218	X'000000DA'
MQIA_SYNCPOINT	30	X'0000001E'
MQIA_TCP_CHANNELS	114	X'00000072'
MQIA_TCP_KEEP_ALIVE	115	X'00000073'
MQIA_TCP_STACK_TYPE	116	X'00000074'
MQIA_TIME_SINCE_RESET	35	X'00000023'
MQIA_TOPIC_DEF_PERSISTENCE	185	X'000000B9'
MQIA_TOPIC_NODE_COUNT	253	X'000000FD'
MQIA_TOPIC_TYPE	208	X'000000D0'
MQIA_TRACE_ROUTE_RECORDING	137	X'00000089'
MQIA_TREE_LIFE_TIME	183	X'000000B7'
MQIA_TRIGGER_CONTROL	24	X'00000018'
MQIA_TRIGGER_DEPTH	29	X'0000001D'
MQIA_TRIGGER_INTERVAL	25	X'00000019'
MQIA_TRIGGER_MSG_PRIORITY	26	X'0000001A'
MQIA_TRIGGER_TYPE	28	X'0000001C'
MQIA_TRIGGER_RESTART	91	X'0000005B'
MQIA_USAGE	12	X'0000000C'
MQIA_USE_DEAD_LETTER_Q	234	X'000000EA'
MQIA_USER_LIST	2000	X'000007D0'
MQIA_WILDCARD_OPERATION	216	X'000000D8'
MQIA_XR_CAPABILITY	243	X'000000F3'

MQIACF_* (Command format Integer Parameter Types)

Table 186. Values of constants		
Name	Decimal value	Hexadecimal value
MQIACF_FIRST	1001	X'000003E9'
MQIACF_Q_MGR_ATTRS	1001	X'000003E9'
MQIACF_Q_ATTRS	1002	X'000003EA'
MQIACF_PROCESS_ATTRS	1003	X'000003EB'
MQIACF_NAMELIST_ATTRS	1004	X'000003EC'
MQIACF_FORCE	1005	X'000003ED'
MQIACF_REPLACE	1006	X'000003EE'
MQIACF_PURGE	1007	X'000003EF'
MQIACF_QUIESCE	1008	X'000003F0'
MQIACF_MODE	1008	X'000003F0'
MQIACF_ALL	1009	X'000003F1'

Table 186. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIACF_EVENT_APPL_TYPE	1010	X'000003F2'
MQIACF_EVENT_ORIGIN	1011	X'000003F3'
MQIACF_PARAMETER_ID	1012	X'000003F4'
MQIACF_ERROR_ID	1013	X'000003F5'
MQIACF_ERROR_IDENTIFIER	1013	X'000003F5'
MQIACF_SELECTOR	1014	X'000003F6'
MQIACF_CHANNEL_ATTRS	1015	X'000003F7'
MQIACF_OBJECT_TYPE	1016	X'000003F8'
MQIACF_ESCAPE_TYPE	1017	X'000003F9'
MQIACF_ERROR_OFFSET	1018	X'000003FA'
MQIACF_AUTH_INFO_ATTRS	1019	X'000003FB'
MQIACF_REASON_QUALIFIER	1020	X'000003FC'
MQIACF_COMMAND	1021	X'000003FD'
MQIACF_OPEN_OPTIONS	1022	X'000003FE'
MQIACF_OPEN_TYPE	1023	X'000003FF'
MQIACF_PROCESS_ID	1024	X'00000400'
MQIACF_THREAD_ID	1025	X'00000401'
MQIACF_Q_STATUS_ATTRS	1026	X'00000402'
MQIACF_UNCOMMITTED_MSGS	1027	X'00000403'
MQIACF_HANDLE_STATE	1028	X'00000404'
MQIACF_AUX_ERROR_DATA_INT_1	1070	X'0000042E'
MQIACF_AUX_ERROR_DATA_INT_2	1071	X'0000042F'
MQIACF_CONV_REASON_CODE	1072	X'00000430'
MQIACF_BRIDGE_TYPE	1073	X'00000431'
MQIACF_INQUIRY	1074	X'00000432'
MQIACF_WAIT_INTERVAL	1075	X'00000433'
MQIACF_OPTIONS	1076	X'00000434'
MQIACF_BROKER_OPTIONS	1077	X'00000435'
MQIACF_REFRESH_TYPE	1078	X'00000436'
MQIACF_SEQUENCE_NUMBER	1079	X'00000437'
MQIACF_INTEGER_DATA	1080	X'00000438'
MQIACF_REGISTRATION_OPTIONS	1081	X'00000439'
MQIACF_PUBLICATION_OPTIONS	1082	X'0000043A'
MQIACF_CLUSTER_INFO	1083	X'0000043B'
MQIACF_Q_MGR_DEFINITION_TYPE	1084	X'0000043C'
MQIACF_Q_MGR_TYPE	1085	X'0000043D'
MQIACF_ACTION	1086	X'0000043E'
MQIACF_SUSPEND	1087	X'0000043F'
MQIACF_BROKER_COUNT	1088	X'00000440'

Table 186. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIACF_APPL_COUNT	1089	X'00000441'
MQIACF_ANONYMOUS_COUNT	1090	X'00000442'
MQIACF_REG_REG_OPTIONS	1091	X'00000443'
MQIACF_DELETE_OPTIONS	1092	X'00000444'
MQIACF_CLUSTER_Q_MGR_ATTRS	1093	X'00000445'
MQIACF_REFRESH_INTERVAL	1094	X'00000446'
MQIACF_REFRESH_REPOSITORY	1095	X'00000447'
MQIACF_REMOVE_QUEUES	1096	X'00000448'
MQIACF_OPEN_INPUT_TYPE	1098	X'0000044A'
MQIACF_OPEN_OUTPUT	1099	X'0000044B'
MQIACF_OPEN_SET	1100	X'0000044C'
MQIACF_OPEN_INQUIRE	1101	X'0000044D'
MQIACF_OPEN_BROWSE	1102	X'0000044E'
MQIACF_Q_STATUS_TYPE	1103	X'0000044F'
MQIACF_Q_HANDLE	1104	X'00000450'
MQIACF_Q_STATUS	1105	X'00000451'
MQIACF_SECURITY_TYPE	1106	X'00000452'
MQIACF_CONNECTION_ATTRS	1107	X'00000453'
MQIACF_CONNECT_OPTIONS	1108	X'00000454'
MQIACF_CONN_INFO_TYPE	1110	X'00000456'
MQIACF_CONN_INFO_CONN	1111	X'00000457'
MQIACF_CONN_INFO_HANDLE	1112	X'00000458'
MQIACF_CONN_INFO_ALL	1113	X'00000459'
MQIACF_AUTH_PROFILE_ATTRS	1114	X'0000045A'
MQIACF_AUTHORIZATION_LIST	1115	X'0000045B'
MQIACF_AUTH_ADD_AUTHS	1116	X'0000045C'
MQIACF_AUTH_REMOVE_AUTHS	1117	X'0000045D'
MQIACF_ENTITY_TYPE	1118	X'0000045E'
MQIACF_COMMAND_INFO	1120	X'00000460'
MQIACF_CMDSCOPE_Q_MGR_COUNT	1121	X'00000461'
MQIACF_Q_MGR_SYSTEM	1122	X'00000462'
MQIACF_Q_MGR_EVENT	1123	X'00000463'
MQIACF_Q_MGR_DQM	1124	X'00000464'
MQIACF_Q_MGR_CLUSTER	1125	X'00000465'
MQIACF_QSG_DISPS	1126	X'00000466'
MQIACF_UOW_STATE	1128	X'00000468'
MQIACF_SECURITY_ITEM	1129	X'00000469'
MQIACF_CF_STRUC_STATUS	1130	X'0000046A'
MQIACF_UOW_TYPE	1132	X'0000046C'

Table 186. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIACF_CF_STRUC_ATTRS	1133	X'0000046D'
MQIACF_EXCLUDE_INTERVAL	1134	X'0000046E'
MQIACF_CF_STATUS_TYPE	1135	X'0000046F'
MQIACF_CF_STATUS_SUMMARY	1136	X'00000470'
MQIACF_CF_STATUS_CONNECT	1137	X'00000471'
MQIACF_CF_STATUS_BACKUP	1138	X'00000472'
MQIACF_CF_STRUC_TYPE	1139	X'00000473'
MQIACF_CF_STRUC_SIZE_MAX	1140	X'00000474'
MQIACF_CF_STRUC_SIZE_USED	1141	X'00000475'
MQIACF_CF_STRUC_ENTRIES_MAX	1142	X'00000476'
MQIACF_CF_STRUC_ENTRIES_USED	1143	X'00000477'
MQIACF_CF_STRUC_BACKUP_SIZE	1144	X'00000478'
MQIACF_MOVE_TYPE	1145	X'00000479'
MQIACF_MOVE_TYPE_MOVE	1146	X'0000047A'
MQIACF_MOVE_TYPE_ADD	1147	X'0000047B'
MQIACF_Q_MGR_NUMBER	1148	X'0000047C'
MQIACF_Q_MGR_STATUS	1149	X'0000047D'
MQIACF_Db2®_CONN_STATUS	1150	X'0000047E'
MQIACF_SECURITY_ATTRS	1151	X'0000047F'
MQIACF_SECURITY_TIMEOUT	1152	X'00000480'
MQIACF_SECURITY_INTERVAL	1153	X'00000481'
MQIACF_SECURITY_SWITCH	1154	X'00000482'
MQIACF_SECURITY_SETTING	1155	X'00000483'
MQIACF_STORAGE_CLASS_ATTRS	1156	X'00000484'
MQIACF_USAGE_TYPE	1157	X'00000485'
MQIACF_BUFFER_POOL_ID	1158	X'00000486'
MQIACF_USAGE_TOTAL_PAGES	1159	X'00000487'
MQIACF_USAGE_UNUSED_PAGES	1160	X'00000488'
MQIACF_USAGE_PERSIST_PAGES	1161	X'00000489'
MQIACF_USAGE_NONPERSIST_PAGES	1162	X'0000048A'
MQIACF_USAGE_RESTART_EXTENTS	1163	X'0000048B'
MQIACF_USAGE_EXPAND_COUNT	1164	X'0000048C'
MQIACF_PAGESET_STATUS	1165	X'0000048D'
MQIACF_USAGE_TOTAL_BUFFERS	1166	X'0000048E'
MQIACF_USAGE_DATA_SET_TYPE	1167	X'0000048F'
MQIACF_USAGE_PAGESET	1168	X'00000490'
MQIACF_USAGE_DATA_SET	1169	X'00000491'
MQIACF_USAGE_BUFFER_POOL	1170	X'00000492'
MQIACF_MOVE_COUNT	1171	X'00000493'

Table 186. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIACF_EXPIRY_Q_COUNT	1172	X'00000494'
MQIACF_CONFIGURATION_OBJECTS	1173	X'00000495'
MQIACF_CONFIGURATION_EVENTS	1174	X'00000496'
MQIACF_SYSP_TYPE	1175	X'00000497'
MQIACF_SYSP_DEALLOC_INTERVAL	1176	X'00000498'
MQIACF_SYSP_MAX_ARCHIVE	1177	X'00000499'
MQIACF_SYSP_MAX_READ_TAPES	1178	X'0000049A'
MQIACF_SYSP_IN_BUFFER_SIZE	1179	X'0000049B'
MQIACF_SYSP_OUT_BUFFER_SIZE	1180	X'0000049C'
MQIACF_SYSP_OUT_BUFFER_COUNT	1181	X'0000049D'
MQIACF_SYSP_ARCHIVE	1182	X'0000049E'
MQIACF_SYSP_DUAL_ACTIVE	1183	X'0000049F'
MQIACF_SYSP_DUAL_ARCHIVE	1184	X'000004A0'
MQIACF_SYSP_DUAL_BSDS	1185	X'000004A1'
MQIACF_SYSP_MAX_CONNS	1186	X'000004A2'
MQIACF_SYSP_MAX_CONNS_FORE	1187	X'000004A3'
MQIACF_SYSP_MAX_CONNS_BACK	1188	X'000004A4'
MQIACF_SYSP_EXIT_INTERVAL	1189	X'000004A5'
MQIACF_SYSP_EXIT_TASKS	1190	X'000004A6'
MQIACF_SYSP_CHKPOINT_COUNT	1191	X'000004A7'
MQIACF_SYSP_OTMA_INTERVAL	1192	X'000004A8'
MQIACF_SYSP_Q_INDEX_DEFER	1193	X'000004A9'
MQIACF_SYSP_Db2_TASKS	1194	X'000004AA'
MQIACF_SYSP_RESLEVEL_AUDIT	1195	X'000004AB'
MQIACF_SYSP_ROUTING_CODE	1196	X'000004AC'
MQIACF_SYSP_SMF_ACCOUNTING	1197	X'000004AD'
MQIACF_SYSP_SMF_STATS	1198	X'000004AE'
MQIACF_SYSP_SMF_INTERVAL	1199	X'000004AF'
MQIACF_SYSP_TRACE_CLASS	1200	X'000004B0'
MQIACF_SYSP_TRACE_SIZE	1201	X'000004B1'
MQIACF_SYSP_WLM_INTERVAL	1202	X'000004B2'
MQIACF_SYSP_ALLOC_UNIT	1203	X'000004B3'
MQIACF_SYSP_ARCHIVE_RETAIN	1204	X'000004B4'
MQIACF_SYSP_ARCHIVE_WTOR	1205	X'000004B5'
MQIACF_SYSP_BLOCK_SIZE	1206	X'000004B6'
MQIACF_SYSP_CATALOG	1207	X'000004B7'
MQIACF_SYSP_COMPACT	1208	X'000004B8'
MQIACF_SYSP_ALLOC_PRIMARY	1209	X'000004B9'
MQIACF_SYSP_ALLOC_SECONDARY	1210	X'000004BA'

Table 186. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
MQIACF_SYSP_PROTECT	1211	X'000004BB'
MQIACF_SYSP_QUIESCE_INTERVAL	1212	X'000004BC'
MQIACF_SYSP_TIMESTAMP	1213	X'000004BD'
MQIACF_SYSP_UNIT_ADDRESS	1214	X'000004BE'
MQIACF_SYSP_UNIT_STATUS	1215	X'000004BF'
MQIACF_SYSP_LOG_COPY	1216	X'000004C0'
MQIACF_SYSP_LOG_USED	1217	X'000004C1'
MQIACF_SYSP_LOG_SUSPEND	1218	X'000004C2'
MQIACF_SYSP_OFFLOAD_STATUS	1219	X'000004C3'
MQIACF_SYSP_TOTAL_LOGS	1220	X'000004C4'
MQIACF_SYSP_FULL_LOGS	1221	X'000004C5'
MQIACF_LISTENER_ATTRS	1222	X'000004C6'
MQIACF_LISTENER_STATUS_ATTRS	1223	X'000004C7'
MQIACF_SERVICE_ATTRS	1224	X'000004C8'
MQIACF_SERVICE_STATUS_ATTRS	1225	X'000004C9'
MQIACF_Q_TIME_INDICATOR	1226	X'000004CA'
MQIACF_OLDEST_MSG_AGE	1227	X'000004CB'
MQIACF_AUTH_OPTIONS	1228	X'000004CC'
MQIACF_Q_MGR_STATUS_ATTRS	1229	X'000004CD'
MQIACF_CONNECTION_COUNT	1230	X'000004CE'
MQIACF_Q_MGR_FACILITY	1231	X'000004CF'
MQIACF_CHINIT_STATUS	1232	X'000004D0'
MQIACF_CMD_SERVER_STATUS	1233	X'000004D1'
MQIACF_ROUTE_DETAIL	1234	X'000004D2'
MQIACF_RECORDED_ACTIVITIES	1235	X'000004D3'
MQIACF_MAX_ACTIVITIES	1236	X'000004D4'
MQIACF_DISCONTINUITY_COUNT	1237	X'000004D5'
MQIACF_ROUTE_ACCUMULATION	1238	X'000004D6'
MQIACF_ROUTE_DELIVERY	1239	X'000004D7'
MQIACF_OPERATION_TYPE	1240	X'000004D8'
MQIACF_BACKOUT_COUNT	1241	X'000004D9'
MQIACF_COMP_CODE	1242	X'000004DA'
MQIACF_ENCODING	1243	X'000004DB'
MQIACF_EXPIRY	1244	X'000004DC'
MQIACF_FEEDBACK	1245	X'000004DD'
MQIACF_MSG_FLAGS	1247	X'000004DF'
MQIACF_MSG_LENGTH	1248	X'000004E0'
MQIACF_MSG_TYPE	1249	X'000004E1'
MQIACF_OFFSET	1250	X'000004E2'

Table 186. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIACF_ORIGINAL_LENGTH	1251	X'000004E3'
MQIACF_PERSISTENCE	1252	X'000004E4'
MQIACF_PRIORITY	1253	X'000004E5'
MQIACF_REASON_CODE	1254	X'000004E6'
MQIACF_REPORT	1255	X'000004E7'
MQIACF_VERSION	1256	X'000004E8'
MQIACF_UNRECORDED_ACTIVITIES	1257	X'000004E9'
MQIACF_MONITORING	1258	X'000004EA'
MQIACF_ROUTE_FORWARDING	1259	X'000004EB'
MQIACF_SERVICE_STATUS	1260	X'000004EC'
MQIACF_Q_TYPES	1261	X'000004ED'
MQIACF_USER_ID_SUPPORT	1262	X'000004EE'
MQIACF_INTERFACE_VERSION	1263	X'000004EF'
MQIACF_AUTH_SERVICE_ATTRS	1264	X'000004F0'
MQIACF_USAGE_EXPAND_TYPE	1265	X'000004F1'
MQIACF_SYSP_CLUSTER_CACHE	1266	X'000004F2'
MQIACF_SYSP_Db2_BLOB_TASKS	1267	X'000004F3'
MQIACF_SYSP_WLM_INT_UNITS	1268	X'000004F4'
MQIACF_TOPIC_ATTRS	1269	X'000004F5'
MQIACF_PUBSUB_PROPERTIES	1271	X'000004F7'
MQIACF_DESTINATION_CLASS	1273	X'000004F9'
MQIACF_DURABLE_SUBSCRIPTION	1274	X'000004FA'
MQIACF_SUBSCRIPTION_SCOPE	1275	X'000004FB'
MQIACF_VARIABLE_USER_ID	1277	X'000004FD'
MQIACF_REQUEST_ONLY	1280	X'00000500'
MQIACF_PUB_PRIORITY	1283	X'00000503'
MQIACF_SUB_ATTRS	1287	X'00000507'
MQIACF_WILDCARD_SCHEMA	1288	X'00000508'
MQIACF_SUB_TYPE	1289	X'00000509'
MQIACF_MESSAGE_COUNT	1290	X'0000050A'
MQIACF_Q_MGR_PUBSUB	1291	X'0000050B'
MQIACF_Q_MGR_VERSION	1292	X'0000050C'
MQIACF_SUB_STATUS_ATTRS	1294	X'0000050E'
MQIACF_TOPIC_STATUS	1295	X'0000050F'
MQIACF_TOPIC_SUB	1296	X'00000510'
MQIACF_TOPIC_PUB	1297	X'00000511'
MQIACF_RETAINED_PUBLICATION	1300	X'00000514'
MQIACF_TOPIC_STATUS_ATTRS	1301	X'00000515'
MQIACF_TOPIC_STATUS_TYPE	1302	X'00000516'

Table 186. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIACF_SUB_OPTIONS	1303	X'00000517'
MQIACF_PUBLISH_COUNT	1304	X'00000518'
MQIACF_CLEAR_TYPE	1305	X'00000519'
MQIACF_CLEAR_SCOPE	1306	X'0000051A'
MQIACF_SUB_LEVEL	1307	X'0000051B'
MQIACF_ASYNC_STATE	1308	X'0000051C'
MQIACF_SUB_SUMMARY	1309	X'0000051D'
MQIACF_OBSOLETE_MSGS	1310	X'0000051E'
MQIACF_PUBSUB_STATUS	1311	X'0000051F'
MQIACF_PS_STATUS_TYPE	1314	X'00000522'
MQIACF_PUBSUB_STATUS_ATTRS	1318	X'00000526'
MQIACF_SELECTOR_TYPE	1321	X'00000529'
MQIACF_MCAST_REL_INDICATOR	1351	X'00000547'
MQIACF_CHLAUTH_TYPE	1352	X'00000548'
MQXR_DIAGNOSTICS_TYPE	1354	X'0000054A'
MQIACF_CHLAUTH_ATTRS	1355	X'0000054B'
MQIACF_OPERATION_ID	1356	X'0000054C'
MQIACF_API_CALLER_TYPE	1357	X'0000054D'
MQIACF_API_ENVIRONMENT	1358	X'0000054E'
MQIACF_TRACE_DETAIL	1359	X'0000054F'
MQIACF_HOBJ	1360	X'00000550'
MQIACF_CALL_TYPE	1361	X'00000551'
MQIACF_MQCB_OPERATION	1362	X'00000552'
MQIACF_MQCB_TYPE	1363	X'00000553'
MQIACF_MQCB_OPTIONS	1364	X'00000554'
MQIACF_CLOSE_OPTIONS	1365	X'00000555'
MQIACF_CTL_OPERATION	1366	X'00000556'
MQIACF_GET_OPTIONS	1367	X'00000557'
MQIACF_RECS_PRESENT	1368	X'00000558'
MQIACF_KNOWN_DEST_COUNT	1369	X'00000559'
MQIACF_UNKNOWN_DEST_COUNT	1370	X'0000055A'
MQIACF_INVALID_DEST_COUNT	1371	X'0000055B'
MQIACF_RESOLVED_TYPE	1372	X'0000055C'
MQIACF_PUT_OPTIONS	1373	X'0000055D'
MQIACF_BUFFER_LENGTH	1374	X'0000055E'
MQIACF_TRACE_DATA_LENGTH	1375	X'0000055F'
MQIACF_SMDS_EXPANDST	1376	X'00000560'
MQIACF_STRUC_LENGTH	1377	X'00000561'
MQIACF_ITEM_COUNT	1378	X'00000562'

Table 186. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIACF_EXPIRY_TIME	1379	X'00000563'
MQIACF_CONNECT_TIME	1380	X'00000564'
MQIACF_DISCONNECT_TIME	1381	X'00000565'
MQIACF_HSUB	1382	X'00000566'
MQIACF_SUBRQ_OPTIONS	1383	X'00000567'
MQIACF_XA_RMID	1384	X'00000568'
MQIACF_XA_FLAGS	1385	X'00000569'
MQIACF_XA_RETCODE	1386	X'0000056A'
MQIACF_XA_HANDLE	1387	X'0000056B'
MQIACF_XA_RETVAL	1388	X'0000056C'
MQIACF_STATUS_TYPE	1389	X'0000056D'
MQIACF_XA_COUNT	1390	X'0000056E'
MQIACF_SELECTOR_COUNT	1391	X'0000056F'
MQIACF_SELECTORS	1392	X'00000570'
MQIACF_INTATTR_COUNT	1393	X'00000571'
MQIACF_INTATTRS	1394	X'00000572'
MQIACF_SUBRQ_ACTION	1395	X'00000573'
MQIACF_NUM_PUBS	1396	X'00000574'
MQIACF_POINTER_SIZE	1397	X'00000575'
MQIACF_REMOVE_AUTHREC	1398	X'00000576'
MQIACF_XR_ATTRS	1399	X'00000577'
MQIACF_APPL_FUNCTION_TYPE	1400	X'00000578'
MQIACF_AMQP_ATTRS	1401	X'00000579'
MQIACF_EXPORT_TYPE	1402	X'0000057A'
MQIACF_EXPORT_ATTRS	1403	X'0000057B'
MQIACF_SYSTEM_OBJECTS	1404	X'0000057C'
MQIACF_CONNECTION_SWAP	1405	X'0000057D'
MQIACF_AMQP_DIAGNOSTICS_TYPE	1406	X'0000057E'
MQIACF_BUFFER_POOL_LOCATION	1408	X'00000580'
MQIACF_LDAP_CONNECTION_STATUS	1409	X'00000581'
MQIACF_SYSP_MAX_ACE_POOL	1410	X'00000582'
MQIACF_PAGECLAS	1411	X'00000583'
MQIACF_AUTH_REC_TYPE	1412	X'00000584'
MQIACF_SYSP_MAX_CONC_OFFLOADS	1413	X'00000585'
MQIACF_SYSP_ZHYPERWRITE	1414	X'00000586'
MQIACF_Q_MGR_STATUS_LOG	1415	X'00000587'
MQIACF_ARCHIVE_LOG_SIZE	1416	X'00000588'
MQIACF_MEDIA_LOG_SIZE	1417	X'00000589'
MQIACF_RESTART_LOG_SIZE	1418	X'0000058A'

Table 186. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIACF_REUSABLE_LOG_SIZE	1419	X'0000058B'
MQIACF_LOG_IN_USE	1420	X'0000058C'
MQIACF_LOG_UTILIZATION	1421	X'0000058D'
V 9.1.1 V 9.1.1 MQIACF_IGNORE_STATE	1423	X'0000058F'
MQIACF_LAST_USED	1423	X'0000058F'

MQIACH_* (Command format Integer Channel Types)

Table 187. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQIACH_FIRST	1501	X'000005DD'
MQIACH_XMIT_PROTOCOL_TYPE	1501	X'000005DD'
MQIACH_BATCH_SIZE	1502	X'000005DE'
MQIACH_DISC_INTERVAL	1503	X'000005DF'
MQIACH_SHORT_TIMER	1504	X'000005E0'
MQIACH_SHORT_RETRY	1505	X'000005E1'
MQIACH_LONG_TIMER	1506	X'000005E2'
MQIACH_LONG_RETRY	1507	X'000005E3'
MQIACH_PUT_AUTHORITY	1508	X'000005E4'
MQIACH_SEQUENCE_NUMBER_WRAP	1509	X'000005E5'
MQIACH_MAX_MSG_LENGTH	1510	X'000005E6'
MQIACH_CHANNEL_TYPE	1511	X'000005E7'
MQIACH_DATA_COUNT	1512	X'000005E8'
MQIACH_NAME_COUNT	1513	X'000005E9'
MQIACH_MSG_SEQUENCE_NUMBER	1514	X'000005EA'
MQIACH_DATA_CONVERSION	1515	X'000005EB'
MQIACH_IN_DOUBT	1516	X'000005EC'
MQIACH_MCA_TYPE	1517	X'000005ED'
MQIACH_SESSION_COUNT	1518	X'000005EE'
MQIACH_ADAPTER	1519	X'000005EF'
MQIACH_COMMAND_COUNT	1520	X'000005F0'
MQIACH_SOCKET	1521	X'000005F1'
MQIACH_PORT	1522	X'000005F2'
MQIACH_CHANNEL_INSTANCE_TYPE	1523	X'000005F3'
MQIACH_CHANNEL_INSTANCE_ATTRS	1524	X'000005F4'
MQIACH_CHANNEL_ERROR_DATA	1525	X'000005F5'
MQIACH_CHANNEL_TABLE	1526	X'000005F6'
MQIACH_CHANNEL_STATUS	1527	X'000005F7'
MQIACH_INDOUBT_STATUS	1528	X'000005F8'
MQIACH_LAST_SEQ_NUMBER	1529	X'000005F9'

Table 187. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIACH_LAST_SEQUENCE_NUMBER	1529	X'000005F9'
MQIACH_CURRENT_MSGS	1531	X'000005FB'
MQIACH_CURRENT_SEQ_NUMBER	1532	X'000005FC'
MQIACH_CURRENT_SEQUENCE_NUMBER	1532	X'000005FC'
MQIACH_SSL_RETURN_CODE	1533	X'000005FD'
MQIACH_MSGS	1534	X'000005FE'
MQIACH_BYTES_SENT	1535	X'000005FF'
MQIACH_BYTES_RCVD	1536	X'00000600'
MQIACH_BYTES_RECEIVED	1536	X'00000600'
MQIACH_BATCHES	1537	X'00000601'
MQIACH_BUFFERS_SENT	1538	X'00000602'
MQIACH_BUFFERS_RCVD	1539	X'00000603'
MQIACH_BUFFERS_RECEIVED	1539	X'00000603'
MQIACH_LONG_RETRIES_LEFT	1540	X'00000604'
MQIACH_SHORT_RETRIES_LEFT	1541	X'00000605'
MQIACH_MCA_STATUS	1542	X'00000606'
MQIACH_STOP_REQUESTED	1543	X'00000607'
MQIACH_MR_COUNT	1544	X'00000608'
MQIACH_MR_INTERVAL	1545	X'00000609'
MQIACH_NPM_SPEED	1562	X'0000061A'
MQIACH_HB_INTERVAL	1563	X'0000061B'
MQIACH_BATCH_INTERVAL	1564	X'0000061C'
MQIACH_NETWORK_PRIORITY	1565	X'0000061D'
MQIACH_KEEP_ALIVE_INTERVAL	1566	X'0000061E'
MQIACH_BATCH_HB	1567	X'0000061F'
MQIACH_SSL_CLIENT_AUTH	1568	X'00000620'
MQIACH_ALLOC_RETRY	1570	X'00000622'
MQIACH_ALLOC_FAST_TIMER	1571	X'00000623'
MQIACH_ALLOC_SLOW_TIMER	1572	X'00000624'
MQIACH_DISC_RETRY	1573	X'00000625'
MQIACH_PORT_NUMBER	1574	X'00000626'
MQIACH_HDR_COMPRESSION	1575	X'00000627'
MQIACH_MSG_COMPRESSION	1576	X'00000628'
MQIACH_CLWL_CHANNEL_RANK	1577	X'00000629'
MQIACH_CLWL_CHANNEL_PRIORITY	1578	X'0000062A'
MQIACH_CLWL_CHANNEL_WEIGHT	1579	X'0000062B'
MQIACH_CHANNEL_DISP	1580	X'0000062C'
MQIACH_INBOUND_DISP	1581	X'0000062D'
MQIACH_CHANNEL_TYPES	1582	X'0000062E'

Table 187. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQIACH_ADAPS_STARTED	1583	X'0000062F'
MQIACH_ADAPS_MAX	1584	X'00000630'
MQIACH_DISPS_STARTED	1585	X'00000631'
MQIACH_DISPS_MAX	1586	X'00000632'
MQIACH_SSLTASKS_STARTED	1587	X'00000633'
MQIACH_SSLTASKS_MAX	1588	X'00000634'
MQIACH_CURRENT_CHL	1589	X'00000635'
MQIACH_CURRENT_CHL_MAX	1590	X'00000636'
MQIACH_CURRENT_CHL_TCP	1591	X'00000637'
MQIACH_CURRENT_CHL_LU62	1592	X'00000638'
MQIACH_ACTIVE_CHL	1593	X'00000639'
MQIACH_ACTIVE_CHL_MAX	1594	X'0000063A'
MQIACH_ACTIVE_CHL_PAUSED	1595	X'0000063B'
MQIACH_ACTIVE_CHL_STARTED	1596	X'0000063C'
MQIACH_ACTIVE_CHL_STOPPED	1597	X'0000063D'
MQIACH_ACTIVE_CHL_RETRY	1598	X'0000063E'
MQIACH_LISTENER_STATUS	1599	X'0000063F'
MQIACH_SHARED_CHL_RESTART	1600	X'00000640'
MQIACH_LISTENER_CONTROL	1601	X'00000641'
MQIACH_BACKLOG	1602	X'00000642'
MQIACH_XMITQ_TIME_INDICATOR	1604	X'00000644'
MQIACH_NETWORK_TIME_INDICATOR	1605	X'00000645'
MQIACH_EXIT_TIME_INDICATOR	1606	X'00000646'
MQIACH_BATCH_SIZE_INDICATOR	1607	X'00000647'
MQIACH_XMITQ_MSGS_AVAILABLE	1608	X'00000648'
MQIACH_CHANNEL_SUBSTATE	1609	X'00000649'
MQIACH_SSL_KEY_RESETS	1610	X'0000064A'
MQIACH_COMPRESSION_RATE	1611	X'0000064B'
MQIACH_COMPRESSION_TIME	1612	X'0000064C'
MQIACH_MAX_XMIT_SIZE	1613	X'0000064D'
MQIACH_DEF_CHANNEL_DISP	1614	X'0000064E'
MQIACH_SHARING_CONVERSATIONS	1615	X'0000064F'
MQIACH_MAX_SHARING_CONVS	1616	X'00000650'
MQIACH_CURRENT_SHARING_CONVS	1617	X'00000651'
MQIACH_MAX_INSTANCES	1618	X'00000652'
MQIACH_MAX_INSTS_PER_CLIENT	1619	X'00000653'
MQIACH_CLIENT_CHANNEL_WEIGHT	1620	X'00000654'
MQIACH_CONNECTION_AFFINITY	1621	X'00000655'
MQIACH_AUTH_INFO_TYPES	1622	X'00000656'

Name	Decimal value	Hexadecimal value
MQIACH_RESET_REQUESTED	1623	X'00000657'
MQIACH_BATCH_DATA_LIMIT	1624	X'00000658'
MQIACH_MSG_HISTORY	1625	X'00000659'
MQIACH_MULTICAST_PROPERTIES	1626	X'0000065A'
MQIACH_NEW_SUBSCRIBER_HISTORY	1627	X'0000065B'
MQIACH_MC_HB_INTERVAL	1628	X'0000065C'
MQIACH_USE_CLIENT_ID	1629	X'0000065D'
MQIACH_MQTT_KEEP_ALIVE	1630	X'0000065E'
MQIACH_IN_DOUBT_IN	1631	X'0000065F'
MQIACH_IN_DOUBT_OUT	1632	X'00000660'
MQIACH_MSGS_SENT<	1633	X'00000661'
MQIACH_MSGS_RECEIVED	1634	X'00000662'
MQIACH_MSGS_RCVD	1634	X'00000662'
MQIACH_PENDING_OUT	1635	X'00000663'
MQIACH_AVAILABLE_CIPHERSPECS	1636	X'00000664'
MQIACH_MATCH	1637	X'00000665'
MQIACH_USER_SOURCE	1638	X'00000666'
MQIACH_WARNING	1639	X'00000667'
MQIACH_DEF_RECONNECT	1640	X'00000668'
MQIACH_CHANNEL_SUMMARY_ATTRS	1642	X'0000066A'
MQIACH_PROTOCOL	1643	X'0000066B'
MQIACH_AMQPKEEPALIVE	1644	X'0000066C'
MQIACH_SECURITY_PROTOCOL	1645	X'0000066D'
z/OS V 9.1.3 MQIACH_SPL_PROTECTION	1646	X'0000066E'
MQIACH_LAST_USED	1646	X'0000066E'

Table 187. Values of constants (continued)

MQIAMO_* (Command format Integer Monitoring Parameter Types)

Table 188. Values of constants

Name	Decimal value	Hexadecimal value
MQIAMO_FIRST	701	X'000002BD'
MQIAMO_AVG_BATCH_SIZE	702	X'000002BE'
MQIAMO_AVG_Q_TIME	703	X'000002BF'
MQIAMO_BACKOUTS	704	X'000002C0'
MQIAMO_BROWSES	705	X'000002C1'
MQIAMO_BROWSE_MAX_BYTES	706	X'000002C2'
MQIAMO_BROWSE_MIN_BYTES	707	X'000002C3'
MQIAMO_BROWSES_FAILED	708	X'000002C4'
MQIAMO_CLOSES	709	X'000002C5'
MQIAMO_COMMITS	710	X'000002C6'

Table 188. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIAMO_COMMITS_FAILED	711	X'000002C7'
MQIAMO_CONNS	712	X'000002C8'
MQIAMO_CONNS_MAX	713	X'000002C9'
MQIAMO_DISCS	714	X'000002CA'
MQIAMO_DISCS_IMPLICIT	715	X'000002CB'
MQIAMO_DISC_TYPE	716	X'000002CC'
MQIAMO_EXIT_TIME_AVG	717	X'000002CD'
MQIAMO_EXIT_TIME_MAX	718	X'000002CE'
MQIAMO_EXIT_TIME_MIN	719	X'000002CF'
MQIAMO_FULL_BATCHES	720	X'000002D0'
MQIAMO_GENERATED_MSGS	721	X'000002D1'
MQIAMO_GETS	722	X'000002D2'
MQIAMO_GET_MAX_BYTES	723	X'000002D3'
MQIAMO_GET_MIN_BYTES	724	X'000002D4'
MQIAMO_GETS_FAILED	725	X'000002D5'
MQIAMO_INCOMPLETE_BATCHES	726	X'000002D6'
MQIAMO_INQS	727	X'000002D7'
MQIAMO_MSGS	728	X'000002D8'
MQIAMO_NET_TIME_AVG	729	X'000002D9'
MQIAMO_NET_TIME_MAX	730	X'000002DA'
MQIAMO_NET_TIME_MIN	731	X'000002DB'
MQIAMO_OBJECT_COUNT	732	X'000002DC'
MQIAMO_OPENS	733	X'000002DD'
MQIAMO_PUT1S	734	X'000002DE'
MQIAMO_PUTS	735	X'000002DF'
MQIAMO_PUT_MAX_BYTES	736	X'000002E0'
MQIAMO_PUT_MIN_BYTES	737	X'000002E1'
MQIAMO_PUT_RETRIES	738	X'000002E2'
MQIAMO_Q_MAX_DEPTH	739	X'000002E3'
MQIAMO_Q_MIN_DEPTH	740	X'000002E4'
MQIAMO_Q_TIME_AVG	741	X'000002E5'
MQIAMO_Q_TIME_MAX	742	X'000002E6'
MQIAMO_Q_TIME_MIN	743	X'000002E7'
MQIAMO_SETS	744	X'000002E8'
MQIAMO_CONNS_FAILED	749	X'000002ED'
MQIAMO_OPENS_FAILED	751	X'000002EF'
MQIAMO_INQS_FAILED	752	X'000002F0'
MQIAMO_SETS_FAILED	753	X'000002F1'
MQIAMO_PUTS_FAILED	754	X'000002F2'

Table 188. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIAMO_PUT1S_FAILED	755	X'000002F3'
MQIAMO_CLOSES_FAILED	757	X'000002F5'
MQIAMO_MSGS_EXPIRED	758	X'000002F6'
MQIAMO_MSGS_NOT_QUEUED	759	X'000002F7'
MQIAMO_MSGS_PURGED	760	X'000002F8'
MQIAMO_SUBS_DUR	764	X'000002FC'
MQIAMO_SUBS_NDUR	765	X'000002FD'
MQIAMO_SUBS_FAILED	766	X'000002FE'
MQIAMO_SUBRQS	767	X'000002FF'
MQIAMO_SUBRQS_FAILED	768	X'00000300'
MQIAMO_CBS	769	X'00000301'
MQIAMO_CBS_FAILED	770	X'00000302'
MQIAMO_CTLS	771	X'00000303'
MQIAMO_CTLS_FAILED	772	X'00000304'
MQIAMO_STATS	773	X'00000305'
MQIAMO_STATS_FAILED	774	X'00000306'
MQIAMO_SUB_DUR_HIGHWATER	775	X'00000307'
MQIAMO_SUB_DUR_LOWWATER	776	X'00000308'
MQIAMO_SUB_NDUR_HIGHWATER	777	X'00000309'
MQIAMO_SUB_NDUR_LOWWATER	778	X'0000030A'
MQIAMO_TOPIC_PUTS	779	X'0000030B'
MQIAMO_TOPIC_PUTS_FAILED	780	X'0000030C'
MQIAMO_TOPIC_PUT1S	781	X'0000030D'
MQIAMO_TOPIC_PUT1S_FAILED	782	X'0000030E'
MQIAMO_PUBLISH_MSG_COUNT	784	X'00000310'
MQIAMO_UNSUBS_DUR	786	X'00000312'
MQIAMO_UNSUBS_NDUR	787	X'00000313'
MQIAMO_UNSUBS_FAILED	788	X'00000314'
MQIAMO_INTERVAL	789	X'00000315'
MQIAMO_MSGS_SENT	790	X'00000316'
MQIAMO_BYTES_SENT	791	X'00000317'
MQIAMO_REPAIR_BYTES	792	X'00000318'
MQIAMO_FEEDBACK_MODE	793	X'00000319'
MQIAMO_RELIABILITY_TYPE	794	X'0000031A'
MQIAMO_LATE_JOIN_MARK	795	X'0000031B'
MQIAMO_NACKS_RCVD	796	X'0000031C'
MQIAMO_REPAIR_PKTS	797	X'0000031D'
MQIAMO_HISTORY_PKTS	798	X'0000031E'
MQIAMO_PENDING_PKTS	799	X'0000031F'

Table 188. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQIAMO_PKT_RATE	800	X'00000320'
MQIAMO_MCAST_XMIT_RATE	801	X'00000321'
MQIAMO_MCAST_BATCH_TIME	802	X'00000322'
MQIAMO_MCAST_HEARTBEAT	803	X'00000323'
MQIAMO_DEST_DATA_PORT	804	X'00000324'
MQIAMO_DEST_REPAIR_PORT	805	X'00000325'
MQIAMO_ACKS_RCVD	806	X'00000326'
MQIAMO_ACTIVE_ACKERS	807	X'00000327'
MQIAMO_PKTS_SENT	808	X'00000328'
MQIAMO_TOTAL_REPAIR_PKTS	809	X'00000329'
MQIAMO_TOTAL_PKTS_SENT	810	X'0000032A'
MQIAMO_TOTAL_MSGS_SENT	811	X'0000032B'
MQIAMO_TOTAL_BYTES_SENT	812	X'0000032C'
MQIAMO_NUM_STREAMS	813	X'0000032D'
MQIAMO_ACK_FEEDBACK	814	X'0000032E'
MQIAMO_NACK_FEEDBACK	815	X'0000032F'
MQIAMO_PKTS_LOST	816	X'00000330'
MQIAMO_MSGS_RCVD	817	X'00000331'
MQIAMO_MSG_BYTES_RCVD	818	X'00000332'
MQIAMO_MSGS_DELIVERED	819	X'00000333'
MQIAMO_PKTS_PROCESSED	820	X'00000334'
MQIAMO_PKTS_DLVD	821	X'00000335'
MQIAMO_PKTS_DROPPED	822	X'00000336'
MQIAMO_PKTS_DUPLICATED	823	X'00000337'
MQIAMO_NACKS_CREATED	824	X'00000338'
MQIAMO_NACK_PKTS_SENT	825	X'00000339'
MQIAMO_REPAIR_PKTS_RQSTD	826	X'0000033A'
MQIAMO_REPAIR_PKTS_RCVD	827	X'0000033B'
MQIAMO_PKTS_REPAIRED	828	X'0000033C'
MQIAMO_TOTAL_MSGS_RCVD	829	X'0000033D'
MQIAMO_TOTAL_MSGS_BYTES_RCVD	830	X'0000033E'
MQIAMO_TOTAL_REPAIR_PKTS_RCVD	831	X'0000033F'
MQIAMO_TOTAL_REPAIR_PKTS_RQSTD	832	X'00000340'
MQIAMO_TOTAL_MSGS_PROCESSED	833	X'00000341'
MQIAMO_TOTAL_MSGS_SELECTED	834	X'00000342'
MQIAMO_TOTAL_MSGS_EXPIRED	835	X'00000343'
MQIAMO_TOTAL_MSGS_DELIVERED	836	X'00000344'
MQIAMO_TOTAL_MSGS_RETURNED	837	X'00000345'
MQIAMO_LAST_USED	837	X'00000345'

MQIAMO64_* (Command format 64-bit Integer Monitoring Parameter Types)

Table 189. Values of constants

Name	Decimal value	Hexadecimal value
MQIAMO64_AVG_Q_TIME	703	X'000002BF'
MQIAMO64_Q_TIME_AVG	741	X'000002E5'
MQIAMO64_Q_TIME_MAX	742	X'000002E6'
MQIAMO64_Q_TIME_MIN	743	X'000002E7'
MQIAMO64_BROWSE_BYTES	745	X'000002E9'
MQIAMO64_BYTES	746	X'000002EA'
MQIAMO64_GET_BYTES	747	X'000002EB'
MQIAMO64_PUT_BYTES	748	X'000002EC'
MQIAMO64_TOPIC_PUT_BYTES	783	X'0000030F'
MQIAMO64_PUBLISH_MSG_BYTES	785	X'00000311'

MQIASY_* (Integer System Selectors)

Table 190. Values of constants

Name	Decimal value	Hexadecimal value
MQIASY_FIRST	-1	X'FFFFFFFF'
MQIASY_CODED_CHAR_SET_ID	-1	X'FFFFFFFF'
MQIASY_TYPE	-2	X'FFFFFFFE'
MQIASY_COMMAND	-3	X'FFFFFFFD'
MQIASY_MSG_SEQ_NUMBER	-4	X'FFFFFFFC'
MQIASY_CONTROL	-5	X'FFFFFFFB'
MQIASY_COMP_CODE	-6	X'FFFFFFFA'
MQIASY_REASON	-7	X'FFFFFFF9'
MQIASY_BAG_OPTIONS	-8	X'FFFFFFF8'
MQIASY_VERSION	-9	X'FFFFFFF7'
MQIASY_LAST_USED	-9	X'FFFFFFF7'
MQIASY_LAST	-2000	X'FFFFF830'

MQIAUT_* (IMS information header Authenticator)

Table 191. Constant names and values

Name	Value
MQIAUT_NONE	"¬¬¬¬¬¬¬¬"
MQIAUT_NONE_ARRAY	'¬','¬','¬','¬','¬','¬','¬','¬'

Note: The symbol ¬ represents a single blank character.

MQIAV_* (Integer Attribute Values)

Table 192. Values of constants

Name	Decimal value	Hexadecimal value
MQIAV_NOT_APPLICABLE	-1	X'FFFFFFFF'

Name	Decimal value	Hexadecimal value
MQIAV_UNDEFINED	-2	X'FFFFFFFE'

Table 192. Values of constants (continued)

MQICM_* (IMS information header Commit Modes)

Table 193. Constant names and values

Name	Value
MQICM_COMMIT_THEN_SEND	'0'
MQICM_SEND_THEN_COMMIT	'1'

MQIDO_* (Command format Indoubt Options)

Table 194. Values of constants

Name	Decimal value	Hexadecimal value
MQIDO_COMMIT	1	X'00000001'
MQIDO_BACKOUT	2	X'00000002'

MQIEP_* (Interface entry points)

Connection security parameters structure

Table 195. Structures of constants

Name	Structure
MQIEP_STRUC_ID	"IEP¬"
MQIEP_STRUC_ID_ARRAY	'I','E','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 196. Values of constants

Name	Decimal value	Hexadecimal value
MQIEP_VERSION_1	1	X'00000001'
MQDXP_CURRENT_VERSION	1	X'00000001'

MQIGQ_* (Intra-Group queuing)

Table 197. Values of constants

Name	Decimal value	Hexadecimal value
MQIGQ_DISABLED	0	X'00000000'
MQIGQ_ENABLED	1	X'00000001'

MQIGQPA_* (Intra-Group queuing Put Authority)

Table 198. Values of constants

Name	Decimal value	Hexadecimal value
MQIGQPA_DEFAULT	1	X'00000001'
MQIGQPA_CONTEXT	2	X'00000002'
MQIGQPA_ONLY_IGQ	3	X'00000003'

Table 198. Values of constants (continued)		
Name	Decimal value	Hexadecimal value
MQIGQPA_ALTERNATE_OR_IGQ	4	X'00000004'

MQIIH_* (IMS information header structure and Flags)

IMS information header structure

Table 199. Structures of constants	
Name	Structure
MQIIH_STRUC_ID	"IIH¬"
MQIIH_STRUC_ID_ARRAY	'I','I','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 200. Values of constants		
Name	Decimal value	Hexadecimal value
MQIIH_VERSION_1	1	X'00000001'
MQIIH_CURRENT_VERSION	1	X'00000001'
MQIIH_LENGTH_1	84	X'00000054'

IMS information header Flags

Table 201. Values of constants		
Name	Decimal value	Hexadecimal value
MQIIH_NONE	0	X'00000000'
MQIIH_PASS_EXPIRATION	1	X'00000001'
MQIIH_UNLIMITED_EXPIRATION	0	X'00000000'
MQIIH_REPLY_FORMAT_NONE	8	X'00000008'
MQIIH_IGNORE_PURG	16	X'00000010'
MQIIH_CM0_REQUEST_RESPONSE	32	X'00000020'

MQIMPO_* (Inquire message property options and structure)

Inquire message property options structure

Table 202. Structures of constants	
Name	Structure
MQIMPO_STRUC_ID	"IMPO"
MQIMPO_STRUC_ID_ARRAY	'I','M','P','O'

Note: The symbol ¬ represents a single blank character.

Table 203. Values of constants		
Name	Decimal value	Hexadecimal value
MQIMPO_VERSION_1	1	X'00000001'
MQIMPO_CURRENT_VERSION	1	X'00000001'

Inquire Message Property Options

Table 204. Values of constants

Name	Decimal value	Hexadecimal value
MQIMPO_CONVERT_TYPE	2	X'00000002'
MQIMPO_QUERY_LENGTH	4	X'00000004'
MQIMPO_INQ_FIRST	0	X'00000000'
MQIMPO_INQ_NEXT	8	X'00000008'
MQIMPO_INQ_PROP_UNDER_CURSOR	16	X'00000010'
MQIMPO_CONVERT_VALUE	32	X'00000020'
MQIMPO_NONE	0	X'00000000'

MQINBD_* (Command format Inbound Dispositions)

Table 205. Values of constants

Name	Decimal value	Hexadecimal value
MQINBD_Q_MGR	0	X'00000000'
MQINBD_GROUP	3	X'00000003'

MQIND_* (Special Index Values)

Table 206. Values of constants

Name	Decimal value	Hexadecimal value
MQIND_NONE	-1	X'FFFFFFFF'
MQIND_ALL	-2	X'FFFFFFFE'

MQIPADDR_* (IP Address Versions)

Table 207. Values of constants

Name	Decimal value	Hexadecimal value
MQIPADDR_IPv4	0	X'00000000'
MQIPADDR_IPv6	1	X'00000001'

MQISS_* (IMS information header Security Scopes)

Table 208. Constant names and values

Name	Value
MQISS_CHECK	'C'
MQISS_FULL	'F'

MQIT_* (Index Types)

Table 209. Values of constants

Name	Decimal value	Hexadecimal value
MQIT_NONE	0	X'00000000'
MQIT_MSG_ID	1	X'00000001'
MQIT_CORREL_ID	2	X'00000002'

Name	Decimal value	Hexadecimal value
MQIT_MSG_TOKEN	4	X'00000004'
MQIT_GROUP_ID	5	X'00000005'

Table 209. Values of constants (continued)

MQITEM_* (Item Type for mqInquireItemInfo)

Table 210. Values of constants

Name	Decimal value	Hexadecimal value
MQITEM_INTEGER	1	X'00000001'
MQITEM_STRING	2	X'00000002'
MQITEM_BAG	3	X'00000003'
MQITEM_BYTE_STRING	4	X'00000004'
MQITEM_INTEGER_FILTER	5	X'00000005'
MQITEM_STRING_FILTER	6	X'00000006'
MQITEM_INTEGER64	7	X'00000007'
MQITEM_BYTE_STRING_FILTER	8	X'00000008'

MQITII_* (IMS information header Transaction Instance Identifier)

Table 211. Constant names and values

Name	Value
MQITII_NONE	X'00...00' (16 nulls)
MQITII_NONE_ARRAY	'\0','\0',... (16 nulls)

MQITS_* (IMS information header Transaction States)

Table 212. Constant names and values

Name	Value
MQITS_IN_CONVERSATION	'C'
MQITS_NOT_IN_CONVERSATION	'¬'
MQITS_ARCHITECTED	'A'

Note: The symbol ¬ represents a single blank character.

MQKAI_* (KeepAlive Interval)

Table 213. Values of constants

Name	Decimal value	Hexadecimal value
MQKAI_AUTO	-1	X'FFFFFFFF'

MQMASTER_* (Master administration)

Table 214. Values of constants

Name	Decimal value	Hexadecimal value
MQMASTER_NO	0	X'00000000'
MQMASTER_YES	1	X'00000001'

MQMCAS_* (Command format Message Channel Agent Status)

Table 215. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMCAS_STOPPED	0	X'00000000'
MQMCAS_RUNNING	3	X'00000003'

MQMCAT_* (MCA Types)

Table 216. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMCAT_PROCESS	1	X'00000001'
MQMCAT_THREAD	2	X'00000002'

MQMCD_* (Publish/Subscribe Options Tag Information)

Publish/Subscribe Options Tag Message Content Descriptor (mcd) Tags

Table 217. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMCD_FOLDER_VERSION	1	X'00000001'

Publish/Subscribe Options Tag Tag names

Table 218. Constant names and values	
Name	**Value**
MQMCD_MSG_DOMAIN	"Msd"
MQMCD_MSG_SET	"Set"
MQMCD_MSG_TYPE	"Type"
MQMCD_MSG_FORMAT	"Fmt"

Publish/Subscribe Options Tag XML tag names

Table 219. Constant names and values	
Name	**Value**
MQMCD_MSG_DOMAIN_B	"<Msd>"
MQMCD_MSG_DOMAIN_E	"</Msd>"
MQMCD_MSG_SET_B	"<Set>"
MQMCD_MSG_SET_E	"</Set>"
MQMCD_MSG_TYPE_B	"<Type>"
MQMCD_MSG_TYPE_E	"</Type>"
MQMCD_MSG_FORMAT_B	"<Fmt>"
MQMCD_MSG_FORMAT_E	"</Fmt>"

Publish/Subscribe Options Tag Tag values

Table 220. Constant names and values	
Name	**Value**
MQMCD_DOMAIN_NONE	"none"
MQMCD_DOMAIN_NEON	"neon"
MQMCD_DOMAIN_MRM	"mrm"
MQMCD_DOMAIN_JMS_NONE	"jms_none"
MQMCD_DOMAIN_JMS_TEXT	"jms_text"
MQMCD_DOMAIN_JMS_OBJECT	"jms_object"
MQMCD_DOMAIN_JMS_MAP	"jms_map"
MQMCD_DOMAIN_JMS_STREAM	"jms_stream"
MQMCD_DOMAIN_JMS_BYTES	"jms_bytes"

MQMD_* (Message descriptor structure)

Table 221. Structures of constants	
Name	**Structure**
MQMD_STRUC_ID	"MD¬¬"
MQMD_STRUC_ID_ARRAY	'M','D','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 222. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMD_VERSION_1	1	X'00000001'
MQMD_VERSION_2	2	X'00000002'
MQMD_CURRENT_VERSION	2	X'00000002'

MQMDE_* (Message descriptor extension structure)

Table 223. Structures of constants	
Name	**Structure**
MQMDE_STRUC_ID	"MDE¬"
MQMDE_STRUC_ID_ARRAY	'M','D','E','¬'

Note: The symbol ¬ represents a single blank character.

Table 224. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMDE_VERSION_2	2	X'00000002'
MQMDE_CURRENT_VERSION	2	X'00000002'
MQMDE_LENGTH_2	72	X'00000048'

MQMDEF_* (Message descriptor extension Flags)

Table 225. Values of constants

Name	Decimal value	Hexadecimal value
MQMDEF_NONE	0	X'00000000'

MQMDS_* (Message Delivery Sequence)

Table 226. Values of constants

Name	Decimal value	Hexadecimal value
MQMDS_PRIORITY	0	X'00000000'
MQMDS_FIFO	1	X'00000001'

MQMF_* (Message Flags)

Table 227. Values of constants

Name	Decimal value	Hexadecimal value
MQMF_SEGMENTATION_INHIBITED	0	X'00000000'
MQMF_SEGMENTATION_ALLOWED	1	X'00000001'
MQMF_MSG_IN_GROUP	8	X'00000008'
MQMF_LAST_MSG_IN_GROUP	16	X'00000010'
MQMF_SEGMENT	2	X'00000002'
MQMF_LAST_SEGMENT	4	X'00000004'
MQMF_NONE	0	X'00000000'

MQMHBO_* (Message handle to buffer options and structure)

Message handle to buffer options structure

Table 228. Structures of constants

Name	Structure
MQMHBO_STRUC_ID	"MHBO"
MQMHBO_STRUC_ID_ARRAY	'M','H','B','O'

Note: The symbol ¬ represents a single blank character.

Table 229. Values of constants

Name	Decimal value	Hexadecimal value
MQMHBO_VERSION_1	1	X'00000001'
MQMHBO_CURRENT_VERSION	1	X'00000001'

Message Handle To Buffer Options

Table 230. Values of constants

Name	Decimal value	Hexadecimal value
MQMHBO_PROPERTIES_IN_MQRFH2	1	X'00000001'
MQMHBO_DELETE_PROPERTIES	2	X'00000002'
MQMHBO_NONE	0	X'00000000'

MQMI_* (Message Identifier)

Table 231. Constant names and values	
Name	**Value**
MQMI_NONE	X'00...00' (24 nulls)
MQMI_NONE_ARRAY	'\0','\0',... (24 nulls)

MQMMBI_* (Message Mark-Browse Interval)

Table 232. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMMBI_UNLIMITED	-1	X'FFFFFFFF'

MQMO_* (Match Options)

Table 233. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMO_MATCH_MSG_ID	1	X'00000001'
MQMO_MATCH_CORREL_ID	2	X'00000002'
MQMO_MATCH_GROUP_ID	4	X'00000004'
MQMO_MATCH_MSG_SEQ_NUMBER	8	X'00000008'
MQMO_MATCH_OFFSET	16	X'00000010'
MQMO_MATCH_MSG_TOKEN	32	X'00000020'
MQMO_NONE	0	X'00000000'

MQMODE_* (Command format Mode Options)

Table 234. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMODE_FORCE	0	X'00000000'
MQMODE_QUIESCE	1	X'00000001'
MQMODE_TERMINATE	2	X'00000002'

MQMON_* (Monitoring Values)

Table 235. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMON_NOT_AVAILABLE	-1	X'FFFFFFFF'
MQMON_NONE	-1	X'FFFFFFFF'
MQMON_Q_MGR	-3	X'FFFFFFFD'
MQMON_OFF	0	X'00000000'
MQMON_ON	1	X'00000001'
MQMON_DISABLED	0	X'00000000'
MQMON_ENABLED	1	X'00000001'
MQMON_LOW	17	X'00000011'
MQMON_MEDIUM	33	X'00000021'

Table 235. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQMON_HIGH	65	X'00000041'

MQMT_* (Message Types)

Table 236. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMT_SYSTEM_FIRST	1	X'00000001'
MQMT_REQUEST	1	X'00000001'
MQMT_REPLY	2	X'00000002'
MQMT_DATAGRAM	8	X'00000008'
MQMT_REPORT	4	X'00000004'
MQMT_MQE_FIELDS_FROM_MQE	112	X'00000070'
MQMT_MQE_FIELDS	113	X'00000071'
MQMT_SYSTEM_LAST	65535	X'0000FFFF'
MQMT_APPL_FIRST	65536	X'00010000'
MQMT_APPL_LAST	999999999	X'3B9AC9FF'

MQMTOK_* (Message Token)

Table 237. Constant names and values	
Name	**Value**
MQMTOK_NONE	X'00...00' (16 nulls)
MQMTOK_NONE_ARRAY	'\0','\0',... (16 nulls)

Table 238. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQMTOK_NONE	X'00...00'	(16 nulls)
MQMTOK_NONE_ARRAY	'\0','\0',...	(16 nulls)

MQNC_* (Name Count)

Table 239. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQNC_MAX_NAMELIST_NAME_COUNT	256	X'00000100'

MQNPM_* (Nonpersistent Message Class)

Table 240. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQNPM_CLASS_NORMAL	0	X'00000000'
MQNPM_CLASS_HIGH	10	X'0000000A'

MQNPMS_* (NonPersistent-Message Speeds)

Table 241. Values of constants

Name	Decimal value	Hexadecimal value
MQNPMS_NORMAL	1	X'00000001'
MQNPMS_FAST	2	X'00000002'

MQNT_* (Namelist Types)

Table 242. Values of constants

Name	Decimal value	Hexadecimal value
MQNT_NONE	0	X'00000000'
MQNT_Q	1	X'00000001'
MQNT_CLUSTER	2	X'00000002'
MQNT_AUTH_INFO	4	X'00000004'
MQNT_ALL	1001	X'000003E9'

MQNVS_* (Names for Name/Value String)

Table 243. Constant names and values

Name	Value
MQNVS_APPL_TYPE	"OPT_APP_GRP¬"
MQNVS_MSG_TYPE	"OPT_MSG_TYPE¬"

Note: The symbol ¬ represents a single blank character.

MQOA_* (Limits for Selectors for Object Attributes)

Table 244. Values of constants

Name	Decimal value	Hexadecimal value
MQOA_FIRST	1	X'00000001'
MQOA_LAST	9000	X'00002328'

MQOD_* (Object descriptor structure)

Table 245. Structures of constants

Name	Structure
MQOD_STRUC_ID	"OD¬¬"
MQOD_STRUC_ID_ARRAY	'O','D','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 246. Values of constants

Name	Decimal value	Hexadecimal value
MQOD_VERSION_1	1	X'00000001'
MQOD_VERSION_2	2	X'00000002'
MQOD_VERSION_3	3	X'00000003'
MQOD_VERSION_4	4	X'00000004'

Table 246. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQOD_CURRENT_VERSION	4	X'00000004'
MQOD_CURRENT_LENGTH	(value differs by platform or version)	(value differs by platform or version)

MQOII_* (Object Instance Identifier)

Table 247. Constant names and values	
Name	**Value**
MQOII_NONE	X'00...00' (24 nulls)
MQOII_NONE_ARRAY	'\0','\0',... (24 nulls)

MQOL_* (Original Length)

Table 248. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOL_UNDEFINED	-1	X'FFFFFFFF'

MQOM_* (Obsolete Db2 Messages options on Inquire Group)

Table 249. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOM_NO	0	X'00000000'
MQOM_YES	1	X'00000001'

MQOO_* (Open Options)

Table 250. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOO_BIND_AS_Q_DEF	0	X'00000000'
MQOO_READ_AHEAD_AS_Q_DEF	0	X'00000000'
MQOO_INPUT_AS_Q_DEF	1	X'00000001'
MQOO_INPUT_SHARED	2	X'00000002'
MQOO_INPUT_EXCLUSIVE	4	X'00000004'
MQOO_BROWSE	8	X'00000008'
MQOO_OUTPUT	16	X'00000010'
MQOO_INQUIRE	32	X'00000020'
MQOO_SET	64	X'00000040'
MQOO_SAVE_ALL_CONTEXT	128	X'00000080'
MQOO_PASS_IDENTITY_CONTEXT	256	X'00000100'
MQOO_PASS_ALL_CONTEXT	512	X'00000200'
MQOO_SET_IDENTITY_CONTEXT	1024	X'00000400'
MQOO_SET_ALL_CONTEXT	2048	X'00000800'
MQOO_ALTERNATE_USER_AUTHORITY	4096	X'00001000'
MQOO_FAIL_IF_QUIESCING	8192	X'00002000'

Table 250. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQOO_BIND_ON_OPEN	16384	X'00004000'
MQOO_BIND_NOT_FIXED	32768	X'00008000'
MQOO_CO_OP	131072	X'00020000'
MQOO_RESOLVE_LOCAL_TOPIC	262144	X'00040000'
MQOO_NO_READ_AHEAD	524288	X'00080000'
MQOO_READ_AHEAD	1048576	X'00100000'
MQOO_BIND_ON_GROUP	4194304	X'00400000'

MQOO_* (Following used in C++ only)

Table 251. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOO_RESOLVE_NAMES	65536	X'00010000'
MQOO_RESOLVE_LOCAL_Q	262144	X'00040000'

MQOP_* (Operation codes for MQCTL and MQCB)

Operation codes for MQCTL

Table 252. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOP_START	1	X'00000001'
MQOP_START_WAIT	2	X'00000002'
MQOP_STOP	4	X'00000004'

Operation codes for MQCB

Table 253. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOP_REGISTER	256	X'00000100'
MQOP_DEREGISTER	512	X'00000200'

Operation codes for MQCTL and MQCB

Table 254. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOP_SUSPEND	65536	X'00010000'
MQOP_RESUME	131072	X'00020000'

MQOPEN_* (Values related to MQOPEN_PRIV structure)

Table 255. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQOPEN_PRIV_VERSION_1	1	X'00000001'
MQOPEN_PRIV_CURRENT_VERSION	1	X'00000001'

MQOPER_* (Activity Operations)

Table 256. Values of constants

Name	Decimal value	Hexadecimal value
MQOPER_SYSTEM_FIRST	0	X'00000000'
MQOPER_UNKNOWN	0	X'00000000'
MQOPER_BROWSE	1	X'00000001'
MQOPER_DISCARD	2	X'00000002'
MQOPER_GET	3	X'00000003'
MQOPER_PUT	4	X'00000004'
MQOPER_PUT_REPLY	5	X'00000005'
MQOPER_PUT_REPORT	6	X'00000006'
MQOPER_RECEIVE	7	X'00000007'
MQOPER_SEND	8	X'00000008'
MQOPER_TRANSFORM	9	X'00000009'
MQOPER_PUBLISH	10	X'0000000A'
MQOPER_EXCLUDED_PUBLISH	11	X'0000000B'
MQOPER_DISCARDED_PUBLISH	12	X'0000000C'
MQOPER_SYSTEM_LAST	65535	X'0000FFFF'
MQOPER_APPL_FIRST	65536	X'00010000'
MQOPER_APPL_LAST	999999999	X'3B9AC9FF'

MQOT_* (Object Types and Extended Object Types)

Object Types

Table 257. Values of constants

Name	Decimal value	Hexadecimal value
MQOT_NONE	0	X'00000000'
MQOT_Q	1	X'00000001'
MQOT_NAMELIST	2	X'00000002'
MQOT_PROCESS	3	X'00000003'
MQOT_STORAGE_CLASS	4	X'00000004'
MQOT_Q_MGR	5	X'00000005'
MQOT_CHANNEL	6	X'00000006'
MQOT_AUTH_INFO	7	X'00000007'
MQOT_TOPIC	8	X'00000008'
MQOT_CF_STRUC	10	X'0000000A'
MQOT_LISTENER	11	X'0000000B'
MQOT_SERVICE	12	X'0000000C'
MQOT_RESERVED_1	999	X'000003E7'

Extended Object Types

Table 258. Values of constants

Name	Decimal value	Hexadecimal value
MQOT_ALL	1001	X'000003E9'
MQOT_ALIAS_Q	1002	X'000003EA'
MQOT_MODEL_Q	1003	X'000003EB'
MQOT_LOCAL_Q	1004	X'000003EC'
MQOT_REMOTE_Q	1005	X'000003ED'
MQOT_SENDER_CHANNEL	1007	X'000003EF'
MQOT_SERVER_CHANNEL	1008	X'000003F0'
MQOT_REQUESTER_CHANNEL	1009	X'000003F1'
MQOT_RECEIVER_CHANNEL	1010	X'000003F2'
MQOT_CURRENT_CHANNEL	1011	X'000003F3'
MQOT_SAVED_CHANNEL	1012	X'000003F4'
MQOT_SVRCONN_CHANNEL	1013	X'000003F5'
MQOT_CLNTCONN_CHANNEL	1014	X'000003F6'
MQOT_SHORT_CHANNEL	1015	X'000003F7'
MQOT_CHLAUTH	1016	X'000003F8'
MQOT_REMOTE_Q_MGR_NAME	1017	X'000003F9'
MQOT_PROT_POLICY	1019	X'000003FB'
MQOT_TT_CHANNEL	1020	X'000003FC'
MQOT_AMQP_CHANNEL	1021	X'000003FD'
MQOT_AUTH_REC	1022	X'000003FE'

MQPA_* (Put Authority)

Table 259. Values of constants

Name	Decimal value	Hexadecimal value
MQPA_DEFAULT	1	X'00000001'
MQPA_CONTEXT	2	X'00000002'
MQPA_ONLY_MCA	3	X'00000003'
MQPA_ALTERNATE_OR_MCA	4	X'00000004'

MQPD_* (Property descriptor, support and context)

Property descriptor structure

Table 260. Structures of constants

Name	Structure
MQPD_STRUC_ID	"PD¬¬"
MQPD_STRUC_ID_ARRAY	'P','D','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 261. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPD_VERSION_1	1	X'00000001'
MQPD_CURRENT_VERSION	1	X'00000001'

Note: The symbol ¬ represents a single blank character.

Property Descriptor Options

Table 262. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPD_NONE	0	X'00000000'

Property Support Options

Table 263. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPD_SUPPORT_OPTIONAL	1	X'00000001'
MQPD_SUPPORT_REQUIRED	1048576	X'00100000'
MQPD_SUPPORT_REQUIRED_IF_LOCAL	1024	X'00000400'
MQPD_REJECT_UNSUP_MASK	-1048576	X'FFF00000'
MQPD_ACCEPT_UNSUP_IF_XMIT_MASK	1047552	X'000FFC00'
MQPD_ACCEPT_UNSUP_MASK	1023	X'000003FF'

Property Context

Table 264. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPD_NO_CONTEXT	0	X'00000000'
MQPD_USER_CONTEXT	1	X'00000001'

MQPER_* (Persistence Values)

Table 265. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPER_PERSISTENCE_AS_PARENT	-1	X'FFFFFFFF'
MQPER_NOT_PERSISTENT	0	X'00000000'
MQPER_PERSISTENT	1	X'00000001'
MQPER_PERSISTENCE_AS_Q_DEF	2	X'00000002'
MQPER_PERSISTENCE_AS_TOPIC_DEF	2	X'00000002'

MQPL_* (Platforms)

Table 266. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPL_MVS	1	X'00000001'
MQPL_OS390	1	X'00000001'

Table 266. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQPL_ZOS	1	X'00000001'
MQPL_OS2	2	X'00000002'
MQPL_AIX	3	X'00000003'
MQPL_UNIX	3	X'00000003'
MQPL_OS400	4	X'00000004'
MQPL_WINDOWS	5	X'00000005'
MQPL_WINDOWS_NT	11	X'0000000B'
MQPL_VMS	12	X'0000000C'
MQPL_NSK	13	X'0000000D'
MQPL_OPEN_TP1	15	X'0000000F'
MQPL_VM	18	X'00000012'
MQPL_TPF	23	X'00000017'
MQPL_VSE	27	X'0000001B'
MQPL_APPLIANCE	28	X'0000001C'
MQPL_NATIVE	1	X'00000001'

MQPMO_* (Put message options and structure for publish mask)

Put message options structure

Table 267. Structures of constants	
Name	**Structure**
MQPMO_STRUC_ID	"PMO¬"
MQPMO_STRUC_ID_ARRAY	'P','M','O','¬'

Note: The symbol ¬ represents a single blank character.

Table 268. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPMO_VERSION_1	1	X'00000001'
MQPMO_VERSION_2	2	X'00000002'
MQPMO_VERSION_3	3	X'00000003'
MQPMO_CURRENT_VERSION	3	X'00000003'
MQPMO_CURRENT_LENGTH	(value differs by platform or version)	(value differs by platform or version)

Put Message Options

Table 269. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPMO_SYNCPOINT	2	X'00000002'
MQPMO_NO_SYNCPOINT	4	X'00000004'
MQPMO_DEFAULT_CONTEXT	32	X'00000020'

Table 269. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQPMO_NEW_MSG_ID	64	X'00000040'
MQPMO_NEW_CORREL_ID	128	X'00000080'
MQPMO_PASS_IDENTITY_CONTEXT	256	X'00000100'
MQPMO_PASS_ALL_CONTEXT	512	X'00000200'
MQPMO_SET_IDENTITY_CONTEXT	1024	X'00000400'
MQPMO_SET_ALL_CONTEXT	2048	X'00000800'
MQPMO_ALTERNATE_USER_AUTHORITY	4096	X'00001000'
MQPMO_FAIL_IF_QUIESCING	8192	X'00002000'
MQPMO_NO_CONTEXT	16384	X'00004000'
MQPMO_LOGICAL_ORDER	32768	X'00008000'
MQPMO_ASYNC_RESPONSE	65536	X'00010000'
MQPMO_SYNC_RESPONSE	131072	X'00020000'
MQPMO_RESOLVE_LOCAL_Q	262144	X'00040000'
MQPMO_RETAIN	2097152	X'00200000'
MQPMO_MD_FOR_OUTPUT_ONLY	8388608	X'00800000'
MQPMO_SCOPE_QMGR	67108864	X'04000000'
MQPMO_SUPPRESS_REPLYTO	134217728	X'08000000'
MQPMO_NOT_OWN_SUBS	268435456	X'10000000'
MQPMO_RESPONSE_AS_Q_DEF	0	X'00000000'
MQPMO_RESPONSE_AS_TOPIC_DEF	0	X'00000000'
MQPMO_NONE	0	X'00000000'

Put Message Options for publish mask

Table 270. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPMO_PUB_OPTIONS_MASK	2097152	X'00200000'

MQPMRF_* (Put Message Record Fields)

Table 271. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPMRF_MSG_ID	1	X'00000001'
MQPMRF_CORREL_ID	2	X'00000002'
MQPMRF_GROUP_ID	4	X'00000004'
MQPMRF_FEEDBACK	8	X'00000008'
MQPMRF_ACCOUNTING_TOKEN	16	X'00000010'
MQPMRF_NONE	0	X'00000000'

MQPO_* (Command format Purge Options)

Table 272. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPO_YES	1	X'00000001'
MQPO_NO	0	X'00000000'

MQPRI_* (Priority)

Table 273. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPRI_PRIORITY_AS_Q_DEF	-1	X'FFFFFFFF'
MQPRI_PRIORITY_AS_PARENT	-2	X'FFFFFFFE'
MQPRI_PRIORITY_AS_PUBLISHED	-3	X'FFFFFFFD'
MQPRI_PRIORITY_AS_TOPIC_DEF	-1	X'FFFFFFFF'

MQPROP_* (Queue and Channel Property Control Values and Maximum Properties Length)

Queue and Channel Property Control Values

Table 274. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPROP_COMPATIBILITY	0	X'00000000'
MQPROP_NONE	1	X'00000001'
MQPROP_ALL	2	X'00000002'
MQPROP_FORCE_MQRFH2	3	X'00000003'

Maximum Properties Length

Table 275. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPROP_UNRESTRICTED_LENGTH	-1	X'FFFFFFFF'

MQPRT_* (Put Response Values)

Table 276. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPRT_RESPONSE_AS_PARENT	0	X'00000000'
MQPRT_SYNC_RESPONSE	1	X'00000001'
MQPRT_ASYNC_RESPONSE	2	X'00000002'

MQPS_* (Publish/Subscribe)

Command format Publish/Subscribe Status

Table 277. Values of constants

Name	Decimal value	Hexadecimal value
MQPS_STATUS_INACTIVE	0	X'00000000'
MQPS_STATUS_STARTING	1	X'00000001'
MQPS_STATUS_STOPPING	2	X'00000002'
MQPS_STATUS_ACTIVE	3	X'00000003'
MQPS_STATUS_COMPAT	4	X'00000004'
MQPS_STATUS_ERROR	5	X'00000005'
MQPS_STATUS_REFUSED	6	X'00000006'

Publish/Subscribe Tags as strings

MQPS_COMMAND	"MQPSCommand"
MQPS_COMP_CODE	"MQPSCompCode"
MQPS_CORREL_ID	"MQPSCorrelId"
MQPS_DELETE_OPTIONS	"MQPSDelOpts"
MQPS_ERROR_ID	"MQPSErrorId"
MQPS_ERROR_POS	"MQPSErrorPos"
MQPS_INTEGER_DATA	"MQPSIntData"
MQPS_PARAMETER_ID	"MQPSParmId"
MQPS_PUBLICATION_OPTIONS	"MQPSPubOpts"
MQPS_PUBLISH_TIMESTAMP	"MQPSPubTime"
MQPS_Q_MGR_NAME	"MQPSQMgrName"
MQPS_Q_NAME	"MQPSQName"
MQPS_REASON	"MQPSReason"
MQPS_REASON_TEXT	"MQPSReasonText"
MQPS_REGISTRATION_OPTIONS	"MQPSRegOpts"
MQPS_SEQUENCE_NUMBER	"MQPSSeqNum"
MQPS_STREAM_NAME	"MQPSStreamName"
MQPS_STRING_DATA	"MQPSStringData"
MQPS_SUBSCRIPTION_IDENTITY	"MQPSSubIdentity"
MQPS_SUBSCRIPTION_NAME	"MQPSSubName"
MQPS_SUBSCRIPTION_USER_DATA	"MQPSSubUserData"
MQPS_TOPIC	"MQPSTopic"
MQPS_USER_ID	"MQPSUserId"

Publish/Subscribe Tags as blank-enclosed strings

MQPS_COMMAND_B	"¬MQPSCommand¬"
MQPS_COMP_CODE_B	"¬MQPSCompCode¬"
MQPS_CORREL_ID_B	"¬MQPSCorrelId¬"
MQPS_DELETE_OPTIONS_B	"¬MQPSDelOpts¬"
MQPS_ERROR_ID_B	"¬MQPSErrorId¬"
MQPS_ERROR_POS_B	"¬MQPSErrorPos¬"
MQPS_INTEGER_DATA_B	"¬MQPSIntData¬"
MQPS_PARAMETER_ID_B	"¬MQPSParmId¬"
MQPS_PUBLICATION_OPTIONS_B	"¬MQPSPubOpts¬"
MQPS_PUBLISH_TIMESTAMP_B	"¬MQPSPubTime¬"
MQPS_Q_MGR_NAME_B	"¬MQPSQMgrName¬"
MQPS_Q_NAME_B	"¬MQPSQName¬"
MQPS_REASON_B	"¬MQPSReason¬"
MQPS_REASON_TEXT_B	"¬MQPSReasonText¬"
MQPS_REGISTRATION_OPTIONS_B	"¬MQPSRegOpts¬"
MQPS_SEQUENCE_NUMBER_B	"¬MQPSSeqNum¬"
MQPS_STREAM_NAME_B	"¬MQPSStreamName¬"
MQPS_STRING_DATA_B	"¬MQPSStringData¬"
MQPS_SUBSCRIPTION_IDENTITY_B	"¬MQPSSubIdentity¬"
MQPS_SUBSCRIPTION_NAME_B	"¬MQPSSubName¬"
MQPS_SUBSCRIPTION_USER_DATA_B	"¬MQPSSubUserData¬"
MQPS_TOPIC_B	"¬MQPSTopic¬"
MQPS_USER_ID_B	"¬MQPSUserId¬"

Note: The symbol ¬ represents a single blank character.

Publish/Subscribe Command Tag Values as strings

MQPS_DELETE_PUBLICATION	"DeletePub"
MQPS_DEREGISTER_PUBLISHER	"DeregPub"
MQPS_DEREGISTER_SUBSCRIBER	"DeregSub"
MQPS_PUBLISH	"Publish"
MQPS_REGISTER_PUBLISHER	"RegPub"
MQPS_REGISTER_SUBSCRIBER	"RegSub"
MQPS_REQUEST_UPDATE	"ReqUpdate"

Note: The symbol ¬ represents a single blank character.

Publish/Subscribe Command Tag Values as blank-enclosed strings

MQPS_DELETE_PUBLICATION_B	"¬DeletePub¬"
MQPS_DEREGISTER_PUBLISHER_B	"¬DeregPub¬"
MQPS_DEREGISTER_SUBSCRIBER_B	"¬DeregSub¬"
MQPS_PUBLISH_B	"¬Publish¬"
MQPS_REGISTER_PUBLISHER_B	"¬RegPub¬"
MQPS_REGISTER_SUBSCRIBER_B	"¬RegSub¬"
MQPS_REQUEST_UPDATE_B	"¬ReqUpdate¬"

Note: The symbol ¬ represents a single blank character.

Publish/Subscribe Options Tag Values as strings

MQPS_ADD_NAME	"AddName"
MQPS_ANONYMOUS	"Anon"
MQPS_CORREL_ID_AS_IDENTITY	"CorrelAsId"
MQPS_DEREGISTER_ALL	"DeregAll"
MQPS_DIRECT_REQUESTS	"DirectReq"
MQPS_DUPLICATES_OK	"DupsOK"
MQPS_FULL_RESPONSE	"FullResp"
MQPS_INCLUDE_STREAM_NAME	"InclStreamName"
MQPS_INFORM_IF_RETAINED	"InformIfRet"
MQPS_IS_RETAINED_PUBLICATION	"IsRetainedPub"
MQPS_JOIN_EXCLUSIVE	"JoinExcl"
MQPS_JOIN_SHARED	"JoinShared"
MQPS_LEAVE_ONLY	"LeaveOnly"
MQPS_LOCAL	"Local"
MQPS_LOCKED	"Locked"
MQPS_NEW_PUBLICATIONS_ONLY	"NewPubsOnly"
MQPS_NO_ALTERATION	"NoAlter"
MQPS_NO_REGISTRATION	"NoReg"
MQPS_NON_PERSISTENT	"NonPers"
MQPS_NONE	"None"
MQPS_OTHER_SUBSCRIBERS_ONLY	"OtherSubsOnly"
MQPS_PERSISTENT	"Pers"
MQPS_PERSISTENT_AS_PUBLISH	"PersAsPub"
MQPS_PERSISTENT_AS_Q	"PersAsQueue"
MQPS_PUBLISH_ON_REQUEST_ONLY	"PubOnReqOnly"

MQPS_RETAIN_PUBLICATION	"RetainPub"
MQPS_VARIABLE_USER_ID	"VariableUserId"

Publish/Subscribe Options Tag Values as blank-enclosed strings

MQPS_ADD_NAME_B	"¬AddName¬"
MQPS_ANONYMOUS_B	"¬Anon¬"
MQPS_CORREL_ID_AS_IDENTITY_B	"¬CorrelAsId¬"
MQPS_DEREGISTER_ALL_B	"¬DeregAll¬"
MQPS_DIRECT_REQUESTS_B	"¬DirectReq¬"
MQPS_DUPLICATES_OK_B	"¬DupsOK¬"
MQPS_FULL_RESPONSE_B	"¬FullResp¬"
MQPS_INCLUDE_STREAM_NAME_B	"¬InclStreamName¬"
MQPS_INFORM_IF_RETAINED_B	"¬InformIfRet¬"
MQPS_IS_RETAINED_PUBLICATION_B	"¬IsRetainedPub¬"
MQPS_JOIN_EXCLUSIVE_B	"¬JoinExcl¬"
MQPS_JOIN_SHARED_B	"¬JoinShared¬"
MQPS_LEAVE_ONLY_B	"¬LeaveOnly¬"
MQPS_LOCAL_B	"¬Local¬"
MQPS_LOCKED_B	"¬Locked¬"
MQPS_NEW_PUBLICATIONS_ONLY_B	"¬NewPubsOnly¬"
MQPS_NO_ALTERATION_B	"¬NoAlter¬"
MQPS_NO_REGISTRATION_B	"¬NoReg¬"
MQPS_NON_PERSISTENT_B	"¬NonPers¬"
MQPS_NONE_B	"¬None¬"
MQPS_OTHER_SUBSCRIBERS_ONLY_B	"¬OtherSubsOnly¬"
MQPS_PERSISTENT_B	"¬Pers¬"
MQPS_PERSISTENT_AS_PUBLISH_B	"¬PersAsPub¬"
MQPS_PERSISTENT_AS_Q_B	"¬PersAsQueue¬"
MQPS_PUBLISH_ON_REQUEST_ONLY_B	"¬PubOnReqOnly¬"
MQPS_RETAIN_PUBLICATION_B	"¬RetainPub¬"
MQPS_VARIABLE_USER_ID_B	"¬VariableUserId¬"

Note: The symbol ¬ represents a single blank character.

MQPSC_* (Publish/Subscribe Options Tag Publish/Subscribe Command Folder (psc) Tags)

Table 278. Values of constants

Name	Decimal value	Hexadecimal value
MQPSC_FOLDER_VERSION	1	X'00000001'

MQPSC_* (Publish/Subscribe Options Tag Tag names)

MQPSC_COMMAND	"Command"
MQPSC_REGISTRATION_OPTION	"RegOpt"
MQPSC_PUBLICATION_OPTION	"PubOpt"
MQPSC_DELETE_OPTION	"DelOpt"
MQPSC_TOPIC	"Topic"
MQPSC_SUBSCRIPTION_POINT	"SubPoint"
MQPSC_FILTER	"Filter"
MQPSC_Q_MGR_NAME	"QMgrName"
MQPSC_Q_NAME	"QName"
MQPSC_PUBLISH_TIMESTAMP	"PubTime"
MQPSC_SEQUENCE_NUMBER	"SeqNum"
MQPSC_SUBSCRIPTION_NAME	"SubName"
MQPSC_SUBSCRIPTION_IDENTITY	"SubIdentity"
MQPSC_SUBSCRIPTION_USER_DATA	"SubUserData"
MQPSC_CORREL_ID	"CorrelId"

MQPSC_* (Publish/Subscribe Options Tag XML tag names)

MQPSC_COMMAND_B	"<Command>"
MQPSC_COMMAND_E	"</Command>"
MQPSC_REGISTRATION_OPTION_B	"<RegOpt>"
MQPSC_REGISTRATION_OPTION_E	"</RegOpt>"
MQPSC_PUBLICATION_OPTION_B	"<PubOpt>"
MQPSC_PUBLICATION_OPTION_E	"</PubOpt>"
MQPSC_DELETE_OPTION_B	"<DelOpt>"
MQPSC_DELETE_OPTION_E	"</DelOpt>"
MQPSC_TOPIC_B	"<Topic>"
MQPSC_TOPIC_E	"</Topic>"
MQPSC_SUBSCRIPTION_POINT_B	"<SubPoint>"
MQPSC_SUBSCRIPTION_POINT_E	"</SubPoint>"
MQPSC_FILTER_B	"<Filter>"
MQPSC_FILTER_E	"</Filter>"

MQPSC_Q_MGR_NAME_B	"<QMgrName>"
MQPSC_Q_MGR_NAME_E	"</QMgrName>"
MQPSC_Q_NAME_B	"<QName>"
MQPSC_Q_NAME_E	"</QName>"
MQPSC_PUBLISH_TIMESTAMP_B	"<PubTime>"
MQPSC_PUBLISH_TIMESTAMP_E	"</PubTime>"
MQPSC_SEQUENCE_NUMBER_B	"<SeqNum>"
MQPSC_SEQUENCE_NUMBER_E	"</SeqNum>"
MQPSC_SUBSCRIPTION_NAME_B	"<SubName>"
MQPSC_SUBSCRIPTION_NAME_E	"</SubName>"
MQPSC_SUBSCRIPTION_IDENTITY_B	"<SubIdentity>"
MQPSC_SUBSCRIPTION_IDENTITY_E	"</SubIdentity>"
MQPSC_SUBSCRIPTION_USER_DATA_B	"<SubUserData>"
MQPSC_SUBSCRIPTION_USER_DATA_E	"</SubUserData>"
MQPSC_CORREL_ID_B	"<CorrelId>"
MQPSC_CORREL_ID_E	"</CorrelId>"

MQPSC_* (Publish/Subscribe Options Tag Values as strings)

MQPSC_DELETE_PUBLICATION	"DeletePub"
MQPSC_DEREGISTER_SUBSCRIBER	"DeregSub"
MQPSC_PUBLISH	"Publish"
MQPSC_REGISTER_SUBSCRIBER	"RegSub"
MQPSC_REQUEST_UPDATE	"ReqUpdate"

MQPSC_* (Publish/Subscribe Options Tag Values as strings)

MQPSC_ADD_NAME	"AddName"
MQPSC_CORREL_ID_AS_IDENTITY	"CorrelAsId"
MQPSC_DEREGISTER_ALL	"DeregAll"
MQPSC_DUPLICATES_OK	"DupsOK"
MQPSC_FULL_RESPONSE	"FullResp"
MQPSC_INFORM_IF_RETAINED	"InformIfRet"
MQPSC_IS_RETAINED_PUB	"IsRetainedPub"
MQPSC_JOIN_SHARED	"JoinShared"
MQPSC_JOIN_EXCLUSIVE	"JoinExcl"
MQPSC_LEAVE_ONLY	"LeaveOnly"
MQPSC_LOCAL	"Local"
MQPSC_LOCKED	"Locked"

MQPSC_NEW_PUBS_ONLY	"NewPubsOnly"
MQPSC_NO_ALTERATION	"NoAlter"
MQPSC_NON_PERSISTENT	"NonPers"
MQPSC_OTHER_SUBS_ONLY	"OtherSubsOnly"
MQPSC_PERSISTENT	"Pers"
MQPSC_PERSISTENT_AS_PUBLISH	"PersAsPub"
MQPSC_PERSISTENT_AS_Q	"PersAsQueue"
MQPSC_NONE	"None"
MQPSC_PUB_ON_REQUEST_ONLY	"PubOnReqOnly"
MQPSC_RETAIN_PUB	"RetainPub"
MQPSC_VARIABLE_USER_ID	"VariableUserId"

MQPSCR_* (Publish/Subscribe Options)

Publish/Subscribe Options Tag Publish/Subscribe Response Folder (pscr) Tags

Table 279. Values of constants

Name	Decimal value	Hexadecimal value
MQPSCR_FOLDER_VERSION	1	X'00000001'

Publish/Subscribe Options Tag Tag names

MQPSCR_COMPLETION	"Completion"
MQPSCR_RESPONSE	"Response"
MQPSCR_REASON	"Reason"

Publish/Subscribe Options Tag XML tag names

MQPSCR_COMPLETION_B	"<Completion>"
MQPSCR_COMPLETION_E	"</Completion>"
MQPSCR_RESPONSE_B	"<Response>"
MQPSCR_RESPONSE_E	"</Response>"
MQPSCR_REASON_B	"<Reason>"
MQPSCR_REASON_E	"</Reason>"

Publish/Subscribe Options Tag Tag values

MQPSCR_OK	"ok"
MQPSCR_WARNING	"warning"
MQPSCR_ERROR	"error"

MQPSM_* (Pub/Sub Mode)

Table 280. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPSM_DISABLED	0	X'00000000'
MQPSM_COMPAT	1	X'00000001'
MQPSM_ENABLED	2	X'00000002'

MQPSPROP_* (Pub/Sub Message Properties)

Table 281. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPSPROP_NONE	0	X'00000000'
MQPSPROP_COMPAT	1	X'00000001'
MQPSPROP_RFH2	2	X'00000002'
MQPSPROP_MSGPROP	3	X'00000003'

MQPSST_* (Command format Pub/Sub Status Type)

Table 282. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPSST_ALL	0	X'00000000'
MQPSST_LOCAL	1	X'00000001'
MQPSST_PARENT	2	X'00000002'
MQPSST_CHILD	3	X'00000003'

MQPUBO_* (Publish/Subscribe Publication Options)

Table 283. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPUBO_NONE	0	X'00000000'
MQPUBO_CORREL_ID_AS_IDENTITY	1	X'00000001'
MQPUBO_RETAIN_PUBLICATION	2	X'00000002'
MQPUBO_OTHER_SUBSCRIBERS_ONLY	4	X'00000004'
MQPUBO_NO_REGISTRATION	8	X'00000008'
MQPUBO_IS_RETAINED_PUBLICATION	16	X'00000010'

MQPXP_* (Publish/subscribe routing exit parameter structure)

Table 284. Structures of constants	
Name	**Structure**
MQPXP_STRUC_ID	"PXP¬"
MQPXP_STRUC_ID_ARRAY	'P','X','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 285. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQPXP_VERSION_1	1	X'00000001'
MQPXP_CURRENT_VERSION	1	X'00000001'

MQQA_* (Queue attributes)

Inhibit Get Values

Table 286. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQA_GET_INHIBITED	1	X'00000001'
MQQA_GET_ALLOWED	0	X'00000000'

Inhibit Put Values

Table 287. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQA_PUT_INHIBITED	1	X'00000001'
MQQA_PUT_ALLOWED	0	X'00000000'

Queue Shareability

Table 288. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQA_SHAREABLE	1	X'00000001'
MQQA_NOT_SHAREABLE	0	X'00000000'

Back-Out Hardening

Table 289. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQA_BACKOUT_HARDENED	1	X'00000001'
MQQA_BACKOUT_NOT_HARDENED	0	X'00000000'

MQQDT_* (Queue Definition Types)

Table 290. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQDT_PREDEFINED	1	X'00000001'
MQQDT_PERMANENT_DYNAMIC	2	X'00000002'
MQQDT_TEMPORARY_DYNAMIC	3	X'00000003'
MQQDT_SHARED_DYNAMIC	4	X'00000004'

MQQF_* (Queue Flags)

Table 291. Values of constants

Name	Decimal value	Hexadecimal value
MQQF_LOCAL_Q	1	X'00000001'
MQQF_CLWL_USEQ_ANY	64	X'00000040'
MQQF_CLWL_USEQ_LOCAL	128	X'00000080'

MQQMDT_* (Command format Queue Manager Definition Types)

Table 292. Values of constants

Name	Decimal value	Hexadecimal value
MQQMDT_EXPLICIT_CLUSTER_SENDER	1	X'00000001'
MQQMDT_AUTO_CLUSTER_SENDER	2	X'00000002'
MQQMDT_AUTO_EXP_CLUSTER_SENDER	4	X'00000004'
MQQMDT_CLUSTER_RECEIVER	3	X'00000003'

MQQMF_* (Queue Manager Flags)

Table 293. Values of constants

Name	Decimal value	Hexadecimal value
MQQMF_REPOSITORY_Q_MGR	2	X'00000002'
MQQMF_CLUSSDR_USER_DEFINED	8	X'00000008'
MQQMF_CLUSSDR_AUTO_DEFINED	16	X'00000010'
MQQMF_AVAILABLE	32	X'00000020'

MQQMFAC_* (Command format Queue Manager Facility)

Table 294. Values of constants

Name	Decimal value	Hexadecimal value
MQQMFAC_IMS_BRIDGE	1	X'00000001'
MQQMFAC_DB2	2	X'00000002'

MQQMSTA_* (Command format Queue Manager Status)

Table 295. Values of constants

Name	Decimal value	Hexadecimal value
MQQMSTA_STARTING	1	X'00000001'
MQQMSTA_RUNNING	2	X'00000002'
MQQMSTA_QUIESCING	3	X'00000003'

MQQMT_* (Command format Queue Manager Types)

Table 296. Values of constants

Name	Decimal value	Hexadecimal value
MQQMT_NORMAL	0	X'00000000'
MQQMT_REPOSITORY	1	X'00000001'

MQQO_* (Command format Quiesce Options)

Table 297. Values of constants

Name	Decimal value	Hexadecimal value
MQQO_YES	1	X'00000001'
MQQO_NO	0	X'00000000'

MQQSGD_* (Queue sharing group dispositions)

Table 298. Values of constants

Name	Decimal value	Hexadecimal value
MQQSGD_ALL	-1	X'FFFFFFFF'
MQQSGD_Q_MGR	0	X'00000000'
MQQSGD_COPY	1	X'00000001'
MQQSGD_SHARED	2	X'00000002'
MQQSGD_GROUP	3	X'00000003'
MQQSGD_PRIVATE	4	X'00000004'
MQQSGD_LIVE	6	X'00000006'

MQQSGS_* (Command format queue sharing group status)

Table 299. Values of constants

Name	Decimal value	Hexadecimal value
MQQSGS_UNKNOWN	0	X'00000000'
MQQSGS_CREATED	1	X'00000001'
MQQSGS_ACTIVE	2	X'00000002'
MQQSGS_INACTIVE	3	X'00000003'
MQQSGS_FAILED	4	X'00000004'
MQQSGS_PENDING	5	X'00000005'

MQQSIE_* (Command format Queue Service-Interval Events)

Table 300. Values of constants

Name	Decimal value	Hexadecimal value
MQQSIE_NONE	0	X'00000000'
MQQSIE_HIGH	1	X'00000001'
MQQSIE_OK	2	X'00000002'

MQQSO_* (Command format Queue Status Open Options for SET, BROWSE, INPUT)

Table 301. Values of constants

Name	Decimal value	Hexadecimal value
MQQSO_NO	0	X'00000000'
MQQSO_YES	1	X'00000001'
MQQSO_SHARED	1	X'00000001'

Table 301. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQQSO_EXCLUSIVE	2	X'00000002'

MQQSOT_* (Command format Queue Status Open Types)

Table 302. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQSOT_ALL	1	X'00000001'
MQQSOT_INPUT	2	X'00000002'
MQQSOT_OUTPUT	3	X'00000003'

MQQSUM_* (Command format Queue Status Uncommitted Messages)

Table 303. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQSUM_YES	1	X'00000001'
MQQSUM_NO	0	X'00000000'

MQQT_* (Queue Types and Extended Queue Types)

Queue Types

Table 304. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQT_LOCAL	1	X'00000001'
MQQT_MODEL	2	X'00000002'
MQQT_ALIAS	3	X'00000003'
MQQT_REMOTE	6	X'00000006'
MQQT_CLUSTER	7	X'00000007'

Extended Queue Types

Table 305. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQQT_ALL	1001	X'000003E9'

MQRC_* (reason codes)

Table 306. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRC_NONE	0	X'00000000'
MQRC_APPL_FIRST	900	X'00000384'
MQRC_APPL_LAST	999	X'000003E7'
MQRC_ALIAS_BASE_Q_TYPE_ERROR	2001	X'000007D1'
MQRC_ALREADY_CONNECTED	2002	X'000007D2'
MQRC_BACKED_OUT	2003	X'000007D3'

Table 306. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRC_BUFFER_ERROR	2004	X'000007D4'
MQRC_BUFFER_LENGTH_ERROR	2005	X'000007D5'
MQRC_CHAR_ATTR_LENGTH_ERROR	2006	X'000007D6'
MQRC_CHAR_ATTRS_ERROR	2007	X'000007D7'
MQRC_CHAR_ATTRS_TOO_SHORT	2008	X'000007D8'
MQRC_CONNECTION_BROKEN	2009	X'000007D9'
MQRC_DATA_LENGTH_ERROR	2010	X'000007DA'
MQRC_DYNAMIC_Q_NAME_ERROR	2011	X'000007DB'
MQRC_ENVIRONMENT_ERROR	2012	X'000007DC'
MQRC_EXPIRY_ERROR	2013	X'000007DD'
MQRC_FEEDBACK_ERROR	2014	X'000007DE'
MQRC_GET_INHIBITED	2016	X'000007E0'
MQRC_HANDLE_NOT_AVAILABLE	2017	X'000007E1'
MQRC_HCONN_ERROR	2018	X'000007E2'
MQRC_HOBJ_ERROR	2019	X'000007E3'
MQRC_INHIBIT_VALUE_ERROR	2020	X'000007E4'
MQRC_INT_ATTR_COUNT_ERROR	2021	X'000007E5'
MQRC_INT_ATTR_COUNT_TOO_SMALL	2022	X'000007E6'
MQRC_INT_ATTRS_ARRAY_ERROR	2023	X'000007E7'
MQRC_SYNCPOINT_LIMIT_REACHED	2024	X'000007E8'
MQRC_MAX_CONNS_LIMIT_REACHED	2025	X'000007E9'
MQRC_MD_ERROR	2026	X'000007EA'
MQRC_MISSING_REPLY_TO_Q	2027	X'000007EB'
MQRC_MSG_TYPE_ERROR	2029	X'000007ED'
MQRC_MSG_TOO_BIG_FOR_Q	2030	X'000007EE'
MQRC_MSG_TOO_BIG_FOR_Q_MGR	2031	X'000007EF'
MQRC_NO_MSG_AVAILABLE	2033	X'000007F1'
MQRC_NO_MSG_UNDER_CURSOR	2034	X'000007F2'
MQRC_NOT_AUTHORIZED	2035	X'000007F3'
MQRC_NOT_OPEN_FOR_BROWSE	2036	X'000007F4'
MQRC_NOT_OPEN_FOR_INPUT	2037	X'000007F5'
MQRC_NOT_OPEN_FOR_INQUIRE	2038	X'000007F6'
MQRC_NOT_OPEN_FOR_OUTPUT	2039	X'000007F7'
MQRC_NOT_OPEN_FOR_SET	2040	X'000007F8'
MQRC_OBJECT_CHANGED	2041	X'000007F9'
MQRC_OBJECT_IN_USE	2042	X'000007FA'
MQRC_OBJECT_TYPE_ERROR	2043	X'000007FB'
MQRC_OD_ERROR	2044	X'000007FC'
MQRC_OPTION_NOT_VALID_FOR_TYPE	2045	X'000007FD'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_OPTIONS_ERROR	2046	X'000007FE'
MQRC_PERSISTENCE_ERROR	2047	X'000007FF'
MQRC_PERSISTENT_NOT_ALLOWED	2048	X'00000800'
MQRC_PRIORITY_EXCEEDS_MAXIMUM	2049	X'00000801'
MQRC_PRIORITY_ERROR	2050	X'00000802'
MQRC_PUT_INHIBITED	2051	X'00000803'
MQRC_Q_DELETED	2052	X'00000804'
MQRC_Q_FULL	2053	X'00000805'
MQRC_Q_NOT_EMPTY	2055	X'00000807'
MQRC_Q_SPACE_NOT_AVAILABLE	2056	X'00000808'
MQRC_Q_TYPE_ERROR	2057	X'00000809'
MQRC_Q_MGR_NAME_ERROR	2058	X'0000080A'
MQRC_Q_MGR_NOT_AVAILABLE	2059	X'0000080B'
MQRC_REPORT_OPTIONS_ERROR	2061	X'0000080D'
MQRC_SECOND_MARK_NOT_ALLOWED	2062	X'0000080E'
MQRC_SECURITY_ERROR	2063	X'0000080F'
MQRC_SELECTOR_COUNT_ERROR	2065	X'00000811'
MQRC_SELECTOR_LIMIT_EXCEEDED	2066	X'00000812'
MQRC_SELECTOR_ERROR	2067	X'00000813'
MQRC_SELECTOR_NOT_FOR_TYPE	2068	X'00000814'
MQRC_SIGNAL_OUTSTANDING	2069	X'00000815'
MQRC_SIGNAL_REQUEST_ACCEPTED	2070	X'00000816'
MQRC_STORAGE_NOT_AVAILABLE	2071	X'00000817'
MQRC_SYNCPOINT_NOT_AVAILABLE	2072	X'00000818'
MQRC_TRIGGER_CONTROL_ERROR	2075	X'0000081B'
MQRC_TRIGGER_DEPTH_ERROR	2076	X'0000081C'
MQRC_TRIGGER_MSG_PRIORITY_ERR	2077	X'0000081D'
MQRC_TRIGGER_TYPE_ERROR	2078	X'0000081E'
MQRC_TRUNCATED_MSG_ACCEPTED	2079	X'0000081F'
MQRC_TRUNCATED_MSG_FAILED	2080	X'00000820'
MQRC_UNKNOWN_ALIAS_BASE_Q	2082	X'00000822'
MQRC_UNKNOWN_OBJECT_NAME	2085	X'00000825'
MQRC_UNKNOWN_OBJECT_Q_MGR	2086	X'00000826'
MQRC_UNKNOWN_REMOTE_Q_MGR	2087	X'00000827'
MQRC_WAIT_INTERVAL_ERROR	2090	X'0000082A'
MQRC_XMIT_Q_TYPE_ERROR	2091	X'0000082B'
MQRC_XMIT_Q_USAGE_ERROR	2092	X'0000082C'
MQRC_NOT_OPEN_FOR_PASS_ALL	2093	X'0000082D'
MQRC_NOT_OPEN_FOR_PASS_IDENT	2094	X'0000082E'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_NOT_OPEN_FOR_SET_ALL	2095	X'0000082F'
MQRC_NOT_OPEN_FOR_SET_IDENT	2096	X'00000830'
MQRC_CONTEXT_HANDLE_ERROR	2097	X'00000831'
MQRC_CONTEXT_NOT_AVAILABLE	2098	X'00000832'
MQRC_SIGNAL1_ERROR	2099	X'00000833'
MQRC_OBJECT_ALREADY_EXISTS	2100	X'00000834'
MQRC_OBJECT_DAMAGED	2101	X'00000835'
MQRC_RESOURCE_PROBLEM	2102	X'00000836'
MQRC_ANOTHER_Q_MGR_CONNECTED	2103	X'00000837'
MQRC_UNKNOWN_REPORT_OPTION	2104	X'00000838'
MQRC_STORAGE_CLASS_ERROR	2105	X'00000839'
MQRC_COD_NOT_VALID_FOR_XCF_Q	2106	X'0000083A'
MQRC_XWAIT_CANCELED	2107	X'0000083B'
MQRC_XWAIT_ERROR	2108	X'0000083C'
MQRC_SUPPRESSED_BY_EXIT	2109	X'0000083D'
MQRC_FORMAT_ERROR	2110	X'0000083E'
MQRC_SOURCE_CCSID_ERROR	2111	X'0000083F'
MQRC_SOURCE_INTEGER_ENC_ERROR	2112	X'00000840'
MQRC_SOURCE_DECIMAL_ENC_ERROR	2113	X'00000841'
MQRC_SOURCE_FLOAT_ENC_ERROR	2114	X'00000842'
MQRC_TARGET_CCSID_ERROR	2115	X'00000843'
MQRC_TARGET_INTEGER_ENC_ERROR	2116	X'00000844'
MQRC_TARGET_DECIMAL_ENC_ERROR	2117	X'00000845'
MQRC_TARGET_FLOAT_ENC_ERROR	2118	X'00000846'
MQRC_NOT_CONVERTED	2119	X'00000847'
MQRC_CONVERTED_MSG_TOO_BIG	2120	X'00000848'
MQRC_TRUNCATED	2120	X'00000848'
MQRC_NO_EXTERNAL_PARTICIPANTS	2121	X'00000849'
MQRC_PARTICIPANT_NOT_AVAILABLE	2122	X'0000084A'
MQRC_OUTCOME_MIXED	2123	X'0000084B'
MQRC_OUTCOME_PENDING	2124	X'0000084C'
MQRC_BRIDGE_STARTED	2125	X'0000084D'
MQRC_BRIDGE_STOPPED	2126	X'0000084E'
MQRC_ADAPTER_STORAGE_SHORTAGE	2127	X'0000084F'
MQRC_UOW_IN_PROGRESS	2128	X'00000850'
MQRC_ADAPTER_CONN_LOAD_ERROR	2129	X'00000851'
MQRC_ADAPTER_SERV_LOAD_ERROR	2130	X'00000852'
MQRC_ADAPTER_DEFS_ERROR	2131	X'00000853'
MQRC_ADAPTER_DEFS_LOAD_ERROR	2132	X'00000854'

Table 306. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRC_ADAPTER_CONV_LOAD_ERROR	2133	X'00000855'
MQRC_BO_ERROR	2134	X'00000856'
MQRC_DH_ERROR	2135	X'00000857'
MQRC_MULTIPLE_REASONS	2136	X'00000858'
MQRC_OPEN_FAILED	2137	X'00000859'
MQRC_ADAPTER_DISC_LOAD_ERROR	2138	X'0000085A'
MQRC_CNO_ERROR	2139	X'0000085B'
MQRC_CICS_WAIT_FAILED	2140	X'0000085C'
MQRC_DLH_ERROR	2141	X'0000085D'
MQRC_HEADER_ERROR	2142	X'0000085E'
MQRC_SOURCE_LENGTH_ERROR	2143	X'0000085F'
MQRC_TARGET_LENGTH_ERROR	2144	X'00000860'
MQRC_SOURCE_BUFFER_ERROR	2145	X'00000861'
MQRC_TARGET_BUFFER_ERROR	2146	X'00000862'
MQRC_IIH_ERROR	2148	X'00000864'
MQRC_PCF_ERROR	2149	X'00000865'
MQRC_DBCS_ERROR	2150	X'00000866'
MQRC_OBJECT_NAME_ERROR	2152	X'00000868'
MQRC_OBJECT_Q_MGR_NAME_ERROR	2153	X'00000869'
MQRC_RECS_PRESENT_ERROR	2154	X'0000086A'
MQRC_OBJECT_RECORDS_ERROR	2155	X'0000086B'
MQRC_RESPONSE_RECORDS_ERROR	2156	X'0000086C'
MQRC_ASID_MISMATCH	2157	X'0000086D'
MQRC_PMO_RECORD_FLAGS_ERROR	2158	X'0000086E'
MQRC_PUT_MSG_RECORDS_ERROR	2159	X'0000086F'
MQRC_CONN_ID_IN_USE	2160	X'00000870'
MQRC_Q_MGR_QUIESCING	2161	X'00000871'
MQRC_Q_MGR_STOPPING	2162	X'00000872'
MQRC_DUPLICATE_RECOV_COORD	2163	X'00000873'
MQRC_PMO_ERROR	2173	X'0000087D'
MQRC_API_EXIT_NOT_FOUND	2182	X'00000886'
MQRC_API_EXIT_LOAD_ERROR	2183	X'00000887'
MQRC_REMOTE_Q_NAME_ERROR	2184	X'00000888'
MQRC_INCONSISTENT_PERSISTENCE	2185	X'00000889'
MQRC_GMO_ERROR	2186	X'0000088A'
MQRC_CICS_BRIDGE_RESTRICTION	2187	X'0000088B'
MQRC_STOPPED_BY_CLUSTER_EXIT	2188	X'0000088C'
MQRC_CLUSTER_RESOLUTION_ERROR	2189	X'0000088D'
MQRC_CONVERTED_STRING_TOO_BIG	2190	X'0000088E'

Table 306. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRC_TMC_ERROR	2191	X'0000088F'
MQRC_PAGESET_FULL	2192	X'00000890'
MQRC_STORAGE_MEDIUM_FULL	2192	X'00000890'
MQRC_PAGESET_ERROR	2193	X'00000891'
MQRC_NAME_NOT_VALID_FOR_TYPE	2194	X'00000892'
MQRC_UNEXPECTED_ERROR	2195	X'00000893'
MQRC_UNKNOWN_XMIT_Q	2196	X'00000894'
MQRC_UNKNOWN_DEF_XMIT_Q	2197	X'00000895'
MQRC_DEF_XMIT_Q_TYPE_ERROR	2198	X'00000896'
MQRC_DEF_XMIT_Q_USAGE_ERROR	2199	X'00000897'
MQRC_MSG_MARKED_BROWSE_CO_OP	2200	X'00000898'
MQRC_NAME_IN_USE	2201	X'00000899'
MQRC_CONNECTION_QUIESCING	2202	X'0000089A'
MQRC_CONNECTION_STOPPING	2203	X'0000089B'
MQRC_ADAPTER_NOT_AVAILABLE	2204	X'0000089C'
MQRC_MSG_ID_ERROR	2206	X'0000089E'
MQRC_CORREL_ID_ERROR	2207	X'0000089F'
MQRC_FILE_SYSTEM_ERROR	2208	X'000008A0'
MQRC_NO_MSG_LOCKED	2209	X'000008A1'
MQRC_SOAP_DOTNET_ERROR	2210	X'000008A2'
MQRC_SOAP_AXIS_ERROR	2211	X'000008A3'
MQRC_SOAP_URL_ERROR	2212	X'000008A4'
MQRC_FILE_NOT_AUDITED	2216	X'000008A8'
MQRC_CONNECTION_NOT_AUTHORIZED	2217	X'000008A9'
MQRC_MSG_TOO_BIG_FOR_CHANNEL	2218	X'000008AA'
MQRC_CALL_IN_PROGRESS	2219	X'000008AB'
MQRC_RMH_ERROR	2220	X'000008AC'
MQRC_Q_MGR_ACTIVE	2222	X'000008AE'
MQRC_Q_MGR_NOT_ACTIVE	2223	X'000008AF'
MQRC_Q_DEPTH_HIGH	2224	X'000008B0'
MQRC_Q_DEPTH_LOW	2225	X'000008B1'
MQRC_Q_SERVICE_INTERVAL_HIGH	2226	X'000008B2'
MQRC_Q_SERVICE_INTERVAL_OK	2227	X'000008B3'
MQRC_RFH_HEADER_FIELD_ERROR	2228	X'000008B4'
MQRC_RAS_PROPERTY_ERROR	2229	X'000008B5'
MQRC_UNIT_OF_WORK_NOT_STARTED	2232	X'000008B8'
MQRC_CHANNEL_AUTO_DEF_OK	2233	X'000008B9'
MQRC_CHANNEL_AUTO_DEF_ERROR	2234	X'000008BA'
MQRC_CFH_ERROR	2235	X'000008BB'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_CFIL_ERROR	2236	X'000008BC'
MQRC_CFIN_ERROR	2237	X'000008BD'
MQRC_CFSL_ERROR	2238	X'000008BE'
MQRC_CFST_ERROR	2239	X'000008BF'
MQRC_INCOMPLETE_GROUP	2241	X'000008C1'
MQRC_INCOMPLETE_MSG	2242	X'000008C2'
MQRC_INCONSISTENT_CCSIDS	2243	X'000008C3'
MQRC_INCONSISTENT_ENCODINGS	2244	X'000008C4'
MQRC_INCONSISTENT_UOW	2245	X'000008C5'
MQRC_INVALID_MSG_UNDER_CURSOR	2246	X'000008C6'
MQRC_MATCH_OPTIONS_ERROR	2247	X'000008C7'
MQRC_MDE_ERROR	2248	X'000008C8'
MQRC_MSG_FLAGS_ERROR	2249	X'000008C9'
MQRC_MSG_SEQ_NUMBER_ERROR	2250	X'000008CA'
MQRC_OFFSET_ERROR	2251	X'000008CB'
MQRC_ORIGINAL_LENGTH_ERROR	2252	X'000008CC'
MQRC_SEGMENT_LENGTH_ZERO	2253	X'000008CD'
MQRC_UOW_NOT_AVAILABLE	2255	X'000008CF'
MQRC_WRONG_GMO_VERSION	2256	X'000008D0'
MQRC_WRONG_MD_VERSION	2257	X'000008D1'
MQRC_GROUP_ID_ERROR	2258	X'000008D2'
MQRC_INCONSISTENT_BROWSE	2259	X'000008D3'
MQRC_XQH_ERROR	2260	X'000008D4'
MQRC_SRC_ENV_ERROR	2261	X'000008D5'
MQRC_SRC_NAME_ERROR	2262	X'000008D6'
MQRC_DEST_ENV_ERROR	2263	X'000008D7'
MQRC_DEST_NAME_ERROR	2264	X'000008D8'
MQRC_TM_ERROR	2265	X'000008D9'
MQRC_CLUSTER_EXIT_ERROR	2266	X'000008DA'
MQRC_CLUSTER_EXIT_LOAD_ERROR	2267	X'000008DB'
MQRC_CLUSTER_PUT_INHIBITED	2268	X'000008DC'
MQRC_CLUSTER_RESOURCE_ERROR	2269	X'000008DD'
MQRC_NO_DESTINATIONS_AVAILABLE	2270	X'000008DE'
MQRC_CONN_TAG_IN_USE	2271	X'000008DF'
MQRC_PARTIALLY_CONVERTED	2272	X'000008E0'
MQRC_CONNECTION_ERROR	2273	X'000008E1'
MQRC_OPTION_ENVIRONMENT_ERROR	2274	X'000008E2'
MQRC_CD_ERROR	2277	X'000008E5'
MQRC_CLIENT_CONN_ERROR	2278	X'000008E6'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_CHANNEL_STOPPED_BY_USER	2279	X'000008E7'
MQRC_HCONFIG_ERROR	2280	X'000008E8'
MQRC_FUNCTION_ERROR	2281	X'000008E9'
MQRC_CHANNEL_STARTED	2282	X'000008EA'
MQRC_CHANNEL_STOPPED	2283	X'000008EB'
MQRC_CHANNEL_CONV_ERROR	2284	X'000008EC'
MQRC_SERVICE_NOT_AVAILABLE	2285	X'000008ED'
MQRC_INITIALIZATION_FAILED	2286	X'000008EE'
MQRC_TERMINATION_FAILED	2287	X'000008EF'
MQRC_UNKNOWN_Q_NAME	2288	X'000008F0'
MQRC_SERVICE_ERROR	2289	X'000008F1'
MQRC_Q_ALREADY_EXISTS	2290	X'000008F2'
MQRC_USER_ID_NOT_AVAILABLE	2291	X'000008F3'
MQRC_UNKNOWN_ENTITY	2292	X'000008F4'
MQRC_UNKNOWN_AUTH_ENTITY	2293	X'000008F5'
MQRC_UNKNOWN_REF_OBJECT	2294	X'000008F6'
MQRC_CHANNEL_ACTIVATED	2295	X'000008F7'
MQRC_CHANNEL_NOT_ACTIVATED	2296	X'000008F8'
MQRC_UOW_CANCELED	2297	X'000008F9'
MQRC_FUNCTION_NOT_SUPPORTED	2298	X'000008FA'
MQRC_SELECTOR_TYPE_ERROR	2299	X'000008FB'
MQRC_COMMAND_TYPE_ERROR	2300	X'000008FC'
MQRC_MULTIPLE_INSTANCE_ERROR	2301	X'000008FD'
MQRC_SYSTEM_ITEM_NOT_ALTERABLE	2302	X'000008FE'
MQRC_BAG_CONVERSION_ERROR	2303	X'000008FF'
MQRC_SELECTOR_OUT_OF_RANGE	2304	X'00000900'
MQRC_SELECTOR_NOT_UNIQUE	2305	X'00000901'
MQRC_INDEX_NOT_PRESENT	2306	X'00000902'
MQRC_STRING_ERROR	2307	X'00000903'
MQRC_ENCODING_NOT_SUPPORTED	2308	X'00000904'
MQRC_SELECTOR_NOT_PRESENT	2309	X'00000905'
MQRC_OUT_SELECTOR_ERROR	2310	X'00000906'
MQRC_STRING_TRUNCATED	2311	X'00000907'
MQRC_SELECTOR_WRONG_TYPE	2312	X'00000908'
MQRC_INCONSISTENT_ITEM_TYPE	2313	X'00000909'
MQRC_INDEX_ERROR	2314	X'0000090A'
MQRC_SYSTEM_BAG_NOT_ALTERABLE	2315	X'0000090B'
MQRC_ITEM_COUNT_ERROR	2316	X'0000090C'
MQRC_FORMAT_NOT_SUPPORTED	2317	X'0000090D'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_SELECTOR_NOT_SUPPORTED	2318	X'0000090E'
MQRC_ITEM_VALUE_ERROR	2319	X'0000090F'
MQRC_HBAG_ERROR	2320	X'00000910'
MQRC_PARAMETER_MISSING	2321	X'00000911'
MQRC_CMD_SERVER_NOT_AVAILABLE	2322	X'00000912'
MQRC_STRING_LENGTH_ERROR	2323	X'00000913'
MQRC_INQUIRY_COMMAND_ERROR	2324	X'00000914'
MQRC_NESTED_BAG_NOT_SUPPORTED	2325	X'00000915'
MQRC_BAG_WRONG_TYPE	2326	X'00000916'
MQRC_ITEM_TYPE_ERROR	2327	X'00000917'
MQRC_SYSTEM_BAG_NOT_DELETABLE	2328	X'00000918'
MQRC_SYSTEM_ITEM_NOT_DELETABLE	2329	X'00000919'
MQRC_CODED_CHAR_SET_ID_ERROR	2330	X'0000091A'
MQRC_MSG_TOKEN_ERROR	2331	X'0000091B'
MQRC_MISSING_WIH	2332	X'0000091C'
MQRC_WIH_ERROR	2333	X'0000091D'
MQRC_RFH_ERROR	2334	X'0000091E'
MQRC_RFH_STRING_ERROR	2335	X'0000091F'
MQRC_RFH_COMMAND_ERROR	2336	X'00000920'
MQRC_RFH_PARM_ERROR	2337	X'00000921'
MQRC_RFH_DUPLICATE_PARM	2338	X'00000922'
MQRC_RFH_PARM_MISSING	2339	X'00000923'
MQRC_CHAR_CONVERSION_ERROR	2340	X'00000924'
MQRC_UCS2_CONVERSION_ERROR	2341	X'00000925'
MQRC_DB2_NOT_AVAILABLE	2342	X'00000926'
MQRC_OBJECT_NOT_UNIQUE	2343	X'00000927'
MQRC_CONN_TAG_NOT_RELEASED	2344	X'00000928'
MQRC_CF_NOT_AVAILABLE	2345	X'00000929'
MQRC_CF_STRUC_IN_USE	2346	X'0000092A'
MQRC_CF_STRUC_LIST_HDR_IN_USE	2347	X'0000092B'
MQRC_CF_STRUC_AUTH_FAILED	2348	X'0000092C'
MQRC_CF_STRUC_ERROR	2349	X'0000092D'
MQRC_CONN_TAG_NOT_USABLE	2350	X'0000092E'
MQRC_GLOBAL_UOW_CONFLICT	2351	X'0000092F'
MQRC_LOCAL_UOW_CONFLICT	2352	X'00000930'
MQRC_HANDLE_IN_USE_FOR_UOW	2353	X'00000931'
MQRC_UOW_ENLISTMENT_ERROR	2354	X'00000932'
MQRC_UOW_MIX_NOT_SUPPORTED	2355	X'00000933'
MQRC_WXP_ERROR	2356	X'00000934'

Table 306. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRC_CURRENT_RECORD_ERROR	2357	X'00000935'
MQRC_NEXT_OFFSET_ERROR	2358	X'00000936'
MQRC_NO_RECORD_AVAILABLE	2359	X'00000937'
MQRC_OBJECT_LEVEL_INCOMPATIBLE	2360	X'00000938'
MQRC_NEXT_RECORD_ERROR	2361	X'00000939'
MQRC_BACKOUT_THRESHOLD_REACHED	2362	X'0000093A'
MQRC_MSG_NOT_MATCHED	2363	X'0000093B'
MQRC_JMS_FORMAT_ERROR	2364	X'0000093C'
MQRC_SEGMENTS_NOT_SUPPORTED	2365	X'0000093D'
MQRC_WRONG_CF_LEVEL	2366	X'0000093E'
MQRC_CONFIG_CREATE_OBJECT	2367	X'0000093F'
MQRC_CONFIG_CHANGE_OBJECT	2368	X'00000940'
MQRC_CONFIG_DELETE_OBJECT	2369	X'00000941'
MQRC_CONFIG_REFRESH_OBJECT	2370	X'00000942'
MQRC_CHANNEL_SSL_ERROR	2371	X'00000943'
MQRC_PARTICIPANT_NOT_DEFINED	2372	X'00000944'
MQRC_CF_STRUC_FAILED	2373	X'00000945'
MQRC_API_EXIT_ERROR	2374	X'00000946'
MQRC_API_EXIT_INIT_ERROR	2375	X'00000947'
MQRC_API_EXIT_TERM_ERROR	2376	X'00000948'
MQRC_EXIT_REASON_ERROR	2377	X'00000949'
MQRC_RESERVED_VALUE_ERROR	2378	X'0000094A'
MQRC_NO_DATA_AVAILABLE	2379	X'0000094B'
MQRC_SCO_ERROR	2380	X'0000094C'
MQRC_KEY_REPOSITORY_ERROR	2381	X'0000094D'
MQRC_CRYPTO_HARDWARE_ERROR	2382	X'0000094E'
MQRC_AUTH_INFO_REC_COUNT_ERROR	2383	X'0000094F'
MQRC_AUTH_INFO_REC_ERROR	2384	X'00000950'
MQRC_AIR_ERROR	2385	X'00000951'
MQRC_AUTH_INFO_TYPE_ERROR	2386	X'00000952'
MQRC_AUTH_INFO_CONN_NAME_ERROR	2387	X'00000953'
MQRC_LDAP_USER_NAME_ERROR	2388	X'00000954'
MQRC_LDAP_USER_NAME_LENGTH_ERR	2389	X'00000955'
MQRC_LDAP_PASSWORD_ERROR	2390	X'00000956'
MQRC_SSL_ALREADY_INITIALIZED	2391	X'00000957'
MQRC_SSL_CONFIG_ERROR	2392	X'00000958'
MQRC_SSL_INITIALIZATION_ERROR	2393	X'00000959'
MQRC_Q_INDEX_TYPE_ERROR	2394	X'0000095A'
MQRC_CFBS_ERROR	2395	X'0000095B'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_SSL_NOT_ALLOWED	2396	X'0000095C'
MQRC_JSSE_ERROR	2397	X'0000095D'
MQRC_SSL_PEER_NAME_MISMATCH	2398	X'0000095E'
MQRC_SSL_PEER_NAME_ERROR	2399	X'0000095F'
MQRC_UNSUPPORTED_CIPHER_SUITE	2400	X'00000960'
MQRC_SSL_CERTIFICATE_REVOKED	2401	X'00000961'
MQRC_SSL_CERT_STORE_ERROR	2402	X'00000962'
MQRC_CLIENT_EXIT_LOAD_ERROR	2406	X'00000966'
MQRC_CLIENT_EXIT_ERROR	2407	X'00000967'
MQRC_UOW_COMMITTED	2408	X'00000968'
MQRC_SSL_KEY_RESET_ERROR	2409	X'00000969'
MQRC_UNKNOWN_COMPONENT_NAME	2410	X'0000096A'
MQRC_LOGGER_STATUS	2411	X'0000096B'
MQRC_COMMAND_MQSC	2412	X'0000096C'
MQRC_COMMAND_PCF	2413	X'0000096D'
MQRC_CFIF_ERROR	2414	X'0000096E'
MQRC_CFSF_ERROR	2415	X'0000096F'
MQRC_CFGR_ERROR	2416	X'00000970'
MQRC_MSG_NOT_ALLOWED_IN_GROUP	2417	X'00000971'
MQRC_FILTER_OPERATOR_ERROR	2418	X'00000972'
MQRC_NESTED_SELECTOR_ERROR	2419	X'00000973'
MQRC_EPH_ERROR	2420	X'00000974'
MQRC_RFH_FORMAT_ERROR	2421	X'00000975'
MQRC_CFBF_ERROR	2422	X'00000976'
MQRC_CLIENT_CHANNEL_CONFLICT	2423	X'00000977'
MQRC_SD_ERROR	2424	X'00000978'
MQRC_TOPIC_STRING_ERROR	2425	X'00000979'
MQRC_STS_ERROR	2426	X'0000097A'
MQRC_NO_SUBSCRIPTION	2428	X'0000097C'
MQRC_SUBSCRIPTION_IN_USE	2429	X'0000097D'
MQRC_STAT_TYPE_ERROR	2430	X'0000097E'
MQRC_SUB_USER_DATA_ERROR	2431	X'0000097F'
MQRC_SUB_ALREADY_EXISTS	2432	X'00000980'
MQRC_IDENTITY_MISMATCH	2434	X'00000982'
MQRC_ALTER_SUB_ERROR	2435	X'00000983'
MQRC_DURABILITY_NOT_ALLOWED	2436	X'00000984'
MQRC_NO_RETAINED_MSG	2437	X'00000985'
MQRC_SRO_ERROR	2438	X'00000986'
MQRC_SUB_NAME_ERROR	2440	X'00000988'

Table 306. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRC_OBJECT_STRING_ERROR	2441	X'00000989'
MQRC_PROPERTY_NAME_ERROR	2442	X'0000098A'
MQRC_SEGMENTATION_NOT_ALLOWED	2443	X'0000098B'
MQRC_CBD_ERROR	2444	X'0000098C'
MQRC_CTLO_ERROR	2445	X'0000098D'
MQRC_NO_CALLBACKS_ACTIVE	2446	X'0000098E'
MQRC_CALLBACK_NOT_REGISTERED	2448	X'00000990'
MQRC_OPTIONS_CHANGED	2457	X'00000999'
MQRC_READ_AHEAD_MSGS	2458	X'0000099A'
MQRC_SELECTOR_SYNTAX_ERROR	2459	X'0000099B'
MQRC_HMSG_ERROR	2460	X'0000099C'
MQRC_CMHO_ERROR	2461	X'0000099D'
MQRC_DMHO_ERROR	2462	X'0000099E'
MQRC_SMPO_ERROR	2463	X'0000099F'
MQRC_IMPO_ERROR	2464	X'000009A0'
MQRC_PROPERTY_NAME_TOO_BIG	2465	X'000009A1'
MQRC_PROP_VALUE_NOT_CONVERTED	2466	X'000009A2'
MQRC_PROP_TYPE_NOT_SUPPORTED	2467	X'000009A3'
MQRC_PROPERTY_VALUE_TOO_BIG	2469	X'000009A5'
MQRC_PROP_CONV_NOT_SUPPORTED	2470	X'000009A6'
MQRC_PROPERTY_NOT_AVAILABLE	2471	X'000009A7'
MQRC_PROP_NUMBER_FORMAT_ERROR	2472	X'000009A8'
MQRC_PROPERTY_TYPE_ERROR	2473	X'000009A9'
MQRC_PROPERTIES_TOO_BIG	2478	X'000009AE'
MQRC_PUT_NOT_RETAINED	2479	X'000009AF'
MQRC_ALIAS_TARGTYPE_CHANGED	2480	X'000009B0'
MQRC_DMPO_ERROR	2481	X'000009B1'
MQRC_PD_ERROR	2482	X'000009B2'
MQRC_CALLBACK_TYPE_ERROR	2483	X'000009B3'
MQRC_CBD_OPTIONS_ERROR	2484	X'000009B4'
MQRC_MAX_MSG_LENGTH_ERROR	2485	X'000009B5'
MQRC_CALLBACK_ROUTINE_ERROR	2486	X'000009B6'
MQRC_CALLBACK_LINK_ERROR	2487	X'000009B7'
MQRC_OPERATION_ERROR	2488	X'000009B8'
MQRC_BMHO_ERROR	2489	X'000009B9'
MQRC_UNSUPPORTED_PROPERTY	2490	X'000009BA'
MQRC_PROP_NAME_NOT_CONVERTED	2492	X'000009BC'
MQRC_GET_ENABLED	2494	X'000009BE'
MQRC_MODULE_NOT_FOUND	2495	X'000009BF'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_MODULE_INVALID	2496	X'000009C0'
MQRC_MODULE_ENTRY_NOT_FOUND	2497	X'000009C1'
MQRC_MIXED_CONTENT_NOT_ALLOWED	2498	X'000009C2'
MQRC_MSG_HANDLE_IN_USE	2499	X'000009C3'
MQRC_HCONN_ASYNC_ACTIVE	2500	X'000009C4'
MQRC_MHBO_ERROR	2501	X'000009C5'
MQRC_PUBLICATION_FAILURE	2502	X'000009C6'
MQRC_SUB_INHIBITED	2503	X'000009C7'
MQRC_SELECTOR_ALWAYS_FALSE	2504	X'000009C8'
MQRC_XEPO_ERROR	2507	X'000009CB'
MQRC_DURABILITY_NOT_ALTERABLE	2509	X'000009CD'
MQRC_TOPIC_NOT_ALTERABLE	2510	X'000009CE'
MQRC_SUBLEVEL_NOT_ALTERABLE	2512	X'000009D0'
MQRC_PROPERTY_NAME_LENGTH_ERR	2513	X'000009D1'
MQRC_DUPLICATE_GROUP_SUB	2514	X'000009D2'
MQRC_GROUPING_NOT_ALTERABLE	2515	X'000009D3'
MQRC_SELECTOR_INVALID_FOR_TYPE	2516	X'000009D4'
MQRC_HOBJ_QUIESCED	2517	X'000009D5'
MQRC_HOBJ_QUIESCED_NO_MSGS	2518	X'000009D6'
MQRC_SELECTION_STRING_ERROR	2519	X'000009D7'
MQRC_RES_OBJECT_STRING_ERROR	2520	X'000009D8'
MQRC_CONNECTION_SUSPENDED	2521	X'000009D9'
MQRC_INVALID_DESTINATION	2522	X'000009DA'
MQRC_INVALID_SUBSCRIPTION	2523	X'000009DB'
MQRC_SELECTOR_NOT_ALTERABLE	2524	X'000009DC'
MQRC_RETAINED_MSG_Q_ERROR	2525	X'000009DD'
MQRC_RETAINED_NOT_DELIVERED	2526	X'000009DE'
MQRC_RFH_RESTRICTED_FORMAT_ERR	2527	X'000009DF'
MQRC_CONNECTION_STOPPED	2528	X'000009E0'
MQRC_ASYNC_UOW_CONFLICT	2529	X'000009E1'
MQRC_ASYNC_XA_CONFLICT	2530	X'000009E2'
MQRC_PUBSUB_INHIBITED	2531	X'000009E3'
MQRC_MSG_HANDLE_COPY_FAILURE	2532	X'000009E4'
MQRC_DEST_CLASS_NOT_ALTERABLE	2533	X'000009E5'
MQRC_OPERATION_NOT_ALLOWED	2534	X'000009E6'
MQRC_ACTION_ERROR	2535	X'000009E7'
MQRC_CHANNEL_NOT_AVAILABLE	2537	X'000009E9'
MQRC_HOST_NOT_AVAILABLE	2538	X'000009EA'
MQRC_CHANNEL_CONFIG_ERROR	2539	X'000009EB'

Table 306. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRC_UNKNOWN_CHANNEL_NAME	2540	X'000009EC'
MQRC_LOOPING_PUBLICATION	2541	X'000009ED'
MQRC_ALREADY_JOINED	2542	X'000009EE'
MQRC_CHANNEL_SSL_WARNING	2552	X'000009F8'
MQRC_OCSP_URL_ERROR	2553	X'000009F9'
MQRC_CIPHER_SPEC_NOT_SUITE_B	2591	X'00000A1F'
MQRC_SUITE_B_ERROR	2592	X'00000A20'
MQRC_PASSWORD_PROTECTION_ERROR	2594	X'00000A22'
MQRC_REOPEN_EXCL_INPUT_ERROR	6100	X'000017D4'
MQRC_REOPEN_INQUIRE_ERROR	6101	X'000017D5'
MQRC_REOPEN_SAVED_CONTEXT_ERR	6102	X'000017D6'
MQRC_REOPEN_TEMPORARY_Q_ERROR	6103	X'000017D7'
MQRC_ATTRIBUTE_LOCKED	6104	X'000017D8'
MQRC_CURSOR_NOT_VALID	6105	X'000017D9'
MQRC_ENCODING_ERROR	6106	X'000017DA'
MQRC_STRUC_ID_ERROR	6107	X'000017DB'
MQRC_NULL_POINTER	6108	X'000017DC'
MQRC_NO_CONNECTION_REFERENCE	6109	X'000017DD'
MQRC_NO_BUFFER	6110	X'000017DE'
MQRC_BINARY_DATA_LENGTH_ERROR	6111	X'000017DF'
MQRC_BUFFER_NOT_AUTOMATIC	6112	X'000017E0'
MQRC_INSUFFICIENT_BUFFER	6113	X'000017E1'
MQRC_INSUFFICIENT_DATA	6114	X'000017E2'
MQRC_DATA_TRUNCATED	6115	X'000017E3'
MQRC_ZERO_LENGTH	6116	X'000017E4'
MQRC_NEGATIVE_LENGTH	6117	X'000017E5'
MQRC_NEGATIVE_OFFSET	6118	X'000017E6'
MQRC_INCONSISTENT_FORMAT	6119	X'000017E7'
MQRC_INCONSISTENT_OBJECT_STATE	6120	X'000017E8'
MQRC_CONTEXT_OBJECT_NOT_VALID	6121	X'000017E9'
MQRC_CONTEXT_OPEN_ERROR	6122	X'000017EA'
MQRC_STRUC_LENGTH_ERROR	6123	X'000017EB'
MQRC_NOT_CONNECTED	6124	X'000017EC'
MQRC_NOT_OPEN	6125	X'000017ED'
MQRC_DISTRIBUTION_LIST_EMPTY	6126	X'000017EE'
MQRC_INCONSISTENT_OPEN_OPTIONS	6127	X'000017EF'
MQRC_WRONG_VERSION	6128	X'000017F0'
MQRC_REFERENCE_ERROR	6129	X'000017F1'

MQRCCF_* (Command format header reason codes)

See PCF reason codes for more information on the programmer response.

Table 307. Values of constants

Name	Decimal value	Hexadecimal value
MQRCCF_CFH_TYPE_ERROR	3001	X'00000BB9'
MQRCCF_CFH_LENGTH_ERROR	3002	X'00000BBA'
MQRCCF_CFH_VERSION_ERROR	3003	X'00000BBB'
MQRCCF_CFH_MSG_SEQ_NUMBER_ERR	3004	X'00000BBC'
MQRCCF_CFH_CONTROL_ERROR	3005	X'00000BBD'
MQRCCF_CFH_PARM_COUNT_ERROR	3006	X'00000BBE'
MQRCCF_CFH_COMMAND_ERROR	3007	X'00000BBF'
MQRCCF_COMMAND_FAILED	3008	X'00000BC0'
MQRCCF_CFIN_LENGTH_ERROR	3009	X'00000BC1'
MQRCCF_CFST_LENGTH_ERROR	3010	X'00000BC2'
MQRCCF_CFST_STRING_LENGTH_ERR	3011	X'00000BC3'
MQRCCF_FORCE_VALUE_ERROR	3012	X'00000BC4'
MQRCCF_STRUCTURE_TYPE_ERROR	3013	X'00000BC5'
MQRCCF_CFIN_PARM_ID_ERROR	3014	X'00000BC6'
MQRCCF_CFST_PARM_ID_ERROR	3015	X'00000BC7'
MQRCCF_MSG_LENGTH_ERROR	3016	X'00000BC8'
MQRCCF_CFIN_DUPLICATE_PARM	3017	X'00000BC9'
MQRCCF_CFST_DUPLICATE_PARM	3018	X'00000BCA'
MQRCCF_PARM_COUNT_TOO_SMALL	3019	X'00000BCB'
MQRCCF_PARM_COUNT_TOO_BIG	3020	X'00000BCC'
MQRCCF_Q_ALREADY_IN_CELL	3021	X'00000BCD'
MQRCCF_Q_TYPE_ERROR	3022	X'00000BCE'
MQRCCF_MD_FORMAT_ERROR	3023	X'00000BCF'
MQRCCF_CFSL_LENGTH_ERROR	3024	X'00000BD0'
MQRCCF_REPLACE_VALUE_ERROR	3025	X'00000BD1'
MQRCCF_CFIL_DUPLICATE_VALUE	3026	X'00000BD2'
MQRCCF_CFIL_COUNT_ERROR	3027	X'00000BD3'
MQRCCF_CFIL_LENGTH_ERROR	3028	X'00000BD4'
MQRCCF_QUIESCE_VALUE_ERROR	3029	X'00000BD5'
MQRCCF_MODE_VALUE_ERROR	3029	X'00000BD5'
MQRCCF_MSG_SEQ_NUMBER_ERROR	3030	X'00000BD6'
MQRCCF_PING_DATA_COUNT_ERROR	3031	X'00000BD7'
MQRCCF_PING_DATA_COMPARE_ERROR	3032	X'00000BD8'
MQRCCF_CFSL_PARM_ID_ERROR	3033	X'00000BD9'
MQRCCF_CHANNEL_TYPE_ERROR	3034	X'00000BDA'
MQRCCF_PARM_SEQUENCE_ERROR	3035	X'00000BDB'
MQRCCF_XMIT_PROTOCOL_TYPE_ERR	3036	X'00000BDC'

Table 307. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRCCF_BATCH_SIZE_ERROR	3037	X'00000BDD'
MQRCCF_DISC_INT_ERROR	3038	X'00000BDE'
MQRCCF_SHORT_RETRY_ERROR	3039	X'00000BDF'
MQRCCF_SHORT_TIMER_ERROR	3040	X'00000BE0'
MQRCCF_LONG_RETRY_ERROR	3041	X'00000BE1'
MQRCCF_LONG_TIMER_ERROR	3042	X'00000BE2'
MQRCCF_SEQ_NUMBER_WRAP_ERROR	3043	X'00000BE3'
MQRCCF_MAX_MSG_LENGTH_ERROR	3044	X'00000BE4'
MQRCCF_PUT_AUTH_ERROR	3045	X'00000BE5'
MQRCCF_PURGE_VALUE_ERROR	3046	X'00000BE6'
MQRCCF_CFIL_PARM_ID_ERROR	3047	X'00000BE7'
MQRCCF_MSG_TRUNCATED	3048	X'00000BE8'
MQRCCF_CCSID_ERROR	3049	X'00000BE9'
MQRCCF_ENCODING_ERROR	3050	X'00000BEA'
MQRCCF_QUEUES_VALUE_ERROR	3051	X'00000BEB'
MQRCCF_DATA_CONV_VALUE_ERROR	3052	X'00000BEC'
MQRCCF_INDOUBT_VALUE_ERROR	3053	X'00000BED'
MQRCCF_ESCAPE_TYPE_ERROR	3054	X'00000BEE'
MQRCCF_REPOS_VALUE_ERROR	3055	X'00000BEF'
MQRCCF_CHANNEL_TABLE_ERROR	3062	X'00000BF6'
MQRCCF_MCA_TYPE_ERROR	3063	X'00000BF7'
MQRCCF_CHL_INST_TYPE_ERROR	3064	X'00000BF8'
MQRCCF_CHL_STATUS_NOT_FOUND	3065	X'00000BF9'
MQRCCF_CFSL_DUPLICATE_PARM	3066	X'00000BFA'
MQRCCF_CFSL_TOTAL_LENGTH_ERROR	3067	X'00000BFB'
MQRCCF_CFSL_COUNT_ERROR	3068	X'00000BFC'
MQRCCF_CFSL_STRING_LENGTH_ERR	3069	X'00000BFD'
MQRCCF_BROKER_DELETED	3070	X'00000BFE'
MQRCCF_STREAM_ERROR	3071	X'00000BFF'
MQRCCF_TOPIC_ERROR	3072	X'00000C00'
MQRCCF_NOT_REGISTERED	3073	X'00000C01'
MQRCCF_Q_MGR_NAME_ERROR	3074	X'00000C02'
MQRCCF_INCORRECT_STREAM	3075	X'00000C03'
MQRCCF_Q_NAME_ERROR	3076	X'00000C04'
MQRCCF_NO_RETAINED_MSG	3077	X'00000C05'
MQRCCF_DUPLICATE_IDENTITY	3078	X'00000C06'
MQRCCF_INCORRECT_Q	3079	X'00000C07'
MQRCCF_CORREL_ID_ERROR	3080	X'00000C08'
MQRCCF_NOT_AUTHORIZED	3081	X'00000C09'

Table 307. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRCCF_UNKNOWN_STREAM	3082	X'00000C0A'
MQRCCF_REG_OPTIONS_ERROR	3083	X'00000C0B'
MQRCCF_PUB_OPTIONS_ERROR	3084	X'00000C0C'
MQRCCF_UNKNOWN_BROKER	3085	X'00000C0D'
MQRCCF_Q_MGR_CCSID_ERROR	3086	X'00000C0E'
MQRCCF_DEL_OPTIONS_ERROR	3087	X'00000C0F'
MQRCCF_CLUSTER_NAME_CONFLICT	3088	X'00000C10'
MQRCCF_REPOS_NAME_CONFLICT	3089	X'00000C11'
MQRCCF_CLUSTER_Q_USAGE_ERROR	3090	X'00000C12'
MQRCCF_ACTION_VALUE_ERROR	3091	X'00000C13'
MQRCCF_COMMS_LIBRARY_ERROR	3092	X'00000C14'
MQRCCF_NETBIOS_NAME_ERROR	3093	X'00000C15'
MQRCCF_BROKER_COMMAND_FAILED	3094	X'00000C16'
MQRCCF_CFST_CONFLICTING_PARM	3095	X'00000C17'
MQRCCF_PATH_NOT_VALID	3096	X'00000C18'
MQRCCF_PARM_SYNTAX_ERROR	3097	X'00000C19'
MQRCCF_PWD_LENGTH_ERROR	3098	X'00000C1A'
MQRCCF_FILTER_ERROR	3150	X'00000C4E'
MQRCCF_WRONG_USER	3151	X'00000C4F'
MQRCCF_DUPLICATE_SUBSCRIPTION	3152	X'00000C50'
MQRCCF_SUB_NAME_ERROR	3153	X'00000C51'
MQRCCF_SUB_IDENTITY_ERROR	3154	X'00000C52'
MQRCCF_SUBSCRIPTION_IN_USE	3155	X'00000C53'
MQRCCF_SUBSCRIPTION_LOCKED	3156	X'00000C54'
MQRCCF_ALREADY_JOINED	3157	X'00000C55'
MQRCCF_OBJECT_IN_USE	3160	X'00000C58'
MQRCCF_UNKNOWN_FILE_NAME	3161	X'00000C59'
MQRCCF_FILE_NOT_AVAILABLE	3162	X'00000C5A'
MQRCCF_DISC_RETRY_ERROR	3163	X'00000C5B'
MQRCCF_ALLOC_RETRY_ERROR	3164	X'00000C5C'
MQRCCF_ALLOC_SLOW_TIMER_ERROR	3165	X'00000C5D'
MQRCCF_ALLOC_FAST_TIMER_ERROR	3166	X'00000C5E'
MQRCCF_PORT_NUMBER_ERROR	3167	X'00000C5F'
MQRCCF_CHL_SYSTEM_NOT_ACTIVE	3168	X'00000C60'
MQRCCF_ENTITY_NAME_MISSING	3169	X'00000C61'
MQRCCF_PROFILE_NAME_ERROR	3170	X'00000C62'
MQRCCF_AUTH_VALUE_ERROR	3171	X'00000C63'
MQRCCF_AUTH_VALUE_MISSING	3172	X'00000C64'
MQRCCF_OBJECT_TYPE_MISSING	3173	X'00000C65'

Table 307. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRCCF_CONNECTION_ID_ERROR	3174	X'00000C66'
MQRCCF_LOG_TYPE_ERROR	3175	X'00000C67'
MQRCCF_PROGRAM_NOT_AVAILABLE	3176	X'00000C68'
MQRCCF_PROGRAM_AUTH_FAILED	3177	X'00000C69'
MQRCCF_NONE_FOUND	3200	X'00000C80'
MQRCCF_SECURITY_SWITCH_OFF	3201	X'00000C81'
MQRCCF_SECURITY_REFRESH_FAILED	3202	X'00000C82'
MQRCCF_PARM_CONFLICT	3203	X'00000C83'
MQRCCF_COMMAND_INHIBITED	3204	X'00000C84'
MQRCCF_OBJECT_BEING_DELETED	3205	X'00000C85'
MQRCCF_STORAGE_CLASS_IN_USE	3207	X'00000C87'
MQRCCF_OBJECT_NAME_RESTRICTED	3208	X'00000C88'
MQRCCF_OBJECT_LIMIT_EXCEEDED	3209	X'00000C89'
MQRCCF_OBJECT_OPEN_FORCE	3210	X'00000C8A'
MQRCCF_DISPOSITION_CONFLICT	3211	X'00000C8B'
MQRCCF_Q_MGR_NOT_IN_QSG	3212	X'00000C8C'
MQRCCF_ATTR_VALUE_FIXED	3213	X'00000C8D'
MQRCCF_NAMELIST_ERROR	3215	X'00000C8F'
MQRCCF_NO_CHANNEL_INITIATOR	3217	X'00000C91'
MQRCCF_CHANNEL_INITIATOR_ERROR	3218	X'00000C92'
MQRCCF_COMMAND_LEVEL_CONFLICT	3222	X'00000C96'
MQRCCF_Q_ATTR_CONFLICT	3223	X'00000C97'
MQRCCF_EVENTS_DISABLED	3224	X'00000C98'
MQRCCF_COMMAND_SCOPE_ERROR	3225	X'00000C99'
MQRCCF_COMMAND_REPLY_ERROR	3226	X'00000C9A'
MQRCCF_FUNCTION_RESTRICTED	3227	X'00000C9B'
MQRCCF_PARM_MISSING	3228	X'00000C9C'
MQRCCF_PARM_VALUE_ERROR	3229	X'00000C9D'
MQRCCF_COMMAND_LENGTH_ERROR	3230	X'00000C9E'
MQRCCF_COMMAND_ORIGIN_ERROR	3231	X'00000C9F'
MQRCCF_LISTENER_CONFLICT	3232	X'00000CA0'
MQRCCF_LISTENER_STARTED	3233	X'00000CA1'
MQRCCF_LISTENER_STOPPED	3234	X'00000CA2'
MQRCCF_CHANNEL_ERROR	3235	X'00000CA3'
MQRCCF_CF_STRUC_ERROR	3236	X'00000CA4'
MQRCCF_UNKNOWN_USER_ID	3237	X'00000CA5'
MQRCCF_UNEXPECTED_ERROR	3238	X'00000CA6'
MQRCCF_NO_XCF_PARTNER	3239	X'00000CA7'
MQRCCF_CFGR_PARM_ID_ERROR	3240	X'00000CA8'

Name	Decimal value	Hexadecimal value
MQRCCF_CFIF_LENGTH_ERROR	3241	X'00000CA9'
MQRCCF_CFIF_OPERATOR_ERROR	3242	X'00000CAA'
MQRCCF_CFIF_PARM_ID_ERROR	3243	X'00000CAB'
MQRCCF_CFSF_FILTER_VAL_LEN_ERR	3244	X'00000CAC'
MQRCCF_CFSF_LENGTH_ERROR	3245	X'00000CAD'
MQRCCF_CFSF_OPERATOR_ERROR	3246	X'00000CAE'
MQRCCF_CFSF_PARM_ID_ERROR	3247	X'00000CAF'
MQRCCF_TOO_MANY_FILTERS	3248	X'00000CB0'
MQRCCF_LISTENER_RUNNING	3249	X'00000CB1'
MQRCCF_LSTR_STATUS_NOT_FOUND	3250	X'00000CB2'
MQRCCF_SERVICE_RUNNING	3251	X'00000CB3'
MQRCCF_SERV_STATUS_NOT_FOUND	3252	X'00000CB4'
MQRCCF_SERVICE_STOPPED	3253	X'00000CB5'
MQRCCF_CFBS_DUPLICATE_PARM	3254	X'00000CB6'
MQRCCF_CFBS_LENGTH_ERROR	3255	X'00000CB7'
MQRCCF_CFBS_PARM_ID_ERROR	3256	X'00000CB8'
MQRCCF_CFBS_STRING_LENGTH_ERR	3257	X'00000CB9'
MQRCCF_CFGR_LENGTH_ERROR	3258	X'00000CBA'
MQRCCF_CFGR_PARM_COUNT_ERROR	3259	X'00000CBB'
MQRCCF_CONN_NOT_STOPPED	3260	X'00000CBC'
MQRCCF_SERVICE_REQUEST_PENDING	3261	X'00000CBD'
MQRCCF_NO_START_CMD	3262	X'00000CBE'
MQRCCF_NO_STOP_CMD	3263	X'00000CBF'
MQRCCF_CFBF_LENGTH_ERROR	3264	X'00000CC0'
MQRCCF_CFBF_PARM_ID_ERROR	3265	X'00000CC1'
MQRCCF_CFBF_OPERATOR_ERROR	3266	X'00000CC2'
MQRCCF_CFBF_FILTER_VAL_LEN_ERR	3267	X'00000CC3'
MQRCCF_LISTENER_STILL_ACTIVE	3268	X'00000CC4'
MQRCCF_DEF_XMIT_Q_CLUS_ERROR	3269	X'0000CC5'
MQRCCF_TOPICSTR_ALREADY_EXISTS	3300	X'00000CE4'
MQRCCF_SHARING_CONVS_ERROR	3301	X'00000CE5'
MQRCCF_SHARING_CONVS_TYPE	3302	X'00000CE6'
MQRCCF_SECURITY_CASE_CONFLICT	3303	X'00000CE7'
MQRCCF_TOPIC_TYPE_ERROR	3305	X'00000CE9'
MQRCCF_MAX_INSTANCES_ERROR	3306	X'00000CEA'
MQRCCF_MAX_INSTS_PER_CLNT_ERR	3307	X'00000CEB'
MQRCCF_TOPIC_STRING_NOT_FOUND	3308	X'00000CEC'
MQRCCF_SUBSCRIPTION_POINT_ERR	3309	X'00000CED'
MQRCCF_SUB_ALREADY_EXISTS	3311	X'00000CEF'

Table 307. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRCCF_UNKNOWN_OBJECT_NAME	3312	X'00000CF0'
MQRCCF_REMOTE_Q_NAME_ERROR	3313	X'00000CF1'
MQRCCF_DURABILITY_NOT_ALLOWED	3314	X'00000CF2'
MQRCCF_HOBJ_ERROR	3315	X'00000CF3'
MQRCCF_DEST_NAME_ERROR	3316	X'00000CF4'
MQRCCF_INVALID_DESTINATION	3317	X'00000CF5'
MQRCCF_PUBSUB_INHIBITED	3318	X'00000CF6'
MQRCCF_CHLAUTH_TYPE_ERROR	3326	X'00000CFE'
MQRCCF_CHLAUTH_ACTION_ERROR	3327	X'00000CFF'
MQRCCF_CHLAUTH_USERSRC_ERROR	3335	X'00000D07'
MQRCCF_WRONG_CHLAUTH_TYPE	3336	X'00000D08'
MQRCCF_CHLAUTH_ALREADY_EXISTS	3337	X'00000D09'
MQRCCF_CHLAUTH_NOT_FOUND	3338	X'00000D0A'
MQRCCF_WRONG_CHLAUTH_ACTION	3339	X'00000D0B'
MQRCCF_WRONG_CHLAUTH_USERSRC	3340	X'00000D0C'
MQRCCF_CHLAUTH_WARN_ERROR	3341	X'00000D0D'
MQRCCF_WRONG_CHLAUTH_MATCH	3342	X'00000D0E'
MQRCCF_IPADDR_RANGE_CONFLICT	3343	X'00000D0F'
MQRCCF_CHLAUTH_MAX_EXCEEDED	3344	X'00000D10'
MQRCCF_IPADDR_ERROR	3345	X'00000D11'
MQRCCF_IPADDR_RANGE_ERROR	3346	X'00000D12'
MQRCCF_PROFILE_NAME_MISSING	3347	X'00000D13'
MQRCCF_CHLAUTH_CLNTUSER_ERROR	3348	X'00000D14'
MQRCCF_CHLAUTH_NAME_ERROR	3349	X'00000D15'
MQRCCF_SUITE_B_ERROR	3353	X'00000D19'
MQRCCF_PSCLUS_DISABLED_TOPDEF	3359	X'00000D1F'
MQRCCF_PSCLUS_TOPIC_EXISTS	3360	X'00000D20'
MQRCCF_INVALID_PROTOCOL	3365	X'00000D25'
V 9.1.0 V 9.1.0 MQRCCF_ACCESS_BLOCKED	3382	X'00000D36'
MQRCCF_OBJECT_ALREADY_EXISTS	4001	X'00000FA1'
MQRCCF_OBJECT_WRONG_TYPE	4002	X'00000FA2'
MQRCCF_LIKE_OBJECT_WRONG_TYPE	4003	X'00000FA3'
MQRCCF_OBJECT_OPEN	4004	X'00000FA4'
MQRCCF_ATTR_VALUE_ERROR	4005	X'00000FA5'
MQRCCF_UNKNOWN_Q_MGR	4006	X'00000FA6'
MQRCCF_Q_WRONG_TYPE	4007	X'00000FA7'
MQRCCF_OBJECT_NAME_ERROR	4008	X'00000FA8'
MQRCCF_ALLOCATE_FAILED	4009	X'00000FA9'
MQRCCF_HOST_NOT_AVAILABLE	4010	X'00000FAA'

Table 307. Values of constants (continued)

Name	Decimal value	Hexadecimal value
MQRCCF_CONFIGURATION_ERROR	4011	X'00000FAB'
MQRCCF_CONNECTION_REFUSED	4012	X'00000FAC'
MQRCCF_ENTRY_ERROR	4013	X'00000FAD'
MQRCCF_SEND_FAILED	4014	X'00000FAE'
MQRCCF_RECEIVED_DATA_ERROR	4015	X'00000FAF'
MQRCCF_RECEIVE_FAILED	4016	X'00000FB0'
MQRCCF_CONNECTION_CLOSED	4017	X'00000FB1'
MQRCCF_NO_STORAGE	4018	X'00000FB2'
MQRCCF_NO_COMMS_MANAGER	4019	X'00000FB3'
MQRCCF_LISTENER_NOT_STARTED	4020	X'00000FB4'
MQRCCF_BIND_FAILED	4024	X'00000FB8'
MQRCCF_CHANNEL_INDOUBT	4025	X'00000FB9'
MQRCCF_MQCONN_FAILED	4026	X'00000FBA'
MQRCCF_MQOPEN_FAILED	4027	X'00000FBB'
MQRCCF_MQGET_FAILED	4028	X'00000FBC'
MQRCCF_MQPUT_FAILED	4029	X'00000FBD'
MQRCCF_PING_ERROR	4030	X'00000FBE'
MQRCCF_CHANNEL_IN_USE	4031	X'00000FBF'
MQRCCF_CHANNEL_NOT_FOUND	4032	X'00000FC0'
MQRCCF_UNKNOWN_REMOTE_CHANNEL	4033	X'00000FC1'
MQRCCF_REMOTE_QM_UNAVAILABLE	4034	X'00000FC2'
MQRCCF_REMOTE_QM_TERMINATING	4035	X'00000FC3'
MQRCCF_MQINQ_FAILED	4036	X'00000FC4'
MQRCCF_NOT_XMIT_Q	4037	X'00000FC5'
MQRCCF_CHANNEL_DISABLED	4038	X'00000FC6'
MQRCCF_USER_EXIT_NOT_AVAILABLE	4039	X'00000FC7'
MQRCCF_COMMIT_FAILED	4040	X'00000FC8'
MQRCCF_WRONG_CHANNEL_TYPE	4041	X'00000FC9'
MQRCCF_CHANNEL_ALREADY_EXISTS	4042	X'00000FCA'
MQRCCF_DATA_TOO_LARGE	4043	X'00000FCB'
MQRCCF_CHANNEL_NAME_ERROR	4044	X'00000FCC'
MQRCCF_XMIT_Q_NAME_ERROR	4045	X'00000FCD'
MQRCCF_MCA_NAME_ERROR	4047	X'00000FCF'
MQRCCF_SEND_EXIT_NAME_ERROR	4048	X'00000FD0'
MQRCCF_SEC_EXIT_NAME_ERROR	4049	X'00000FD1'
MQRCCF_MSG_EXIT_NAME_ERROR	4050	X'00000FD2'
MQRCCF_RCV_EXIT_NAME_ERROR	4051	X'00000FD3'
MQRCCF_XMIT_Q_NAME_WRONG_TYPE	4052	X'00000FD4'
MQRCCF_MCA_NAME_WRONG_TYPE	4053	X'00000FD5'

Table 307. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRCCF_DISC_INT_WRONG_TYPE	4054	X'00000FD6'
MQRCCF_SHORT_RETRY_WRONG_TYPE	4055	X'00000FD7'
MQRCCF_SHORT_TIMER_WRONG_TYPE	4056	X'00000FD8'
MQRCCF_LONG_RETRY_WRONG_TYPE	4057	X'00000FD9'
MQRCCF_LONG_TIMER_WRONG_TYPE	4058	X'00000FDA'
MQRCCF_PUT_AUTH_WRONG_TYPE	4059	X'00000FDB'
MQRCCF_KEEP_ALIVE_INT_ERROR	4060	X'00000FDC'
MQRCCF_MISSING_CONN_NAME	4061	X'00000FDD'
MQRCCF_CONN_NAME_ERROR	4062	X'00000FDE'
MQRCCF_MQSET_FAILED	4063	X'00000FDF'
MQRCCF_CHANNEL_NOT_ACTIVE	4064	X'00000FE0'
MQRCCF_TERMINATED_BY_SEC_EXIT	4065	X'00000FE1'
MQRCCF_DYNAMIC_Q_SCOPE_ERROR	4067	X'00000FE3'
MQRCCF_CELL_DIR_NOT_AVAILABLE	4068	X'00000FE4'
MQRCCF_MR_COUNT_ERROR	4069	X'00000FE5'
MQRCCF_MR_COUNT_WRONG_TYPE	4070	X'00000FE6'
MQRCCF_MR_EXIT_NAME_ERROR	4071	X'00000FE7'
MQRCCF_MR_EXIT_NAME_WRONG_TYPE	4072	X'00000FE8'
MQRCCF_MR_INTERVAL_ERROR	4073	X'00000FE9'
MQRCCF_MR_INTERVAL_WRONG_TYPE	4074	X'00000FEA'
MQRCCF_NPM_SPEED_ERROR	4075	X'00000FEB'
MQRCCF_NPM_SPEED_WRONG_TYPE	4076	X'00000FEC'
MQRCCF_HB_INTERVAL_ERROR	4077	X'00000FED'
MQRCCF_HB_INTERVAL_WRONG_TYPE	4078	X'00000FEE'
MQRCCF_CHAD_ERROR	4079	X'00000FEF'
MQRCCF_CHAD_WRONG_TYPE	4080	X'00000FF0'
MQRCCF_CHAD_EVENT_ERROR	4081	X'00000FF1'
MQRCCF_CHAD_EVENT_WRONG_TYPE	4082	X'00000FF2'
MQRCCF_CHAD_EXIT_ERROR	4083	X'00000FF3'
MQRCCF_CHAD_EXIT_WRONG_TYPE	4084	X'00000FF4'
MQRCCF_SUPPRESSED_BY_EXIT	4085	X'00000FF5'
MQRCCF_BATCH_INT_ERROR	4086	X'00000FF6'
MQRCCF_BATCH_INT_WRONG_TYPE	4087	X'00000FF7'
MQRCCF_NET_PRIORITY_ERROR	4088	X'00000FF8'
MQRCCF_NET_PRIORITY_WRONG_TYPE	4089	X'00000FF9'
MQRCCF_CHANNEL_CLOSED	4090	X'00000FFA'
MQRCCF_Q_STATUS_NOT_FOUND	4091	X'00000FFB'
MQRCCF_SSL_CIPHER_SPEC_ERROR	4092	X'00000FFC'
MQRCCF_SSL_PEER_NAME_ERROR	4093	X'00000FFD'

Name	Decimal value	Hexadecimal value
MQRCCF_SSL_CLIENT_AUTH_ERROR	4094	X'00000FFE'
MQRCCF_RETAINED_NOT_SUPPORTED	4095	X'00000FFF'
z/OS V 9.1.3 MQRCCF_KWD_VALUE_WRONG_TYPE	4096	X'00001000'

Table 307. Values of constants (continued)

MQRCN_* (Client reconnect Constants)

Table 308. Values of constants

Name	Decimal value	Hexadecimal value
MQRCN_NO	0	X'00000000'
MQRCN_YES	1	X'00000001'
MQRCN_Q_MGR	2	X'00000002'
MQRCN_DISABLED	3	X'00000003'

MQRCVTIME_* (Receive Timeout Types)

Table 309. Values of constants

Name	Decimal value	Hexadecimal value
MQRCVTIME_MULTIPLY	0	X'00000000'
MQRCVTIME_ADD	1	X'00000001'
MQRCVTIME_EQUAL	2	X'00000002'

MQREADA_* (Read Ahead Values)

Table 310. Values of constants

Name	Decimal value	Hexadecimal value
MQREADA_NO	0	X'00000000'
MQREADA_YES	1	X'00000001'
MQREADA_DISABLED	2	X'00000002'
MQREADA_INHIBITED	3	X'00000003'
MQREADA_BACKLOG	4	X'00000004'

MQRECORDING_* (Recording Options)

Table 311. Values of constants

Name	Decimal value	Hexadecimal value
MQRECORDING_DISABLED	0	X'00000000'
MQRECORDING_Q	1	X'00000001'
MQRECORDING_MSG	2	X'00000002'

MQREGO_* (Publish/Subscribe Registration Options)

Table 312. Values of constants

Name	Decimal value	Hexadecimal value
MQREGO_NONE	0	X'00000000'

Table 312. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQREGO_CORREL_ID_AS_IDENTITY	1	X'00000001'
MQREGO_ANONYMOUS	2	X'00000002'
MQREGO_LOCAL	4	X'00000004'
MQREGO_DIRECT_REQUESTS	8	X'00000008'
MQREGO_NEW_PUBLICATIONS_ONLY	16	X'00000010'
MQREGO_PUBLISH_ON_REQUEST_ONLY	32	X'00000020'
MQREGO_DEREGISTER_ALL	64	X'00000040'
MQREGO_INCLUDE_STREAM_NAME	128	X'00000080'
MQREGO_INFORM_IF_RETAINED	256	X'00000100'
MQREGO_DUPLICATES_OK	512	X'00000200'
MQREGO_NON_PERSISTENT	1024	X'00000400'
MQREGO_PERSISTENT	2048	X'00000800'
MQREGO_PERSISTENT_AS_PUBLISH	4096	X'00001000'
MQREGO_PERSISTENT_AS_Q	8192	X'00002000'
MQREGO_ADD_NAME	16384	X'00004000'
MQREGO_NO_ALTERATION	32768	X'00008000'
MQREGO_FULL_RESPONSE	65536	X'00010000'
MQREGO_JOIN_SHARED	131072	X'00020000'
MQREGO_JOIN_EXCLUSIVE	262144	X'00040000'
MQREGO_LEAVE_ONLY	524288	X'00080000'
MQREGO_VARIABLE_USER_ID	1048576	X'00100000'
MQREGO_LOCKED	2097152	X'00200000'

MQRFH_* (Rules and formatting header structure and Flags)

Rules and formatting header structure

Table 313. Structures of constants	
Name	**Structure**
MQRFH_STRUC_ID	"RFH¬"
MQRFH_STRUC_ID_ARRAY	'R','F','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 314. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRFH_VERSION_1	1	X'00000001'
MQRFH_VERSION_2	2	X'00000002'
MQRFH_STRUC_LENGTH_FIXED	32	X'00000020'
MQRFH_STRUC_LENGTH_FIXED_2	36	X'00000024'

Rules and formatting header Flags

Table 315. Values of constants		
Name	Decimal value	Hexadecimal value
MQRFH_NONE	0	X'00000000'
MQRFH_NO_FLAGS	0	X'00000000'

MQRFH2_* (Publish/Subscribe Options Tag RFH2 Top-level folder Tags)

Table 316. Values of constants		
Name	Decimal value	Hexadecimal value
MQRFH2_NAME_VALUE_VERSION	1	X'00000001'

MQRFH2_* (Publish/Subscribe Options Tag Tag names)

MQRFH2_PUBSUB_CMD_FOLDER	"psc"
MQRFH2_PUBSUB_RESP_FOLDER	"pscr"
MQRFH2_MSG_CONTENT_FOLDER	"mcd"
MQRFH2_USER_FOLDER	"usr"

MQRFH2_* (Publish/Subscribe Options Tag XML tag names)

MQRFH2_PUBSUB_CMD_FOLDER_B	"<psc>"
MQRFH2_PUBSUB_CMD_FOLDER_E	"</psc>"
MQRFH2_PUBSUB_RESP_FOLDER_B	"<pscr>"
MQRFH2_PUBSUB_RESP_FOLDER_E	"</pscr>"
MQRFH2_MSG_CONTENT_FOLDER_B	"<mcd>"
MQRFH2_MSG_CONTENT_FOLDER_E	"</mcd>"
MQRFH2_USER_FOLDER_B	"<usr>"
MQRFH2_USER_FOLDER_E	"</usr>"

MQRL_* (Returned Length)

Table 317. Values of constants		
Name	Decimal value	Hexadecimal value
MQRL_UNDEFINED	-1	X'FFFFFFFF'

MQRMH_* (Reference message header structure)

Table 318. Structures of constants	
Name	Structure
MQRMH_STRUC_ID	"RMH¬"
MQRMH_STRUC_ID_ARRAY	'R','M','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 319. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRMH_VERSION_1	1	X'00000001'
MQRMH_CURRENT_VERSION	1	X'00000001'

MQRMHF_* (Reference message header Flags)

Table 320. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRMHF_LAST	1	X'00000001'
MQRMHF_NOT_LAST	0	X'00000000'

MQRO_* (Report Options)

Table 321. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRO_EXCEPTION	16777216	X'01000000'
MQRO_EXCEPTION_WITH_DATA	50331648	X'03000000'
MQRO_EXCEPTION_WITH_FULL_DATA	117440512	X'07000000'
MQRO_EXPIRATION	2097152	X'00200000'
MQRO_EXPIRATION_WITH_DATA	6291456	X'00600000'
MQRO_EXPIRATION_WITH_FULL_DATA	14680064	X'00E00000'
MQRO_COA	256	X'00000100'
MQRO_COA_WITH_DATA	768	X'00000300'
MQRO_COA_WITH_FULL_DATA	1792	X'00000700'
MQRO_COD	2048	X'00000800'
MQRO_COD_WITH_DATA	6144	X'00001800'
MQRO_COD_WITH_FULL_DATA	14336	X'00003800'
MQRO_PAN	1	X'00000001'
MQRO_NAN	2	X'00000002'
MQRO_ACTIVITY	4	X'00000004'
MQRO_NEW_MSG_ID	0	X'00000000'
MQRO_PASS_MSG_ID	128	X'00000080'
MQRO_COPY_MSG_ID_TO_CORREL_ID	0	X'00000000'
MQRO_PASS_CORREL_ID	64	X'00000040'
MQRO_DEAD_LETTER_Q	0	X'00000000'
MQRO_DISCARD_MSG	134217728	X'08000000'
MQRO_PASS_DISCARD_AND_EXPIRY	16384	X'00004000'
MQRO_NONE	0	X'00000000'

MQRO_* (Report Options Masks)

Table 322. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRO_REJECT_UNSUP_MASK	270270464	X'101C0000'

Table 322. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQRO_ACCEPT_UNSUP_MASK	-270532353	X'EFE000FF'
MQRO_ACCEPT_UNSUP_IF_XMIT_MASK	261888	X'0003FF00'

MQROUTE_* (Trace-route)

Trace-route Max Activities (MQIACF_MAX_ACTIVITIES)

Table 323. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQROUTE_UNLIMITED_ACTIVITIES	0	X'00000000'

Trace-route Detail (MQIACF_ROUTE_DETAIL)

Table 324. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQROUTE_DETAIL_LOW	2	X'00000002'
MQROUTE_DETAIL_MEDIUM	8	X'00000008'
MQROUTE_DETAIL_HIGH	32	X'00000020'

Trace-route Forwarding (MQIACF_ROUTE_FORWARDING)

Table 325. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQROUTE_FORWARD_ALL	256	X'00000100'
MQROUTE_FORWARD_IF_SUPPORTED	512	X'00000200'
MQROUTE_FORWARD_REJ_UNSUP_MASK	-65536	X'FFFF0000'

Trace-route Delivery (MQIACF_ROUTE_DELIVERY)

Table 326. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQROUTE_DELIVER_YES	4096	X'00001000'
MQROUTE_DELIVER_NO	8192	X'00002000'
MQROUTE_DELIVER_REJ_UNSUP_MASK	-65536	X'FFFF0000'

Trace-route Accumulation (MQIACF_ROUTE_ACCUMULATION)

Table 327. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQROUTE_ACCUMULATE_NONE	65539	X'00010003'
MQROUTE_ACCUMULATE_IN_MSG	65540	X'00010004'
MQROUTE_ACCUMULATE_AND_REPLY	65541	X'00010005'

MQRP_* (Command format Replace Options)

Table 328. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRP_YES	1	X'00000001'
MQRP_NO	0	X'00000000'

MQRQ_* (Command format Reason Qualifiers)

Table 329. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRQ_CONN_NOT_AUTHORIZED	1	X'00000001'
MQRQ_OPEN_NOT_AUTHORIZED	2	X'00000002'
MQRQ_CLOSE_NOT_AUTHORIZED	3	X'00000003'
MQRQ_CMD_NOT_AUTHORIZED	4	X'00000004'
MQRQ_Q_MGR_STOPPING	5	X'00000005'
MQRQ_Q_MGR_QUIESCING	6	X'00000006'
MQRQ_CHANNEL_STOPPED_OK	7	X'00000007'
MQRQ_CHANNEL_STOPPED_ERROR	8	X'00000008'
MQRQ_CHANNEL_STOPPED_RETRY	9	X'00000009'
MQRQ_CHANNEL_STOPPED_DISABLED	10	X'0000000A'
MQRQ_BRIDGE_STOPPED_OK	11	X'0000000B'
MQRQ_BRIDGE_STOPPED_ERROR	12	X'0000000C'
MQRQ_SSL_HANDSHAKE_ERROR	13	X'0000000D'
MQRQ_SSL_CIPHER_SPEC_ERROR	14	X'0000000E'
MQRQ_SSL_CLIENT_AUTH_ERROR	15	X'0000000F'
MQRQ_SSL_PEER_NAME_ERROR	16	X'00000010'
MQRQ_SUB_NOT_AUTHORIZED	17	X'00000011'
MQRQ_SUB_DEST_NOT_AUTHORIZED	18	X'00000012'
MQRQ_SSL_UNKNOWN_REVOCATION	19	X'00000013'
MQRQ_SYS_CONN_NOT_AUTHORIZED	20	X'00000014'
MQRQ_CHANNEL_BLOCKED_ADDRESS	21	X'00000015'
MQRQ_CHANNEL_BLOCKED_USERID	22	X'00000016'
MQRQ_CHANNEL_BLOCKED_NOACCESS	23	X'00000017'
MQRQ_MAX_ACTIVE_CHANNELS	24	X'00000018'
MQRQ_MAX_CHANNELS	25	X'00000019'
MQRQ_SVRCONN_INST_LIMIT	26	X'0000001A'
MQRQ_CLIENT_INST_LIMIT!	27	X'0000001B'
MQRQ_CAF_NOT_INSTALLED	28	X'0000001C'

MQRT_* (Command format Refresh Types)

Table 330. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRT_CONFIGURATION	1	X'00000001'
MQRT_EXPIRY	2	X'00000002'
MQRT_NSPROC	3	X'00000003'
MQRT_PROXYSUB	4	X'00000004'

MQRU_* (Request Only)

Table 331. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQRU_PUBLISH_ON_REQUEST	1	X'00000001'
MQRU_PUBLISH_ALL	2	X'00000002'

MQSCA_* (TLS Client Authentication)

Table 332. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSCA_REQUIRED	0	X'00000000'
MQSCA_OPTIONAL	1	X'00000001'

MQSCO_* (TLS configuration options)

TLS configuration options structure

Table 333. Structures of constants	
Name	**Structure**
MQSCO_STRUC_ID	"SCO¬"
MQSCO_STRUC_ID_ARRAY	'S','C','O','¬'

Note: The symbol ¬ represents a single blank character.

Table 334. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSCO_VERSION_1	1	X'00000001'
MQSCO_VERSION_2	2	X'00000002'
MQSCO_VERSION_3	3	X'00000003'
MQSCO_VERSION_4	4	X'00000004'
MQSCO_CURRENT_VERSION	4	X'00000004'

Note: The symbol ¬ represents a single blank character.

TLS configuration options Key Reset Count

Table 335. Values of constants

Name	Decimal value	Hexadecimal value
MQSCO_RESET_COUNT_DEFAULT	0	X'00000000'

Command format Queue Definition Scope

Table 336. Values of constants

Name	Decimal value	Hexadecimal value
MQSCO_Q_MGR	1	X'00000001'
MQSCO_CELL	2	X'00000002'

MQSCOPE_* (Publish scope)

Table 337. Values of constants

Name	Decimal value	Hexadecimal value
MQSCOPE_ALL	0	X'00000000'
MQSCOPE_AS_PARENT	1	X'00000001'
MQSCOPE_QMGR	4	X'00000004'

MQSCYC_* (Security Case)

Table 338. Values of constants

Name	Decimal value	Hexadecimal value
MQSCYC_UPPER	0	X'00000000'
MQSCYC_MIXED	1	X'00000001'

MQSD_* (Object descriptor structure)

Table 339. Constant names and structures

Name	Structure
MQSD_STRUC_ID	"SD¬¬"
MQSD_STRUC_ID_ARRAY	'S','D','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 340. Values of constants

Name	Decimal value	Hexadecimal value
MQSD_VERSION_1	1	X'00000001'
MQSD_CURRENT_VERSION	1	X'00000001'

MQSECITEM_* (Command format Security Items)

Table 341. Values of constants

Name	Decimal value	Hexadecimal value
MQSECITEM_ALL	0	X'00000000'
MQSECITEM_MQADMIN	1	X'00000001'
MQSECITEM_MQNLIST	2	X'00000002'

Table 341. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQSECITEM_MQPROC	3	X'00000003'
MQSECITEM_MQQUEUE	4	X'00000004'
MQSECITEM_MQCONN	5	X'00000005'
MQSECITEM_MQCMDS	6	X'00000006'
MQSECITEM_MXADMIN	7	X'00000007'
MQSECITEM_MXNLIST	8	X'00000008'
MQSECITEM_MXPROC	9	X'00000009'
MQSECITEM_MXQUEUE	10	X'0000000A'
MQSECITEM_MXTOPIC	11	X'0000000B'

MQSECPROT_* (Security Protocol Types)

Table 342. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSECPROT_NONE	0	X'00000000'
MQSECPROT_SSLV30	1	X'00000001'
MQSECPROT_TLSV10	2	X'00000002'
MQSECPROT_TLSV12	4	X'00000004'

MQSECSW_* (Command format Security Switches and Switch States)

Command format Security Switches

Table 343. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSECSW_PROCESS	1	X'00000001'
MQSECSW_NAMELIST	2	X'00000002'
MQSECSW_Q	3	X'00000003'
MQSECSW_TOPIC	4	X'00000004'
MQSECSW_CONTEXT	6	X'00000006'
MQSECSW_ALTERNATE_USER	7	X'00000007'
MQSECSW_COMMAND	8	X'00000008'
MQSECSW_CONNECTION	9	X'00000009'
MQSECSW_SUBSYSTEM	10	X'0000000A'
MQSECSW_COMMAND_RESOURCES	11	X'0000000B'
MQSECSW_Q_MGR	15	X'0000000F'
MQSECSW_QSG	16	X'00000010'

Command format Security Switch States

Table 344. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSECSW_OFF_FOUND	21	X'00000015'

Table 344. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQSECSW_ON_FOUND	22	X'00000016'
MQSECSW_OFF_NOT_FOUND	23	X'00000017'
MQSECSW_ON_NOT_FOUND	24	X'00000018'
MQSECSW_OFF_ERROR	25	X'00000019'
MQSECSW_ON_OVERRIDDEN	26	X'0000001A'

MQSECTYPE_* (Command format Security Types)

Table 345. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSECTYPE_AUTHSERV	1	X'00000001'
MQSECTYPE_SSL	2	X'00000002'
MQSECTYPE_CLASSES	3	X'00000003'

MQSEG_* (Segmentation)

Table 346. Constant names and values	
Name	**Value**
MQSEG_INHIBITED	'¬'
MQSEG_ALLOWED	'A'

Note: The symbol ¬ represents a single blank character.

MQSEL_* (Special Selector Values)

Table 347. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSEL_ANY_SELECTOR	-30001	X'FFFF8ACF'
MQSEL_ANY_USER_SELECTOR	-30002	X'FFFF8ACE'
MQSEL_ANY_SYSTEM_SELECTOR	-30003	X'FFFF8ACD'
MQSEL_ALL_SELECTORS	-30001	X'FFFF8ACF'
MQSEL_ALL_USER_SELECTORS	-30002	X'FFFF8ACE'
MQSEL_ALL_SYSTEM_SELECTORS	-30003	X'FFFF8ACD'

MQSELTYPE_* (Selector Types)

Table 348. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSELTYPE_NONE	0	X'00000000'
MQSELTYPE_STANDARD	1	X'00000001'
MQSELTYPE_EXTENDED	2	X'00000002'

MQSID_* (Security Identifier)

Table 349. Constant names and values	
Name	**Value**
MQSID_NONE	X'00...00' (40 nulls)
MQSID_NONE_ARRAY	'\0','\0',... (40 nulls)

MQSIDT_* (Security Identifier Types)

Table 350. Constant names and values	
Name	**Hexadecimal value**
MQSIDT_NONE	X'00'
MQSIDT_NT_SECURITY_ID	X'01'
MQSIDT_WAS_SECURITY_ID	X'02'

MQSMPO_* (Set message property options and structure)

Set message property options structure

Table 351. Structures of constants	
Name	**Structure**
MQSMPO_STRUC_ID	"SMPO"
MQSMPO_STRUC_ID_ARRAY	'S','M','P','O'

Note: The symbol ¬ represents a single blank character.

Table 352. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSMPO_VERSION_1	1	X'00000001'
MQSMPO_CURRENT_VERSION	1	X'00000001'

Set Message Property Options

Table 353. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSMPO_SET_FIRST	0	X'00000000'
MQSMPO_SET_PROP_UNDER_CURSOR	1	X'00000001'
MQSMPO_SET_PROP_AFTER_CURSOR	2	X'00000002'
MQSMPO_APPEND_PROPERTY	4	X'00000004'
MQSMPO_SET_PROP_BEFORE_CURSOR	8	X'00000008'
MQSMPO_NONE	0	X'00000000'

MQSO_* (Subscribe Options)

Table 354. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSO_NONE	0	X'00000000'
MQSO_NON_DURABLE	0	X'00000000'

Table 354. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQSO_READ_AHEAD_AS_Q_DEF	0	X'00000000'
MQSO_ALTER	1	X'00000001'
MQSO_CREATE	2	X'00000002'
MQSO_RESUME	4	X'00000004'
MQSO_DURABLE	8	X'00000008'
MQSO_GROUP_SUB	16	X'00000010'
MQSO_MANAGED	32	X'00000020'
MQSO_SET_IDENTITY_CONTEXT	64	X'00000040'
MQSO_FIXED_USERID	256	X'00000100'
MQSO_ANY_USERID	512	X'00000200'
MQSO_PUBLICATIONS_ON_REQUEST	2048	X'00000800'
MQSO_NEW_PUBLICATIONS_ONLY	4096	X'00001000'
MQSO_FAIL_IF_QUIESCING	8192	X'00002000'
MQSO_ALTERNATE_USER_AUTHORITY	262144	X'00040000'
MQSO_WILDCARD_CHAR	1048576	X'00100000'
MQSO_WILDCARD_TOPIC	2097152	X'00200000'
MQSO_SET_CORREL_ID	4194304	X'00400000'
MQSO_SCOPE_QMGR	67108864	X'04000000'
MQSO_NO_READ_AHEAD	134217728	X'08000000'
MQSO_READ_AHEAD	268435456	X'10000000'

MQSP_* (Sync point Availability)

Table 355. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSP_AVAILABLE	1	X'00000001'
MQSP_NOT_AVAILABLE	0	X'00000000'

V 9.1.3 MQSPL_* (Security Policy Protection Options)

Table 356. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSPL_PASSTHRU	0	X'00000000'
MQSPL_REMOVE	1	X'00000001'
MQSPL_AS_POLICY	2	X'00000002'

MQSQQM_* (Shared Queue Queue Manager Name)

Table 357. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSQQM_USE	0	X'00000000'
MQSQQM_IGNORE	1	X'00000001'

MQSR_* (Action)

Table 358. Values of constants

Name	Decimal value	Hexadecimal value
MQSR_ACTION_PUBLICATION	1	X'00000001'

MQSRO_* (Subscription request options structure)

Table 359. Structures of constants

Name	Structure
MQSRO_STRUC_ID	"SRO¬"
MQSRO_STRUC_ID_ARRAY	'S','R','O','¬'

Note: The symbol ¬ represents a single blank character.

Table 360. Values of constants

Name	Decimal value	Hexadecimal value
MQSRO_VERSION_1	1	X'00000001'
MQSRO_CURRENT_VERSION	1	X'00000001'
MQSRO_NONE	0	X'00000000'
MQSRO_FAIL_IF_QUIESCING	8192	X'00002000'

MQSS_* (Segment Status)

Table 361. Constant names and structures

Name	Structure
MQSS_NOT_A_SEGMENT	'¬'
MQSS_SEGMENT	'S'
MQSS_LAST_SEGMENT	'L'

Note: The symbol ¬ represents a single blank character.

MQSSL_* (TLS FIPS Requirements)

Note: On UNIX, Linux, and Windows, IBM MQ provides FIPS 140-2 compliance through the "IBM Crypto for C" cryptographic module. The certificate for this module has been moved to the Historical status. Customers should view the IBM Crypto for C certificate and be aware of any advice provided by NIST. A replacement FIPS 140-3 module is currently in progress and its status can be viewed by searching for it in the NIST CMVP modules in process list.

Table 362. Values of constants

Name	Decimal value	Hexadecimal value
MQSSL_FIPS_NO	0	X'00000000'
MQSSL_FIPS_YES	1	X'00000001'

MQSTAT_* (Stat Options)

Table 363. Values of constants

Name	Decimal value	Hexadecimal value
MQSTAT_TYPE_ASYNC_ERROR	0	X'00000000'

Table 363. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQSTAT_TYPE_RECONNECTION	0	X'00000000'
MQSTAT_TYPE_RECONNECTION_ERROR	0	X'00000000'

MQSTS_* (Status reporting structure structure)

Table 364. Structures of constants	
Name	**Structure**
MQSTS_STRUC_ID	"STAT"
MQSTS_STRUC_ID_ARRAY	'S','T','A','T'

Note: The symbol ¬ represents a single blank character.

Table 365. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSTS_VERSION_1	1	X'00000001'
MQSTS_CURRENT_VERSION	1	X'00000001'

MQSUB_* (Durable subscriptions)

Durable subscriptions

Table 366. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSUB_DURABLE_AS_PARENT	0	X'00000000'
MQSUB_DURABLE_ALLOWED	1	X'00000001'
MQSUB_DURABLE_INHIBITED	2	X'00000002'

Durable Subscriptions

Table 367. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSUB_DURABLE_ALL	-1	X'FFFFFFFF'
MQSUB_DURABLE_YES	1	X'00000001'
MQSUB_DURABLE_NO	2	X'00000002'

MQSUBTYPE_* (Command format Subscription Types)

Table 368. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSUBTYPE_API	1	X'00000001'
MQSUBTYPE_ADMIN	2	X'00000002'
MQSUBTYPE_PROXY	3	X'00000003'
MQSUBTYPE_ALL	-1	X'FFFFFFFF'
MQSUBTYPE_USER	-2	X'FFFFFFFE'

MQSUS_* (Command format Suspend Status)

Table 369. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSUS_YES	1	X'00000001'
MQSUS_NO	0	X'00000000'

MQSVC_* (Service)

Service Types

Table 370. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSVC_TYPE_COMMAND	0	X'00000000'
MQSVC_TYPE_SERVER	1	X'00000001'

Service Controls

Table 371. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSVC_CONTROL_Q_MGR	0	X'00000000'
MQSVC_CONTROL_Q_MGR_START	1	X'00000001'
MQSVC_CONTROL_MANUAL	2	X'00000002'

Service Status

Table 372. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSVC_STATUS_STOPPED	0	X'00000000'
MQSVC_STATUS_STARTING	1	X'00000001'
MQSVC_STATUS_RUNNING	2	X'00000002'
MQSVC_STATUS_STOPPING	3	X'00000003'
MQSVC_STATUS_RETRYING	4	X'00000004'

MQSYNCPOINT_* (Command format Syncpoint values for Pub/Sub migration)

Table 373. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSYNCPOINT_YES	0	X'00000000'
MQSYNCPOINT_IFPER	1	X'00000001'

MQSYSP_* (Command format System Parameter Values)

Table 374. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQSYSP_NO	0	X'00000000'
MQSYSP_YES	1	X'00000001'

Name	Decimal value	Hexadecimal value
MQSYSP_EXTENDED	2	X'00000002'
MQSYSP_TYPE_INITIAL	10	X'0000000A'
MQSYSP_TYPE_SET	11	X'0000000B'
MQSYSP_TYPE_LOG_COPY	12	X'0000000C'
MQSYSP_TYPE_LOG_STATUS	13	X'0000000D'
MQSYSP_TYPE_ARCHIVE_TAPE	14	X'0000000E'
MQSYSP_ALLOC_BLK	20	X'00000014'
MQSYSP_ALLOC_TRK	21	X'00000015'
MQSYSP_ALLOC_CYL	22	X'00000016'
MQSYSP_STATUS_BUSY	30	X'0000001E'
MQSYSP_STATUS_PREMOUNT	31	X'0000001F'
MQSYSP_STATUS_AVAILABLE	32	X'00000020'
MQSYSP_STATUS_UNKNOWN	33	X'00000021'
MQSYSP_STATUS_ALLOC_ARCHIVE	34	X'00000022'
MQSYSP_STATUS_COPYING_BSDS	35	X'00000023'
MQSYSP_STATUS_COPYING_LOG	36	X'00000024'

Table 374. Values of constants (continued)

MQTA_* (Topic attributes)

Wildcards

Table 375. Values of constants

Name	Decimal value	Hexadecimal value
MQTA_BLOCK	1	X'00000001'
MQTA_PASSTHRU	2	X'00000002'

Subscriptions Allowed

Table 376. Values of constants

Name	Decimal value	Hexadecimal value
MQTA_SUB_AS_PARENT	0	X'00000000'
MQTA_SUB_INHIBITED	1	X'00000001'
MQTA_SUB_ALLOWED	2	X'00000002'

Proxy Sub Propagation

Table 377. Values of constants

Name	Decimal value	Hexadecimal value
MQTA_PROXY_SUB_FORCE	1	X'00000001'
MQTA_PROXY_SUB_FIRSTUSE	2	X'00000002'

Publications Allowed

Table 378. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTA_PUB_AS_PARENT	0	X'00000000'
MQTA_PUB_INHIBITED	1	X'00000001'
MQTA_PUB_ALLOWED	2	X'00000002'

MQTC_* (Trigger Controls)

Table 379. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTC_OFF	0	X'00000000'
MQTC_ON	1	X'00000001'

MQTCPKEEP_* (TCP Keepalive)

Table 380. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTCPKEEP_NO	0	X'00000000'
MQTCPKEEP_YES	1	X'00000001'

MQTCPSTACK_* (TCP Stack Types)

Table 381. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTCPSTACK_SINGLE	0	X'00000000'
MQTCPSTACK_MULTIPLE	1	X'00000001'

MQTIME_* (Command format Time units)

Table 382. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTIME_UNIT_MINS	0	X'00000000'
MQTIME_UNIT_SECS	1	X'00000001'

MQTM_* (Trigger message structure)

Table 383. Structures of constants	
Name	**Structure**
MQTM_STRUC_ID	"TM¬¬"
MQTM_STRUC_ID_ARRAY	'T','M','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 384. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTM_VERSION_1	1	X'00000001'
MQTM_CURRENT_VERSION	1	X'00000001'

MQTMC_* (Trigger message character format structure)

Table 385. Structures of constants	
Name	**Structure**
MQTMC_STRUC_ID	"TMC¬"
MQTMC_STRUC_ID_ARRAY	'T','M','C','¬'
MQTMC_VERSION_1	"¬¬¬1"
MQTMC_VERSION_2	"¬¬¬2"
MQTMC_CURRENT_VERSION	"¬¬¬2"
MQTMC_VERSION_1_ARRAY	'¬','¬','¬','1'
MQTMC_VERSION_2_ARRAY	'¬','¬','¬','2'
MQTMC_CURRENT_VERSION_ARRAY	'¬','¬','¬','2'

MQTOPT_* (Topic Type)

Table 386. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTOPT_LOCAL	0	X'00000000'
MQTOPT_CLUSTER	1	X'00000001'
MQTOPT_ALL	2	X'00000002'

MQTRAXSTR_* (Channel Initiator Trace Autostart)

Table 387. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTRAXSTR_NO	0	X'00000000'
MQTRAXSTR_YES	1	X'00000001'

MQTSCOPE_* (Subscription Scope)

Table 388. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTSCOPE_QMGR	1	X'00000001'
MQTSCOPE_ALL	2	X'00000002'

MQTT_* (Trigger Types)

Table 389. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQTT_NONE	0	X'00000000'
MQTT_FIRST	1	X'00000001'
MQTT_EVERY	2	X'00000002'
MQTT_DEPTH	3	X'00000003'

MQTYPE_* (Property data types)

Table 390. Values of constants

Name	Decimal value	Hexadecimal value
MQTYPE_AS_SET	0	X'00000000'
MQTYPE_NULL	2	X'00000002'
MQTYPE_BOOLEAN	4	X'00000004'
MQTYPE_BYTE_STRING	8	X'00000008'
MQTYPE_INT8	16	X'00000010'
MQTYPE_INT16	32	X'00000020'
MQTYPE_INT32	64	X'00000040'
MQTYPE_LONG	64	X'00000040'
MQTYPE_INT64	128	X'00000080'
MQTYPE_FLOAT32	256	X'00000100'
MQTYPE_FLOAT64	512	X'00000200'
MQTYPE_STRING	1024	X'00000400'

MQUA_* (Publish/Subscribe User Attribute Selectors)

Table 391. Values of constants

Name	Decimal value	Hexadecimal value
MQUA_FIRST	65536	X'00010000'
MQUA_LAST	999999999	X'3B9AC9FF'

MQUIDSUPP_* (Command format User ID Support)

Table 392. Values of constants

Name	Decimal value	Hexadecimal value
MQUIDSUPP_NO	0	X'00000000'
MQUIDSUPP_YES	1	X'00000001'

MQUNDELIVERED_* (Command format Undelivered values for Pub/Sub migration)

Table 393. Values of constants

Name	Decimal value	Hexadecimal value
MQUNDELIVERED_NORMAL	0	X'00000000'
MQUNDELIVERED_SAFE	1	X'00000001'
MQUNDELIVERED_DISCARD	2	X'00000002'
MQUNDELIVERED_KEEP	3	X'00000003'

MQUOWST_* (Command format UOW States)

Table 394. Values of constants

Name	Decimal value	Hexadecimal value
MQUOWST_NONE	0	X'00000000'

Table 394. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQUOWST_ACTIVE	1	X'00000001'
MQUOWST_PREPARED	2	X'00000002'
MQUOWST_UNRESOLVED	3	X'00000003'

MQUOWT_* (Command format UOW Types)

Table 395. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQUOWT_Q_MGR	0	X'00000000'
MQUOWT_CICS	1	X'00000001'
MQUOWT_RRS	2	X'00000002'
MQUOWT_IMS	3	X'00000003'
MQUOWT_XA	4	X'00000004'

MQUS_* (Queue Usages)

Table 396. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQUS_NORMAL	0	X'00000000'
MQUS_TRANSMISSION	1	X'00000001'

MQUSAGE_* (Command format Page Set Usage Values and Data Set Usage Values)

Command format Page Set Usage Values

Table 397. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQUSAGE_PS_AVAILABLE	0	X'00000000'
MQUSAGE_PS_DEFINED	1	X'00000001'
MQUSAGE_PS_OFFLINE	2	X'00000002'
MQUSAGE_PS_NOT_DEFINED	3	X'00000003'
MQUSAGE_PS_SUSPENDED	4	X'00000004'
MQUSAGE_EXPAND_USER	1	X'00000001'
MQUSAGE_EXPAND_SYSTEM	2	X'00000002'
MQUSAGE_EXPAND_NONE	3	X'00000003'

Command format Data Set Usage Values

Table 398. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQUSAGE_DS_OLDEST_ACTIVE_UOW	10	X'0000000A'
MQUSAGE_DS_OLDEST_PS_RECOVERY	11	X'0000000B'
MQUSAGE_DS_OLDEST_CF_RECOVERY	12	X'0000000C'

MQVL_* (Value Length)

Table 399. Values of constants

Name	Decimal value	Hexadecimal value
MQVL_NULL_TERMINATED	-1	X'FFFFFFFF'
MQVL_EMPTY_STRING	0	X'00000000'

MQVU_* (Variable User ID)

Table 400. Values of constants

Name	Decimal value	Hexadecimal value
MQVU_FIXED_USER	1	X'00000001'
MQVU_ANY_USER	2	X'00000002'

MQWDR_* (Cluster workload exit destination record structure)

Table 401. Structures of constants

Name	Structure
MQWDR_STRUC_ID	"WDR¬"
MQWDR_STRUC_ID_ARRAY	'W','D','R','¬'

Note: The symbol ¬ represents a single blank character.

Table 402. Values of constants

Name	Decimal value	Hexadecimal value
MQWDR_VERSION_1	1	X'00000001'
MQWDR_VERSION_2	2	X'00000002'
MQWDR_CURRENT_VERSION	2	X'00000002'
MQWDR_LENGTH_1	124	X'0000007C'
MQWDR_LENGTH_2	136	X'00000088'
MQWDR_CURRENT_LENGTH	136	X'00000088'

MQWI_* (Wait Interval)

Table 403. Values of constants

Name	Decimal value	Hexadecimal value
MQWI_UNLIMITED	-1	X'FFFFFFFF'

MQWIH_* (Workload information header structure and Flags)

Workload information header structure

Table 404. Structures of constants

Name	Structure
MQWIH_STRUC_ID	"WIH¬"
MQWIH_STRUC_ID_ARRAY	'W','I','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 405. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQWIH_VERSION_1	1	X'00000001'
MQWIH_CURRENT_VERSION	1	X'00000001'
MQWIH_LENGTH_1	120	X'00000078'
MQWIH_CURRENT_LENGTH	120	X'00000078'

Workload information header Flags

Table 406. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQWIH_NONE	0	X'00000000'

MQWQR_* (Cluster workload exit queue record structure)

Table 407. Structures of constants	
Name	**Structure**
MQWQR_STRUC_ID	"WQR¬"
MQWQR_STRUC_ID_ARRAY	'W','Q','R','¬'

Note: The symbol ¬ represents a single blank character.

Table 408. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQWQR_VERSION_1	1	X'00000001'
MQWQR_VERSION_2	2	X'00000002'
MQWQR_VERSION_3	3	X'00000003'
MQWQR_CURRENT_VERSION	3	X'00000003'
MQWQR_LENGTH_1	200	X'000000C8'
MQWQR_LENGTH_2	208	X'000000D0'
MQWQR_LENGTH_3	212	X'000000D4'
MQWQR_CURRENT_LENGTH	212	X'000000D4'

MQWS_* (Wildcard Schema)

Table 409. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQWS_DEFAULT	0	X'00000000'
MQWS_CHAR	1	X'00000001'
MQWS_TOPIC	2	X'00000002'

MQWXP_* (Cluster workload exit parameter structure)

MQWXP_* (Cluster workload exit parameter structure)

Table 410. Structures of constants

Name	Structure
MQWXP_STRUC_ID	"WXP¬"
MQWXP_STRUC_ID_ARRAY	'W','X','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 411. Values of constants

Name	Decimal value	Hexadecimal value
MQWXP_VERSION_1	1	X'00000001'
MQWXP_VERSION_2	2	X'00000002'
MQWXP_VERSION_3	3	X'00000003'
MQWXP_VERSION_4	4	X'00000004'
MQWXP_CURRENT_VERSION	4	X'00000004'

MQWXP_* (Cluster Workload Flags)

Table 412. Values of constants

Name	Decimal value	Hexadecimal value
MQWXP_PUT_BY_CLUSTER_CHL	2	X'00000002'

Related reference

“Fields in MQWXP - Cluster workload exit parameter structure” on page 1527
Description of the fields in the MQWXP - Cluster workload exit parameter structure

MQXACT_* (API Caller Types)

Table 413. Values of constants

Name	Decimal value	Hexadecimal value
MQXACT_EXTERNAL	1	X'00000001'
MQXACT_INTERNAL	2	X'00000002'

MQXC_* (Exit Commands)

Table 414. Values of constants

Name	Decimal value	Hexadecimal value
MQXC_MQOPEN	1	X'00000001'
MQXC_MQCLOSE	2	X'00000002'
MQXC_MQGET	3	X'00000003'
MQXC_MQPUT	4	X'00000004'
MQXC_MQPUT1	5	X'00000005'
MQXC_MQINQ	6	X'00000006'
MQXC_MQSET	8	X'00000008'
MQXC_MQBACK	9	X'00000009'

Table 414. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQXC_MQCMIT	10	X'0000000A'

MQXCC_* (Exit Responses)

Table 415. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXCC_OK	0	X'00000000'
MQXCC_SUPPRESS_FUNCTION	-1	X'FFFFFFFF'
MQXCC_SKIP_FUNCTION	-2	X'FFFFFFFE'
MQXCC_SEND_AND_REQUEST_SEC_MSG	-3	X'FFFFFFFD'
MQXCC_SEND_SEC_MSG	-4	X'FFFFFFFC'
MQXCC_SUPPRESS_EXIT	-5	X'FFFFFFFB'
MQXCC_CLOSE_CHANNEL	-6	X'FFFFFFFA'
MQXCC_REQUEST_ACK	-7	X'FFFFFFF9'
MQXCC_FAILED	-8	X'FFFFFFF8'

MQXDR_* (Exit Response)

Table 416. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXDR_OK	0	X'00000000'
MQXDR_CONVERSION_FAILED	1	X'00000001'

MQXE_* (Environments)

Table 417. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXE_OTHER	0	X'00000000'
MQXE_MCA	1	X'00000001'
MQXE_MCA_SVRCONN	2	X'00000002'
MQXE_COMMAND_SERVER	3	X'00000003'
MQXE_MQSC	4	X'00000004'

MQXEPO_* (Register Entry Point Options structure and Exit Options)

Register Entry Point Options structure

Table 418. Structures of constants	
Name	**Structure**
MQXEPO_STRUC_ID	"XEPO"
MQXEPO_STRUC_ID_ARRAY	'X','E','P','O'

Note: The symbol ¬ represents a single blank character.

Table 419. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXEPO_VERSION_1	1	X'00000001'
MQXEPO_CURRENT_VERSION	1	X'00000001'

Exit Options

Table 420. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXEPO_NONE	0	X'00000000'

MQXF_* (API Function Identifiers)

Table 421. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXF_INIT	1	X'00000001'
MQXF_TERM	2	X'00000002'
MQXF_CONN	3	X'00000003'
MQXF_CONNX	4	X'00000004'
MQXF_DISC	5	X'00000005'
MQXF_OPEN	6	X'00000006'
MQXF_CLOSE	7	X'00000007'
MQXF_PUT1	8	X'00000008'
MQXF_PUT	9	X'00000009'
MQXF_GET	10	X'0000000A'
MQXF_DATA_CONV_ON_GET	11	X'0000000B'
MQXF_INQ	12	X'0000000C'
MQXF_SET	13	X'0000000D'
MQXF_BEGIN	14	X'0000000E'
MQXF_CMIT	15	X'0000000F'
MQXF_BACK	16	X'00000010'
MQXF_STAT	18	X'00000012'
MQXF_CB	19	X'00000013'
MQXF_CTL	20	X'00000014'
MQXF_CALLBACK	21	X'00000015'
MQXF_SUB	22	X'00000016'
MQXF_SUBRQ	23	X'00000017'
MQXF_XACLOSE	24	X'00000018'
MQXF_XACOMMIT	25	X'00000019'
MQXF_XACOMPLETE	26	X'0000001A'
MQXF_XAEND	27	X'0000001B'
MQXF_XAFORGET	28	X'0000001C'
MQXF_XAOPEN	29	X'0000001D'

Table 421. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQXF_XAPREPARE	30	X'0000001E'
MQXF_XARECOVER	31	X'0000001F'
MQXF_XAROLLBACK	32	X'00000020'
MQXF_XASTART	33	X'00000021'
MQXF_AXREG	34	X'00000022'
MQXF_AXUNREG	35	X'00000023'

MQXP_* (API crossing exit parameter structure)

Table 422. Structures of constants	
Name	**Structure**
MQXP_STRUC_ID	"XP¬¬"
MQXP_STRUC_ID_ARRAY	'X','P','¬','¬'

Note: The symbol ¬ represents a single blank character.

Table 423. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXP_VERSION_1	1	X'00000001'

MQXPDA_* (Problem Determination Area)

Table 424. Constant names and values	
Name	**Value**
MQXPDA_NONE	X'00...00' (48 nulls)
MQXPDA_NONE_ARRAY	'\0','\0',... (48 nulls)

MQXPT_* (Transport Types)

Table 425. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXPT_ALL	-1	X'FFFFFFFF'
MQXPT_LOCAL	0	X'00000000'
MQXPT_LU62	1	X'00000001'
MQXPT_TCP	2	X'00000002'
MQXPT_NETBIOS	3	X'00000003'
MQXPT_SPX	4	X'00000004'
MQXPT_DECNET	5	X'00000005'
MQXPT_UDP	6	X'00000006'

MQXQH_* (Transmission queue header structure)

Table 426. Structures of constants	
Name	**Structure**
MQXQH_STRUC_ID	"XQH¬"

Table 426. Structures of constants (continued)	
Name	**Structure**
MQXQH_STRUC_ID_ARRAY	'X','Q','H','¬'

Note: The symbol ¬ represents a single blank character.

Table 427. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXQH_VERSION_1	1	X'00000001'
MQXQH_CURRENT_VERSION	1	X'00000001'

MQXR_* (Exit Reasons)

Table 428. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXR_BEFORE	1	X'00000001'
MQXR_AFTER	2	X'00000002'
MQXR_CONNECTION	3	X'00000003'
MQXR_INIT	11	X'0000000B'
MQXR_TERM	12	X'0000000C'
MQXR_MSG	13	X'0000000D'
MQXR_XMIT	14	X'0000000E'
MQXR_SEC_MSG	15	X'0000000F'
MQXR_INIT_SEC	16	X'00000010'
MQXR_RETRY	17	X'00000011'
MQXR_AUTO_CLUSSDR	18	X'00000012'
MQXR_AUTO_RECEIVER	19	X'00000013'
MQXR_CLWL_OPEN	20	X'00000014'
MQXR_CLWL_PUT	21	X'00000015'
MQXR_CLWL_MOVE	22	X'00000016'
MQXR_CLWL_REPOS	23	X'00000017'
MQXR_CLWL_REPOS_MOVE	24	X'00000018'
MQXR_END_BATCH	25	X'00000019'
MQXR_ACK_RECEIVED	26	X'0000001A'
MQXR_AUTO_SVRCONN	27	X'0000001B'
MQXR_AUTO_CLUSRCVR	28	X'0000001C'
MQXR_SEC_PARMS	29	X'0000001D'

MQXR2_* (Exit Response 2)

Table 429. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXR2_PUT_WITH_DEF_ACTION	0	X'00000000'
MQXR2_PUT_WITH_DEF_USERID	1	X'00000001'
MQXR2_PUT_WITH_MSG_USERID	2	X'00000002'

Table 429. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQXR2_USE_AGENT_BUFFER	0	X'00000000'
MQXR2_USE_EXIT_BUFFER	4	X'00000004'
MQXR2_DEFAULT_CONTINUATION	0	X'00000000'
MQXR2_CONTINUE_CHAIN	8	X'00000008'
MQXR2_SUPPRESS_CHAIN	16	X'00000010'
MQXR2_STATIC_CACHE	0	X'00000000'
MQXR2_DYNAMIC_CACHE	32	X'00000020'

MQXT_* (Exit Identifiers)

Table 430. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXT_API_CROSSING_EXIT	1	X'00000001'
MQXT_API_EXIT	2	X'00000002'
MQXT_CHANNEL_SEC_EXIT	11	X'0000000B'
MQXT_CHANNEL_MSG_EXIT	12	X'0000000C'
MQXT_CHANNEL_SEND_EXIT	13	X'0000000D'
MQXT_CHANNEL_RCV_EXIT	14	X'0000000E'
MQXT_CHANNEL_MSG_RETRY_EXIT	15	X'0000000F'
MQXT_CHANNEL_AUTO_DEF_EXIT	16	X'00000010'
MQXT_CLUSTER_WORKLOAD_EXIT	20	X'00000014'
MQXT_PUBSUB_ROUTING_EXIT	21	X'00000015'

MQXUA_* (Exit User Area Value)

Table 431. Constant names and values	
Name	**Value**
MQXUA_NONE	X'00...00' (16 nulls)
MQXUA_NONE_ARRAY	'\0','\0',... (16 nulls)

MQXWD_* (Exit wait descriptor structure)

Table 432. Structures of constants	
Name	**Structure**
MQXWD_STRUC_ID	"XWD¬"
MQXWD_STRUC_ID_ARRAY	'X','W','D','¬'

Note: The symbol ¬ represents a single blank character.

Table 433. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQXWD_VERSION_1	1	X'00000001'

MQZAC_* (Application context structure)

Table 434. Structures of constants	
Name	**Structure**
MQZAC_STRUC_ID	"ZAC¬"
MQZAC_STRUC_ID_ARRAY	'Z','A','C','¬'

Note: The symbol ¬ represents a single blank character.

Table 435. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAC_VERSION_1	1	X'00000001'
MQZAC_CURRENT_VERSION	1	X'00000001'

MQZAD_* (Authority data structure)

Table 436. Structures of constants	
Name	**Structure**
MQZAD_STRUC_ID	"ZAD¬"
MQZAD_STRUC_ID_ARRAY	'Z','A','D','¬'

Note: The symbol ¬ represents a single blank character.

Table 437. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAD_VERSION_1	1	X'00000001'
MQZAD_VERSION_2	2	X'00000002'
MQZAD_CURRENT_VERSION	2	X'00000002'

MQZAET_* (Installable Services Entity Types)

Table 438. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAET_NONE	0	X'00000000'
MQZAET_PRINCIPAL	1	X'00000001'
MQZAET_GROUP	2	X'00000002'
MQZAET_UNKNOWN	3	X'00000003'

MQZAO_* (Installable Services Authorizations)

Table 439. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAO_CONNECT	1	X'00000001'
MQZAO_BROWSE	2	X'00000002'
MQZAO_INPUT	4	X'00000004'
MQZAO_OUTPUT	8	X'00000008'
MQZAO_INQUIRE	16	X'00000010'
MQZAO_SET	32	X'00000020'

Table 439. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQZAO_PASS_IDENTITY_CONTEXT	64	X'00000040'
MQZAO_PASS_ALL_CONTEXT	128	X'00000080'
MQZAO_SET_IDENTITY_CONTEXT	256	X'00000100'
MQZAO_SET_ALL_CONTEXT	512	X'00000200'
MQZAO_ALTERNATE_USER_AUTHORITY	1024	X'00000400'
MQZAO_PUBLISH	2048	X'00000800'
MQZAO_SUBSCRIBE	4096	X'00001000'
MQZAO_RESUME	8192	X'00002000'
MQZAO_ALL_MQI	16383	X'00003FFF'
MQZAO_CREATE	65536	X'00010000'
MQZAO_DELETE	131072	X'00020000'
MQZAO_DISPLAY	262144	X'00040000'
MQZAO_CHANGE	524288	X'00080000'
MQZAO_CLEAR	1048576	X'00100000'
MQZAO_CONTROL	2097152	X'00200000'
MQZAO_CONTROL_EXTENDED	4194304	X'00400000'
MQZAO_AUTHORIZE	8388608	X'00800000'
MQZAO_ALL_ADMIN	16646144	X'00FE0000'
MQZAO_ALL	16662527	X'00FE3FFF'
MQZAO_REMOVE	16777216	X'01000000'
MQZAO_NONE	0	X'00000000'

MQZAS_* (Installable Services Service Interface Version)

Table 440. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAS_VERSION_1	1	X'00000001'
MQZAS_VERSION_2	2	X'00000002'
MQZAS_VERSION_3	3	X'00000003'
MQZAS_VERSION_4	4	X'00000004'
MQZAS_VERSION_5	5	X'00000005'
MQZAS_VERSION_6	6	X'00000006'

MQZAT_* (Authentication Types)

Table 441. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZAT_INITIAL_CONTEXT	0	X'00000000'
MQZAT_CHANGE_CONTEXT	1	X'00000001'

MQZCI_* (Installable Services Continuation Indicator)

Table 442. Values of constants

Name	Decimal value	Hexadecimal value
MQZCI_DEFAULT	0	X'00000000'
MQZCI_CONTINUE	0	X'00000000'
MQZCI_STOP	1	X'00000001'

MQZED_* (Entity data structure)

Table 443. Structures of constants

Name	Structure
MQZED_STRUC_ID	"ZED¬"
MQZED_STRUC_ID_ARRAY	'Z','E','D','¬'

Note: The symbol ¬ represents a single blank character.

Table 444. Values of constants

Name	Decimal value	Hexadecimal value
MQZED_VERSION_1	1	X'00000001'
MQZED_VERSION_2	2	X'00000002'
MQZED_CURRENT_VERSION	2	X'00000002'

MQZFP_* (Free parameters structure)

Table 445. Structures of constants

Name	Structure
MQZFP_STRUC_ID	"ZFP¬"
MQZFP_STRUC_ID_ARRAY	'Z','F','P','¬'

Note: The symbol ¬ represents a single blank character.

Table 446. Values of constants

Name	Decimal value	Hexadecimal value
MQZFP_VERSION_1	1	X'00000001'
MQZFP_CURRENT_VERSION	1	X'00000001'

MQZIC_* (Identity context structure)

Table 447. Structures of constants

Name	Structure
MQZIC_STRUC_ID	"ZIC¬"
MQZIC_STRUC_ID_ARRAY	'Z','I','C','¬'

Note: The symbol ¬ represents a single blank character.

Table 448. Values of constants

Name	Decimal value	Hexadecimal value
MQZIC_VERSION_1	1	X'00000001'

Table 448. Values of constants (continued)		
Name	**Decimal value**	**Hexadecimal value**
MQZIC_CURRENT_VERSION	1	X'00000001'

MQZID_* (Function ids for services)

Function ids common to all services

Table 449. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZID_INIT	0	X'00000000'
MQZID_TERM	1	X'00000001'

Function ids for Authority service

Table 450. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZID_INIT_AUTHORITY	0	X'00000000'
MQZID_TERM_AUTHORITY	1	X'00000001'
MQZID_CHECK_AUTHORITY	2	X'00000002'
MQZID_COPY_ALL_AUTHORITY	3	X'00000003'
MQZID_DELETE_AUTHORITY	4	X'00000004'
MQZID_SET_AUTHORITY	5	X'00000005'
MQZID_GET_AUTHORITY	6	X'00000006'
MQZID_GET_EXPLICIT_AUTHORITY	7	X'00000007'
MQZID_REFRESH_CACHE	8	X'00000008'
MQZID_ENUMERATE_AUTHORITY_DATA	9	X'00000009'
MQZID_AUTHENTICATE_USER	10	X'0000000A'
MQZID_FREE_USER	11	X'0000000B'
MQZID_INQUIRE	12	X'0000000C'
MQZID_CHECK_PRIVILEGED	13	X'0000000D'

Function ids for Name service

Table 451. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZID_INIT_NAME	0	X'00000000'
MQZID_TERM_NAME	1	X'00000001'
MQZID_LOOKUP_NAME	2	X'00000002'
MQZID_INSERT_NAME	3	X'00000003'
MQZID_DELETE_NAME	4	X'00000004'

Function ids for Userid service

Table 452. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZID_INIT_USERID	0	X'00000000'
MQZID_TERM_USERID	1	X'00000001'
MQZID_FIND_USERID	2	X'00000002'

MQZIO_* (Installable Services Initialization Options)

Table 453. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZIO_PRIMARY	0	X'00000000'
MQZIO_SECONDARY	1	X'00000001'

MQZNS_* (Name Service Interface Version)

Table 454. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZNS_VERSION_1	1	X'00000001'

MQZSE_* (Installable Services Start-Enumeration Indicator)

Table 455. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZSE_START	1	X'00000001'
MQZSE_CONTINUE	0	X'00000000'

MQZSL_* (Installable Services Selector Indicator)

Table 456. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZSL_NOT_RETURNED	0	X'00000000'
MQZSL_RETURNED	1	X'00000001'

MQZTO_* (Installable Services Termination Options)

Table 457. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZTO_PRIMARY	0	X'00000000'
MQZTO_SECONDARY	1	X'00000001'

MQZUS_* (Userid Service Interface Version)

Table 458. Values of constants		
Name	**Decimal value**	**Hexadecimal value**
MQZUS_VERSION_1	1	X'00000001'

Data types used in the MQI

Information on the data types that can be used in the Message Queue Interface (MQI). Descriptions, fields, and language declarations for relevant languages with each data type.

Data types and programming for the MQI

Introducing Elementary and Structure data types, and how to use the MQI through C programming, COBOL programming, or High Level Assembler programming.

Elementary data types

This section contains information about data types used in the MQI (or in exit functions). These are described in detail, followed by examples showing how to declare the elementary data types in the supported programming languages in the following topics.

The data types used in the MQI (or in exit functions) are either:

- Elementary data types, or
- Aggregates of elementary data types (arrays or structures)

The following elementary data types are used in the MQI (or in exit functions):

Table 459. Elementary data type names, types and descriptions

Elementary data type name	Data type	Description
MQBOOL	Boolean	The MQBOOL data type represents a boolean value. The value 0 represents false. Any other value represents true. An MQBOOL must be aligned as for the MQLONG data type.

Elementary data type name	Data type	Description
MQBYTE	Byte	The MQBYTE data type represents a single byte of data. No particular interpretation is placed on the byte; it is treated as a string of bits, and not as a binary number or character. No special alignment is required. When MQBYTE data is sent between queue managers that use different character sets or encodings, the MQBYTE data is not converted in any way. The *MsgId* and *CorrelId* fields in the MQMD structure are like this. An array of MQBYTE is sometimes used to represent an area of main storage that is not known to the queue manager. For example, the area might contain application message data or a structure. The boundary alignment of this area must be compatible with the nature of the data contained within it. In the C programming language, any data type can be used for function parameters that are shown as arrays of MQBYTE. This is because such parameters are always passed by address, and in C the function parameter is declared as a pointer-to-void.

Table 459. Elementary data type names, types and descriptions (continued)

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
MQBYTEn	String of *n* bytes	Each MQBYTEn data type represents a string of *n* bytes, where *n* can take any of the following values: 8, 16, 24, 32, 40, or 128. Each byte is described by the MQBYTE data type. No special alignment is required. If the data in the byte string is shorter than the defined length of the string, the data must be padded with nulls to fill the string. When the queue manager returns byte strings to the application (for example, on the MQGET call), the queue manager pads with nulls to the defined length of the string. Named constants are available to define the lengths of byte string fields. These are listed in "Constants" on page 61
MQCHAR	Character	The MQCHAR data type represents a single-byte character, or one byte of a double-byte or multi-byte character. No special alignment is required. When MQCHAR data is sent between queue managers that use different character sets or encodings, the MQCHAR data usually requires conversion in order for the data to be interpreted correctly. The queue manager does this automatically for MQCHAR data in the MQMD structure. Conversion of MQCHAR data in the application message data is controlled by the MQGMO_CONVERT option specified on the MQGET call; see the description of this option in "MQGMO - Get-message options" on page 360 for further details.

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
MQCHARn	String of *n* characters	Each MQCHARn data type represents a string of *n* characters, where *n* can take any of the following values: 4, 8, 12, 20, 28, 32, 48, 64, 128, or 256. Each character is described by the MQCHAR data type. No special alignment is required. If the data in the string is shorter than the defined length of the string, the data must be padded with blanks to fill the string. In some cases a null character can be used to end the string prematurely, instead of padding with blanks; the null character and characters following it are treated as blanks, up to the defined length of the string. The places where a null can be used are identified in the call and data type descriptions. When the queue manager returns character strings to the application (for example, on the MQGET call), the queue manager always pads with blanks to the defined length of the string; the queue manager does not use the null character to delimit the string. Named constants are available that define the lengths of character string fields and are listed in “Constants” on page 61.
MQFLOAT32	32-bit floating point number	The MQFLOAT32 data type is a 32-bit floating-point number represented using the standard IEEE floating-point format. An MQFLOAT32 must be aligned on a 4-byte boundary. The use of MQFLOAT32 in C on z/OS requires the use of the FLOAT(IEEE) compiler flag. The use of MQFLOAT32 in COBOL is limited to compilers that support floating-point numbers in IEEE format. This might require the use of the FLOAT(NATIVE) compiler flag.

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
MQFLOAT64	64-bit floating point number	The MQFLOAT64 data type is a 64-bit floating-point number represented using the standard IEEE floating-point format. An MQFLOAT64 must be aligned on an 8-byte boundary. The use of MQFLOAT64 in C on z/OS requires the use of the FLOAT(IEEE) compiler flag. The use of MQFLOAT64 in COBOL is limited to compilers that support floating-point numbers in IEEE format. This might require the use of the FLOAT(NATIVE) compiler flag.
MQHCONFIG	Configuration handle	The MQHCONFIG data type represents a configuration handle, that is, the component that is being configured for a particular installable service. A configuration handle must be aligned on its natural boundary. Applications must not rely on the format of the data stored inside this handle. If valid, its value is intended to be usable in further MQI calls, but is not intended to have any meaning besides that purpose.
MQHCONN	Connection handle	The MQHCONN data type represents a connection handle, that is, the connection to a particular queue manager. A connection handle must be aligned on a 4-byte boundary. Applications must not rely on the format of the data stored inside this handle. If valid, its value is intended to be usable in further MQI calls, but is not intended to have any meaning besides that purpose.

Elementary data type name	Data type	Description
MQHMSG	Message handle	The MQHMSG data type represents a message handle that gives access to a message. A message handle must be aligned on an 8-byte boundary. Applications must not rely on the format of the data stored inside this handle. If valid, its value is intended to be usable in further MQI calls, but is not intended to have any meaning besides that purpose.
MQHOBJ	Object handle	The MQHOBJ data type represents an object handle that gives access to an object. An object handle must be aligned on a 4-byte boundary. Applications must not rely on the format of the data stored inside this handle. If valid, its value is intended to be usable in further MQI calls, but is not intended to have any meaning besides that purpose.
MQINT8	8-bit signed integer	The MQINT8 data type is an 8-bit signed integer that can take any value in the range -128 to +127, unless otherwise restricted by the context.
MQINT16	16-bit signed integer	The MQINT16 data type is a 16-bit signed integer that can take any value in the range -32 768 to +32 767, unless otherwise restricted by the context. An MQINT16 must be aligned on a 2-byte boundary.
MQINT32	32-bit signed integer	The MQINT32 data type is a 32-bit signed binary integer that can take any value in the range -2 147 483 648 through +2 147 483 647, unless otherwise restricted by the context. See the definition of MQLONG.

Table 459. Elementary data type names, types and descriptions (continued)

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
MQINT64	64-bit signed integer	The MQINT64 data type is a 64-bit signed integer that can take any value in the range -9 223 372 036 854 775 808 through +9 223 372 036 854 775 807, unless otherwise restricted by the context. For COBOL, the valid range is limited to -999 999 999 999 999 999 through +999 999 999 999 999 999. A 64-bit integer must be aligned on an 8-byte boundary.
MQLONG	32-bit signed integer	The MQLONG data type is a 32-bit signed binary integer that can take any value in the range -2 147 483 648 through +2 147 483 647, unless otherwise restricted by the context. For COBOL, the valid range is limited to -999 999 999 through +999 999 999. An MQLONG must be aligned on a 4-byte boundary.
MQPID	Process identifier	The IBM MQ process identifier. This is the same identifier used in MQ trace and FFST™ dumps, but might be different from the operating system process identifier.
MQPTR	Pointer	The MQPTR data type is the address of data of any type. A pointer must be aligned on its natural boundary; this is a 16-byte boundary on IBM i, and an 8-byte boundary on other platforms. Some programming languages support typed pointers; the MQI also uses these in a few cases (for example, PMQCHAR and PMQLONG in the C programming language).
MQTID	Thread identifier	The IBM MQ thread identifier. This is the same identifier used in MQ trace and FFST™ dumps, but might be different from the operating system thread identifier.
MQUINT8	8-bit unsigned integer	The MQUINT8 data type is an 8-bit unsigned integer that can take any value in the range 0 to +255, unless otherwise restricted by the context.

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
MQUINT16	16-bit unsigned integer	The MQUINT16 data type is a 16-bit unsigned integer that can take any value in the range 0 through +65 535, unless otherwise restricted by the context. An MQUINT16 must be aligned on a 2-byte boundary.
MQUINT32	32-bit unsigned integer	The MQUINT32 data type is a 32-bit unsigned binary integer. See the definition of MQULONG.
MQUINT64	64-bit unsigned integer	The MQINT64 data type is a 64-bit unsigned integer that can take any value in the range 0 through +18 446 744 073 709 551 615, unless otherwise restricted by the context. For COBOL, the valid range is limited to 0 through +999 999 999 999 999 999. A 64-bit integer must be aligned on an 8-byte boundary.
MQULONG	32-bit unsigned integer	The MQULONG data type is a 32-bit unsigned binary integer that can take any value in the range 0 through +4 294 967 294, unless otherwise restricted by the context. For COBOL, the valid range is limited to 0 through +999 999 999. An MQULONG must be aligned on a 4-byte boundary.
PMQACH	Pointer	Pointer to a data structure of type MQACH
PMQAIR	Pointer	Pointer to a data structure of type MQAIR
PMQAXC	Pointer	Pointer to a data structure of type MQAXC
PMQAXP	Pointer	Pointer to a data structure of type MQAXP
PMQBMHO	Pointer	Pointer to a data structure of type MQBMHO
PMQBO	Pointer	Pointer to a data structure of type MQBO
PMQBOOL	Pointer	Pointer to data of type MQBOOL
PMQBYTE	Pointer	Pointer to data of type MQBYTE

Elementary data type name	Data type	Description
PMQBYTEn	Pointer	Pointer to data of type MQBYTEn, where n can be 8, 16, 24, 32, 40, 128
PMQCBC	Pointer	Pointer to a data structure of type MQCBC
PMQCBD	Pointer	Pointer to a data structure of type MQCBD
PMQCHAR	Pointer	Pointer to data of type MQCHAR
PMQCHARN	Pointer	Pointer to a data type of MQCHARN, where n can be 4, 8, 12, 20, 28, 32, 48, 64, 128, 256, 264
PMQCHARV	Pointer	Pointer to a data structure of type MQCHARV
PMQCIH	Pointer	Pointer to a data structure of type MQCIH
PMQCMHO	Pointer	Pointer to a data structure of type MQCMHO
PMQCNO	Pointer	Pointer to a data structure of type MQCNO
PMQCSP	Pointer	Pointer to a data structure of type MQCSP
PMQCTLO	Pointer	Pointer to a data structure of type MQCTLO
PMQDH	Pointer	Pointer to a data structure of type MQDH
PMQDHO	Pointer	Pointer to a data structure of type MQDHO
PMQDLH	Pointer	Pointer to a data structure of type MQDLH
PMQDMHO	Pointer	Pointer to a data structure of type MQDMHO
PMQDMPO	Pointer	Pointer to a data structure of type MQDMPO
PMQEPH	Pointer	Pointer to a data structure of type MQEPH
PMQFLOAT32	Pointer	Pointer to a data structure of type MQFLOAT32
PMQFLOAT64	Pointer	Pointer to a data structure of type MQFLOAT64
PMQFUNC	Pointer	Pointer to a function
PMQGMO	Pointer	Pointer to a data structure of type MQGMO

Table 459. Elementary data type names, types and descriptions (continued)

Table 459. Elementary data type names, types and descriptions (continued)

Elementary data type name	Data type	Description
PMQHCONFIG	Pointer	Pointer to data of type MQHCONFIG
PMQHCONN	Pointer	Pointer to data of type MQHCONN
PMQHMSG	Pointer	Pointer to data of type MQHMSG
PMQHOBJ	Pointer	Pointer to data of type MQHOBJ
PMQIIH	Pointer	Pointer to a data structure of type MQIIH
PMQIMPO	Pointer	Pointer to a data structure of type MQIMPO
PMQINT8	Pointer	Pointer to data of type MQINT8
PMQINT16	Pointer	Pointer to data of type MQINT16
PMQINT32	Pointer	Pointer to data of type MQINT32
PMQINT64	Pointer	Pointer to data of type MQINT64
PMQLONG	Pointer	Pointer to data of type MQLONG
PMQMD	Pointer	Pointer to structure of type MQMD
PMQMDE	Pointer	Pointer to a data structure of type MQMDE
PMQMD1	Pointer	Pointer to a data structure of type MQMD1
PMQMD2	Pointer	Pointer to a data structure of type MQMD2
PMQMHBO	Pointer	Pointer to a data structure of type MQMHBO
PMQOD	Pointer	Pointer to a data structure of type MQOD
PMQOR	Pointer	Pointer to a data structure of type MQOR
PMQPD	Pointer	Pointer to a data structure of type MQPD
PMQPID	Pointer	Pointer to a process identifier
PMQMD	Pointer	Pointer to a data structure of type MQMD
PMQPMO	Pointer	Pointer to a data structure of type MQPMO
PMQPTR	Pointer	Pointer to data of type MQPTR
PMQRFH	Pointer	Pointer to a data structure of type MQRFH
PMQRFH2	Pointer	Pointer to a data structure of type MQRFH2

Table 459. Elementary data type names, types and descriptions (continued)		
Elementary data type name	**Data type**	**Description**
PMQRMH	Pointer	Pointer to a data structure of type MQRMH
PMQRR	Pointer	Pointer to a data structure of type MQRR
PMQSCO	Pointer	Pointer to a data structure of type MQSCO
PMQSD	Pointer	Pointer to a data structure of type MQSD
PMQSMPO	Pointer	Pointer to a data structure of type MQSMPO
PMQSRO	Pointer	Pointer to a data structure of type MQSRO
PMSSTS	Pointer	Pointer to a data structure of type MQSTS
PMQTID	Pointer	Pointer to a thread ID
PMQTM	Pointer	Pointer to a data structure of type MQTM
PMQTMC2	Pointer	Pointer to a data structure of type MQTMC2
PMQUINT8	Pointer	Pointer to a data type of MQUINT8
PMQUINT16	Pointer	Pointer to a data type of MQUINT16
PMQUINT32	Pointer	Pointer to a data type of MQUINT32
PMQUINT64	Pointer	Pointer to a data type of MQUINT64
PMQULONG	Pointer	Pointer to a data type of MQULONG
PMQVOID	Pointer	
PMQWIH	Pointer	Pointer to a data structure of type MQWIH
PMQXQH	Pointer	Pointer to a data structure of type MQXQH

C declarations

Table 460. C data type names and representations	
Data type	**Representation**
MQBOOL	`typedef MQLONG MQBOOL;`
MQBYTE	`typedef unsigned char MQBYTE;`
MQBYTE8	`typedef MQBYTE MQBYTE8[8];`

Table 460. C data type names and representations (continued)

Data type	Representation
MQBYTE16	`typedef MQBYTE MQBYTE16[16];`
MQBYTE24	`typedef MQBYTE MQBYTE24[24];`
MQBYTE32	`typedef MQBYTE MQBYTE32[32];`
MQBYTE40	`typedef MQBYTE MQBYTE40[40];`
MQCHAR	`typedef char MQCHAR;`
MQCHAR4	`typedef MQCHAR MQCHAR4[4];`
MQCHAR8	`typedef MQCHAR MQCHAR8[8];`
MQCHAR12	`typedef MQCHAR MQCHAR12[12];`
MQCHAR20	`typedef MQCHAR MQCHAR20[20];`
MQCHAR28	`typedef MQCHAR MQCHAR28[28];`
MQCHAR32	`typedef MQCHAR MQCHAR32[32];`
MQCHAR48	`typedef MQCHAR MQCHAR48[48];`
MQCHAR64	`typedef MQCHAR MQCHAR64[64];`
MQCHAR128	`typedef MQCHAR MQCHAR128[128];`
MQCHAR256	`typedef MQCHAR MQCHAR256[256];`
MQFLOAT32	`typedef float MQFLOAT32;`

Table 460. C data type names and representations (continued)	
Data type	**Representation**
MQFLOAT64	`typedef double MQFLOAT64;`
MQHCONFIG	`typedef void MQPOINTER MQHCONFIG;`
MQHCONN	`typedef MQLONG MQHCONN;`
MQHOBJ	`typedef MQLONG MQHOBJ;`
MQINT8	`typedef signed char MQINT8;`
MQINT16	`typedef short MQINT16;`

MQINT64	UNIX On 64-bit UNIX:
	`typedef long;`
	UNIX On 32-bit AIX, Solaris:
	`typedef int64_t;`
	IBM i z/OS Linux On Linux, IBM i, and z/OS:
	`typedef long long;`
	Windows On Windows:
	`typedef _int64;`

MQLONG	IBM i On IBM i:
	`typedef long MQLONG;`
	ULW z/OS On other platforms:
	`if defined(MQ_64_BIT)`
	`    typedef int MQLONG;`
	`else`
	`    typedef long MQLONG;`

Table 460. C data type names and representations (continued)

Data type	Representation
MQPID	`typedef MQLONG MQPID;`
MQPTR	`typedef void MQPOINTER MQPTR;`
MQTID	`typedef MQLONG MQTID;`
MQUINT8	`typedef unsigned char MQUINT8;`
MQUINT16	`typedef unsigned short MQUINT16;`

MQUINT64	UNIX On 64-bit UNIX:
	`typedef unsigned long;`
	UNIX On 32-bit AIX, Solaris:
	`typedef uint64_t;`
	IBM i z/OS Linux On Linux, IBM i, and z/OS:
	`typedef unsigned long long;`
	Windows On Windows:
	`typedef unsigned _int64;`

MQULONG	IBM i On IBM i:
	`typedef unsigned long MQULONG;`
	ULW z/OS On other platforms:
	`if defined(MQ_64_BIT)`
	`    typedef unsigned int MQULONG;`
	`else`
	`    typedef unsigned long MQULONG;`

PMQBO	`typedef MQBO MQPOINTER PMQBO;`

Table 460. C data type names and representations (continued)

Data type	Representation
PMQBOOL	`typedef MQBOOL MQPOINTER PMQBOOL;`
PMQBYTE	`typedef MQBYTE MQPOINTER PMQBYTE;`
PMQBYTE8	`typedef MQBYTE8[8] MQPOINTER PMQBYTE8[8];`
PMQBYTE16	`typedef MQBYTE16[16] MQPOINTER PMQBYTE16[16];`
PMQBYTE24	`typedef MQBYTE24[24] MQPOINTER PMQBYTE24[24];`
PMQBYTE32	`typedef MQBYTE32[32] MQPOINTER PMQBYTE32[32];`
PMQBYTE40	`typedef MQBYTE40[40] MQPOINTER PMQBYTE40[40];`
PMQBYTE128	`typedef MQBYTE128[128] MQPOINTER PMQBYTE128[128];`
PMQCHAR	`typedef MQCHAR MQPOINTER PMQCHAR;`
PMQCHAR4	`typedef MQCHAR4[4] MQPOINTER PMQCHAR4[4];`
PMQCHAR8	`typedef MQCHAR8[8] MQPOINTER PMQCHAR8[8];`
PMQCHAR12	`typedef MQCHAR12[12] MQPOINTER PMQCHAR12[12];`
PMQCHAR20	`typedef MQCHAR20[20] MQPOINTER PMQCHAR20[20];`
PMQCHAR28	`typedef MQCHAR28[28] MQPOINTER PMQCHAR28[28];`
PMQCHAR32	`typedef MQCHAR32[32] MQPOINTER PMQCHAR32[32];`
PMQCHAR48	`typedef MQCHAR48[48] MQPOINTER PMQCHAR48[48];`

Data type	Representation
PMQCHAR64	`typedef MQCHAR64[64] MQPOINTER PMQCHAR64[64];`
PMQCHAR128	`typedef MQCHAR128[128] MQPOINTER PMQCHAR128[128];`
PMQCHAR256	`typedef MQCHAR256[256] MQPOINTER PMQCHAR256[256];`
PMQCHAR264	`typedef MQCHAR264[264] MQPOINTER PMQCHAR264[264];`
PMQCIH	`typedef MQCIH MQPOINTER PMQCIH;`
PMQCNO	`typedef MQCNO MQPOINTER PMQCNO;`
PMQDLH	`typedef MQDLH MQPOINTER PMQDLH;`
PMQFUNC	`typedef void MQPOINTER PMQFUNC;`
PMQFLOAT32	`typedef MQFLOAT32 MQPOINTER PMQFLOAT32;`
PMQFLOAT64	`typedef MQFLOAT64 MQPOINTER PMQFLOAT64;`
PMQGMO	`typedef MQGMO MQPOINTER PMQGMO;`
PMQHCONFIG	`typedef MQHCONFIG MQPOINTER PMQHCONFIG;`
PMQHCONN	`typedef MQHCONN MQPOINTER PMQHCONN;`
PMQHOBJ	`typedef MQHOBJ MQPOINTER PMQHOBJ;`
PMQIIH	`typedef MQIIH MQPOINTER PMQIIH;`
PMQINT8	`typedef MQINT8 MQPOINTER PMQINT8;`

Table 460. C data type names and representations (continued)

Table 460. C data type names and representations (continued)	
Data type	**Representation**
PMQINT16	`typedef MQINT16 MQPOINTER PMQINT16;`
PMQLONG	`typedef MQLONG MQPOINTER PMQLONG;`
PMQMD	`typedef MQMD MQPOINTER PMQMD;`
PMQMD1	`typedef MQMD1[1] MQPOINTER PMQMD1[1];`
PMQMDE	`typedef MQMDE MQPOINTER PMQMDE;`
PMQOD	`typedef MQOD MQPOINTER PMQOD;`
PMQPMO	`typedef MQPMO MQPOINTER PMQPMO;`
PMQPTR	`typedef MQPTR MQPOINTER PMQPTR;`
PMQRFH	`typedef MQRFH MQPOINTER PMQRFH;`
PMQRFH2	`typedef MQRFH2[2] MQPOINTER PMQRFH2[2];`
PMQRMH	`typedef MQRMH MQPOINTER PMQRMH;`
PMQTM	`typedef MQTM MQPOINTER PMQTM;`
PMQTMC2	`typedef MQTMC2[2] MQPOINTER PMQTMC2[2];`
PMQUINT8	`typedef MQUINT8 MQPOINTER PMQUINT8;`
PMQUINT16	`typedef MQUINT16 MQPOINTER PMQUINT16;`
PMQULONG	`typedef MQULONG MQPOINTER PMQULONG;`

Table 460. C data type names and representations (continued)

Data type	Representation
PMQVOID	`typedef void MQPOINTER PMQVOID;`
PMQWIH	`typedef MQWIH MQPOINTER PMQWIH;`
PMQXQH	`typedef MQXQH MQPOINTER PMQXQH;`
PPMQBO	`typedef PMQBO MQPOINTER PPMQBO;`
PPMQBYTE	`typedef PMQBYTE MQPOINTER PPMQBYTE;`
PPMQCHAR	`typedef PMQCHAR MQPOINTER PPMQCHAR;`
PPMQCNO	`typedef PMQCNO MQPOINTER PPMQCNO;`
PPMQGMO	`typedef PMQGMO MQPOINTER PPMQGMO;`
PPMQHCONN	`typedef PMQHCONN MQPOINTER PPMQHCONN;`
PPMQHOBJ	`typedef PMQHOBJ MQPOINTER PPMQHOBJ;`
PPMQLONG	`typedef PMQLONG MQPOINTER PPMQLONG;`
PPMQMD	`typedef PMQMD MQPOINTER PPMQMD;`
PPMQOD	`typedef PMQOD MQPOINTER PPMQOD;`
PPMQPMO	`typedef PMQPMO MQPOINTER PPMQPMO;`
PPMQULONG	`typedef PMQULONG MQPOINTER PPMQULONG;`
PPMQVOID	`typedef PMQVOID MQPOINTER PPMQVOID;`

Where `defined(MQ_64_BIT)` means a 64 bit platform.

See “Data types” on page 262 for a description of the MQPOINTER macro variable.

COBOL declarations

Table 461. COBOL data type names and representations

Data type	Representation
MQBOOL	`PIC S9(9) BINARY`
MQBYTE	`PIC X`
MQBYTE8	`PIC X(8)`
MQBYTE16	`PIC X(16)`
MQBYTE24	`PIC X(24)`
MQBYTE32	`PIC X(32)`
MQBYTE40	`PIC X(40)`
MQCHAR	`PIC X`
MQCHAR4	`PIC X(4)`
MQCHAR8	`PIC X(8)`
MQCHAR12	`PIC X(12)`
MQCHAR20	`PIC X(20)`
MQCHAR28	`PIC X(28)`
MQCHAR32	`PIC X(32)`
MQCHAR48	`PIC X(48)`

Data type	Representation
MQCHAR64	`PIC X(64)`
MQCHAR128	`PIC X(128)`
MQCHAR256	`PIC X(256)`
MQFLOAT32	`USAGE COMP-1`
MQFLOAT64	`USAGE COMP-2`

MQHCONN	On z/OS
	`PIC S9(9) COMP-5`
	On other platforms
	`PIC S9(9) BINARY`

MQHOBJ	`PIC S9(9) BINARY`
MQINT8	`PIC S9(2) BINARY`
MQINT16	`PIC S9(4) BINARY`
MQINT64	`PIC S9(18) BINARY`
MQLONG	`PIC S9(9) BINARY`
MQPTR	`POINTER`
MQUINT8	`PIC 9(2) BINARY`
MQUINT16	`PIC 9(4) BINARY`

Table 461. COBOL data type names and representations (continued)

Table 461. COBOL data type names and representations (continued)

Data type	Representation
MQUINT64	`PIC 9(18) BINARY`
MQULONG	`PIC 9(9) BINARY`

PL/I declarations
PL/I is supported on z/OS.

Table 462. PL/I data type names and representations

Data type	Representation
MQBOOL	`fixed bin(31)`
MQBYTE	`char(1)`
MQBYTE8	`char(8)`
MQBYTE16	`char(16)`
MQBYTE24	`char(24)`
MQBYTE32	`char(32)`
MQBYTE40	`char(40)`
MQCHAR	`char(1)`
MQCHAR4	`char(4)`
MQCHAR8	`char(8)`
MQCHAR12	`char(12)`
MQCHAR20	`char(20)`

Table 462. PL/I data type names and representations (continued)

Data type	Representation
MQCHAR28	`char(28)`
MQCHAR32	`char(32)`
MQCHAR48	`char(48)`
MQCHAR64	`char(64)`
MQCHAR128	`char(128)`
MQCHAR256	`char(256)`
MQFLOAT32	`binary float(21) ieee`
MQFLOAT64	`binary float(52) ieee`
MQHCONN	`fixed bin(31)`
MQHOBJ	`fixed bin(31)`
MQINT8	`fixed bin(7)`
MQINT16	`fixed bin(15)`
MQINT64	`fixed bin(63)`
MQLONG	`fixed bin(31)`
MQPTR	`pointer`
MQUINT8	`fixed bin(8)`

Table 462. PL/I data type names and representations (continued)	
Data type	**Representation**
MQUINT16	`fixed bin(16)`
MQUINT64	`fixed bin(64)`
MQULONG	`fixed bin(32)`

System/390 assembler declarations
System/390 assembler is supported on z/OS only.

Table 463. System/390 assembler data type names and representations	
Data type	**Representation**
MQBOOL	`DS F`
MQBYTE	`DS XL1`
MQBYTE8	`DS XL8`
MQBYTE16	`DS XL16`
MQBYTE24	`DS XL24`
MQBYTE32	`DS XL32`
MQBYTE40	`DS XL40`
MQCHAR	`DS CL1`
MQCHAR4	`DS CL4`
MQCHAR8	`DS CL8`
MQCHAR12	`DS CL12`

Table 463. System/390 assembler data type names and representations (continued)

Data type	Representation
MQCHAR20	`DS CL20`
MQCHAR28	`DS CL28`
MQCHAR32	`DS CL32`
MQCHAR48	`DS CL48`
MQCHAR64	`DS CL64`
MQCHAR128	`DS CL128`
MQCHAR256	`DS CL256`
MQFLOAT32	`DS EB`
MQFLOAT64	`DS DB`
MQHCONN	`DS F`
MQHOBJ	`DS F`
MQINT8	`DS XL1`
MQINT16	`DS H`
MQINT64	`DS D`
MQLONG	`DS F`
MQPTR	`DS F`

Data type	Representation
MQUINT8	`DS XL1`
MQUINT16	`DS H`
MQUINT64	`DS D`
MQULONG	`DS F`

Table 463. System/390 assembler data type names and representations (continued)

Structure data types

A summary of the structure data types, rules for mapping the MQI structures consistently, and conventions used in each structure data type description.

- "Summary of the structure data types used on MQI calls or exit functions" on page 258
- "Summary of the structure data types used in message data" on page 259
- "Rules for mapping the MQI structures consistently" on page 260
- "Conventions used in each structure data type description" on page 260

Summary of the structure data types used on MQI calls or exit functions

Table 464. Structure data types used on MQI calls or exit functions

Structure	Description	Calls where used
MQACH	API exit chain header	
MQAIR	Authentication information record	MQCONNX
MQAXC	API exit context	
MQAXP	API exit parameter	
MQBMHO	Buffer to message handle options	MQBUFMH
MQBO	Begin options	MQBEGIN
MQCBD	Callback descriptor	MQCB
MQCBO	Create-bag options	mqCreateBag
MQCHARV	Variable length string	MQINQMP
MQCNO	Connect options	MQCONNX
MQCSP	Security parameters	MQCONNX
MQCTLO	Callback options	MQCTL
MQDMPO	Delete message property options	MQDLTMP
MQGMO	Get-message options	MQGET
MQIMPO	Inquire message property options	MQINQMP

Structure	Description	Calls where used
MQMD	Message descriptor	MQBUFMH, MQMHBUF, MQCB, MQGET, MQPUT, MQPUT1
MQMHBO	Message handle to buffer options	MQMHBUF
MQOD	Object descriptor	MQOPEN, MQPUT1
MQOR	Object record	MQOPEN, MQPUT1
MQPD	Property descriptor	MQSETMP
MQPMO	Put-message options	MQPUT, MQPUT1
MQPMR	Put-message record	MQPUT, MQPUT1
MQRR	Response record	MQOPEN, MQPUT, MQPUT1
MQSCO	TLS configuration options	MQCONNX
MQSD	Subscription descriptor	MQSUB
MQSMPO	Set message property option	MQSETMP
MQSRO	Subscription request options	MQSUBRQ
MQSTS	Status reporting structure	MQSTAT

Table 464. Structure data types used on MQI calls or exit functions (continued)

Summary of the structure data types used in message data

Table 465. Structure data types used in message data

Structure	Description
MQCIH	CICS information header
MQCFH	PCF header
MQEPH	Embedded PCF header
MQDH	Distribution header
MQDLH	Dead letter (undelivered message) header
MQIIH	IMS information header
MQMDE	Message descriptor extension
MQRFH	Rules and formatting header
MQRFH2	Rules and formatting header 2
MQRMH	Reference message header
MQTM	Trigger message
MQTMC2	Trigger message (character format 2)
MQWIH	Work information header
MQXQH	Transmission queue header

Note: The MQDXP structure (data conversion exit parameter) is described in “Data-conversion exit” on page 894, together with the associated data conversion calls.

Rules for mapping the MQI structures consistently

Programming languages vary in their level of support for structures, and certain rules and conventions are adopted to map the MQI structures consistently in each programming language:

1. Structures must be aligned on their natural boundaries.
   - Most MQI structures require 4-byte alignment.
   - On IBM i, structures containing pointers require 16-byte alignment; these are: MQCNO, MQOD, MQPMO.
2. Each field in a structure must be aligned on its natural boundary.
   - Fields with data types that equate to MQLONG must be aligned on 4-byte boundaries.
   - Fields with data types that equate to MQPTR must be aligned on 16-byte boundaries on IBM i, and 4-byte boundaries in other environments.
   - Other fields are aligned on 1-byte boundaries.
3. The length of a structure must be a multiple of its boundary alignment.
   - Most MQI structures have lengths that are multiples of 4 bytes.
   - On IBM i, structures containing pointers have lengths that are multiples of 16 bytes.
4. Where necessary, padding bytes or fields must be added to ensure compliance with the preceding rules.

Conventions used in each structure data type description

The description of each structure data type includes:

- An overview of the purpose and use of the structure
- Descriptions of the fields in the structure, in a form that is independent of the programming language
- Examples of how the structure is declared in each of the supported programming languages

The description of each structure data type contains the following sections:

Structure name
The name of the structure, followed by a summary of the fields in the structure.

Overview
A brief description of the purpose and use of the structure.

Fields
Descriptions of the fields. For each field, the name of the field is followed by its elementary data type in parentheses ( ). In text, field names are shown using an italic typeface; for example *Version*.

There is also a description of the purpose of the field, together with a list of any values that the field can take. Names of constants are shown in uppercase; for example MQGMO_STRUC_ID. A set of constants having the same prefix is shown using the * character, for example: MQIA_*.

In the descriptions of the fields, the following terms are used:

input
You supply information in the field when you make a call.

output
The queue manager returns information in the field when the call completes or fails.

input/output
You supply information in the field when you make a call, and the queue manager changes the information when the call completes or fails.

Initial values
A table showing the initial values for each field in the data definition files supplied with the MQI.

C declaration
Typical declaration of the structure in C.

COBOL declaration
Typical declaration of the structure in COBOL.

PL/I declaration
Typical declaration of the structure in PL/I.

High Level Assembler declaration
Typical declaration of the structure in System/390 assembler language.

Visual Basic declaration
Typical declaration of the structure in Visual Basic.

C programming

Information to help you use the MQI from the C programming language.

- "Header files" on page 261
- "Functions" on page 261
- "Parameters with undefined data type" on page 262
- "Data types" on page 262
- "Manipulating binary strings" on page 262
- "Manipulating character strings" on page 262
- "Initial values for structures" on page 263
- "Initial values for dynamic structures" on page 263
- "Use from C++" on page 264
- "Notation conventions" on page 264

Header files

Table 466. C header files

File	Contents
CMQC	Function prototypes, data types, and named constants for the main MQI
CMQXC	Function prototypes, data types, and named constants for the data conversion exit
CMQEC	Function prototypes, data types, and named constants for the main MQI, data conversion exit and Interface Entry Points structure (CMQEC includes CMQXC and CMQC.)
CMQSTRC	Functions that convert MQI constant definitions to the text equivalent. **Attention:** z/OS V 9.1.0 Applicable to z/OS from IBM MQ 9.1. Programs using this header file must be compiled with the LONGNAME compiler option.

To improve the portability of applications, code the name of the header file in lowercase on the `#include` preprocessor directive:

```
#include "cmqec.h"
```

Functions

You do not need to specify all parameters that are passed by address every time you invoke a function.

- Pass parameters that are *input-only* and of type MQHCONN, MQHOBJ, or MQLONG by value.
- Pass all other parameters by address.

Where a particular parameter is not required, use a null pointer as the parameter on the function invocation, in place of the address of the parameter data. Parameters for which this is possible are identified in the call descriptions.

No parameter is returned as the value of the function; in C terminology, this means that all functions return `void`.

The attributes of the function are defined by the MQENTRY macro variable; the value of this macro variable depends on the environment.

Parameters with undefined data type

The **Buffer** parameter on the MQGET, MQPUT, and MQPUT1 functions has an undefined data type. This parameter is used to send and receive the application's message data.

Parameters of this sort are shown in the C examples as arrays of MQBYTE. You can declare the parameters in this way, but it is usually more convenient to declare them as the particular structure that describes the layout of the data in the message. Declare the actual function parameter as a pointer-to-void, and specify the address of any sort of data as the parameter on the function invocation.

Data types

Define all data types using the C `typedef` statement. For each data type, also define the corresponding pointer data type. The name of the pointer data type is the name of the elementary or structure data type prefixed with the letter P to denote a pointer. Define the attributes of the pointer using the MQPOINTER macro variable; the value of this macro variable depends on the environment. The following illustrates how to declare pointer data types:

```
#define MQPOINTER *                /* depends on environment */
...
typedef MQLONG MQPOINTER PMQLONG;  /* pointer to MQLONG */
typedef MQMD   MQPOINTER PMQMD;    /* pointer to MQMD */
```

Manipulating binary strings

Declare strings of binary data as one of the MQBYTEn data types.

Whenever you copy, compare, or set fields of this type, use the C functions **memcpy**, **memcmp**, or **memset** ; for example:

```
#include <string.h>
#include "cmqc.h"

MQMD MyMsgDesc;

memcpy(MyMsgDesc.MsgId,           /* set "MsgId" field to nulls    */
       MQMI_NONE,                 /* ...using named constant       */
       sizeof(MyMsgDesc.MsgId));

memset(MyMsgDesc.CorrelId,        /* set "CorrelId" field to nulls */
       0x00,                      /* ...using a different method   */
       sizeof(MQBYTE24));
```

Do not use the string functions **strcpy**, **strcmp**, **strncpy**, or **strncmp**, because these do not work correctly for data declared with the MQBYTEn data types.

Manipulating character strings

When the queue manager returns character data to the application, the queue manager always pads the character data with blanks to the defined length of the field. The queue manager *does not* return null-terminated strings.

Therefore, when copying, comparing, or concatenating such strings, use the string functions **strncpy**, **strncmp**, or **strncat**.

Do not use the string functions that require the string to be terminated by a null (**strcpy**, **strcmp**, **strcat**). Also, do not use the function **strlen** to determine the length of the string; use instead the **sizeof** function to determine the length of the field.

Initial values for structures

The header files define various macro variables that you can use to provide initial values for the MQ structures when you declare instances of those structures.

These macro variables have names of the form MQxxx_DEFAULT, where MQxxx represents the name of the structure. They are used in the following way:

```
MQMD   MyMsgDesc = {MQMD_DEFAULT};
MQPMO  MyPutOpts = {MQPMO_DEFAULT};
```

For some character fields (for example, the *StrucId* fields that occur in most structures, or the *Format* field that occurs in MQMD), the MQI defines particular values that are valid. For each of the valid values, *two* macro variables are provided:

- One macro variable defines the value as a string with a length, excluding the implied null matches, exactly the defined length of the field. For example, for the *Format* field in MQMD the following macro variable is provided (¬ represents a single blank character):

  ```
  #define MQFMT_STRING "MQSTR¬¬¬"
  ```

  Use this form with the memcpy and memcmp functions.
- The other macro variable defines the value as an array of characters; the name of this macro variable is the name of the string form suffixed with _ARRAY. For example:

  ```
  #define MQFMT_STRING_ARRAY 'M','Q','S','T','R','¬','¬','¬'
  ```

  Use this form to initialize the field when you declare an instance of the structure with values different from those provided by the MQMD_DEFAULT macro variable. (This is not always necessary; in some environments you can use the string form of the value in both situations. However, you can use the array form for declarations, because this is required for compatibility with the C++ programming language.)

Initial values for dynamic structures

When a variable number of instances of a structure is required, the instances are typically created in main storage obtained dynamically using the calloc or malloc functions. To initialize the fields in such structures, consider the following technique:

1. Declare an instance of the structure using the appropriate MQxxx_DEFAULT macro variable to initialize the structure. This instance becomes the model for other instances:

   ```
   MQMD Model = {MQMD_DEFAULT}; /* declare model instance */
   ```

   The static or auto keywords can be coded on the declaration in order to give the model instance static or dynamic lifetime, as required.
2. Use the calloc or malloc functions to obtain storage for a dynamic instance of the structure:

   ```
   PMQMD Instance;
   Instance = malloc(sizeof(MQMD)); /* get storage for dynamic instance */
   ```

3. Use the memcpy function to copy the model instance to the dynamic instance:

```
memcpy(Instance,&Model,sizeof(MQMD)); /* initialize dynamic instance */
```

Use from C++

For the C++ programming language, the header files contain the following additional statements that are included only when you use a C++ compiler:

```
#ifdef __cplusplus
  extern "C" {
#endif

/* rest of header file */

#ifdef __cplusplus
  }
#endif
```

Notation conventions

This information shows how to invoke the functions and declare parameters.

In some cases, the parameters are arrays with a size that is not fixed. For these, a lowercase n is used to represent a numeric constant. When you code the declaration for that parameter, replace the n with the numeric value required.

COBOL programming

This section contains information to help you use the MQI from the COBOL programming language.

High Level Assembler programming

Information to help to you use the MQI from the System/390 Assembler programming language.

- "Macros" on page 264
- "Structures" on page 265
- "CMQVERA macro" on page 265
- "Notation conventions" on page 265

Macros

There are two macros for named constants, and one macro for each of the structures. These files are summarized in the following table.

Table 467. Assembler macros

File	Contents
CMQA	Named constants (equates) for main MQI
CMQCIHA	CICS information header structure
CMQCNOA	Connect options structure
CMQDLHA	Dead letter header structure
CMQDXPA	Data conversion exit parameter structure
CMQGMOA	Get message options structure
CMQIIHA	IMS information header structure
CMQMDA	Message descriptor structure

File	Contents
CMQMDEA	Message descriptor extension structure
CMQODA	Object descriptor structure
CMQPMOA	Put message options structure
CMQRFHA	Rules and formatting header structure
CMQRFH2A	Rules and formatting header structure version 2
CMQRMHA	Reference message header structure
CMQTMA	Trigger message structure
CMQTMC2A	Trigger message structure (character format) version 2
CMQVERA	Structure version control
CMQWIHA	Work information header structure
CMQXA	Named constants for data conversion exit
CMQXPA	API crossing exit parameter structure
CMQXQHA	Transmission queue header structure

Table 467. Assembler macros (continued)

Structures

The structures are generated by macros that have various parameters to control the action of the macro. See "Structures" on page 265

CMQVERA macro

This macro allows you to set the default value to be used for the DCLVER parameter on the structure macros.

The value specified by CMQVERA is used by the structure macro only if you omit the DCLVER parameter from the invocation of the structure macro. The default value is set by coding the CMQVERA macro with the DCLVER parameter:

DCLVER=CURRENT
The default version is set to the current (most recent) version.

DCLVER=SPECIFIED
The default version is set to the version specified by the VERSION parameter.

You must specify the **DCLVER** parameter, and the value must be uppercase. The value set by CMQVERA remains the default value until the next invocation of CMQVERA, or the end of the assembly. If you omit CMQVERA, the default is DCLVER=CURRENT.

Notation conventions

Other topics show how to invoke the calls and declare parameters. In some cases, the parameters are arrays or character strings with a size that is not fixed for which, a lowercase n is used to represent a numeric constant. When you code the declaration for that parameter, replace the n with the numeric value required.

Structures
The structures are generated by macros that have various parameters to control the action of the macro.

Note: From time to time new versions of the IBM MQ structures are introduced. The additional fields in a new version can cause a structure that previously was smaller than 256 bytes to become larger than

256 bytes. Because of this, write assembler instructions that are intended to copy an IBM MQ structure, or to set an IBM MQ structure to nulls, to work correctly with structures that might be larger than 256 bytes. Alternatively, use the DCLVER macro parameter or CMQVERA macro with the VERSION parameter to declare a specific version of the structure.

- "Specifying the name of the structure" on page 266
- "Specifying the form of the structure" on page 266
- "Controlling the version of the structure" on page 266
- "Declaring one structure embedded within another" on page 267
- "Specifying initial values for fields" on page 267
- "Controlling the listing" on page 267

Specifying the name of the structure

To declare more than one instance of a structure, the macro prefixes the name of each field in the structure with a user-specifiable string and an underscore.

The string used is the label specified on the invocation of the macro. If no label is specified, the name of the structure is used to construct the prefix:

```
* Declare two object descriptors
         CMQODA  ,         Prefix used="MQOD_" (the default)
MY_MQOD  CMQODA  ,         Prefix used="MY_MQOD_"
```

The structure declarations shown in this section use the default prefix.

Specifying the form of the structure

Structure declarations can be generated by the macro in one of two forms, controlled by the DSECT parameter:

DSECT=YES
: An assembler DSECT instruction is used to start a new data section; the structure definition immediately follows the DSECT statement. The label on the macro invocation is used as the name of the data section; if no label is specified, the name of the structure is used.

DSECT=NO
: Assembler DC instructions are used to define the structure at the current position in the routine. The fields are initialized with values, which can be specified by coding the relevant parameters on the macro invocation. Fields for which no values are specified on the macro invocation are initialized with default values.

The value specified must be uppercase. If the DSECT parameter is not specified, DSECT=NO is assumed.

Controlling the version of the structure

By default, the macros always declare the most recent version of each structure.

Although you can use the VERSION macro parameter to specify a value for the *Version* field in the structure, that parameter defines the initial value for the *Version* field, and does not control the version of the structure actually declared. To control the version of the structure that is declared, use the DCLVER parameter:

DCLVER=CURRENT
: The version declared is the current (most recent) version.

DCLVER=SPECIFIED
: The version declared is the version specified by the VERSION parameter. If you omit the VERSION parameter, the default is version 1.

If you specify the VERSION parameter, the value must be a self-defining numeric constant, or the named constant for the version required (for example, MQCNO_VERSION_3). If you specify some other value, the structure is declared as if DCLVER=CURRENT had been specified, even if the value of VERSION resolves to a valid value.

The value specified must be uppercase. If you omit the DCLVER parameter, the value used is taken from the MQDCLVER global macro variable. You can set this variable using the CMQVERA macro.

Declaring one structure embedded within another

To declare one structure as a component of another structure, use the NESTED parameter:

NESTED=YES
The structure declaration is nested within another.

NESTED=NO
The structure declaration is not nested within another.

The value specified must be uppercase. If you omit the NESTED parameter, NESTED=NO is assumed.

Specifying initial values for fields

Specify the value to be used to initialize a field in a structure by coding the name of that field (without the prefix) as a parameter on the macro invocation, accompanied by the value required.

For example, to declare a message-descriptor structure with the *MsgType* field initialized with MQMT_REQUEST, and the *ReplyToQ* field initialized with the string "MY_REPLY_TO_QUEUE", use the following:

```
MY_MQMD  CMQMDA  MSGTYPE=MQMT_REQUEST,                                 X
               REPLYTOQ=MY_REPLY_TO_QUEUE
```

If you specify a named constant (equate) as a value on the macro invocation, use the CMQA macro to define the named constant. Do not enclose character string values in single quotation marks.

Controlling the listing

Control the appearance of the structure declaration in the assembler listing using the LIST parameter:

LIST=YES
The structure declaration appears in the assembler listing.

LIST=NO
The structure declaration does not appear in the assembler listing.

The value specified must be uppercase. If you omit the LIST parameter, LIST=NO is assumed.

MQAIR - Authentication information record

The MQAIR structure allows an application running as an IBM MQ MQI client to specify information about an authenticator that is to be used for the client connection. The structure is an input parameter on the MQCONNX call.

Availability

The MQAIR structure is available for the following clients:

- AIX AIX
- Linux Linux
- Solaris Solaris

- Windows Windows

Character set and encoding

Data in MQAIR must be in the character set and encoding of the local queue manager; these are given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 468. Fields in MQAIR

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQAIR_STRUC_ID	'AIR¬'
Version (structure version number)	MQAIR_VERSION_1	1
AuthInfoType (type of authentication information)	MQAIT_CRL_LDAP	1
AuthInfoConnName (connection name of LDAP CRL server)	None	Null string or blanks
LDAPUserNamePtr (address of LDAP user name)	None	Null pointer or null bytes
LDAPUserNameOffset (offset of LDAP user name from start of MQSCO)	None	0
LDAPUserNameLength (length of LDAP user name)	None	0
LDAPPassword (password to access LDAP server)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQAIR_VERSION_2.		
OCSPResponderURL (URL at which the OCSP responder can be contacted)	None	Null string or blanks

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQAIR_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQAIR MyAIR = {MQAIR_DEFAULT};
```

Language declarations

C declaration for MQAIR

```
typedef struct tagMQAIR MQAIR;
struct tagMQAIR {
  MQCHAR4    StrucId;             /* Structure identifier */
  MQLONG     Version;             /* Structure version number */
  MQLONG     AuthInfoType;        /* Type of authentication
                                     information */
  MQCHAR264  AuthInfoConnName;    /* Connection name of CRL LDAP
                                     server */
  PMQCHAR    LDAPUserNamePtr;     /* Address of LDAP user name */
  MQLONG     LDAPUserNameOffset;  /* Offset of LDAP user name from start
                                     of MQAIR structure */
```

```
  MQLONG     LDAPUserNameLength;  /* Length of LDAP user name */
  MQCHAR32   LDAPPassword;        /* Password to access LDAP server */
  MQCHAR256  OCSPResponderURL;    /* URL of OCSP responder */

};
```

COBOL declaration for MQAIR

```
**   MQAIR structure
  10 MQAIR.
**    Structure identifier
   15 MQAIR-STRUCID            PIC X(4).
**    Structure version number
   15 MQAIR-VERSION            PIC S9(9) BINARY.
**    Type of authentication information
   15 MQAIR-AUTHINFOTYPE       PIC S9(9) BINARY.
**    Connection name of CRL LDAP server
   15 MQAIR-AUTHINFOCONNNAME   PIC X(264).
**    Address of LDAP user name
   15 MQAIR-LDAPUSERNAMEPTR    POINTER.
**    Offset of LDAP user name from start of MQAIR structure
   15 MQAIR-LDAPUSERNAMEOFFSET PIC S9(9) BINARY.
**    Length of LDAP user name
   15 MQAIR-LDAPUSERNAMELENGTH PIC S9(9) BINARY.
**    Password to access LDAP server
   15 MQAIR-LDAPPASSWORD       PIC X(32).
**    URL of OCSP responder
   15 MQAIR-OCSPRESPONDERURL   PIC X(256).
```

Visual Basic declaration for MQAIR

```
Type MQAIR
  StrucId            As String*4   'Structure identifier'
  Version            As Long       'Structure version number'
  AuthInfoType       As Long       'Type of authentication information'
  AuthInfoConnName   As String*264 'Connection name of CRL LDAP server'
  LDAPUserNamePtr    As MQPTR      'Address of LDAP user name'
  LDAPUserNameOffset As Long       'Offset of LDAP user name from start'
                                   'of MQAIR structure'
  LDAPUserNameLength As Long       'Length of LDAP user name'
  LDAPPassword       As String*32  'Password to access LDAP server'
End Type
```

StrucId (MQCHAR4)

The value must be:

MQAIR_STRUC_ID
: Identifier for the authentication information record.

  For the C programming language, the constant MQAIR_STRUC_ID_ARRAY is also defined; this has the same value as MQAIR_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQAIR_STRUC_ID.

Version (MQLONG)

The version number of the MQAIR structure.

The value must be one of the following:

MQAIR_VERSION_1
: Version-1 authentication information record.

MQAIR_VERSION_2
: Version-2 authentication information record.

The following constant specifies the version number of the current version:

MQAIR_CURRENT_VERSION
: Current version of authentication information record.

This is always an input field. The initial value of this field is MQAIR_VERSION_1.

AuthInfoType (MQLONG)

This is the type of authentication information contained in the record.

The value can be one of the two following parameters:

MQAIT_CRL_LDAP
Certificate revocation checking using LDAP server.

MQAIT_OCSP
Certificate revocation checking using OCSP.

If the value is not valid, the call fails with reason code MQRC_AUTH_INFO_TYPE_ERROR.

This is an input field. The initial value of this field is MQAIT_CRL_LDAP.

AuthInfoConnName (MQCHAR264)

This is either the host name or the network address of a host on which the LDAP server is running. This can be followed by an optional port number, enclosed in parentheses. The default port number is 389.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. If the value is not valid, the call fails with reason code MQRC_AUTH_INFO_CONN_NAME_ERROR.

This is an input field. The length of this field is given by MQ_AUTH_INFO_CONN_NAME_LENGTH. The initial value of this field is the null string in C, and blank characters in other programming languages.

LDAPUserNamePtr (PMQCHAR)

This is the LDAP user name.

It consists of the Distinguished Name of the user who is attempting to access the LDAP CRL server. If the value is shorter than the length specified by *LDAPUserNameLength*, terminate the value with a null character, or pad it with blanks to the length *LDAPUserNameLength*. The field is ignored if *LDAPUserNameLength* is zero.

You can supply the LDAP user name in one of two ways:

- By using the pointer field *LDAPUserNamePtr*

  In this case, the application can declare a string that is separate from the MQAIR structure, and set *LDAPUserNamePtr* to the address of the string.

  Consider using *LDAPUserNamePtr* for programming languages that support the pointer data type in a fashion that is portable to different environments (for example, the C programming language).

- By using the offset field *LDAPUserNameOffset*

  In this case, the application must declare a compound structure containing the MQSCO structure followed by the array of MQAIR records followed by the LDAP user name strings, and set *LDAPUserNameOffset* to the offset of the appropriate name string from the start of the MQAIR structure. Ensure that this value is correct, and has a value that can be accommodated within an MQLONG (the most restrictive programming language is COBOL, for which the valid range is -999 999 999 through +999 999 999).

  Consider using *LDAPUserNameOffset* for programming languages that do not support the pointer data type, or that implement the pointer data type in a fashion that might not be portable to different environments (for example, the COBOL programming language).

Whichever technique is chosen, use only one of *LDAPUserNamePtr* and *LDAPUserNameOffset* ; the call fails with reason code MQRC_LDAP_USER_NAME_ERROR if both are nonzero.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

LDAPUserNameOffset (MQLONG)

This is the offset in bytes of the LDAP user name from the start of the MQAIR structure.

The offset can be positive or negative. The field is ignored if *LDAPUserNameLength* is zero.

You can use either *LDAPUserNamePtr* or *LDAPUserNameOffset* to specify the LDAP user name, but not both; see the description of the *LDAPUserNamePtr* field for details.

This is an input field. The initial value of this field is 0.

LDAPUserNameLength (MQLONG)

This is the length in bytes of the LDAP user name addressed by the *LDAPUserNamePtr* or *LDAPUserNameOffset* field. The value must be in the range zero through MQ_DISTINGUISHED_NAME_LENGTH. If the value is not valid, the call fails with reason code MQRC_LDAP_USER_NAME_LENGTH_ERR.

If the LDAP server involved does not require a user name, set this field to zero.

This is an input field. The initial value of this field is 0.

LDAPPassword (MQCHAR32)

This is the password needed to access the LDAP CRL server. If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field.

If the LDAP server does not require a password, or you omit the LDAP user name, *LDAPPassword* must be null or blank. If you omit the LDAP user name and *LDAPPassword* is not null or blank, the call fails with reason code MQRC_LDAP_PASSWORD_ERROR.

This is an input field. The length of this field is given by MQ_LDAP_PASSWORD_LENGTH. The initial value of this field is the null string in C, and blank characters in other programming languages.

OCSPResponderURL (MQCHAR256)

For an MQAIR structure that represents connection details for an OCSP responder, this field contains the URL at which the responder can be contacted.

The value of this field is an HTTP URL. This field takes priority over a URL in an AuthorityInfoAccess (AIA) certificate extension.

The value is ignored unless both the following statements are true:

- The MQAIR structure is version 2 or later (the Version field is set to MQAIR_VERSION_2 or greater).
- The AuthInfoType field is set to MQAIT_OCSP.

If the field does not contain an HTTP URL in the correct format (and is not being ignored), the MQCONNX call fails with reason code MQRC_OCSP_URL_ERROR.

This field is case-sensitive. It must start with the string http:// in lowercase. The rest of the URL might be case-sensitive, depending on the OCSP server implementation.

This field is not subject to data conversion.

MQBMHO - Buffer to message handle options

The MQBMHO structure allows applications to specify options that control how message handles are produced from buffers. The structure is an input parameter on the MQBUFMH call.

Character set and encoding

Data in MQBMHO must be in the character set of the application and encoding of the application (MQENC_NATIVE).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 469. Fields in MQBMHO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQBMHO_STRUC_ID	'BMHO'
Version (structure version number)	MQBMHO_VERSION_1	1
Options (options controlling the action of MQBMHO)	MQBMHO_NONE	0

Notes:

1. In the C programming language, the macro variable MQBMHO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQBMHO MyBMHO = {MQBMHO_DEFAULT};
```

Language declarations

C declaration for MQBMHO

```
typedef struct tagMQBMHO MQBMHO;
struct tagMQBMHO {
  MQCHAR4  StrucId;        /* Structure identifier */
  MQLONG   Version;        /* Structure version number */
  MQLONG   Options;        /* Options that control the action of
                              MQBUFMH */
};
```

COBOL declaration for MQBMHO

```
**   MQBMHO structure
  10 MQBMHO.
**    Structure identifier
   15 MQBMHO-STRUCID                PIC X(4).
**    Structure version number
   15 MQBMHO-VERSION                PIC S9(9) BINARY.
**    Options that control the action of MQBUFMH
   15 MQBMHO-OPTIONS                PIC S9(9) BINARY.
```

PL/I declaration for MQBMHO

```
Dcl
 1 MQBMHO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action
                                     of MQBUFMH */
```

High Level Assembler declaration for MQBMHO

```
MQBMHO                      DSECT
MQBMHO_STRUCID              DS   CL4  Structure identifier
MQBMHO_VERSION              DS   F    Structure version number
MQBMHO_OPTIONS              DS   F    Options that control the
*                                     action of MQBUFMH
```

```
MQBMHO_LENGTH               EQU  *-MQBMHO
MQBMHO_AREA                 DS   CL(MQBMHO_LENGTH)
```

StrucId (MQCHAR4)

Buffer to message handle structure - StrucId field

This is the structure identifier. The value must be:

MQBMHO_STRUC_ID
: Identifier for buffer to message handle structure.

  For the C programming language, the constant MQBMHO_STRUC_ID_ARRAY is also defined; this has the same value as MQBMHO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQBMHO_STRUC_ID.

Version (MQLONG)

Buffer to message handle structure - Version field

This is the structure version number. The value must be:

MQBMHO_VERSION_1
: Version number for buffer to message handle structure.

The following constant specifies the version number of the current version:

MQBMHO_CURRENT_VERSION
: Current version of buffer to message handle structure.

This is always an input field. The initial value of this field is MQBMHO_VERSION_1.

Options (MQLONG)

Buffer to message handle structure - Options field

The value can be:

MQBMHO_DELETE_PROPERTIES
: Properties that are added to the message handle are deleted from the buffer. If the call fails no properties are deleted.

Default options: If you do not need the option described, use the following option:

MQBMHO_NONE
: No options specified.

This is always an input field. The initial value of this field is MQBMHO_DELETE_PROPERTIES.

MQBO - Begin options

The MQBO structure allows the application to specify options relating to the creation of a unit of work. The structure is an input/output parameter on the MQBEGIN call.

Availability

The MQBO structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

The MQBO structure is not available for IBM MQ MQI clients.

Character set and encoding

Data in MQBO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 470. Fields in MQBO for MQBO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQBO_STRUC_ID	'BO¬¬'
Version (structure version number)	MQBO_VERSION_1	1
Options (options that control the action of MQBEGIN)	MQBO_NONE	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQBO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQBO MyBO = {MQBO_DEFAULT};
```

Language declarations

C declaration for MQBO

```
typedef struct tagMQBO MQBO;
struct tagMQBO {
  MQCHAR4  StrucId;  /* Structure identifier */
  MQLONG   Version;  /* Structure version number */
  MQLONG   Options;  /* Options that control the action of MQBEGIN */
};
```

COBOL declaration for MQBO

```
**   MQBO structure
  10 MQBO.
**    Structure identifier
   15 MQBO-STRUCID PIC X(4).
**    Structure version number
   15 MQBO-VERSION PIC S9(9) BINARY.
**    Options that control the action of MQBEGIN
   15 MQBO-OPTIONS PIC S9(9) BINARY.
```

PL/I declaration for MQBO

```
dcl
 1 MQBO based,
  3 StrucId char(4),       /* Structure identifier */
  3 Version fixed bin(31), /* Structure version number */
```

```
   3 Options fixed bin(31); /* Options that control the action of
                               MQBEGIN */
```

Visual Basic declaration for MQBO

```
Type MQBO
  StrucId As String*4 'Structure identifier'
  Version As Long     'Structure version number'
  Options As Long     'Options that control the action of MQBEGIN'
End Type
```

StrucId (MQCHAR4)

This field is always an input field. Its initial value is MQBO_STRUC_ID.

The value must be:

MQBO_STRUC_ID
Identifier for begin-options structure.

For the C programming language, the constant MQBO_STRUC_ID_ARRAY is also defined; this has the same value as MQBO_STRUC_ID, but is an array of characters instead of a string.

Version (MQLONG)

This field is always an input field. Its initial value is MQBO_VERSION_1.

The value must be:

MQBO_VERSION_1
Version number for begin-options structure.

The following constant specifies the version number of the current version:

MQBO_CURRENT_VERSION
Current version of begin-options structure.

Options (MQLONG)

This field is always an input field. Its initial value is MQBO_NONE.

The value must be:

MQBO_NONE
No options specified.

MQCBC - Callback context

The MQCBC structure is used to specify context information that is passed to a callback function. The structure is an input/output parameter on the call to a message consumer routine.

Availability

The MQCBC structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

Version

The current version of MQCBC is MQCBC_VERSION_2.

Character set and encoding

Data in MQCBC must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure will be in the character set and encoding of the client.

Fields

There are no initial values for the **MQCBC** structure. The structure is passed as a parameter to a callback routine. The queue manager initializes the structure; applications never initialize it.

Notes:

- In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.
- There are no initial values for the MQCBC structure. The structure is passed as a parameter to a callback routine. The queue manager initializes the structure; applications never initialize it.

Table 471. Fields in MQCBC

Field	Description
StrucID	Structure identifier
Version	Structure version number
CallType	Why function has been called
Hobj	Object handle
CallbackArea	Field for callback function to use
ConnectionArea	Field for callback function to use
CompCode	Completion code
Reason	Reason code
State	Indication of the state of the current consumer
DataLength	Message length
BufferLength	Length of message buffer in bytes
Flags	General flags
Note: The remaining field is ignored if Version is less than MQCBC_VERSION_2	
ReconnectDelay	Number of milliseconds before reconnection attempt

Language declarations

C declaration for MQCBC

```
typedef struct tagMQCBC MQCBC;
struct tagMQCBC {
   MQCHAR4   StrucId;               /* Structure identifier */
   MQLONG    Version;               /* Structure version number */
   MQLONG    CallType;              /* Why Function was called */
   MQHOBJ    Hobj;                  /* Object Handle */
   MQPTR     CallbackArea;          /* Callback data passed to the function */
   MQPTR     ConnectionArea;        /* MQCTL data area passed to the function */
```

```
    MQLONG    CompCode;                /* Completion Code */
    MQLONG    Reason;                  /* Reason Code */
    MQLONG    State;                   /* Consumer State */
    MQLONG    DataLength;              /* Message Data Length */
    MQLONG    BufferLength;            /* Buffer Length */
    MQLONG    Flags;                   /* Flags containing information about
                                          this consumer */
   /* Ver:1 */
    MQLONG    ReconnectDelay;          /* Number of milliseconds before */
   /* Ver:2 */  };                     /* reconnect attempt */
```

COBOL declaration for MQCBC

```
** MQCBC structure
 10  MQCBC.
** Structure Identifier
 15  MQCBC-STRUCID                    PIC X(4).
** Structure Version
 15  MQCBC-VERSION                    PIC S9(9) BINARY.
 ** Call Type
 15  MQCBC-CALLTYPE                   PIC S9(9) BINARY.
** Object Handle
 15  MQCBC-HOBJ                       PIC S9(9) BINARY.
** Callback User Area
 15  MQCBC-CALLBACKAREA               POINTER
** Connection Area
 15  MQCBC-CONNECTIONAREA             POINTER
** Completion Code
 15  MQCBC-COMPCODE                   PIC S9(9) BINARY.
** Reason Code
 15  MQCBC-REASON                     PIC S9(9) BINARY.
** Consumer State
 15  MQCBC-STATE                      PIC S9(9) BINARY.
** Data Length
 15  MQCBC-DATALENGTH                 PIC S9(9) BINARY.
** Buffer Length
 15  MQCBC-BUFFERLENGTH               PIC S9(9) BINARY.
** Flags
 15  MQCBC-FLAGS                      PIC S9(9) BINARY.
** Ver:1 **
** Number of milliseconds before reconnect attempt
 15  MQCBC-RECONNECTDELAY PIC S9(9) BINARY.
** Ver:2 **
```

PL/I declaration for MQCBC

```
dcl
 1 MQCBC based,
  3 StrucId             char(4),       /* Structure identifier */
  3 Version             fixed bin(31), /* Structure version */
  3 CallType            fixed bin(31), /* Callback type */
  3 Hobj                fixed bin(31), /* Object Handle */
  3 CallbackArea        pointer,       /* User area passed to the function */
  3 ConnectionArea      pointer,       /* Connection User Area */
  3 CompCode            fixed bin(31); /* Completion Code */
  3 Reason              fixed bin(31); /* Reason Code */
  3 State               fixed bin(31); /* Consumer State */
  3 DataLength          fixed bin(31); /* Message Data Length */
  3 BufferLength        fixed bin(31); /* Message Buffer length */
  3 Flags               fixed bin(31); /* Consumer Flags */
/* Ver:1 */
  3 ReconnectDelay      fixed bin(31); /* Number of milliseconds before */
/* Ver:2 */                            /* reconnect attempt */
```

High Level Assembler declaration for MQCBC

```
     MQCBC                  DSECT
     MQCBC                  DS   0F    Force fullword alignment
     MQCBC_STRUCID          DS   CL4   Structure identifier
     MQCBC_VERSION          DS   F     Structure version number
     MQCBC_CALLTYPE         DS   F     Why Function was called
     MQCBC_HOBJ             DS   F     Object Handle
     MQCBC_CALLBACKAREA     DS   A     Callback data passed to the function
     MQCBC_CONNECTIONAREA   DS   A     MQCTL Data area passed to the function
     MQCBC_COMPCODE         DS   F     Completion Code
```

```
     MQCBC_REASON          DS  F      Reason Code
     MQCBC_STATE           DS  F      Consumer State
     MQCBC_DATALENGTH      DS  F      Message Data Length
     MQCBC_BUFFERLENGTH    DS  F      Buffer Length
     MQCBC_FLAGS           DS  F      Flags containing information about this consumer
     MQCBC_RECONNECTDELAY  DS  F      Number of milliseconds before reconnect
     MQCBC_LENGTH          EQU *-MQCBC
                           ORG        MQCBC
     MQCBC_AREA            DS  CL(MQCBC_LENGTH)
```

StrucId (MQCHAR4)

The value in this field is the structure identifier.

The value must be:

MQCBC_STRUC_ID
Identifier for callback context structure.

For the C programming language, the constant MQCBC_STRUC_ID_ARRAY is also defined; this has the same value as MQCBC_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQCBC_STRUC_ID.

Version (MQLONG)

The value in this field is the structure version number.

The value must be:

MQCBC_VERSION_1
Version-1 callback context structure.

The following constant specifies the version number of the current version:

MQCBC_CURRENT_VERSION
Current version of the callback context structure.

This is always an input field. The initial value of this field is MQCBC_VERSION_1.

The callback function is always passed the latest version of the structure.

CallType (MQLONG)

Field containing information about why this function has been called; the following values are defined.

Message delivery call types: These call types contain information about a message. The **DataLength** and **BufferLength** parameters are valid for these call types.

MQCBCT_MSG_REMOVED
The message consumer function has been invoked with a message that has been destructively removed from the object handle.

If the value of *CompCode* is MQCC_WARNING, the value of the *Reason* field is MQRC_TRUNCATED_MSG_ACCEPTED or one of the codes indicating a data conversion problem.

MQCBCT_MSG_NOT_REMOVED
The message consumer function has been invoked with a message that has not yet been destructively removed from the object handle. The message can be destructively removed from the object handle using the *MsgToken*.

The message might not have been removed because:

- The MQGMO options requested a browse operation, MQGMO_BROWSE_*
- The message is larger than the available buffer and the MQGMO options do not specify MQGMO_ACCEPT_TRUNCATED_MSG

If the value of *CompCode* is MQCC_WARNING, the value of the *Reason* field is MQRC_TRUNCATED_MSG_FAILED or one of the codes indicating a data conversion problem.

Callback control call types: These call types contain information about the control of the callback and do not contain details about a message. These call types are requested using Options in the MQCBD structure.

The **DataLength** and **BufferLength** parameters are not valid for these call types.

MQCBCT_REGISTER_CALL

The purpose of this call type is to allow the callback function to perform some initial setup.

The callback function is invoked is immediately after the callback is registered, that is, upon return from an MQCB call using a value for the *Operation* field of MQOP_REGISTER.

This call type is used both for message consumers and event handlers.

If requested, this is the first invocation of the callback function.

The value of the *Reason* field is MQRC_NONE.

MQCBCT_START_CALL

The purpose of this call type is to allow the callback function to perform some setup when it is started, for example, reinstating resources that were cleaned up when it was previously stopped.

The callback function is invoked when the connection is started using either MQOP_START or MQOP_START_WAIT.

If a callback function is registered within another callback function, this call type is invoked when the callback returns.

This call type is used for message consumers only.

The value of the *Reason* field is MQRC_NONE.

MQCBCT_STOP_CALL

The purpose of this call type is to allow the callback function to perform some cleanup when it is stopped for a while, for example, cleaning up additional resources that have been acquired during the consuming of messages.

The callback function is invoked when an MQCTL call is issued using a value for the *Operation* field of MQOP_STOP.

This call type is used for message consumers only.

The value of the *Reason* field is set to indicate the reason for stopping.

MQCBCT_DEREGISTER_CALL

The purpose of this call type is to allow the callback function to perform final cleanup at the end of the consume process. The callback function is invoked when the:

- Callback function is deregistered using an MQCB call with MQOP_DEREGISTER.
- Queue is closed, causing an implicit deregister. In this instance the callback function is passed MQHO_UNUSABLE_HOBJ as the object handle.
- MQDISC call completes - causing an implicit close and, therefore, a deregister. In this case the connection is not disconnected immediately, and any ongoing transaction is not yet committed.

If any of these actions are taken inside the callback function itself, the action is invoked once the callback returns.

This call type is used both for message consumers and event handlers.

If requested, this is the last invocation of the callback function.

The value of the *Reason* field is set to indicate the reason for stopping.

MQCBCT_EVENT_CALL

Event handler function

The event handler function has been invoked without a message when the queue manager or connection stops or quiesces.

This call can be used to take appropriate action for all callback functions.

Message consumer function

The message consumer function has been invoked without a message when an error (*CompCode* = MQCC_FAILED) has been detected that is specific to the object handle; for example *Reason* code = MQRC_GET_INHIBITED.

The value of the *Reason* field is set to indicate the reason for the call.

MQCBCT_MC_EVENT_CALL

The event handler function has been invoked for multicast events; The event handler is sent IBM MQ Multicast events instead of 'normal' IBM MQ events.

For more information about MQCBCT_MC_EVENT_CALL, see Multicast exception reporting.

Hobj (MQHOBJ)

This is the object handle for calls to the message consumer.

For an event handler, this value is MQHO_NONE

The application can use this handle and the message token in the Get Message Options block to get the message if a message has not been removed from the queue.

This is always an input field. The initial value of this field is MQHO_UNUSABLE_HOBJ

CallbackArea (MQPTR)

This field is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the CallbackArea field in the MQCBD structure, which is a parameter on the MQCB call used to define the callback function.

Changes to the *CallbackArea* are preserved across the invocations of the callback function for an *HObj*. This field is not shared with callback functions for other handles.

This is an input/output field to the callback function. The initial value of this field is a null pointer or null bytes.

ConnectionArea (MQPTR)

This field is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the ConnectionArea field in the MQCTLO structure, which is a parameter on the MQCTL call used to control the callback function.

Any changes made to this field by the callback functions are preserved across the invocations of the callback function. This area can be used to pass information that is to be shared by all callback functions. Unlike *CallbackArea*, this area is common across all callbacks for a connection handle.

This is an input and output field. The initial value of this field is a null pointer or null bytes.

CompCode (MQLONG)

This field is the completion code. It indicates whether there were any problems consuming the message.

The value is one of the following:

MQCC_OK

Successful completion

MQCC_WARNING
Warning (partial completion)

MQCC_FAILED
Call failed

This is an input field. The initial value of this field is MQCC_OK.

Reason (MQLONG)

This is the reason code qualifying the `CompCode`.

This is an input field. The initial value of this field is MQRC_NONE.

State (MQLONG)

An indication as to the state of the current consumer. This field is of most value to an application when a nonzero reason code is passed to the consumer function.

You can use this field to simplify application programming because you do not need to code behavior for each reason code.

This is an input field. The initial value of this field is MQCS_NONE

Table 472.

State	**Queue manager action**	**Value of constant**
MQCS_NONE This reason code represents a normal call with no additional reason information	None; this is the normal operation.	0
MQCS_SUSPENDED_TEMPORARY These reason codes represent temporary conditions.	The callback routine is called to report the condition and then suspended. After a period of time the system might attempt the operation again, which can lead to the same condition being raised again.	1
MQCS_SUSPENDED_USER_ACTION These reason codes represent conditions where the callback needs to take action to resolve the condition.	The consumer is suspended and the callback routine is called to report the condition. The callback routine should resolve the condition if possible and either RESUME or close down the connection.	2
MQCS_SUSPENDED These reason codes represent failures that prevent further message callbacks.	The queue manager automatically suspends the callback function. If the callback function is resumed it is likely to receive the same reason code again.	3
MQCS_STOPPED These reason codes represent the end of message consumption.	Delivered to the exception handler and to callbacks that specified MQCBDO_STOP_CALL. No further messages can be consumed.	4

DataLength (MQLONG)

This is the length in bytes of the application data in the message. If the value is zero, it means that the message contains no application data.

The DataLength field contains the length of the message but not necessarily the length of the message data passed to the consumer. It could be that the message was truncated. Use the ReturnedLength field in the MQGMO to determine how much data has actually been passed to the consumer.

If the reason code indicates the message has been truncated, you can use the DataLength field to determine how large the actual message is. This allows you to determine the size of the buffer required to accommodate the message data, and then issue an MQCB call to update the MaxMsgLength with an appropriate value.

If the MQGMO_CONVERT option is specified, the converted message could be larger than the value returned for DataLength. In such cases, the application probably needs to issue an MQCB call to update the MaxMsgLength to to be greater than the value returned by the queue manager for DataLength.

To avoid message truncation problems, specify MaxMsgLength as MQCBD_FULL_MSG_LENGTH. This causes the queue manager to allocate a buffer for the full message length after data conversion. Be aware, however, that even if this option is specified, it is still possible that sufficient storage is not available to correctly process the request. Applications should always check the returned reason code. For example, if it is not possible to allocate sufficient storage to convert the message, the messages is returned to the application unconverted.

This is an input field to the message consumer function; it is not relevant to an event handler function.

BufferLength (MQLONG)

This field is the length in bytes of the message buffer that has been passed to this function.

The buffer can be larger than both the MaxMsgLength value defined for the consumer and the ReturnedLength value in the MQGMO.

The actual message length is supplied in DataLength field.

The application can use the entire buffer for its own purposes for the duration of the callback function.

This is an input field to the message consumer function; it is not relevant to an exception handler function.

Flags (MQLONG)

Flags containing information about this consumer.

The following option is defined:

MQCBCF_READA_BUFFER_EMPTY

This flag can be returned if a previous MQCLOSE call using the MQCO_QUIESCE option failed with a reason code of MQRC_READ_AHEAD_MSGS.

This code indicated that the last read ahead message is being returned and that the buffer is now empty. If the application issues another MQCLOSE call using the MQCO_QUIESCE) option, it succeeds.

Note, that an application is not guaranteed to be given a message with this flag set, as there might still be messages in the read-ahead buffer that do not match the current selection criteria. In this instance, the consumer function is invoked with the reason code MQRC_HOBJ_QUIESCED.

If the read ahead buffer is completely empty, the consumer is invoked with the MQCBCF_READA_BUFFER_EMPTY flag and the reason code MQRC_HOBJ_QUIESCED_NO_MSGS.

This is an input field to the message consumer function; it is not relevant to an event handler function.

ReconnectDelay (MQLONG)

ReconnectDelay indicates how long the queue manager will wait before trying to reconnect. The field can be modified by an event handler to change the delay or stop reconnection altogether.

Use the `ReconnectDelay` field only if the value of the `Reason` field in the Callback Context is `MQRC_RECONNECTING`.

On entry to the event handler the value of `ReconnectDelay` is the number of milliseconds the queue manager is going to wait before making a reconnection attempt. Table 473 on page 283 lists the values that you can set to modify the behavior of the queue manager on return from the event handler.

Table 473. ReconnectDelay values

Name	Value	Description
MQRD_NO_RECONNECT	-1	Make no more reconnection attempts. An error is returned to the application.
MQRD_NO_DELAY	0	Try to reconnect immediately.
Milliseconds	>0	Wait for this many milliseconds before retrying the connection.

MQCBD - Callback descriptor

The MQCBD structure is used to specify a callback function and the options controlling its use by the queue manager. The structure is an input parameter on the MQCB call.

Availability

The MQCBD structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

Version

The current version of MQCBD is MQCBD_VERSION_1.

Character set and encoding

Data in MQCBD must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 474. Fields in MQCBD

Field name and description	Name of constant	Initial value (if any) of constant
StrucID (structure identifier)	MQCBD_STRUC_ID	'CBD¬'
Version (structure version number)	MQCBD_VERSION_1	1
CallbackType (type of callback function)	MQCBT_MESSAGE_CONSUMER	1
Options (options controlling message consumption)	MQCBDO_NONE	0

Table 474. Fields in MQCBD (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
CallbackArea (field for callback function to use)	None	Null pointer or null blanks
CallbackFunction (whether the function is invoked as an API call)	None	Null pointer or null blanks
CallbackName (whether the function is invoked as a dynamically-linked program)	None	Null string or blanks
MaxMsgLength (length of longest message that can be read)	MQCBD_FULL_MSG_LE NGTH	-1

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null sting in the C programming language, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQCBD_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQCBD MyCBD = {MQCBD_DEFAULT};
```

Language declarations

C declaration for MQCBD

```
typedef struct tagMQCBD MQCBD;
 struct tagMQCBD {
   MQCHAR4    StrucId;                /* Structure identifier */
   MQLONG     Version;                /* Structure version number */
   MQLONG     CallBackType;           /* Callback function type */
   MQLONG     Options;                /* Options controlling message
                                         consumption */
   MQPTR      CallbackArea;           /* User data passed to the function */
   MQPTR      CallbackFunction;       /* Callback function pointer */
   MQCHAR128  CallbackName;           /* Callback name */
   MQLONG     MaxMsgLength;           /* Maximum message length */
 };
```

COBOL declaration for MQCBD

```
** MQCBCD structure
 10  MQCBD.
** Structure Identifier
 15  MQCBD-STRUCID                    PIC X(4).
** Structure Version
 15  MQCBD-VERSION                    PIC S9(9) BINARY.
 ** Callback Type
 15  MQCBD-CALLBACKTYPE               PIC S9(9) BINARY.
** Options
 15  MQCBD-OPTIONS                    PIC S9(9) BINARY.
** Callback User Area
 15  MQCBD-CALLBACKAREA               POINTER
** Callback Function Pointer
 15  MQCBD-CALLBACKFUNCTION           FUNCTION-POINTER
** Callback Program Name
 15  MQCBD-CALLBACKNAME               PIC X(128)
** Maximum Message Length
 15  MQCDB-MAXMSGLENGTH               PIC S9(9) BINARY.
```

PL/I declaration for MQCBD

```
dcl
 1 MQCBD based,
  3 StrucId             char(4),       /* Structure identifier*/
  3 Version             fixed bin(31), /* Structure version*/
  3 CallbackType        fixed bin(31), /* Callback function type */
  3 Options             fixed bin(31), /* Options */
  3 CallbackArea        pointer,       /* User area passed to the function */
  3 CallbackFunction    pointer,       /* Callback Function Pointer */
  3 CallbackName        char(128),     /* Callback Program Name */
  3 MaxMsgLength        fixed bin(31); /* Maximum Message Length */
```

StrucId (MQCHAR4)

Callback descriptor structure - StrucId field

This is the structure identifier; the value must be:

MQCBD_STRUC_ID
Identifier for callback descriptor structure.

For the C programming language, the constant MQCBD_STRUC_ID_ARRAY is also defined; this has the same value as MQCBD_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQCBD_STRUC_ID.

Version (MQLONG)

Callback descriptor structure - Version field

This is the structure version number; the value must be:

MQCBD_VERSION_1
Version-1 callback descriptor structure.

The following constant specifies the version number of the current version:

MQCBD_CURRENT_VERSION
Current version of callback descriptor structure.

This is always an input field. The initial value of this field is MQCBD_VERSION_1.

CallbackType (MQLONG)

Callback descriptor structure - CallbackType field

This is the type of the callback function. The value must be one of:

MQCBT_MESSAGE_CONSUMER
Defines this callback as a message consumer function.

A message consumer callback function is called when a message, meeting the selection criteria specified, is available on an object handle and the connection is started.

MQCBT_EVENT_HANDLER
Defines this callback as the asynchronous event routine; it is not driven to consume messages for a handle.

`Hobj` is not required on the MQCB call defining the event handler and is ignored if specified.

The event handler is called for conditions that affect the whole message consumer environment. The consumer function is invoked without a message when an event, for example, a queue manager or connection stopping, or quiescing, occurs. It is not called for conditions that are specific to a single message consumer, for example, MQRC_GET_INHIBITED.

Events are delivered to the application, regardless of whether the connection is started or stopped, except in the following environments:

- CICS on z/OS environment

- nonthreaded applications

  If the caller does not pass one of these values, the call fails with a *Reason* code of MQRC_CALLBACK_TYPE_ERROR

This is always an input field. The initial value of this field is MQCBT_MESSAGE_CONSUMER.

Options (MQLONG)

Callback descriptor structure - Options field

You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

MQCBDO_FAIL_IF_QUIESCING
The MQCB call fails if the queue manager is in the quiescing state.

On z/OS, this option also forces the MQCB call to fail if the connection (for a CICS or IMS application) is in the quiescing state.

Specify MQGMO_FAIL_IF_QUIESCING, in the MQGMO options passed on the MQCB call, to cause notification to message consumers when they are quiescing.

Control options: The following options control whether the callback function is called, without a message, when the state of the consumer changes:

MQCBDO_REGISTER_CALL
The callback function is invoked with call type MQCBCT_REGISTER_CALL.

MQCBDO_START_CALL
The callback function is invoked with call type MQCBCT_START_CALL.

MQCBDO_STOP_CALL
The callback function is invoked with call type MQCBCT_STOP_CALL.

MQCBDO_DEREGISTER_CALL
The callback function is invoked with call type MQCBCT_DEREGISTER_CALL.

MQCBDO_EVENT_CALL
The callback function is invoked with call type MQCBCT_EVENT_CALL.

MQCBDO_MC_EVENT_CALL
The callback function is invoked with call type MQCBCT__MC_EVENT_CALL.

See CallType for further details about these call types.

Default option: If you do not need any of the options described, use the following option:

MQCBDO_NONE
Use this value to indicate that no other options have been specified; all options assume their default values.

MQCBDO_NONE is defined to aid program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of the `Options` field is MQCBDO_NONE.

CallbackArea (MQPTR)

Callback descriptor structure - CallbackArea field

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the CallbackArea field in the MQCBC structure, which is a parameter on the callback function declaration.

The value is used only on an `Operation` having a value MQOP_REGISTER, with no currently defined callback, it does not replace a previous definition.

This is an input and output field to the callback function. The initial value of this field is a null pointer or null bytes.

CallbackFunction (MQPTR)

Callback descriptor structure - CallbackFunction field

The callback function is invoked as a function call.

Use this field to specify a pointer to the callback function.

You must specify either *CallbackFunction* or *CallbackName*. If you specify both, the reason code MQRC_CALLBACK_ROUTINE_ERROR is returned.

If neither *CallbackName* nor *CallbackFunction* is set, the call fails with the reason code MQRC_CALLBACK_ROUTINE_ERROR.

This option is not supported in the following environment: Programming languages and compilers that do not support function-pointer references. In such situations, the call fails with the reason code MQRC_CALLBACK_ROUTINE_ERROR.

z/OS On z/OS, the function must expect to be called with OS linkage conventions. For example, in the C programming language, specify:

```
#pragma linkage(MQCB_FUNCTION,OS)
```

This is an input field. The initial value of this field is a null pointer or null bytes.

Note: When using CICS with IBM WebSphere® MQ 7.0.1, asynchronous consumption is supported if:

- Apar PK66866 is applied to CICS TS 3.2
- Apar PK89844 is applied to CICS TS 4.1

CallbackName (MQCHAR128)

Callback descriptor structure - CallbackName field

The callback function is invoked as a dynamically linked program.

You must specify either *CallbackFunction* or *CallbackName*. If you specify both, the reason code MQRC_CALLBACK_ROUTINE_ERROR is returned.

If neither *CallbackName* nor *CallbackFunction* is not set, the call fails with the reason code MQRC_CALLBACK_ROUTINE_ERROR.

The module is loaded when the first callback routine to use is registered, and unloaded when the last callback routine to use it deregisters.

Except where noted in the following text, the name is left-justified within the field, with no embedded blanks; the name itself is padded with blanks to the length of the field. In the descriptions that follow, square brackets ([ ]) denote optional information:

IBM i

The callback name can be one of the following formats:

- Library "/" Program
- Library "/" ServiceProgram "("FunctionName")"

For example, `MyLibrary/MyProgram(MyFunction)`.

The library name can be *LIBL. Both the library and program names are limited to a maximum of 10 characters.

UNIX

The callback name is the name of a dynamically-loadable module or library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses. The library name can optionally be prefixed with a directory path:

```
[path]library(function)
```

If the path is not specified the system search path is used.

The name is limited to a maximum of 128 characters.

Windows
The callback name is the name of a dynamic-link library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses .The library name can optionally be prefixed with a directory path and drive:

```
[d:][path]library(function)
```

If the drive and path are not specified the system search path is used.

The name is limited to a maximum of 128 characters.

z/OS
The callback name is the name of a load module that is valid for specification on the EP parameter of the LINK or LOAD macro.

The name is limited to a maximum of 8 characters.

z/OS CICS
The callback name is the name of a load module that is valid for specification on the PROGRAM parameter of the EXEC CICS LINK command macro.

The name is limited to a maximum of 8 characters.

The program can be defined as remote using the REMOTESYTEM option of the installed PROGRAM definition or by the dynamic routing program.

The remote CICS region must be connected to IBM MQ if the program is to use IBM MQ API calls. Note, however, that the Hobj field in the MQCBC structure is not valid in a remote system.

If a failure occurs trying to load *CallbackName*, one of the following error codes is returned to the application:

- MQRC_MODULE_NOT_FOUND
- MQRC_MODULE_INVALID
- MQRC_MODULE_ENTRY_NOT_FOUND

A message is also written to the error log containing the name of the module for which the load was attempted, and the failing reason code from the operating system.

This is an input field. The initial value of this field is a null string or blanks.

MaxMsgLength (MQLONG)

This is the length in bytes of the longest message that can be read from the handle and given to the callback routine. Callback descriptor structure - MaxMsgLength field

If a message has a longer length, the callback routine receives *MaxMsgLength* bytes of the message, and reason code:

- MQRC_TRUNCATED_MSG_FAILED or
- MQRC_TRUNCATED_MSG_ACCEPTED if you specified MQGMO_ACCEPT_TRUNCATED_MSG.

The actual message length is supplied in the DataLength field of the MQCBC structure.

The following special value is defined:

MQCBD_FULL_MSG_LENGTH
The buffer length is adjusted by the system to return messages without truncation.

If insufficient memory is available to allocate a buffer to receive the message, the system calls the callback function with an MQRC_STORAGE_NOT_AVAILABLE reason code.

If, for example, you request data conversion, and there is insufficient memory available to convert the message data, the unconverted message is passed to the callback function.

This is an input field. The initial value of the *MaxMsgLength* field is MQCBD_FULL_MSG_LENGTH.

MQCHARV - Variable Length String

Use the MQCHARV structure to describe a variable length string.

Availability

The MQCHARV structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

Character set and encoding

Data in the MQCHARV must be in the encoding of the local queue manager that is given by MQENC_NATIVE and the character set of the VSCCSID field within the structure. If the application is running as an MQ client, the structure must be in the encoding of the client. Some character sets have a representation that depends on the encoding. If VSCCSID is one of these character sets, the encoding used is the same encoding as that of the other fields in the MQCHARV. The character set identified by VSCCSID can be a double-byte character set (DBCS).

Usage

The MQCHARV structure addresses data that might be discontiguous with the structure containing it. To address this data, fields declared with the pointer data type can be used. Be aware that COBOL does not support the pointer data type in all environments. Because of this, the data can also be addressed using fields that contain the offset of the data from the start of the structure containing the MQCHARV.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 475. Fields in MQCHARV

Field name and description	Name of constant	Initial value (if any) of constant
VSPtr (pointer to the variable length string)	None	Null pointer or null bytes.
VSOffset (offset in bytes of the variable length string from the start of the structure that contains this MQCHARV structure)	None	0

Table 475. Fields in MQCHARV (continued)

Field name and description	Name of constant	Initial value (if any) of constant
VSBufSize (size in bytes of the buffer addressed by the VSPtr or VSOffset field)	MQVS_USE_VSLENGTH	0
VSLength (length in bytes of the variable length string addressed by the VSPtr or VSOffset field)	None	0
VSCCSID (character set identifier of the variable length string addressed by the VSPtr or VSOffset field)	MQCCSI_APPL	-3
Note: In the C programming language, the macro variable MQCHARV_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure: `MQCHARV MyVarStr = {MQCHARV_DEFAULT};`		

Language declarations

C declaration for MQCHARV

```
typedef struct tagMQCHARV MQCHARV;
struct tagMQCHARV {
  MQPTR     VSPtr;               /* Address of variable length string */
  MQLONG    VSOffset;            /* Offset of variable length string */
  MQLONG    VSBufSize;           /* Size of buffer */
  MQLONG    VSLength;            /* Length of variable length string */
  MQLONG    VSCCSID;             /* CCSID of variable length string */
};
```

COBOL declaration for MQCHARV

```
** MQCHARV structure
 10  MQCHARV.
** Address of variable length string
 15  MQCHARV-VSPTR        POINTER.
** Offset of variable length string
 15  MQCHARV-VSOFFSET     PIC S9(9) BINARY.
** Size of buffer
 15  MQCHARV-VSBUFSIZE    PIC S9(9) BINARY.
** Length of variable length string
 15  MQCHARV-VSLENGTH     PIC S9(9) BINARY.
** CCSID of variable length string
 15  MQCHARV-VSCCSID      PIC S9(9) BINARY.
```

Note: If you want to port a COBOL application between environments, you must find out if the pointer data type is available in all the intended environments. If not, the application must address the data using the offset fields instead of the pointer fields. In environments where pointers are not supported, you can declare the pointer fields as byte strings of the appropriate length, with the initial value being the all-null byte string. Do not alter this initial value if you are using the offset fields. One way to do this without changing the supplied copy books is to use the following:

```
COPY CMQCHRVV REPLACING POINTER BY ==BINARY PIC S9(9)==.
```

where CMQCHRVV can be exchanged for the copy book to be used.

PL/I declaration for MQCHARV

```
dcl
 1 MQCHARV based,
  3 VSPtr       pointer,       /* Address of variable length string */
  3 VSOffset    fixed bin(31), /* Offset of variable length string */
  3 VSBufSize   fixed bin(31), /* Size of buffer */
  3 VSLength    fixed bin(31), /* Length of variable length string */
  3 VSCCSID     fixed bin(31); /* CCSID of variable length string */
```

High Level Assembler declaration for MQCHARV

```
MQCHARV            DSECT
MQCHARV_VSPTR      DS   F     Address of variable length string
MQCHARV_VSOFFSET   DS   F     Offset of variable length string
MQCHARV_VSBUFSIZE  DS   F     Size of buffer
MQCHARV_VSLENGTH   DS   F     Length of variable length string
MQCHARV_VSCCSID    DS   F     CCSID of variable length string
*
MQCHARV_LENGTH     EQU  *-MQCHARV
                   ORG  MQCHARV
MQCHARV_AREA       DS   CL(MQCHARV_LENGTH)
```

VSPtr (MQPTR)

This is a pointer to the variable length string.

You can use either the VSPtr or VSOffset field to specify the variable length string, but not both.

The initial value of this field is a null pointer or null bytes.

VSOffset (MQLONG)

The offset can be positive or negative. You can use either the VSPtr or VSOffset field to specify the variable length string, but not both. The offset in bytes of the variable length string from the start of the MQCHARV, or the structure containing it.

When the MQCHARV structure is embedded within another structure, this value is the offset in bytes of the variable length string from the start of the structure that contains this MQCHARV structure. When the MQCHARV structure is not embedded within another structure, for example, if it is specified as a parameter on a function call, the offset is relative to the start of the MQCHARV structure.

The initial value of this field is 0.

VSBufSize (MQLONG)

This is the size in bytes of the buffer addressed by the VSPtr or VSOffset field.

When the MQCHARV structure is used as an output field on a function call, this field must be initialised with the length of the buffer provided. If the value of VSLength is greater than VSBufSize then only VSBufSize bytes of data are returned to the caller in the buffer.

This value must be a value greater than or equal to zero, or the following special value which is recognized:

MQVS_USE_VSLENGTH

When specified, the length of the buffer is taken from the VSLength field in the MQCHARV structure. Do not use this value when using the structure as an output field and a buffer is provided.

This is the initial value of this field.

VSLength (MQLONG)

The length in bytes of the variable length string addressed by the VSPtr or VSOffset field.

The initial value of this field is 0. The value must be either greater than or equal to zero or the following special value which is recognized:

MQVS_NULL_TERMINATED

If MQVS_NULL_TERMINATED is not specified, VSLength bytes are included as part of the string. If null characters are present they do not delimit the string.

If MQVS_NULL_TERMINATED is specified, the string is delimited by the first null encountered in the string. The null itself is not included as part of that string.

Note: The null character used to terminate a string if MQVS_NULL_TERMINATED is specified is a null from the codeset specified by VSCCSID.

For example, in UTF-16 (CCSIDs 1200, 13488, and 17584), this is the two byte Unicode encoding where a null is represented by a 16-bit number of all zeros. In UTF-16 it is common to find single bytes set to all zero which are part of characters (7-bit ASCII characters for instance), but the strings will only be null terminated when two 'zero' bytes are found on an even byte boundary. It is possible to get two 'zero' bytes on an odd boundary when they are each part of valid characters. For example x'01' x'00 x'00' x'30' represents two valid Unicode characters and does not null terminate the string.

VSCCSID (MQLONG)

This is the character set identifier of the variable length string addressed by the **VSPtr** or **VSOffset** field.

The initial value of this field is *MQCCSI_APPL*, which is defined by MQ to indicate that it should be changed to the true character set identifier of the current process. As a result, the value of constant *MQCCSI_APPL* is never associated with a variable length string.

The initial value of this field can be changed by defining a different value for the constant *MQCCSI_APPL* for your compile unit. How you do this depends on your application's programming language.

z/OS On z/OS systems, the default application CCSID used by *MQCCSI_APPL* is defined as follows:

- For batch LE applications using the DLL interface, the default is the CODESET associated with the current locale at the time **MQCONN** is issued (default value is 1047).
- For batch LE applications bound with one of the batch MQ stubs, the default is the CODESET associated with the current locale at the time of the first MQI call issued after **MQCONN** (default value is 1047).
- For batch non-LE applications running on a USS thread, the default is the value of THLICCSID at the time of the first MQI call issued after **MQCONN** (default value is 1047).
- For other batch applications, the default is the CCSID of the queue manager.

Redefinition of MQCCSI_APPL

The following examples show how you can override the value of MQCCSI_APPL in various programming languages. You can change the value of MQCCSI_APPL, removing the need to set the VSCCSID for each variable length string separately. In these examples the CCSID is set to 1208; change this to the value you require. This becomes the default value, which you can override by setting the VSCCSID in any specific instance of MQCHARV.

C usage

```
#define MQCCSI_APPL 1208
#include <cmqc.h>
```

COBOL usage

```
COPY CMQXYZV REPLACING -3 BY 1208.
```

PL/I usage

```
%MQCCSI_APPL = '1208';
%include syslib(cmqp);
```

High Level Assembler usage

```
MQCCSI_APPL EQU 1208
CMQA LIST=NO
```

MQCIH - CICS bridge header

The MQCIH structure describes the header information for a message sent to CICS across the CICS bridge.

For any IBM MQ supported platform you can create and transmit a message that includes the MQCIH structure, but only an IBM MQ for z/OS queue manager can use the CICS bridge. Therefore, for the message to get to CICS from a non-z/OS queue manager, your queue manager network must include at least one z/OS queue manager through which the message can be routed.

All the CICS versions supported by IBM MQ 9.0.0, and later use the CICS supplied version of the bridge. For more information about configuring the IBM MQ CICS adapter, and the IBM MQ CICS bridge components, see the Configuring connections to MQ section of the CICS documentation.

Availability

The MQCIH structure is available on the following platforms:

- AIX AIX
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

Format name

MQFMT_CICS

Version

The current version of MQCIH is MQCIH_VERSION_2. Fields that exist only in the more recent version of the structure are identified as such in the descriptions that follow.

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most-recent version of MQCIH, with the initial value of the `Version` field set to MQCIH_VERSION_2.

Character set and encoding

Special conditions apply to the character set and encoding used for the MQCIH structure and application message data:

- Applications that connect to the queue manager that owns the CICS bridge queue must provide an MQCIH structure that is in the character set and encoding of the queue manager. This is because data conversion of the MQCIH structure is not performed in this case.

- Applications that connect to other queue managers can provide an MQCIH structure that is in any of the supported character sets and encodings; the receiving message channel agent connected to the queue manager that owns the CICS bridge queue converts the MQCIH structure.
- The application message data following the MQCIH structure must be in the same character set and encoding as the MQCIH structure. You cannot use the *CodedCharSetId* and *Encoding* fields in the MQCIH structure to specify the character set and encoding of the application message data.

  You must provide a data-conversion exit to convert the application message data if the data is not one of the built-in formats supported by the queue manager.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 476. Fields in MQCIH for MQCIH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQCIH_STRUC_ID	'CIH¬'
Version (structure version number)	MQCIH_VERSION_2	2
StrucLength (length of MQCIH structure)	MQCIH_LENGTH_2	180
Encoding (reserved)	None	0
CodedCharSetId (reserved)	None	0
Format (MQ format name of data that follows MQCIH)	MQFMT_NONE	Blanks
Flags (flags)	MQCIH_NONE	0
ReturnCode (return code from bridge)	MQCRC_OK	0
CompCode (MQ completion code or CICS EIBRESP)	MQCC_OK	0
Reason (MQ reason or feedback code, or CICS EIBRESP2)	MQRC_NONE	0
UOWControl (unit-of-work control)	MQCUOWC_ONLY	273
GetWaitInterval (wait interval for MQGET call issued by bridge task)	MQCGWI_DEFAULT	-2
LinkType (link type)	MQCLT_PROGRAM	1
OutputDataLength (output COMMAREA data length)	MQCODL_AS_INPUT	-1
FacilityKeepTime (bridge facility release time)	None	0
ADSDescriptor (send/receive ADS descriptor)	MQCADSD_NONE	0
ConversationalTask (whether task can be conversational)	MQCCT_NO	0
TaskEndStatus (status at end of task)	MQCTES_NOSYNC	0
Facility (bridge facility token)	MQCFAC_NONE	Nulls
Function (MQ call name or CICS EIBFN function)	MQCFUNC_NONE	Blanks
AbendCode (abend code)	None	Blanks

Table 476. Fields in MQCIH for MQCIH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Authenticator (password or passticket)	None	Blanks
Reserved1 (reserved)	None	Blanks
ReplyToFormat (MQ format name of reply message)	MQFMT_NONE	Blanks
RemoteSysId (remote CICS system Id to use)	None	Blanks
RemoteTransId (CICS RTRANSID to use)	None	Blanks
TransactionId (transaction to attach)	None	Blanks
FacilityLike (terminal emulated attributes)	None	Blanks
AttentionId (AID key)	None	Blanks
StartCode (transaction start code)	MQCSC_NONE	Blanks
CancelCode (abend transaction code)	None	Blanks
NextTransactionId (next transaction to attach)	None	Blanks
Reserved2 (reserved)	None	Blanks
Reserved3 (reserved)	None	Blanks
Note: The remaining fields are not present if `Version` is less than MQCIH_VERSION_2.		
CursorPosition (cursor position)	None	0
ErrorOffset (offset of error in message)	None	0
InputItem (input item)	None	0
Reserved4 (reserved)	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQCIH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQCIH MyCIH = {MQCIH_DEFAULT};
```

Language declarations

C declaration for MQCIH

```
typedef struct tagMQCIH MQCIH;
struct tagMQCIH {
  MQCHAR4  StrucId;            /* Structure identifier */
  MQLONG   Version;            /* Structure version number */
  MQLONG   StrucLength;        /* Length of MQCIH structure */
  MQLONG   Encoding;           /* Reserved */
  MQLONG   CodedCharSetId;     /* Reserved */
  MQCHAR8  Format;             /* MQ format name of data that follows
                                  MQCIH */
  MQLONG   Flags;              /* Flags */
  MQLONG   ReturnCode;         /* Return code from bridge */
  MQLONG   CompCode;           /* MQ completion code or CICS EIBRESP */
  MQLONG   Reason;             /* MQ reason or feedback code, or CICS
```

```
                                       EIBRESP2 */
   MQLONG   UOWControl;          /* Unit-of-work control */
   MQLONG   GetWaitInterval;     /* Wait interval for MQGET call issued
                                    by bridge task */
   MQLONG   LinkType;            /* Link type */
   MQLONG   OutputDataLength;    /* Output COMMAREA data length */
   MQLONG   FacilityKeepTime;    /* Bridge facility release time */
   MQLONG   ADSDescriptor;       /* Send/receive ADS descriptor */
   MQLONG   ConversationalTask;  /* Whether task can be conversational */
   MQLONG   TaskEndStatus;       /* Status at end of task */
   MQBYTE8  Facility;            /* Bridge facility token */
   MQCHAR4  Function;            /* MQ call name or CICS EIBFN
                                    function */
   MQCHAR4  AbendCode;           /* Abend code */
   MQCHAR8  Authenticator;       /* Password or passticket */
   MQCHAR8  Reserved1;           /* Reserved */
   MQCHAR8  ReplyToFormat;       /* MQ format name of reply message */
   MQCHAR4  RemoteSysId;         /* Reserved */
   MQCHAR4  RemoteTransId;       /* Reserved */
   MQCHAR4  TransactionId;       /* Transaction to attach */
   MQCHAR4  FacilityLike;        /* Terminal emulated attributes */
   MQCHAR4  AttentionId;         /* AID key */
   MQCHAR4  StartCode;           /* Transaction start code */
   MQCHAR4  CancelCode;          /* Abend transaction code */
   MQCHAR4  NextTransactionId;   /* Next transaction to attach */
   MQCHAR8  Reserved2;           /* Reserved */
   MQCHAR8  Reserved3;           /* Reserved */
   MQLONG   CursorPosition;      /* Cursor position */
   MQLONG   ErrorOffset;         /* Offset of error in message */
   MQLONG   InputItem;           /* Reserved */
   MQLONG   Reserved4;           /* Reserved */
 };
```

COBOL declaration for MQCIH

```
**   MQCIH structure
  10 MQCIH.
**    Structure identifier
   15 MQCIH-STRUCID            PIC X(4).
**    Structure version number
   15 MQCIH-VERSION            PIC S9(9) BINARY.
**    Length of MQCIH structure
   15 MQCIH-STRUCLENGTH        PIC S9(9) BINARY.
**    Reserved
   15 MQCIH-ENCODING           PIC S9(9) BINARY.
**    Reserved
   15 MQCIH-CODEDCHARSETID     PIC S9(9) BINARY.
**    MQ format name of data that follows MQCIH
   15 MQCIH-FORMAT             PIC X(8).
**    Flags
   15 MQCIH-FLAGS              PIC S9(9) BINARY.
**    Return code from bridge
   15 MQCIH-RETURNCODE         PIC S9(9) BINARY.
**    MQ completion code or CICS EIBRESP
   15 MQCIH-COMPCODE           PIC S9(9) BINARY.
**    MQ reason or feedback code, or CICS EIBRESP2
   15 MQCIH-REASON             PIC S9(9) BINARY.
**    Unit-of-work control
   15 MQCIH-UOWCONTROL         PIC S9(9) BINARY.
**    Wait interval for MQGET call issued by bridge task
   15 MQCIH-GETWAITINTERVAL    PIC S9(9) BINARY.
**    Link type
   15 MQCIH-LINKTYPE           PIC S9(9) BINARY.
**    Output COMMAREA data length
   15 MQCIH-OUTPUTDATALENGTH   PIC S9(9) BINARY.
**    Bridge facility release time
   15 MQCIH-FACILITYKEEPTIME   PIC S9(9) BINARY.
**    Send/receive ADS descriptor
   15 MQCIH-ADSDESCRIPTOR      PIC S9(9) BINARY.
**    Whether task can be conversational
   15 MQCIH-CONVERSATIONALTASK PIC S9(9) BINARY.
**    Status at end of task
   15 MQCIH-TASKENDSTATUS      PIC S9(9) BINARY.
**    Bridge facility token
   15 MQCIH-FACILITY           PIC X(8).
**    MQ call name or CICS EIBFN function
   15 MQCIH-FUNCTION           PIC X(4).
**    Abend code
   15 MQCIH-ABENDCODE          PIC X(4).
```

```
**    Password or passticket
   15 MQCIH-AUTHENTICATOR      PIC X(8).
**    Reserved
   15 MQCIH-RESERVED1          PIC X(8).
**    MQ format name of reply message
   15 MQCIH-REPLYTOFORMAT      PIC X(8).
**    Reserved
   15 MQCIH-REMOTESYSID        PIC X(4).
**    Reserved
   15 MQCIH-REMOTETRANSID      PIC X(4).
**    Transaction to attach
   15 MQCIH-TRANSACTIONID      PIC X(4).
**    Terminal emulated attributes
   15 MQCIH-FACILITYLIKE       PIC X(4).
**    AID key
   15 MQCIH-ATTENTIONID        PIC X(4).
**    Transaction start code
   15 MQCIH-STARTCODE          PIC X(4).
**    Abend transaction code
   15 MQCIH-CANCELCODE         PIC X(4).
**    Next transaction to attach
   15 MQCIH-NEXTTRANSACTIONID  PIC X(4).
**    Reserved
   15 MQCIH-RESERVED2          PIC X(8).
**    Reserved
   15 MQCIH-RESERVED3          PIC X(8).
**    Cursor position
   15 MQCIH-CURSORPOSITION     PIC S9(9) BINARY.
**    Offset of error in message
   15 MQCIH-ERROROFFSET        PIC S9(9) BINARY.
**    Reserved
   15 MQCIH-INPUTITEM          PIC S9(9) BINARY.
**    Reserved
   15 MQCIH-RESERVED4          PIC S9(9) BINARY.
```

PL/I declaration for MQCIH

```
dcl
 1 MQCIH based,
  3 StrucId            char(4),        /* Structure identifier */
  3 Version            fixed bin(31), /* Structure version number */
  3 StrucLength        fixed bin(31), /* Length of MQCIH structure */
  3 Encoding           fixed bin(31), /* Reserved */
  3 CodedCharSetId     fixed bin(31), /* Reserved */
  3 Format             char(8),        /* MQ format name of data that
                                          follows MQCIH */
  3 Flags              fixed bin(31), /* Flags */
  3 ReturnCode         fixed bin(31), /* Return code from bridge */
  3 CompCode           fixed bin(31), /* MQ completion code or CICS
                                          EIBRESP */
  3 Reason             fixed bin(31), /* MQ reason or feedback code, or
                                          CICS EIBRESP2 */
  3 UOWControl         fixed bin(31), /* Unit-of-work control */
  3 GetWaitInterval    fixed bin(31), /* Wait interval for MQGET call
                                          issued by bridge task */
  3 LinkType           fixed bin(31), /* Link type */
  3 OutputDataLength   fixed bin(31), /* Output COMMAREA data length */
  3 FacilityKeepTime   fixed bin(31), /* Bridge facility release time */
  3 ADSDescriptor      fixed bin(31), /* Send/receive ADS descriptor */
  3 ConversationalTask fixed bin(31), /* Whether task can be
                                          conversational */
  3 TaskEndStatus      fixed bin(31), /* Status at end of task */
  3 Facility           char(8),        /* Bridge facility token */
  3 Function           char(4),        /* MQ call name or CICS EIBFN
                                          function */
  3 AbendCode          char(4),        /* Abend code */
  3 Authenticator      char(8),        /* Password or passticket */
  3 Reserved1          char(8),        /* Reserved */
  3 ReplyToFormat      char(8),        /* MQ format name of reply
                                          message */
  3 RemoteSysId        char(4),        /* Reserved */
  3 RemoteTransId      char(4),        /* Reserved */
  3 TransactionId      char(4),        /* Transaction to attach */
  3 FacilityLike       char(4),        /* Terminal emulated attributes */
  3 AttentionId        char(4),        /* AID key */
  3 StartCode          char(4),        /* Transaction start code */
  3 CancelCode         char(4),        /* Abend transaction code */
  3 NextTransactionId  char(4),        /* Next transaction to attach */
  3 Reserved2          char(8),        /* Reserved */
```

```
  3 Reserved3          char(8),       /* Reserved */
  3 CursorPosition     fixed bin(31), /* Cursor position */
  3 ErrorOffset        fixed bin(31), /* Offset of error in message */
  3 InputItem          fixed bin(31), /* Reserved */
  3 Reserved4          fixed bin(31); /* Reserved */
```

High Level Assembler declaration for MQCIH

```
MQCIH                        DSECT
MQCIH_STRUCID                DS   CL4  Structure identifier
MQCIH_VERSION                DS   F    Structure version number
MQCIH_STRUCLENGTH            DS   F    Length of MQCIH structure
MQCIH_ENCODING               DS   F    Reserved
MQCIH_CODEDCHARSETID         DS   F    Reserved
MQCIH_FORMAT                 DS   CL8  MQ format name of data that follows
*                                      MQCIH
MQCIH_FLAGS                  DS   F    Flags
MQCIH_RETURNCODE             DS   F    Return code from bridge
MQCIH_COMPCODE               DS   F    MQ completion code or CICS EIBRESP
MQCIH_REASON                 DS   F    MQ reason or feedback code, or CICS
*                                      EIBRESP2
MQCIH_UOWCONTROL             DS   F    Unit-of-work control
MQCIH_GETWAITINTERVAL        DS   F    Wait interval for MQGET call issued
*                                      by bridge task
MQCIH_LINKTYPE               DS   F    Link type
MQCIH_OUTPUTDATALENGTH       DS   F    Output COMMAREA data length
MQCIH_FACILITYKEEPTIME       DS   F    Bridge facility release time
MQCIH_ADSDESCRIPTOR          DS   F    Send/receive ADS descriptor
MQCIH_CONVERSATIONALTASK     DS   F    Whether task can be conversational
MQCIH_TASKENDSTATUS          DS   F    Status at end of task
MQCIH_FACILITY               DS   XL8  Bridge facility token
MQCIH_FUNCTION               DS   CL4  MQ call name or CICS EIBFN function
MQCIH_ABENDCODE              DS   CL4  Abend code
MQCIH_AUTHENTICATOR          DS   CL8  Password or passticket
MQCIH_RESERVED1              DS   CL8  Reserved
MQCIH_REPLYTOFORMAT          DS   CL8  MQ format name of reply message
MQCIH_REMOTESYSID            DS   CL4  Reserved
MQCIH_REMOTETRANSID          DS   CL4  Reserved
MQCIH_TRANSACTIONID          DS   CL4  Transaction to attach
MQCIH_FACILITYLIKE           DS   CL4  Terminal emulated attributes
MQCIH_ATTENTIONID            DS   CL4  AID key
MQCIH_STARTCODE              DS   CL4  Transaction start code
MQCIH_CANCELCODE             DS   CL4  Abend transaction code
MQCIH_NEXTTRANSACTIONID      DS   CL4  Next transaction to attach
MQCIH_RESERVED2              DS   CL8  Reserved
MQCIH_RESERVED3              DS   CL8  Reserved
MQCIH_CURSORPOSITION         DS   F    Cursor position
MQCIH_ERROROFFSET            DS   F    Offset of error in message
MQCIH_INPUTITEM              DS   F    Reserved
MQCIH_RESERVED4              DS   F    Reserved
*
MQCIH_LENGTH                 EQU  *-MQCIH
                             ORG  MQCIH
MQCIH_AREA                   DS   CL(MQCIH_LENGTH)
```

Visual Basic declaration for MQCIH

```
Type MQCIH
  StrucId             As String*4 'Structure identifier'
  Version             As Long     'Structure version number'
  StrucLength         As Long     'Length of MQCIH structure'
  Encoding            As Long     'Reserved'
  CodedCharSetId      As Long     'Reserved'
  Format              As String*8 'MQ format name of data that follows'
                                  'MQCIH'
  Flags               As Long     'Flags'
  ReturnCode          As Long     'Return code from bridge'
  CompCode            As Long     'MQ completion code or CICS EIBRESP'
  Reason              As Long     'MQ reason or feedback code, or CICS'
                                  'EIBRESP2'
  UOWControl          As Long     'Unit-of-work control'
  GetWaitInterval     As Long     'Wait interval for MQGET call issued'
                                  'by bridge task'
  LinkType            As Long     'Link type'
  OutputDataLength    As Long     'Output COMMAREA data length'
  FacilityKeepTime    As Long     'Bridge facility release time'
  ADSDescriptor       As Long     'Send/receive ADS descriptor'
```

```
   ConversationalTask As Long     'Whether task can be conversational'
   TaskEndStatus      As Long     'Status at end of task'
   Facility           As MQBYTE8  'Bridge facility token'
   Function           As String*4 'MQ call name or CICS EIBFN function'
   AbendCode          As String*4 'Abend code'
   Authenticator      As String*8 'Password or passticket'
   Reserved1          As String*8 'Reserved'
   ReplyToFormat      As String*8 'MQ format name of reply message'
   RemoteSysId        As String*4 'Reserved'
   RemoteTransId      As String*4 'Reserved'
   TransactionId      As String*4 'Transaction to attach'
   FacilityLike       As String*4 'Terminal emulated attributes'
   AttentionId        As String*4 'AID key'
   StartCode          As String*4 'Transaction start code'
   CancelCode         As String*4 'Abend transaction code'
   NextTransactionId  As String*4 'Next transaction to attach'
   Reserved2          As String*8 'Reserved'
   Reserved3          As String*8 'Reserved'
   CursorPosition     As Long     'Cursor position'
   ErrorOffset        As Long     'Offset of error in message'
   InputItem          As Long     'Reserved'
   Reserved4          As Long     'Reserved'
 End Type
```

Usage

If the application requires values that are the same as the initial values shown in Table 476 on page 294, and the bridge is running with AUTH=LOCAL or AUTH=IDENTIFY, you can omit the MQCIH structure from the message. In all other cases, the structure must be present.

The bridge accepts either a version-1 or a version-2 MQCIH structure, but for 3270 transactions, you must use a version-2 structure.

The application must ensure that fields documented as request fields have appropriate values in the message sent to the bridge; these fields are input to the bridge.

Fields documented as response fields are set by the CICS bridge in the reply message that the bridge sends to the application. Error information is returned in the *ReturnCode*, *Function*, *CompCode*, *Reason*, and *AbendCode* fields, but not all of them are set in all cases. The following table shows which fields are set for different values of *ReturnCode*.

Table 477. Contents of error information fields in MQCIH structure for MQCIH

ReturnCode	***Function***	***CompCode***	***Reason***	***AbendCode***
MQCRC_OK	-	-	-	-
MQCRC_BRIDGE_ERROR	-	-	MQFB_CICS_*	-
MQCRC_MQ_API_ERROR MQCRC_BRIDGE_TIMEOUT	MQ call name	MQ *CompCode*	MQ *Reason*	-
MQCRC_CICS_EXEC_ERROR MQCRC_SECURITY_ERROR MQCRC_PROGRAM_NOT_AVAILABLE MQCRC_TRANSID_NOT_AVAILABLE	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	-
MQCRC_BRIDGE_ABEND MQCRC_APPLICATION_ABEND	-	-	-	CICS ABCODE

StrucId (MQCHAR4)

This field is a request field, with an initial value of MQCIH_STRUC_ID.

The value must be:

MQCIH_STRUC_ID
Identifier for CICS information header structure.

For the C programming language, the constant MQCIH_STRUC_ID_ARRAY is also defined; this has the same value as MQCIH_STRUC_ID, but is an array of characters instead of a string.

Version (MQLONG)

This field is a request field. Its initial value is MQCIH_VERSION_2.

The value must be one of the following:

MQCIH_VERSION_1
Version-1 CICS information header structure.

MQCIH_VERSION_2
Version-2 CICS information header structure.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQCIH_CURRENT_VERSION
Current version of CICS information header structure.

StrucLength (MQLONG)

This field is a request field, with an initial value of MQCIH_LENGTH_2.

The value must be one of the following:

MQCIH_LENGTH_1
Length of version-1 CICS information header structure.

MQCIH_LENGTH_2
Length of version-2 CICS information header structure.

The following constant specifies the length of the current version:

MQCIH_CURRENT_LENGTH
Length of current version of CICS information header structure.

Encoding (MQLONG)

This field is a reserved field; its value is not significant. Its initial value is 0.

The Encoding for supported structures which follow an MQCIH structure is the same as the Encoding of the MQCIH structure itself and taken from any preceding IBM MQ header.

CodedCharSetId (MQLONG)

CodedCharSetId is a reserved field; its value is not significant. The initial value of this field is 0.

The Character Set ID for supported structures which follow an MQCIH structure is the same as the Character Set ID of the MQCIH structure itself and is taken from any preceding IBM MQ header.

Format (MQCHAR8)

This field shows the IBM MQ format name of the data that follows the MQCIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as the rules for coding the *Format* field in MQMD.

This format name is also used for the reply message, if the *ReplyToFormat* field has the value MQFMT_NONE.

- For DPL requests, *Format* must be the format name of the COMMAREA.
- For 3270 requests, *Format* must be CSQCBDCI, and the bridge sets the format to CSQCBDCO for Reply messages.

The data-conversion exits for these formats must be installed on the queue manager where they are to run.

If the request message generates an error reply message, the error reply message has a format name of MQFMT_STRING.

This field is a request field. The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

This field is a request field. The initial value of this field is MQCIH_NONE.

The value must be:

MQCIH_NONE
No flags.

MQCIH_PASS_EXPIRATION
The reply message contains:

- The same expiry report options as the request message.
- The remaining expiry time from the request message with no adjustment made for the processing time of the bridge.

If you omit this value, the expiry time is set to *unlimited*.

MQCIH_REPLY_WITHOUT_NULLS
The reply message length of a CICS DPL program request is adjusted to exclude trailing nulls (X'00') at the end of the COMMAREA returned by the DPL program. If this value is not set, the nulls might be significant, and the full COMMAREA is returned.

MQCIH_SYNC_ON_RETURN
The CICS link for DPL requests uses the SYNCONRETURN option, causing CICS to take a sync point when the program completes if it is shipped to another CICS region. The bridge does not specify to which CICS region to ship the request; that is controlled by the CICS program definition or workload balancing facilities.

ReturnCode (MQLONG)

The value of this field is the return code from the CICS bridge describing the outcome of the processing performed by the bridge. This field is a response field, with an initial value of MQCRC_OK.

The *Function*, *CompCode*, *Reason*, and *AbendCode* fields might contain additional information (see Table 477 on page 299). The value is one of the following:

MQCRC_APPLICATION_ABEND
(5, X'005') Application ended abnormally.

MQCRC_BRIDGE_ABEND
(4, X'004') CICS bridge ended abnormally.

MQCRC_BRIDGE_ERROR
(3, X'003') CICS bridge detected an error.

MQCRC_BRIDGE_TIMEOUT
(8, X'008') Second or later message within current unit of work not received within specified time.

MQCRC_CICS_EXEC_ERROR
(1, X'001') EXEC CICS statement detected an error.

MQCRC_MQ_API_ERROR
(2, X'002') MQ call detected an error.

MQCRC_OK
(0, X'000') No error.

MQCRC_PROGRAM_NOT_AVAILABLE
(7, X'007') Program not available.

MQCRC_SECURITY_ERROR
(6, X'006') Security error occurred.

MQCRC_TRANSID_NOT_AVAILABLE
(9, X'009') Transaction not available.

CompCode (MQLONG)

This field is a response field. Its initial value is MQCC_OK

The value returned in this field depends on `ReturnCode` ; see Table 477 on page 299.

Reason (MQLONG)

This field is a response field. Its initial value is MQRC_NONE.

The value returned in this field depends on `ReturnCode` ; see Table 477 on page 299.

UOWControl (MQLONG)

This field is a request field which controls the unit-of-work processing performed by the CICS bridge. The initial value of this field is MQCUOWC_ONLY.

You can request the bridge to run a single transaction, or one or more programs within a unit of work. The field indicates whether the CICS bridge starts a unit of work, performs the requested function within the current unit of work, or ends the unit of work by committing it or backing it out. Various combinations are supported, to optimize the data transmission flows.

The value must be one of the following:

MQCUOWC_ONLY
Start unit of work, perform function, then commit the unit of work.

MQCUOWC_CONTINUE
Additional data for the current unit of work (3270 only).

MQCUOWC_FIRST
Start unit of work and perform function.

MQCUOWC_MIDDLE
Perform function within current unit of work

MQCUOWC_LAST
Perform function, then commit the unit of work.

MQCUOWC_COMMIT
Commit the unit of work (DPL only).

MQCUOWC_BACKOUT
Back out the unit of work (DPL only).

GetWaitInterval (MQLONG)

This field is a request field. Its initial value is MQCGWI_DEFAULT.

This field applies only when `UOWControl` has the value MQCUOWC_FIRST. It enables the sending application to specify the approximate time in milliseconds that the MQGET calls issued by the bridge will wait for second and subsequent request messages for the unit of work started by this message. This facility overrides the default wait interval used by the bridge. You can use the following special values:

MQCGWI_DEFAULT
Default wait interval.

This value causes the CICS bridge to wait for the time specified when the bridge was started.

MQWI_UNLIMITED
Unlimited wait interval.

LinkType (MQLONG)

This field is a request field. Its initial value is MQCLT_PROGRAM.

This value indicates the type of object that the bridge tries to link. It must be one of the following values:

MQCLT_PROGRAM
DPL program.

MQCLT_TRANSACTION
3270 transaction.

OutputDataLength (MQLONG)

This field is a request field used only for DPL programs. Its initial value is MQCODL_AS_INPUT.

This value is the length of the user data to be returned to the client in a reply message. This length includes the 8-byte program name. The length of the COMMAREA passed to the linked program is the maximum of this field and the length of the user data in the request message, minus 8.

Note: The length of the user data in a message is the length of the message excluding the MQCIH structure.

If the length of the user data in the request message is smaller than *OutputDataLength*, the DATALENGTH option of the LINK command is used, enabling the LINK to be function-shipped efficiently to another CICS region.

You can use the following special value:

MQCODL_AS_INPUT
Output length is same as input length.

This value might be needed even if no reply is requested, in order to ensure that the COMMAREA passed to the linked program is of sufficient size.

FacilityKeepTime (MQLONG)

FacilityKeepTime is the length of time in seconds that the bridge facility is kept after the user transaction ends.

For pseudo-conversational transactions, specify a value that corresponds to the expected duration of a pseudo-conversation; specify zero for the last transaction of a pseudo-conversation, and for other transaction types specify zero.

This field is a request field used only for 3270 transactions. The initial value of this field is 0.

ADSDescriptor (MQLONG)

This field is an indicator specifying whether to send ADS descriptors on SEND and RECEIVE BMS requests.

The following values are defined:

MQCADSD_NONE
Do not send or receive ADS descriptors.

MQCADSD_SEND
Send ADS descriptors.

MQCADSD_RECV
Receive ADS descriptors.

MQCADSD_MSGFORMAT
Use message format for the ADS descriptors.

This sends or receives the ADS descriptors using the long form of the ADS descriptor. The long form has fields that are aligned on 4-byte boundaries.

Set the *ADSDescriptor* field as follows:

- If you are not using ADS descriptors, set the field to MQCADSD_NONE.
- If you are using ADS descriptors with the *same* CCSID in each environment, set the field to the sum of MQCADSD_SEND and MQCADSD_RECV.
- If you are using ADS descriptors with *different* CCSIDs in each environment, set the field to the sum of MQCADSD_SEND, MQCADSD_RECV, and MQCADSD_MSGFORMAT.

This is a request field used only for 3270 transactions. The initial value of this field is MQCADSD_NONE.

ConversationalTask (MQLONG)

This field is an indicator specifying whether to allow the task to issue requests for more information, or to stop the task and issue an abend message.

The value must be one of the following options:

MQCCT_YES
: The task is conversational.

MQCCT_NO
: The task is not conversational.

This field is a request field used only for 3270 transactions. The initial value of this field is MQCCT_NO.

TaskEndStatus (MQLONG)

This field is a response field, showing the status of the user transaction at end of task. The field is used only for 3270 transactions, and its initial value is MQCTES_NOSYNC.

One of the following values is returned:

MQCTES_NOSYNC
: Not synchronized.

: The user transaction has not yet completed and has not syncpointed. The *MsgType* field in MQMD is MQMT_REQUEST in this case.

MQCTES_COMMIT
: Commit unit of work.

: The user transaction has not yet completed, but has syncpointed the first unit of work. The *MsgType* field in MQMD is MQMT_DATAGRAM in this case.

MQCTES_BACKOUT
: Back out unit of work.

: The user transaction has not yet completed. The current unit of work is backed out. The *MsgType* field in MQMD is MQMT_DATAGRAM in this case.

MQCTES_ENDTASK
: End task.

: The user transaction has ended (or abended). The *MsgType* field in MQMD is MQMT_REPLY in this case.

Facility (MQBYTE8)

This field shows the 8-byte bridge facility token.

A bridge facility token enables multiple transactions in a pseudo-conversation to use the same bridge facility (virtual 3270 terminal). In the first, or only, message in a pseudo-conversation, set a value of MQCFAC_NONE. This value tells CICS to allocate a new bridge facility for this message. A bridge facility token is returned in response messages when a nonzero *FacilityKeepTime* is specified on the input message. Subsequent input messages within a pseudo-conversation must then use the same bridge facility token.

The following special value is defined:

MQCFAC_NONE
: No facility token specified.

: For the C programming language, the constant MQCFAC_NONE_ARRAY is also defined, and has the same value as MQCFAC_NONE, but is an array of characters instead of a string.

This field is both a request and a response field used only for 3270 transactions. The length of this field is given by MQ_FACILITY_LENGTH. The initial value of this field is MQCFAC_NONE.

Function (MQCHAR4)

This field is a response field. The length of this field is given by MQ_FUNCTION_LENGTH. The initial value of this field is MQCFUNC_NONE.

The value returned in this field depends on *ReturnCode* ; see Table 477 on page 299. The following values are possible when *Function* contains an IBM MQ call name:

MQCFUNC_MQCONN
MQCONN call.

MQCFUNC_MQGET
MQGET call.

MQCFUNC_MQINQ
MQINQ call.

MQCFUNC_MQOPEN
MQOPEN call.

MQCFUNC_MQPUT
MQPUT call.

MQCFUNC_MQPUT1
MQPUT1 call.

MQCFUNC_NONE
No call.

In all cases, for the C programming language the constants MQCFUNC_*_ARRAY are also defined; these constants have the same values as the corresponding MQCFUNC_* constants, but are arrays of characters instead of strings.

AbendCode (MQCHAR4)

AbendCode is a response field. The length of this field is given by MQ_ABEND_CODE_LENGTH. The initial value of this field is 4 blank characters.

The value returned in this field is significant only if the *ReturnCode* field has the value MQCRC_APPLICATION_ABEND or MQCRC_BRIDGE_ABEND. If it does, *AbendCode* contains the CICS ABCODE value.

Authenticator (MQCHAR8)

The value of this field is the password or passticket.

If user-identifier authentication is active for the CICS bridge, *Authenticator* is used with the user identifier in the MQMD identity context to authenticate the sender of the message.

This is a request field. The length of this field is given by MQ_AUTHENTICATOR_LENGTH. The initial value of this field is 8 blanks.

Reserved1 (MQCHAR8)

This field is a reserved field. The value must be 8 blanks.

ReplyToFormat (MQCHAR8)

The value of this field is the IBM MQ format name of the reply message that is sent in response to the current message.

The rules for coding this field are the same as those rules for coding the *Format* field in MQMD.

This field is a request field used only for DPL programs. The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

RemoteSysId (MQCHAR4)

This field shows the CICS system identifier of the CICS system processing the request.

If this field is blank, the CICS system request is processed on the same CICS system as the bridge monitor. The SYSID used is returned in the Reply message.

For a 3270 pseudo-conversation, all subsequent messages in the conversation must specify the remote SYSID returned in the initial reply. If specified, the SYSID must:

- Be active.
- Have access to the IBM MQ Request queue.
- Be accessible by the CICS ISC links from the CICS system of the bridge monitor.

RemoteTransId (MQCHAR4)

This field is an optional Request field. The length of this field is given by MQ_TRANSACTION_ID_LENGTH.

If specified, the field is used as the RTRANSID value of CICS START.

TransactionId (MQCHAR4)

This field is a request field. Its length is given by MQ_TRANSACTION_ID_LENGTH. The initial value of this field is four blanks.

If *LinkType* has the value MQCLT_TRANSACTION, *TransactionId* is the transaction identifier of the user transaction to be run; specify a nonblank value in this case.

If *LinkType* has the value MQCLT_PROGRAM, *TransactionId* is the transaction code under which all programs within the unit of work are to be run. If you specify a blank value, the CICS DPL bridge default transaction code (CKBP) is used. If the value is nonblank, you must have defined it to CICS as a local transaction with an initial program that is CSQCBP00. This field applies only when *UOWControl* has the value MQCUOWC_FIRST or MQCUOWC_ONLY.

FacilityLike (MQCHAR4)

FacilityLike is the name of an installed terminal that is to be used as a model for the bridge facility.

A value of blanks means that *FacilityLike* is taken from the bridge transaction profile definition, or a default value is used.

This field is a request field used only for 3270 transactions. The length of this field is given by MQ_FACILITY_LIKE_LENGTH. The initial value of this field is four blanks.

AttentionId (MQCHAR4)

The value in this field determines the initial value of the AID key when the transaction is started. It is a 1 byte value, left-aligned.

AttentionId is a request field used only for 3270 transactions. The length of this field is given by MQ_ATTENTION_ID_LENGTH. The initial value of this field is four blanks.

StartCode (MQCHAR4)

The value of this field is an indicator specifying whether the bridge emulates a terminal transaction or a transaction initiated with START.

The value must be one of the following:

MQCSC_START
: Start.

MQCSC_STARTDATA
: Start data.

MQCSC_TERMINPUT
: Terminal input.

MQCSC_NONE
: None.

In all cases, for the C programming language the constants MQCSC_*_ARRAY are also defined; these constants have the same values as the corresponding MQCSC_* constants, but are arrays of characters instead of strings.

In the response from the bridge, this field is set to the start code appropriate to the next transaction ID contained in the *NextTransactionId* field. The following start codes are possible in the response:

- MQCSC_START
- MQCSC_STARTDATA
- MQCSC_TERMINPUT

For CICS Transaction Server 1.2, this field is a request field only; its value in the response is undefined.

For CICS Transaction Server 1.3 and subsequent releases, this field is both a request and a response field.

This field is used only for 3270 transactions. The length of this field is given by MQ_START_CODE_LENGTH. The initial value of this field is MQCSC_NONE.

CancelCode (MQCHAR4)

The value in this field is the abend code to be used to terminate the transaction (normally a conversational transaction that is requesting more data). Otherwise this field is set to blanks.

This field is a request field used only for 3270 transactions. The length of this field is given by MQ_CANCEL_CODE_LENGTH. The initial value of this field is four blanks.

NextTransactionId (MQCHAR4)

This value is the name of the next transaction returned by the user transaction (usually by EXEC CICS RETURN TRANSID). If there is no next transaction, this field is set to blanks.

This field is a response field used only for 3270 transactions. The length of this field is given by MQ_TRANSACTION_ID_LENGTH. The initial value of this field is four blanks.

Reserved2 (MQCHAR8)

This field is a reserved field. The value must be 8 blanks.

Reserved3 (MQCHAR8)

This field is a reserved field. The value must be 8 blanks.

CursorPosition (MQLONG)

The value in this field shows the initial cursor position when the transaction is started. For conversational transactions, the cursor position is in the RECEIVE vector.

This field is a request field used only for 3270 transactions. The initial value of this field is 0. This field is not present if *Version* is less than MQCIH_VERSION_2.

ErrorOffset (MQLONG)

The ErrorOffset field shows the position of invalid data detected by the bridge exit. This field provides the offset from the start of the message to the location of the invalid data.

ErrorOffset is a response field used only for 3270 transactions. The initial value of this field is 0. This field is not present if *Version* is less than MQCIH_VERSION_2.

InputItem (MQLONG)

This field is a reserved field. The value must be 0.

This field is not present if *Version* is less than MQCIH_VERSION_2.

Reserved4 (MQLONG)

This field is a reserved field. The value must be 0.

This field is not present if *Version* is less than MQCIH_VERSION_2.

MQCMHO - Create message handle options

The **MQCMHO** structure allows applications to specify options that control how message handles are created. The structure is an input parameter on the **MQCRTMH** call.

Availability

The **MQCMHO** structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and with IBM MQ clients.

Character set and encoding

Data in **MQCMHO** must be in the character set of the application and encoding of the application (**MQENC_NATIVE**).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 478. Fields in MQCMHO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQCMHO_STRUC_ID	'CMHO'
Version (structure version number)	MQCMHO_VERSION_1	1
Options (options)	MQCMHO_DEFAULT_VALIDATION	0

Notes:

1. In the C programming language, the macro variable MQCMHO_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQCMHO MyCMHO = {MQCMHO_DEFAULT};
```

Language declarations

C declaration for MQCMHO

```
struct tagMQCMHO {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    Options;         /* Options that control the action of MQCRTMH */
};
```

COBOL declaration for MQCMHO

```
**   MQCMHO structure
  10 MQCMHO.
**    Structure identifier
   15 MQCMHO-STRUCID        PIC X(4).
**    Structure version number
   15 MQCMHO-VERSION        PIC S9(9) BINARY.
**    Options that control the action of MQCRTMH
   15 MQCMHO-OPTIONS        PIC S9(9) BINARY.
```

PL/I declaration for MQCMHO

```
dcl
 1 MQCMHO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action of MQCRTMH */
```

High Level Assembler declaration for MQCMHO

```
MQCMHO                DSECT
MQCMHO_STRUCID        DS   CL4   Structure identifier
MQCMHO_VERSION        DS   F     Structure version number
MQCMHO_OPTIONS        DS   F     Options that control the action of
*                                MQCRTMH
MQCMHO_LENGTH         EQU  *-MQCMHO
MQCMHO_AREA           DS   CL(MQCMHO_LENGTH)
```

StrucId (MQCHAR4)

This field is always an input field. Its initial value is MQCMHO_STRUC_ID.

This is the structure identifier; the value must be:

MQCMHO_STRUC_ID
Identifier for create message handle options structure.

For the C programming language, the constant **MQCMHO_STRUC_ID_ARRAY** is also defined; this has the same value as **MQCMHO_STRUC_ID**, but is an array of characters instead of a string.

Version (MQLONG)

This field is always an input field. Its initial value is MQCMHO_VERSION_1.

This is the structure version number; the value must be:

MQCMHO_VERSION_1
Version-1 create message handle options structure.

The following constant specifies the version number of the current version:

MQCMHO_CURRENT_VERSION
Current version of create message handle options structure.

Options (MQLONG)

This field is always an input field. Its initial value is MQCMHO_DEFAULT_VALIDATION.

One of the following options can be specified:

MQCMHO_VALIDATE

When **MQSETMP** is called to set a property in this message handle, the property name is validated to ensure that it:

- contains no invalid characters.
- does not begin JMS or usr.JMS except for the following:
  - JMSCorrelationID
  - JMSReplyTo
  - JMSType
  - JMSXGroupID
  - JMSXGroupSeq

  These names are reserved for JMS properties.
- is not one of the following keywords, in any mixture of uppercase or lowercase:
  - AND
  - BETWEEN
  - ESCAPE
  - FALSE
  - IN
  - IS
  - LIKE
  - NOT
  - NULL
  - OR
  - TRUE
- does not begin Body. or Root. (except for Root.MQMD.).

If the property is MQ-defined (mq.*) and the name is recognized, the property descriptor fields are set to the correct values for the property. If the property is not recognized, the *Support* field of the property descriptor is set to **MQPD_OPTIONAL**.

MQCMHO_DEFAULT_VALIDATION

This value specifies that the default level of validation of property names occur.

The default level of validation is equivalent to the level specified by **MQCMHO_VALIDATE**.

This value is the default value.

MQCMHO_NO_VALIDATION

No validation on the property name occurs. See the description of **MQCMHO_VALIDATE**.

Default option: If none of the preceding options described is required, the following option can be used:

MQCMHO_NONE

All options assume their default values. Use this value to indicate that no other options have been specified. **MQCMHO_NONE** aids program documentation; it is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

MQCNO - Connect options

The MQCNO structure allows the application to specify options relating to the connection to the queue manager. The structure is an input/output parameter on the MQCONNX call.

For more information about using shared handles, and the MQCONNX call, see Shared (thread independent) connections with MQCONNX.

Availability

All versions of the MQCNO structure, except MQCNO_VERSION_4, are available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

Version

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most-recent version of MQCNO, but with the initial value of the *Version* field set to MQCNO_VERSION_1. To use fields that are not present in the version-1 structure, the application must set the *Version* field to the version number that is required.

Character set and encoding

Data in MQCNO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an IBM MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 479. Fields in MQCNO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQCNO_STRUC_ID	'CNO¬'
Version (structure version number)	MQCNO_VERSION_1	1
Options (options that control the action of MQCONNX)	MQCNO_NONE	0
Note: The remaining fields are ignored if *Version* is less than MQCNO_VERSION_2.		

Table 479. Fields in MQCNO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
ClientConnOffset (offset of MQCD structure for client connection)	None	0
ClientConnPtr (address of MQCD structure for client connection)	None	Null pointer or null bytes
Note: The remaining fields are ignored if *Version* is less than MQCNO_VERSION_3.		
ConnTag (queue manager connection tag)	MQCT_NONE	Nulls
Note: The remaining fields are ignored if *Version* is less than MQCNO_VERSION_4.		
SSLConfigPtr (address of MQSCO structure for client connection)	None	Null pointer or null bytes
SSLConfigOffset (offset of MQSCO structure for client connection)	None	0
Note: The remaining fields are ignored if *Version* is less than MQCNO_VERSION_5.		
ConnectionId (unique connection ID)	None	Null pointer or null bytes
SecurityParmsOffset (offset of MQSCO structure for security parameters)	None	Null pointer or null bytes
SecurityParmsPtr (address of MQSCO structure for security parameters)	None	Null pointer or null bytes
Note: The remaining fields are ignored if *Version* is less than MQCNO_VERSION_6.		
Reserved (reserved field)	None	Reserved field to pad the structure out to a 64-bit boundary.
CCDTUrlLength (CCDT URL length)	None	Length of string identified by *CCDTUrlPtr* or *CCDTUrlOffset*
CCDTUrlPtr (CCDT URL pointer)	None	Pointer to a string which contains a URL, to identify the location of the client connection channel table to use for the connection.
CCDTUrlOffset (CCDT URL offset)	None	Offset in bytes from a string which contains a URL that identifies the location of the client connection channel table to use for the connection.
V 9.1.2 V 9.1.2 **Note:** The remaining fields are ignored if *Version* is less than MQCNO_VERSION_7.		

Table 479. Fields in MQCNO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
V 9.1.2 ApplName (name set by the application)	None	Name set by the application to identify the connection to the queue manager
V 9.1.2 Reserved2 (reserved field)	None	Reserved field to pad the structure out to a 64-bit boundary.

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQCNO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQCNO MyCNO = {MQCNO_DEFAULT};
```

Language declarations

C declaration for MQCNO

LTS

```
typedef struct tagMQCNO MQCNO;
struct tagMQCNO {
  MQCHAR4    StrucId;            /* Structure identifier */
  MQLONG     Version;            /* Structure version number */
  MQLONG     Options;            /* Options that control the action of
                                    MQCONNX */
  MQLONG     ClientConnOffset;   /* Offset of MQCD structure for client
                                    connection */
  MQPTR      ClientConnPtr;      /* Address of MQCD structure for client
                                    connection */
  MQBYTE128  ConnTag;            /* Queue managerconnection tag */
  PMQSCO     SSLConfigPtr;       /* Address of MQSCO structure for client
                                    connection */
  MQLONG     SSLConfigOffset;    /* Offset of MQSCO structure for client
                                    connection */
  MQBYTE24   ConnectionId;       /* Unique connection identifier */
  MQLONG     SecurityParmsOffset /* Security fields */
  PMQCSP     SecurityParmsPtr    /* Security parameters */
  MQLONG     CCDTUrlLength       /* Length of string identified by Ptr or offset */
  MQLONG     CCDTUrlOffset       /* Offset in bytes to URL of client connection channel */
  PMQURL     CCDTUrlPtr          /* Pointer to string containing URL */
  MQBYTE4    Reserved            /* Reserved field to pad out to 64 bit boundary */
  };
```

V 9.1.2

```
typedef struct tagMQCNO MQCNO;
struct tagMQCNO {
  MQCHAR4    StrucId;            /* Structure identifier */
  MQLONG     Version;            /* Structure version number */
  MQLONG     Options;            /* Options that control the action of
                                    MQCONNX */
  MQLONG     ClientConnOffset;   /* Offset of MQCD structure for client
                                    connection */
  MQPTR      ClientConnPtr;      /* Address of MQCD structure for client
                                    connection */
  MQBYTE128  ConnTag;            /* Queue managerconnection tag */
  PMQSCO     SSLConfigPtr;       /* Address of MQSCO structure for client
                                    connection */
  MQLONG     SSLConfigOffset;    /* Offset of MQSCO structure for client
                                    connection */
  MQBYTE24   ConnectionId;       /* Unique connection identifier */
```

```
  MQLONG     SecurityParmsOffset /* Security fields */
  PMQCSP     SecurityParmsPtr   /* Security parameters */
  MQLONG     CCDTUrlLength      /* Length of string identified by Ptr or offset */
  MQLONG     CCDTUrlOffset      /* Offset in bytes to URL of client connection channel */
  PMQURL     CCDTUrlPtr         /* Pointer to string containing URL */
  MQBYTE4    Reserved           /* Reserved field to pad out to 64 bit boundary */
  MQCHAR28   ApplName           /* Name set by the application to identify the connection to
                                   the queue manager */
  MQBYTE4    Reserved2          /* Reserved field to pad out to 64 bit boundary */
};
```

COBOL declaration for MQCNO

LTS

```
**   MQCNO structure
  10 MQCNO.
**    Structure identifier
   15 MQCNO-STRUCID          PIC X(4).
**    Structure version number
   15 MQCNO-VERSION          PIC S9(9) BINARY.
**    Options that control the action of MQCONNX
   15 MQCNO-OPTIONS          PIC S9(9) BINARY.
**    Offset of MQCD structure for client connection
   15 MQCNO-CLIENTCONNOFFSET PIC S9(9) BINARY.
**    Address of MQCD structure for client connection
   15 MQCNO-CLIENTCONNPTR    POINTER.
**    Queue manager connection tag
   15 MQCNO-CONNTAG          PIC X(128).
**    Address of MQSCO structure for client connection
   15 MQCNO-SSLCONFIGPTR     POINTER.
**    Offset of MQSCO structure for client connection
   15 MQCNO-SSLCONFIGOFFSET  PIC S9(9) BINARY.
**    Unique connection identifier
   15 MQCNO-CONNECTIONID     PIC X(24).
**    Offset of MQCSP structure for security parameters
   15 MQCNO-SECURITYPARMSOFFSET PIC S9(9) BINARY.
**    Address of MQCSP structure for security parameters
   15 MQCNO-SECURITYPARMSPTR POINTER.
**    Length of string identified by CCDTUrlPtr or CCDTUrlOffset
   15 MQCNO-CCDTURLLENGTH
**    Pointer to a string which contains a URL, to identify the location of the client
connection channel
   15 MQCNO-CCDTURLPTR
**    Offset in bytes from a string which contains a URL that identifies the location of the
client connection channel table
   15 MQCNO-CCDTURLOFFSET
**    Reserved field to pad to 64 bit boundary
   15 MQCNO-RESERVED
```

V 9.1.2

```
**   MQCNO structure
  10 MQCNO.
**    Structure identifier
   15 MQCNO-STRUCID          PIC X(4).
**    Structure version number
   15 MQCNO-VERSION          PIC S9(9) BINARY.
**    Options that control the action of MQCONNX
   15 MQCNO-OPTIONS          PIC S9(9) BINARY.
**    Offset of MQCD structure for client connection
   15 MQCNO-CLIENTCONNOFFSET PIC S9(9) BINARY.
**    Address of MQCD structure for client connection
   15 MQCNO-CLIENTCONNPTR    POINTER.
**    Queue manager connection tag
   15 MQCNO-CONNTAG          PIC X(128).
**    Address of MQSCO structure for client connection
   15 MQCNO-SSLCONFIGPTR     POINTER.
**    Offset of MQSCO structure for client connection
   15 MQCNO-SSLCONFIGOFFSET  PIC S9(9) BINARY.
**    Unique connection identifier
   15 MQCNO-CONNECTIONID     PIC X(24).
**    Offset of MQCSP structure for security parameters
   15 MQCNO-SECURITYPARMSOFFSET PIC S9(9) BINARY.
**    Address of MQCSP structure for security parameters
   15 MQCNO-SECURITYPARMSPTR POINTER.
**    Length of string identified by CCDTUrlPtr or CCDTUrlOffset
   15 MQCNO-CCDTURLLENGTH
**    Pointer to a string which contains a URL, to identify the location of the client
connection channel
```

```
   15 MQCNO-CCDTURLPTR
**    Offset in bytes from a string which contains a URL that identifies the location of the
client connection channel table
   15 MQCNO-CCDTURLOFFSET
**    Reserved field to pad to 64 bit boundary
   15 MQCNO-RESERVED
**    Name set by the application to identify the connection to the queue manager
   15 MQCNO-APPLNAME
**    Reserved field to pad to 64 bit boundary
   15 MQCNO-RESERVED2
```

PL/I declaration for MQCNO

LTS

```
dcl
 1 MQCNO based,
  3 StrucId           char(4),       /* Structure identifier */
  3 Version           fixed bin(31), /* Structure version number */
  3 Options           fixed bin(31), /* Options that control the action
                                        of MQCONNX */
  3 ClientConnOffset fixed bin(31), /* Offset of MQCD structure for
                                        client connection */
  3 ClientConnPtr    pointer,       /* Address of MQCD structure for
                                        client connection */
  3 ConnTag           char(128),     /* Queue managerconnection tag */
  3 SSLConfigPtr     pointer,       /* Address of MQSCO structure for
                                        client connection */
  3 SSLConfigOffset  fixed bin(31), /* Offset of MQSCO structure for
                                        client connection */
  3 ConnectionId     char(24),      /* Unique connection identifier
  3 SecurityParmsOffset fixed bin(31); /* Offset of MQCSP structure for
                                        security parameters */
  3 SecurityParmsPtr pointer,       /* Address of MQCSP structure for
                                        security parameters */
  3 CCDTUrlLength    fixed bin(31)  /* Length of string identified by CCDTUrlPtr
                                        or CCDTUrlOffset */
  3 CCDTUrlOffset    fixed bin(31)  /* Offset in bytes to URL of client connection channel */
  3 CCDTUrlPtr       pointer        /* Pointer to string containing URL */
  3 Reserved         char (4)       /* Reserved field to pad out to 64 bit boundary */
```

V 9.1.2

```
dcl
 1 MQCNO based,
  3 StrucId           char(4),       /* Structure identifier */
  3 Version           fixed bin(31), /* Structure version number */
  3 Options           fixed bin(31), /* Options that control the action
                                        of MQCONNX */
  3 ClientConnOffset fixed bin(31), /* Offset of MQCD structure for
                                        client connection */
  3 ClientConnPtr    pointer,       /* Address of MQCD structure for
                                        client connection */
  3 ConnTag           char(128),     /* Queue managerconnection tag */
  3 SSLConfigPtr     pointer,       /* Address of MQSCO structure for
                                        client connection */
  3 SSLConfigOffset  fixed bin(31), /* Offset of MQSCO structure for
                                        client connection */
  3 ConnectionId     char(24),      /* Unique connection identifier
  3 SecurityParmsOffset fixed bin(31); /* Offset of MQCSP structure for
                                        security parameters */
  3 SecurityParmsPtr pointer,       /* Address of MQCSP structure for
                                        security parameters */
  3 CCDTUrlLength    fixed bin(31)  /* Length of string identified by CCDTUrlPtr
                                        or CCDTUrlOffset */
  3 CCDTUrlOffset    fixed bin(31)  /* Offset in bytes to URL of client connection channel */
  3 CCDTUrlPtr       pointer        /* Pointer to string containing URL */
  3 Reserved         char(4)        /* Reserved field to pad out to 64 bit boundary */
  3 ApplName         char(28)       /* Name set by the application to identify the connection
to
                                        the queue manager */
  3 Reserved2        char(4)        /* Reserved field to pad out to 64 bit boundary */
```

High Level Assembler declaration for MQCNO

LTS

```
MQCNO                      DSECT
MQCNO_STRUCID              DS   CL4     Structure identifier
MQCNO_VERSION              DS   F       Structure version number
MQCNO_OPTIONS              DS   F       Options that control the action of
*                                       MQCONNX
MQCNO_CLIENTCONNOFFSET     DS   F       Offset of MQCD structure for client
*                                       connection
MQCNO_CLIENTCONNPTR        DS   F       Address of MQCD structure for client
*                                       connection
MQCNO_CONNTAG              DS   XL128   Queue manager connection tag
*
MQCNO_CONNECTIONID         DS   XL24    Unique connection identifier
*
MQCNO_SSLCONFIGOFFSET      DS   F       Offset of MQCSP structure for security
*                                       parameters
MQCNO_SSLCONFIGPTR         DS   F       Address of MQCSP structure for security
*                                       parameters
MQCNO_LENGTH               EQU  *-MQCNO
                           ORG  MQCNO
MQCNO_AREA                 DS   CL(MQCNO_LENGTH)
MQCNO_CCDTURLLENGTH        DS   F       Length of string identified by CCDTURLPTR or
*                                       CCDTURLOFFSET
MQCNO_CCDTURLOFFSET        DS   F       Offset in bytes to URL of client connection channel
MQCNO_CCDTURLPTR           DS   F       Pointer to string containing URL
RESERVED                   DS   XL4     Reserved field to pad out to 64 bit boundary
```

V 9.1.2

```
MQCNO                      DSECT
MQCNO_STRUCID              DS   CL4     Structure identifier
MQCNO_VERSION              DS   F       Structure version number
MQCNO_OPTIONS              DS   F       Options that control the action of
*                                       MQCONNX
MQCNO_CLIENTCONNOFFSET     DS   F       Offset of MQCD structure for client
*                                       connection
MQCNO_CLIENTCONNPTR        DS   F       Address of MQCD structure for client
*                                       connection
MQCNO_CONNTAG              DS   XL128   Queue manager connection tag
*
MQCNO_CONNECTIONID         DS   XL24    Unique connection identifier
*
MQCNO_SSLCONFIGOFFSET      DS   F       Offset of MQCSP structure for security
*                                       parameters
MQCNO_SSLCONFIGPTR         DS   F       Address of MQCSP structure for security
*                                       parameters
MQCNO_LENGTH               EQU  *-MQCNO
                           ORG  MQCNO
MQCNO_AREA                 DS   CL(MQCNO_LENGTH)
MQCNO_CCDTURLLENGTH        DS   F       Length of string identified by CCDTURLPTR or
*                                       CCDTURLOFFSET
MQCNO_CCDTURLOFFSET        DS   F       Offset in bytes to URL of client connection channel
MQCNO_CCDTURLPTR           DS   F       Pointer to string containing URL
RESERVED                   DS   XL4     Reserved field to pad out to 64 bit boundary
APPLNAME                   DS   CL28    Name set by the application to identify the connection to
*                                       the queue manager
RESERVED2                  DS   XL4     Reserved field to pad out to 64 bit boundary
```

Visual Basic declaration for MQCNO

LTS

```
Type MQCNO
  StrucId          As String*4  'Structure identifier'
  Version          As Long      'Structure version number'
  Options          As Long      'Options that control the action of'
                                'MQCONNX'
  ClientConnOffset As Long      'Offset of MQCD structure for client'
                                'connection'
  ClientConnPtr    As MQPTR     'Address of MQCD structure for client'
                                'connection'
  ConnTag          As MQBYTE128 'Queue manager connection tag'
  SSLConfigPtr     As MQPTR     'Address of MQSCO structure for client'
                                'connection'
  SSLConfigOffset  As Long      'Offset of MQSCO structure for client'
                                'connection'
```

```
  ConnectionId      As MQBYTE24  'Unique connection identifier'
  SecurityParmsOffset As Long    'Offset of MQCSP structure for security'
                                 'parameters'
  SecurityParmsPtr As MQPTR      'Address of MQCSP structure for security'
                                 'parameters'
  CCDTUrlLength     As Long      'Length of string identified by CCDTUrlPtr'
                                 'or CCDTUrlOffset'
  CCDTUrlOffset     As Long      'Offset in bytes to URL of client connection channel'
  CCDTUrlPtr        As MQPTR     'Pointer to string containing URL'
  Reserved          As MQBYTE4   'Reserved field to pad out to 64 bit boundary'
  End Type
```

V 9.1.2

```
Type MQCNO
  StrucId           As String*4  'Structure identifier'
  Version           As Long      'Structure version number'
  Options           As Long      'Options that control the action of'
                                 'MQCONNX'
  ClientConnOffset As Long       'Offset of MQCD structure for client'
                                 'connection'
  ClientConnPtr     As MQPTR     'Address of MQCD structure for client'
                                 'connection'
  ConnTag           As MQBYTE128 'Queue manager connection tag'
  SSLConfigPtr      As MQPTR     'Address of MQSCO structure for client'
                                 'connection'
  SSLConfigOffset   As Long      'Offset of MQSCO structure for client'
                                 'connection'
  ConnectionId      As MQBYTE24  'Unique connection identifier'
  SecurityParmsOffset As Long    'Offset of MQCSP structure for security'
                                 'parameters'
  SecurityParmsPtr As MQPTR      'Address of MQCSP structure for security'
                                 'parameters'
  CCDTUrlLength     As Long      'Length of string identified by CCDTUrlPtr'
                                 'or CCDTUrlOffset'
  CCDTUrlOffset     As Long      'Offset in bytes to URL of client connection channel'
  CCDTUrlPtr        As MQPTR     'Pointer to string containing URL'
  Reserved          As MQBYTE4   'Reserved field to pad out to 64 bit boundary'
  ApplName          As String*28 'Name set by the application to identify the connection to'
                                 'the queue manager'
  Reserved2         As MQBYTE4   'Reserved field to pad out to 64 bit boundary'
  End Type
```

Related tasks

Using MQCONNX

StrucId (MQCHAR4)

StrucId is always an input field. Its initial value is MQCNO_STRUC_ID.

The value must be:

MQCNO_STRUC_ID

Identifier for connect-options structure.

For the C programming language, the constant MQCNO_STRUC_ID_ARRAY is also defined; this constant has the same value as MQCNO_STRUC_ID, but is an array of characters instead of a string.

Version (MQLONG)

Version is always an input field. Its initial value is MQCNO_VERSION_1.

The value must be one of the following:

MQCNO_VERSION_1

Version-1 connect-options structure.

MQCNO_VERSION_2

Version-2 connect-options structure.

MQCNO_VERSION_3

Version-3 connect-options structure.

MQCNO_VERSION_4

Version-4 connect-options structure.

MQCNO_VERSION_5
Version-5 connect-options structure.

MQCNO_VERSION_6
Version-6 connect-options structure.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQCNO_CURRENT_VERSION
Current version of connect-options structure.

Options (MQLONG)

Options that control the action of MQCONNX.

Accounting options

The following options control the type of accounting if the **AccountingConnOverride** queue manager attribute is set to MQMON_ENABLED:

MQCNO_ACCOUNTING_MQI_ENABLED
When monitoring data collection is disabled in the queue manager definition by setting the **MQIAccounting** attribute to MQMON_OFF, setting this flag enables MQI accounting data collection.

MQCNO_ACCOUNTING_MQI_DISABLED
When monitoring data collection is disabled in the queue manager definition by setting the **MQIAccounting** attribute to MQMON_OFF, setting this flag stops MQI accounting data collection.

MQCNO_ACCOUNTING_Q_ENABLED
When queue-accounting data collection is disabled in the queue manager definition by setting the **MQIAccounting** attribute to MQMON_OFF, setting this flag enables accounting data collection for those queues that specify a queue manager in the *MQIAccounting* field of their queue definition.

MQCNO_ACCOUNTING_Q_DISABLED
When queue-accounting data collection is disabled in the queue manager definition by setting the **MQIAccounting** attribute to MQMON_OFF, setting this flag switches off accounting data collection for those queues that specify a queue manager in the *MQIAccounting* field of their queue definition.

If none of these flags are defined, the accounting for the connection is as defined in the queue manager attributes.

Binding options

The following options control the type of IBM MQ binding to use. Specify only one of these options:

MQCNO_STANDARD_BINDING
The application and the local queue manager agent (the component that manages queuing operations) run in separate units of execution (typically, in separate processes). This arrangement maintains the integrity of the queue manager; that is, it protects the queue manager from errant programs.

If the queue manager supports multiple binding types, and you set MQCNO_STANDARD_BINDING, the queue manager uses the **DefaultBindType** attribute in the Connection stanza in the qm.ini file to select the actual type of binding. If this stanza is not defined, or the value cannot be used or is not appropriate for the application, the queue manager selects an appropriate binding type. The queue manager sets the actual binding type used in the connect options.

Use MQCNO_STANDARD_BINDING in situations where the application might not have been fully tested, or might be unreliable or untrustworthy. MQCNO_STANDARD_BINDING is the default.

This option is supported in all environments.

If you are linking to the mqm library, then a standard server connection using the default bind type is attempted first. If the underlying server library failed to load, a client connection is attempted instead.

- To change the behavior of MQCONN (or MQCONNX if MQCNO_STANDARD_BINDING is specified), set the MQ_CONNECT_TYPE environment variable to one of the following options. Note that there is an exception to this: If MQCNO_FASTPATH_BINDING is specified with MQ_CONNECT_TYPE set to LOCAL or STANDARD, fastpath connections can be downgraded by the administrator without a related change to the application.

Table 480. Values for MQ_CONNECT_TYPE that change the behavior of MQCONN or MQCONNX

Value	**Meaning**
CLIENT	A client connection only is attempted.
FASTPATH	This value was supported in previous releases, but is now ignored if specified.
LOCAL	A server connection only is attempted. Fastpath connections are downgraded to a standard server connection.
STANDARD	Supported for compatibility with previous releases. This value is now treated as LOCAL.

- If the MQ_CONNECT_TYPE environment variable is not set when MQCONNX is called, a standard server connection using the default bind type is attempted. If the server library fails to load, a client connection is attempted.

MQCNO_FASTPATH_BINDING

The application and the local queue manager agent are part of the same unit of execution. This is in contrast to the typical method of binding, where the application and the local queue manager agent run in separate units of execution.

MQCNO_FASTPATH_BINDING is ignored if the queue manager does not support this type of binding; processing continues as though the option had not been specified.

MQCNO_FASTPATH_BINDING can be of advantage in situations where multiple processes consume more resources than the overall resource used by the application. An application that uses the fastpath binding is known as a *trusted application*.

Consider the following important points when deciding whether to use the fastpath binding:

- Using the MQCNO_FASTPATH_BINDING option does not prevent an application altering or corrupting messages and other data areas belonging to the queue manager. Use this option only in situations where you have fully evaluated these issues.
- The application must not use asynchronous signals or timer interrupts (such as sigkill) with MQCNO_FASTPATH_BINDING. There are also restrictions on the use of shared memory segments.
- The application must use the MQDISC call to disconnect from the queue manager.
- The application must finish before you end the queue manager with the endmqm command.
- IBM i On IBM i, the job must run under a user profile that belongs to the QMQMADM group. Also, the program must not stop abnormally, otherwise unpredictable results can occur.
- UNIX On UNIX, the mqm user identifier must be the effective user identifier, and the mqm group identifier must be the effective group identifier. To make the application run in this way, configure the program so that it is owned by the mqm user identifier and mqm group identifier, and then set the setuid and setgid permission bits on the program.

  The IBM MQ Object Authority Manager (OAM) still uses the real user ID for authority checking.
- Windows On Windows, the program must be a member of the mqm group. Fastpath binding is not supported for 64 bit applications.

The MQCNO_FASTPATH_BINDING option is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

z/OS On z/OS, the option is accepted but ignored.

For more information about the implications of using trusted applications, see Restrictions for trusted applications.

MQCNO_SHARED_BINDING

With MQCNO_SHARED_BINDING, the application and the local queue manager agent share some resources. MQCNO_SHARED_BINDING is ignored if the queue manager does not support this type of binding. Processing continues as though the option had not been specified.

MQCNO_ISOLATED_BINDING

In this case, the application process and the local queue manager agent are isolated from each other in that they do not share resources. MQCNO_ISOLATED_BINDING is ignored if the queue manager does not support this type of binding. Processing continues as though the option had not been specified.

MQCNO_CLIENT_BINDING

Specify this option to make the application attempt a client connection only. This option has the following limitations:

- z/OS MQCNO_CLIENT_BINDING is ignored on z/OS.
- MQCNO_CLIENT_BINDING is rejected with MQRC_OPTIONS_ERROR if it is specified with any MQCNO binding option other than MQCNO_STANDARD_BINDING.
- MQCNO_CLIENT_BINDING is not available for Java or .NET as they have their own mechanisms for choosing the bind type.

MQCNO_LOCAL_BINDING

Specify this option to make the application attempt a server connection. If either MQCNO_FASTPATH_BINDING, MQCNO_ISOLATED_BINDING, or MQCNO_SHARED_BINDING is also specified, then the connection is of that type instead, and is documented in this section. Otherwise a standard server connection is attempted using the default bind type. MQCNO_LOCAL_BINDING has the following limitations:

- z/OS MQCNO_LOCAL_BINDING is ignored on z/OS.
- MQCNO_LOCAL_BINDING is rejected with MQRC_OPTIONS_ERROR if it is specified with any MQCNO reconnect option other than MQCNO_RECONNECT_AS_DEF.
- MQCNO_LOCAL_BINDING is not available for Java or .NET as they have their own mechanisms for choosing the bind type.

On the following platforms, you can use the environment variable `MQ_CONNECT_TYPE` with the bind type specified by the `Options` field, to control the type of binding used.

- AIX AIX
- Linux Linux

- Solaris Solaris
- Windows Windows

If you specify this environment variable, it must have the value FASTPATH or STANDARD ; if it has a different value, it is ignored. The value of the environment variable is case sensitive; see MQCONNX environment variable for more information.

The environment variable and *Options* field interact as follows:

- If you omit the environment variable, or give it a value that is not supported, use of the fastpath binding is determined solely by the `Options` field.
- If you give the environment variable a supported value, the fastpath binding is used only if both the environment variable and `Options` field specify the fastpath binding.

Connection-tag options

LTS These options are supported only when connecting to a z/OS queue manager and they control the use of the connection tag `ConnTag`. You can specify only one of these options.

V 9.1.3 The precise implementation of connection tags differs between IBM MQ for z/OS and IBM MQ for Multiplatforms:

- z/OS The following options, apart from *MQCNO_GENERATE_CONN_TAG*, are supported only when connecting to a z/OS queue manager and they control the use of the connection tag. You can specify only one of the supported options.
- ULW *MQCNO_GENERATE_CONN_TAG* is supported only on platforms other than z/OS.

ULW V 9.1.3 MQCNO_GENERATE_CONN_TAG

Returns the connection tag that the queue manager has associated with this connection, in the output MQCNO structure.

The connection tag returned will be identical for all connections which the queue manager considers as a single Application Instance.

z/OS MQCNO_SERIALIZE_CONN_TAG_Q_MGR

This option requests exclusive use of the connection tag within the local queue manager. If the connection tag is already in use in the local queue manager, the MQCONNX call fails with reason code MQRC_CONN_TAG_IN_USE. The outcome of the call is not affected by using the connection tag elsewhere in the queue sharing group to which the local queue manager belongs.

z/OS MQCNO_SERIALIZE_CONN_TAG_QSG

This option requests exclusive use of the connection tag within the queue sharing group to which the local queue manager belongs. If the connection tag is already in use in the queue sharing group, the MQCONNX call fails with reason code MQRC_CONN_TAG_IN_USE.

z/OS MQCNO_RESTRICT_CONN_TAG_Q_MGR

This option requests shared use of the connection tag within the local queue manager. If the connection tag is already in use in the local queue manager, the MQCONNX call can succeed if the requesting application is running in the same processing scope as the existing user of the tag. If this condition is not satisfied, the MQCONNX call fails with reason code MQRC_CONN_TAG_IN_USE. The outcome of the call is not affected by use of the connection tag elsewhere in the queue sharing group to which the local queue manager belongs.

- Applications must run within the same MVS address space to share the connection tag. If the application using the connection tag is a client application, MQCNO_RESTRICT_CONN_TAG_Q_MGR is not allowed.

MQCNO_RESTRICT_CONN_TAG_QSG

This option requests shared use of the connection tag within the queue sharing group to which the local queue manager belongs. If the connection tag is already in use in the queue sharing group, the MQCONNX call can succeed provided the requesting application is running in the same processing scope and is connected to the same queue manager, as the existing user of the tag.

If these conditions are not satisfied, the MQCONNX call fails with reason code MQRC_CONN_TAG_IN_USE.

- Applications must run within the same MVS address space to share the connection tag. If the application using the connection tag is a client application, MQCNO_RESTRICT_CONN_TAG_QSG is not allowed.

If none of these options are specified, `ConnTag` is not used. These options are not valid if `Version` is less than MQCNO_VERSION_3.

Handle-sharing options

These options are supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

They control the sharing of handles between different threads (units of parallel processing) within the same process. You can specify only one of these options:

MQCNO_HANDLE_SHARE_NONE

This option indicates that connection and object handles can be used only by the thread that caused the handle to be allocated (that is, the thread that issued the MQCONN, MQCONNX , or MQOPEN call). The handles cannot be used by other threads belonging to the same process.

MQCNO_HANDLE_SHARE_BLOCK

This option indicates that connection and object handles allocated by one thread of a process can be used by other threads belonging to the same process. However, only one thread at a time can use any particular handle; that is, only serial use of a handle is permitted. If a thread tries to use a handle that is already in use by another thread, the call blocks (waits) until the handle becomes available.

MQCNO_HANDLE_SHARE_NO_BLOCK

This is the same as MQCNO_HANDLE_SHARE_BLOCK, except that if the handle is in use by another thread, the call completes immediately with MQCC_FAILED and MQRC_CALL_IN_PROGRESS instead of blocking until the handle becomes available.

A thread can have zero or one non-shared handles:

- Each MQCONN or MQCONNX call that specifies MQCNO_HANDLE_SHARE_NONE returns a new nonshared handle on the first call, and the same non-shared handle on the second and later calls (assuming no intervening MQDISC call). The reason code is MQRC_ALREADY_CONNECTED for the second and later calls.
- Each MQCONNX call that specifies MQCNO_HANDLE_SHARE_BLOCK or MQCNO_HANDLE_SHARE_NO_BLOCK returns a new shared handle on each call.

Object handles inherit the same sharing properties as the connection handle specified on the MQOPEN call that created the object handle. Also, units of work inherit the same sharing properties as the connection handle used to start the unit of work; if the unit of work is started in one thread using a shared handle, the unit of work can be updated in another thread using the same handle.

If you do not specify a handle-sharing option, the default is determined by the environment:

- Windows In the Microsoft Transaction Server (MTS) environment, the default is the same as MQCNO_HANDLE_SHARE_BLOCK.
- In other environments, the default is the same as MQCNO_HANDLE_SHARE_NONE.

Reconnection options

Reconnection options determine if a connection is reconnectable. Only client connections are reconnectable.

MQCNO_RECONNECT_AS_DEF

The reconnection option is resolved to its default value. If no default is set, the value of this option resolves to DISABLED. The value of the option is passed to the server, and can be queried by PCF and MQSC.

MQCNO_RECONNECT

The application can be reconnected to any queue manager consistent with the value of the **QmgrName** parameter of MQCONNX. Use the MQCNO_RECONNECT option only if there is no affinity between the client application and the queue manager with which it initially established a connection. The value of the option is passed to the server, and can be queried by PCF and MQSC.

MQCNO_RECONNECT_DISABLED

The application cannot be reconnected. The value of the option is not passed to the server.

MQCNO_RECONNECT_Q_MGR

The application can be reconnected only to the queue manager with which it originally connected. Use this value if a client can be reconnected, but there is an affinity between the client application and the queue manager with which it originally established a connection. Choose this value if you want a client to automatically reconnect to the standby instance of a highly available queue manager. The value of the option is passed to the server, and can be queried by PCF and MQSC.

Use the options MQCNO_RECONNECT, MQCNO_RECONNECT_DISABLED and MQCNO_RECONNECT_Q_MGR only for client connections. If the options are used for a binding connection, MQCONNX fails with completion code MQCC_FAILED and reason code MQRC_OPTIONS_ERROR. Automatic client reconnect is not supported by IBM MQ classes for Java

Conversation-sharing options

The following options apply only to TCP/IP client connections. For SNA, SPX and NetBios channels, these values are ignored and the channel runs as in previous versions of the product

MQCNO_NO_CONV_SHARING

This option does not permit conversation sharing.

You might use MQCNO_NO_CONV_SHARING in situations where conversations are heavily loaded and, therefore, where contention is a possibility on the server-connection end of the channel instance on which the sharing conversations exist. MQCNO_NO_CNV_SHARING behaves like sharecnv(1) when connected to a channel that supports conversation sharing, and sharecnv(0) when connected to a channel that does not support conversation sharing.

MQCNO_ALL_CONVS_SHARE

This option permits conversation sharing; the application does not place any limit on the number of connections on the channel instance. This option is the default value.

If the application indicates that the channel instance can share, but the *SharingConversations* (SHARECNV) definition on the server-connection end of the channel is set to one, no sharing occurs and no warning is given to the application.

Similarly, if the application indicates that sharing is permitted but the server-connection *SharingConversations* definition is set to zero, no warning is given, and the application exhibits the same behavior as a client in versions of the product earlier than IBM WebSphere MQ 7.0; the application setting relating to sharing conversations is ignored.

MQCNO_NO_CONV_SHARING and MQCNO_ALL_CONVS_SHARE are mutually exclusive. If both options are specified on a particular connection, the connection is rejected with a reason code of MQRC_OPTIONS_ERROR.

Channel definition options

The following options control the use of the channel definition structure passed in the MQCNO:

MQCNO_CD_FOR_OUTPUT_ONLY

This option permits channel definition structure in the MQCNO to be used only to return the channel name used on a successful MQCONNX call.

If a valid channel definition structure is not provided, the call fails with the reason code MQRC_CD_ERROR.

If the application is not running as a client, the option is ignored.

The returned channel name can be used on a subsequent MQCONNX call using the MQCNO_USE_CD_SELECTION option to reconnect using the same channel definition. This can be useful when there are multiple applicable channel definitions in the client channel table.

MQCNO_USE_CD_SELECTION

This option permits MQCONNX call to connect using the channel name contained in the channel definition structure passed in the MQCNO.

If the MQSERVER environment variable is set, the channel definition defined by it is used. If MQSERVER is not set, the client channel table is used.

If a channel definition with matching channel name and queue manager name is not found, the call fails with reason code MQRC_Q_MGR_NAME_ERROR.

If a valid channel definition structure is not provided, the call fails with the reason code MQRC_CD_ERROR.

If the application is not running as a client, the option is ignored.

Default option

If you require none of the options described above, you can use the following option:

MQCNO_NONE

No options are specified.

Use MQCNO_NONE to aid program documentation. It is not intended that this option is used with any other MQCNO_* option, but because its value is zero, such use cannot be detected.

ClientConnOffset (MQLONG)

ClientConnOffset is the offset in bytes of an MQCD channel definition structure from the start of the MQCNO structure. The offset can be positive or negative. This field is an input field with an initial value of 0.

Use *ClientConnOffset* only when the application issuing the MQCONNX call is running as an IBM MQ MQI client. For information about how to use this field, see the description of the *ClientConnPtr* field.

This field is ignored if *Version* is less than MQCNO_VERSION_2.

ClientConnPtr (MQPTR)

ClientConnPtr is an input field. Its initial value is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Use *ClientConnOffset* and *ClientConnPtr* only when the application issuing the MQCONNX call is running as an IBM MQ MQI client. By specifying one or other of these fields, the application can control the definition of the client connection channel by providing an MQCD channel definition structure that contains the values required.

If the application is running as an IBM MQ MQI client, but does not provide an MQCD structure, the MQSERVER environment variable is used to select the channel definition. If MQSERVER is not set, the client channel table is used.

If the application is not running as an IBM MQ MQI client, *ClientConnOffset* and *ClientConnPtr* are ignored.

If the application provides an MQCD structure, set the fields listed to the values required; other fields in MQCD are ignored. You can pad character strings with blanks to the length of the field, or terminated them with a null character. See "Fields" on page 1466 for more information about the fields in the MQCD structure.

Table 481. Fields in MQCD

Field in MQCD	Value
ChannelName	Channel name.
Version	Structure version number. Must not be less than MQCD_VERSION_7.
TransportType	Any supported transport type.
ModeName	LU 6.2 mode name.
TpName	LU 6.2 transaction program name.
SecurityExit	Name of channel security exit.
SendExit	Name of channel send exit.
ReceiveExit	Name of channel receive exit.
MaxMsgLength	Maximum length in bytes of messages that can be sent over the client connection channel.
SecurityUserData	User data for security exit.
SendUserData	User data for send exit.
ReceiveUserData	User data for receive exit.
UserIdentifier	User identifier to be used to establish an LU 6.2 session.
Password	Password to be used to establish an LU 6.2 session.
ConnectionName	Connection name.
HeartbeatInterval	Time in seconds between heartbeat flows.

Table 481. Fields in MQCD (continued)

Field in MQCD	Value
StrucLength	Length of the MQCD structure.
ExitNameLength	Length of exit names addressed by *SendExitPtr* and *ReceiveExitPtr*. Must be greater than zero if *SendExitPtr* or *ReceiveExitPtr* is set to a value that is not the null pointer.
ExitDataLength	Length of exit data addressed by *SendUserDataPtr* and *ReceiveUserDataPtr*. Must be greater than zero if *SendUserDataPtr* or *ReceiveUserDataPtr* is set to a value that is not the null pointer.
SendExitsDefined	Number of send exits addressed by *SendExitPtr*. If zero, *SendExit* and *SendUserData* provide the exit name and data. If greater than zero, *SendExitPtr* and *SendUserDataPtr* provide the exit names and data, and *SendExit* and *SendUserData* must be blank.
ReceiveExitsDefined	Number of receive exits addressed by *ReceiveExitPtr*. If zero, *ReceiveExit* and *ReceiveUserData* provide the exit name and data. If greater than zero, *ReceiveExitPtr* and *ReceiveUserDataPtr* provide the exit names and data, and *ReceiveExit* and *ReceiveUserData* must be blank.
SendExitPtr	Address of name of first send exit.
SendUserDataPtr	Address of data for first send exit.
ReceiveExitPtr	Address of name of first receive exit.
ReceiveUserDataPtr	Address of data for first receive exit.
LongRemoteUserIdLength	Length of long remote user identifier.
LongRemoteUserIdPtr	Address of long remote user identifier.
RemoteSecurityId	Remote security identifier.
SSLCipherSpec	TLS CipherSpec.
SSLPeerNamePtr	Address of TLS peer name.
SSLPeerNameLength	Length of TLS peer name.
KeepAliveInterval	Value passed to the communications stack for keepalive timing for the channel
LocalAddress	The local communications address, including the IP address of the local network adapter to use, and a range of ports to use for outgoing connections.

Provide the channel definition structure in one of two ways:

- By using the offset field *ClientConnOffset*

  In this case, the application must declare a compound structure containing an MQCNO followed by the channel definition structure MQCD, and set *ClientConnOffset* to the offset of the channel definition structure from the start of the MQCNO. Ensure that this offset is correct. *ClientConnPtr* must be set to the null pointer or null bytes.

  Use *ClientConnOffset* for programming languages that do not support the pointer data type, or that implement the pointer data type in a way that is not portable to different environments (for example, the COBOL programming language).

  For the Visual Basic programming language, a compound structure called MQCNOCD is provided in the header file CMQXB.BAS; this structure contains an MQCNO structure followed by an MQCD structure. Initialize MQCNOCD by invoking the MQCNOCD_DEFAULTS subroutine. MQCNOCD is used with the

MQCONNXAny variant of the MQCONNX call; see the description of the MQCONNX call for further details.

- By using the pointer field *ClientConnPtr*

  In this case, the application can declare the channel definition structure separately from the MQCNO structure, and set *ClientConnPtr* to the address of the channel definition structure. Set *ClientConnOffset* to zero.

  Use *ClientConnPtr* for programming languages that support the pointer data type in a way that is portable to different environments (for example, the C programming language).

  In the C programming language, you can use the macro variable MQCD_CLIENT_CONN_DEFAULT to provide initial values for the structure that are more suitable for use on the MQCONNX call than the initial values provided by MQCD_DEFAULT.

Whichever technique you choose, you can use only one of *ClientConnOffset* and *ClientConnPtr* ; the call fails with reason code MQRC_CLIENT_CONN_ERROR if both are nonzero.

When the MQCONNX call has completed, the MQCD structure is not referenced again.

This field is ignored if *Version* is less than MQCNO_VERSION_2.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length, with the initial value being the all-null byte string.

V 9.1.3 *ConnTag (MQBYTE128) on Multiplatforms*

A connection tag is conceptually similar to a connection identifier, but might span multiple related connections, identifying them as a single application instance. On Multiplatforms, the connection tag is generated by the queue manager at connection time.

V 9.1.3 For more information, see connection identifier and application instance.

Generated connection tags are semi human readable. That is, they can be displayed and filtered in MQSC as if strings in the local character set. Connections that are known by IBM MQ to be related are automatically assigned the same connection tag. This assignment is particularly important to application balancing.

The generated connection tag is visible in three ways:

- In the output MQCNO structure on an MQCONNX call, when MQCNO_GENERATE_CONN_TAG is specified.
- In the output from DISPLAY CONN (or programmatic equivalents).
- In the output from DISPLAY APSTATUS (or equivalents).

The tag ceases to be valid when the application terminates or issues the MQDISC call.

Related reference

"ConnTag (MQBYTE128) on IBM MQ for z/OS" on page 327

A connection tag is conceptually similar to a connection identifier, but might span multiple related connections, identifying them as a single application instance. On IBM MQ for z/OS, the connection tag is an input field, provided by the application and used in conjunction with MQCNO_*_CONN_TAG options to serialize connections from that application instance

z/OS *ConnTag (MQBYTE128) on IBM MQ for z/OS*

A connection tag is conceptually similar to a connection identifier, but might span multiple related connections, identifying them as a single application instance. On IBM MQ for z/OS, the connection tag is an input field, provided by the application and used in conjunction with MQCNO_*_CONN_TAG options to serialize connections from that application instance

Where there are multiple instances of an application that are intended to be simultaneously connected, they must each supply a unique value for this field. See the descriptions of these connection tag options for further details.

Notes:

- On IBM MQ for z/OS, there is no way to administratively determine the connection tag associated with an application at runtime.
- Connection tag values beginning with MQ in upper, lower, or mixed case in either ASCII or EBCDIC are reserved for use by IBM products. Do not use connection tag values beginning with these letters.

Use the following special value if you require no tag:

MQCT_NONE
The value is binary zero for the length of the field.

For the C programming language, the constant MQCT_NONE_ARRAY is also defined; this constant has the same value as MQCT_NONE, but is an array of characters instead of a string.

The ConnTag field is used when connecting to a z/OS queue manager.

The length of this field is given by MQ_CONN_TAG_LENGTH. This field is ignored if *Version* is less than MQCNO_VERSION_3.

Multi See "ConnTag (MQBYTE128) on Multiplatforms" on page 327 for information on using the connection tag on IBM MQ for Multiplatforms.

SSLConfigPtr (PMQSCO)

SSLConfigPtr is an input field. Its initial value is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Use *SSLConfigPtr* and *SSLConfigOffset* only when the application issuing the MQCONNX call is running as an IBM MQ MQI client and the channel protocol is TCP/IP. If the application is not running as an IBM MQ client, or the channel protocol is not TCP/IP, *SSLConfigPtr* and *SSLConfigOffset* are ignored.

By specifying *SSLConfigPtr* or *SSLConfigOffset*, plus either *ClientConnPtr* or *ClientConnOffset*, the application can control the use of TLS for the client connection. When the TLS information is specified in this way, the environment variables MQSSLKEYR and MQSSLCRYP are ignored; any TLS-related information in the client channel definition table (CCDT) is also ignored.

The TLS information can be specified only on:

- The first MQCONNX call of the client process, or
- A subsequent MQCONNX call when all previous TLS connections to the queue manager have been concluded using MQDISC.

These are the only states in which the process-wide TLS environment can be initialized. If an MQCONNX call is issued specifying TLS information when the TLS environment already exists, the TLS information on the call is ignored and the connection is made using the existing TLS environment; the call returns completion code MQCC_WARNING and reason code MQRC_SSL_ALREADY_INITIALIZED in this case.

You can provide the MQSCO structure in the same way as the MQCD structure, either by specifying an address in *SSLConfigPtr*, or by specifying an offset in *SSLConfigOffset* ; see the description of *ClientConnPtr* for details of how to do this. However, you can use no more than one of *SSLConfigPtr* and *SSLConfigOffset* ; the call fails with reason code MQRC_SSL_CONFIG_ERROR. if both are nonzero.

Once the MQCONNX call has completed, the MQSCO structure is not referenced again.

This field is ignored if *Version* is less than MQCNO_VERSION_4.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

SSLConfigOffset (MQLONG)

SSLConfigOffset is the offset in bytes of an MQSCO structure from the start of the MQCNO structure. The offset can be positive or negative. This field is an input field, with an initial value of 0.

Use `SSLConfigOffset` only when the application issuing the MQCONNX call is running as an IBM MQ MQI client. For information about how to use this field, see the description of the `SSLConfigPtr` field.

This field is ignored if `Version` is less than MQCNO_VERSION_4.

ConnectionId (MQBYTE24)

ConnectionId is a unique 24-byte identifier that allows IBM MQ to reliably identify an application. An application can use this identifier for correlation in PUT and GET calls. This output parameter has an initial value of 24 null bytes in all programming languages.

The queue manager assigns a unique ID to all connections, however they are established. If an MQCONNX establishes the connection with a version 5 MQCNO, the application can determine the ConnectionId from the returned MQCNO. The assigned identifier is guaranteed to be unique among all other identifiers that IBM MQ generates, such as CorrelId, MsgID, and GroupId.

Use the ConnectionId to identify long running units of work using the PCF command Inquire Connection or the MQSC command DISPLAY CONN. The ConnectionId used by MQSC commands (CONN) is derived from the ConnectionId returned here. The PCF Inquire and Stop Connection commands can use the ConnectionId returned here without modification.

You can use the ConnectionId to force the end of a long running unit of work, by specifying the ConnectionId using the PCF command Stop Connection or the MQSC command STOP CONN. See Stop Connection and STOP CONN for more information about using these commands.

This field is not returned if Version is less than MQCNO_VERSION_5.

The length of this field is given by MQ_CONNECTION_ID_LENGTH.

SecurityParmsOffset (MQLONG)

SecurityParmsOffset is the offset in bytes of the MQCSP structure from the start of the MQCNO structure. The offset can be positive or negative. This field is an input field, with an initial value of 0.

This field is ignored if *Version* is less than MQCNO_VERSION_5.

The MQCSP structure is defined in "MQCSP - Security parameters" on page 330.

SecurityParmsPtr (PMQCSP)

SecurityParmsPtr is the address of the MQCSP structure, used to specify a user ID and password for authentication by the authorization service. This field is an input field, and its initial value is a null pointer or null bytes.

This field is ignored if *Version* is less than MQCNO_VERSION_5.

The MQCSP structure is defined in "MQCSP - Security parameters" on page 330.

Reserved (MQBYTE4)

A reserved field to pad the structure out to a 64-bit boundary. The initial value of the field is binary zero for the length of the field.

This field is ignored if `Version` is less than MQCNO_VERSION_6.

CCDTUrlLength (MQLONG)

CCDTUrlLength is the length of the string identified by either CCDTUrlPtr or CCDTUrlOffset which contains a URL that identifies the location of the client connection channel table to use for the connection. The initial value of the field is zero.

Use `CCDTUrlLength` only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, `CCDTUrlLength` is ignored.

This field is ignored if `Version` is less than MQCNO_VERSION_6.

CCDTUrlPtr (PMQCHAR)

CCDTUrlPtr is an optional pointer to a string which contains a URL, to identify the location of the client connection channel table to use for the connection.. This field is an input field, with an initial value of a null pointer in programming languages that support pointers, and an all-null byte string otherwise.

Use `CCDTUrlPtr` only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

Important: You can use only one of `CCDTUrlPtr` and `CCDTUrlOffset`. The call fails with reason code MQRC_CCDT_URL_ERROR if both fields are nonzero.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, `CCDTUrlPtr` is ignored.

This field is ignored if `Version` is less than MQCNO_VERSION_6.

CCDTUrlOffset (MQLONG)

CCDTUrlOffset is the offset in bytes, from the start of the MQCNO structure, to a string which contains a URL that identifies the location of the client connection channel table to use for the connection. The offset can be positive or negative and the initial value of the field is zero.

Use `CCDTUrlOffset` only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

Important: You can use only one of `CCDTUrlPtr` and `CCDTUrlOffset`. The call fails with reason code MQRC_CCDT_URL_ERROR if both fields are nonzero.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, `CCDTUrlOffset` is ignored.

This field is ignored if `Version` is less than MQCNO_VERSION_6.

V 9.1.2 *ApplName (MQCHAR28)*

The name set by the application to identify the connection to the queue manager. The initial value of the field is MQAN_NONE_ARRAY (blank characters).

This field is ignored if `Version` is less than MQCNO_VERSION_7, or if the value is set to blanks.

z/OS You cannot set this field on z/OS. If you attempt to do so, you receive the MQRC_CNO_ERROR reason code back.

V 9.1.2 *Reserved2 (MQBYTE4)*

A reserved field to pad the structure out to a 64-bit boundary. The initial value of the field is binary zero for the length of the field.

This field is ignored if `Version` is less than MQCNO_VERSION_7.

MQCSP - Security parameters

The MQCSP structure enables the authorization service to authenticate a user ID and password. You specify the MQCSP connection security parameters structure on an MQCONNX call.

Warning: In some cases, the password in an MQCSP structure for a client application is sent over the network in plain text. To ensure that client application passwords are protected appropriately, see MQCSP password protection.

Availability

The MQCSP structure is available on all supported IBM MQ platforms.

Character set and encoding

Data in MQCSP must be in the character set and encoding of the local queue manager, these are given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE, respectively.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 482. Fields in MQCSP

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQCSP_STRUC_ID	'CSP¬'
Version (structure version number)	MQCSP_VERSION_1	1
AuthenticationType (type of authentication)	None	MQCSP_AUTH_NONE
Reserved1 (required for pointer alignment on IBM i)	None	Null string or blanks
CSPUserIdPtr (address of user ID)	None	Null pointer or null bytes
CSPUserIdOffset (offset of user ID)	None	0
CSPUserIdLength (length of user ID)	None	0
Reserved2 (required for pointer alignment on IBM i)	None	Null string or blanks
CSPPasswordPtr (address of password)	None	Null pointer or null bytes
CSPPasswordOffset (offset of password)	None	0
CSPPasswordLength (length of password)	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQCSP_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQCSP MyCSP = {MQCSP_DEFAULT};
```

Language declarations

C declaration for MQCSP

```
typedef struct tagMQCSP MQCSP;
struct tagMQCSP {
  MQCHAR4    StrucId;            /* Structure identifier */
  MQLONG     Version;            /* Structure version number */
  MQLONG     AuthenticationType; /* Type of authentication */
  MQBYTE4    Reserved1;          /* Required for IBM i pointer
                                    alignment */
  MQPTR      CSPUserIdPtr;       /* Address of user ID */
  MQLONG     CSPUserIdOffset;    /* Offset of user ID */
  MQLONG     CSPUserIdLength;    /* Length of user ID */
  MQBYTE8    Reserved2;          /* Required for IBM i pointer
                                    alignment */
                                 alignment */
```

```
  MQPTR      CSPPasswordPtr;     /* Address of password */
  MQLONG     CSPPasswordOffset;  /* Offset of password */
  MQLONG     CSPPasswordLength;  /* Length of password */
  };
```

COBOL declaration for MQCSP

```
**   MQCSP structure
  10 MQCSP.
**    Structure identifier
   15 MQCSP-STRUCID           PIC X(4).
**    Structure version number
   15 MQCSP-VERSION           PIC S9(9) BINARY.
**    Type of authentication
   15 MQCSP-AUTHENTICATIONTYPE PIC S9(9) BINARY.
**    Required for IBM i pointer alignment
   15 MQCSP-RESERVED1         PIC X(4).
**    Address of user ID
   15 MQCSP-CSPUSERIDPTR      POINTER.
**    Offset of user ID
   15 MQCSP-CSPUSERIDOFFSET   PIC S9(9) BINARY.
**    Length of user ID
   15 MQCSP-CSPUSERIDLENGTH   PIC S9(9) BINARY.
**    Required for IBM i pointer alignment
   15 MQCSP-RESERVED2         PIC X(4).
**    Address of password
   15 MQCSP-CSPPASSWORDPTR    POINTER.
**    Offset of password
   15 MQCSP-CSPPASSWORDOFFSET PIC S9(9) BINARY.
**    Length of password
   15 MQCSP-CSPPASSWORDLENGTH PIC S9(9) BINARY.
```

PL/I declaration for MQCSP

```
dcl
 1 MQCSP based,
  3 StrucId           char(4),       /* Structure identifier */
  3 Version           fixed bin(31), /* Structure version number */
  3 AuthenticationType fixed bin(31),  /* Type of authentication */
  3 Reserved1         char(4),     /* Required for IBM i pointer
                                         alignment */
  3 CSPUserIdPtr      pointer,      /* Address of user ID */
  3 CSPUserIdOffset   fixed bin(31), /* Offset of user ID */
  3 CSPUserIdLength   fixed bin(31), /* Length of user ID */
  3 Reserved2         char(8),     /* Required for IBM i pointer
                                         alignment */
  3 CSPPasswordPtr    pointer,      /* Address of password */
  3 CSPPasswordOffset fixed bin(31), /* Offset of user ID */
  3 CSPPasswordLength fixed bin(31); /* Length of user ID */
```

Visual Basic declaration for MQCSP

```
Type MQCSP
  StrucId           As String*4   'Structure identifier'
  Version           As Long       'Structure version number'
  AuthenticationType As Long      'Type of authentication'
  Reserved1         As MQBYTE4    'Required for IBM i pointer'
                                  'alignment'
  CSPUserIdPtr      As MQPTR      'Address of user ID'
  CSPUserIdOffset   As Long       'Offset of user ID'
  CSPUserIdLength   As Long       'Length of user ID'
  Reserved2         As MQBYTE8    'Required for IBM i pointer'
                                  'alignment'
  CSPPasswordPtr    As MQPTR      'Address of password'
  CSPPasswordOffset As Long       'Offset of password'
  CSPPasswordLength As Long       'Length of password'
End Type
```

StrucId (MQCHAR4)

Structure identifier.

The value must be:

MQCSP_STRUC_ID
Identifier for the security parameters structure.

For the C programming language, the constant MQCSP_STRUC_ID_ARRAY is also defined; this has the same value as MQCSP_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQCSPSTRUC_ID.

Version (MQLONG)

Structure version number.

The value must be:

MQCSP_VERSION_1
Version-1 security parameters structure.

The following constant specifies the version number of the current version:

MQCSP_CURRENT_VERSION
Current version of security parameters structure.

This is always an input field. The initial value of this field is MQCSP_VERSION_1.

AuthenticationType (MQLONG)

AuthenticationType is an input field. Its initial value is MQCSP_AUTH_NONE.

This is the type of authentication to perform. Valid values are:

MQCSP_AUTH_NONE
Do not use user ID and password fields.

MQCSP_AUTH_USER_ID_AND_PWD
Authenticate user ID and password fields.

The default value is MQCSP_AUTH_NONE. With the default setting, no password protection is done.

If you require authentication, you have to set **MQCSP**.**AuthenticationType** to MQCSP_AUTH_USER_ID_AND_PWD.

See MQCSP password protection for more information.

Reserved1 (MQBYTE4)

A reserved field, required for pointer alignment on IBM i.

This is an input field. The initial value of this field is all null.

CSPUserIdPtr (MQPTR)

This is the address in bytes of the user ID to be used in authentication.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if `Version` is less than MQCNO_VERSION_5.

This field can contain an operating system user ID when an **AUTHTYPE** of *IDPWOS* is named in the CONNAUTH field of the queue manager.

On Windows this can be a fully qualified domain user ID.

This field can contain an LDAP User ID when an **AUTHTYPE** of *IDPWLDAP* is named in the CONNAUTH field of the queue manager.

CSPUserIdOffset (MQLONG)

This is the offset in bytes of the user ID to be used in authentication. The offset can be positive or negative.

This is an input field. The initial value of this field is 0.

CSPUserIdLength (MQLONG)

This field is the length of the user ID to be used in authentication.

The maximum length of the user ID is dependent on the platform, see User IDs. If the length of the user ID is greater than the maximum length permitted, the authentication request fails with MQRC_NOT_AUTHORIZED.

This field is an input field. The initial value of this field is 0.

Reserved2 (MQBYTE8)

A reserved field, required for pointer alignment on IBM i.

This is an input field. The initial value of this field is all null.

CSPPasswordPtr (MQPTR)

This is the address in bytes of the password to be used in authentication.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if `Version` is less than MQCNO_VERSION_5.

This field can contain an empty password which is rejected by the operating system or LDAP password checking, depending on setup, but is not rejected by IBM MQ before passing it the authentication method.

CSPPasswordOffset (MQLONG)

This is the offset in bytes of the password to be used in authentication. The offset can be positive or negative.

This is an input field. The initial value of this field is 0.

CSPPasswordLength (MQLONG)

This field is the length of the password to be used in authentication.

The maximum length of the password is MQ_CSP_PASSWORD_LENGTH, which is 256 characters. If the length of the password is greater than the maximum length permitted, the authentication request fails with MQRC_NOT_AUTHORIZED. "

The value of MQ_CSP_PASSWORD_LENGTH is 256.

This field is an input field. The initial value of this field is 0.

MQCTLO - Control callback options structure

The MQCTLO structure is used to specify options relating to a control callbacks function. The structure is an input and output parameter on the MQCTL call.

Availability

The MQCTLO structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

Version

The current version of MQCTLO is MQCTLO_VERSION_1.

Character set and encoding

Data in MQCTLO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 483. Fields in MQCTLO

Field name and description	Name of constant	Initial value (if any) of constant
StrucID (structure identifier)	MQCTLO_STRUC_ID	'CTLO'
Version (structure version number)	MQCTLO_VERSION_1	1
Options (options)	MQCTLO_NONE	Nulls
Options (reserved field)	Reserved field	
ConnectionArea (field for callback function to use)	None	Null pointer or null bytes

Notes:

1. In the C programming language, the macro variable MQCTLO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQCTLO MyCTLO = {MQCTLO_DEFAULT};
```

Language declarations

C declaration for MQCTLO

```
typedef struct tagMQCTLO MQCTLO;
 struct tagMQCTLO {
  MQCHAR4   StrucId;        /* Structure identifier */
  MQLONG    Version;        /* Structure version number */
  MQLONG    Options;        /* Options that control the action of MQCTL */
  MQLONG    Reserved;       /* Reserved field */


MQPTR     ConnectionArea; /* Connection work area passed to the function */
 };
```

COBOL declaration for MQCTLO

```
** MQCTLO structure
 10  MQCTLO.
** Structure Identifier
 15  MQCTLO-STRUCID                      PIC X(4).
** Structure Version
```

```
 15  MQCTLO-VERSION                      PIC S9(9) BINARY.
 ** Options
 15  MQCTLO-OPTIONS                      PIC S9(9) BINARY.
** Reserved
 15  MQCTLO-RESERVED                     PIC S9(9) BINARY.
** ConnectionArea
 15  MQCTLO-CONNECTIONAREA               POINTER
```

PL/I declaration for MQCTLO

```
dcl
 1 MQCTLO based,
  3 StrucId            char(4),       /* Structure identifier */
  3 Version            fixed bin(31), /* Structure version */
  3 Options            fixed bin(31), /* Options */
  3 Reserved           fixed bin(31),
  3 ConnectionArea     pointer;       /* Connection work area */
```

StrucId (MQCHAR4)

Control options structure - StrucId field

This is the structure identifier; the value must be:

MQCTLO_STRUC_ID
: Identifier for Control Options structure.

  For the C programming language, the constant MQCTLO_STRUC_ID_ARRAY is also defined; this has the same value as MQCTLO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQCTLO_STRUC_ID.

Version (MQLONG)

Control options structure - Version field

This is the structure version number; the value must be:

MQCTLO_VERSION_1
: Version-1 Control options structure.

The following constant specifies the version number of the current version:

MQCTLO_CURRENT_VERSION
: Current version of Control options structure.

This is always an input field. The initial value of this field is MQCTLO_VERSION_1.

Options (MQLONG)

Control options structure - Options field

Options that control the action of MQCTL.

MQCTLO_FAIL_IF_QUIESCING
: Force the MQCTL call to fail if the queue manager or connection is in the quiescing state.

  Specify MQGMO_FAIL_IF_QUIESCING, in the MQGMO options passed on the MQCB call, to cause notification to message consumers when they are quiescing.

MQCTLO_THREAD_AFFINITY
: This option informs the system that the application requires that all message consumers, for the same connection, are called on the same thread. This thread will be used for all invocations of the consumers until the connection is stopped.

Default option: If you do not need any of the options described, use the following option:

MQCTLO_NONE
: Use this value to indicate that no other options have been specified; all options assume their default values. MQCTLO_NONE is defined to aid program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of the *Options* field is MQCTLO_NONE.

Reserved (MQLONG)

This is a reserved field. The value must be zero.

ConnectionArea (MQPTR)

Control options structure - ConnectionArea field

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged to the ConnectionArea field in the MQCBC structure, which is an input parameter to the callback.

This field is ignored for all operations other than MQOP_START and MQOP_START_WAIT.

This is an input and output field to the callback function. The initial value of this field is a null pointer or null bytes.

MQDH - Distribution header

The MQDH structure describes the additional data that is present in a message when that message is a distribution-list message stored on a transmission queue. A distribution-list message is a message that is sent to multiple destination queues. The additional data consists of the MQDH structure followed by an array of MQOR records and an array of MQPMR records. This structure is used by specialized applications that put messages directly on transmission queues, or that remove messages from transmission queues (for example: message channel agents). Applications that want to put messages to distribution lists must not use this structure. Instead, they must use the MQOD structure to define the destinations in the distribution list, and the MQPMO structure to specify message properties or receive information about the messages sent to the individual destinations.

Availability

The MQDH structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

Format name

MQFMT_DIST_HEADER

Character set and encoding

Data in MQDH must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE.

Set the character set and encoding of the MQDH into the *CodedCharSetId* and *Encoding* fields in:

- The MQMD (if the MQDH structure is at the start of the message data), or
- The header structure that precedes the MQDH structure (all other cases).

Usage

When an application puts a message to a distribution list, and some or all of the destinations are remote, the queue manager prefixes the application message data with the MQXQH and MQDH structures, and places the message on the relevant transmission queue. The data therefore occurs in the following sequence when the message is on a transmission queue:

- MQXQH structure
- MQDH structure plus arrays of MQOR and MQPMR records
- Application message data

Depending on the destinations, the queue manager can generate more than one such message, and place it on different transmission queues. In this case, the MQDH structures in those messages identify different subsets of the destinations defined by the distribution list opened by the application.

An application that puts a distribution-list message directly on a transmission queue must conform to the sequence described earlier, and must ensure that the MQDH structure is correct. If the MQDH structure is not valid, the queue manager can fail the MQPUT or MQPUT1 call with reason code MQRC_DH_ERROR.

You can store messages on a queue in distribution-list form only if you have defined the queue as being able to support distribution list messages. See the **DistLists** queue attribute described in "Attributes for queues" on page 823. If an application puts a distribution-list message directly on a queue that does not support distribution lists, the queue manager splits the distribution list message into individual messages, and places those on the queue instead.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 484. Fields in MQDH for MQDH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQDH_STRUC_ID	'DH¬¬'
Version (structure version number)	MQDH_VERSION_1	1
StrucLength (length of MQDH structure plus following records)	None	0
Encoding (numeric encoding of data that follows array of MQPMR records)	None	0
CodedCharSetId (character set identifier of data that follows array of MQPMR records)	MQCCSI_UNDEFINED	0
Format (format name of data that follows array of MQPMR records)	MQFMT_NONE	Blanks
Flags (general flags)	MQDHF_NONE	0
PutMsgRecFields (flags indicating which MQPMR fields are present)	MQPMRF_NONE	0
RecsPresent (number of object records present)	None	0
ObjectRecOffset (offset of first object record from start of MQDH)	None	0
PutMsgRecOffset (offset of first put-message record from start of MQDH)	None	0

Table 484. Fields in MQDH for MQDH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. The symbol ¬ represents a single blank character. 2. In the C programming language, the macro variable MQDH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure: `MQDH MyDH = {MQDH_DEFAULT};`		

Language declarations

C declaration for MQDH

```
typedef struct tagMQDH MQDH;
struct tagMQDH {
  MQCHAR4  StrucId;          /* Structure identifier */
  MQLONG   Version;          /* Structure version number */
  MQLONG   StrucLength;      /* Length of MQDH structure plus following
                                MQOR and MQPMR records */
  MQLONG   Encoding;         /* Numeric encoding of data that follows
                                the MQOR and MQPMR records */
  MQLONG   CodedCharSetId;   /* Character set identifier of data that
                                follows the MQOR and MQPMR records */
  MQCHAR8  Format;           /* Format name of data that follows the
                                MQOR and MQPMR records */
  MQLONG   Flags;            /* General flags */
  MQLONG   PutMsgRecFields;  /* Flags indicating which MQPMR fields are
                                present */
  MQLONG   RecsPresent;      /* Number of MQOR records present */
  MQLONG   ObjectRecOffset;  /* Offset of first MQOR record from start
                                of MQDH */
  MQLONG   PutMsgRecOffset;  /* Offset of first MQPMR record from start
                                of MQDH */
};
```

COBOL declaration for MQDH

```
**   MQDH structure
  10 MQDH.
**    Structure identifier
   15 MQDH-STRUCID         PIC X(4).
**    Structure version number
   15 MQDH-VERSION         PIC S9(9) BINARY.
**    Length of MQDH structure plus following MQOR and MQPMR records
   15 MQDH-STRUCLENGTH     PIC S9(9) BINARY.
**    Numeric encoding of data that follows the MQOR and MQPMR records
   15 MQDH-ENCODING        PIC S9(9) BINARY.
**    Character set identifier of data that follows the MQOR and MQPMR
**    records
   15 MQDH-CODEDCHARSETID  PIC S9(9) BINARY.
**    Format name of data that follows the MQOR and MQPMR records
   15 MQDH-FORMAT          PIC X(8).
**    General flags
   15 MQDH-FLAGS           PIC S9(9) BINARY.
**    Flags indicating which MQPMR fields are present
   15 MQDH-PUTMSGRECFIELDS PIC S9(9) BINARY.
**    Number of MQOR records present
   15 MQDH-RECSPRESENT     PIC S9(9) BINARY.
**    Offset of first MQOR record from start of MQDH
   15 MQDH-OBJECTRECOFFSET PIC S9(9) BINARY.
**    Offset of first MQPMR record from start of MQDH
   15 MQDH-PUTMSGRECOFFSET PIC S9(9) BINARY.
```

PL/I declaration for MQDH

```
dcl
 1 MQDH based,
  3 StrucId         char(4),       /* Structure identifier */
  3 Version         fixed bin(31), /* Structure version number */
  3 StrucLength     fixed bin(31), /* Length of MQDH structure plus
                                      following MQOR and MQPMR
                                      records */
  3 Encoding        fixed bin(31), /* Numeric encoding of data that
                                      follows the MQOR and MQPMR
                                      records */
  3 CodedCharSetId  fixed bin(31), /* Character set identifier of data
                                      that follows the MQOR and MQPMR
                                      records */
  3 Format          char(8),       /* Format name of data that follows
                                      the MQOR and MQPMR records */
  3 Flags           fixed bin(31), /* General flags */
  3 PutMsgRecFields fixed bin(31), /* Flags indicating which MQPMR
                                      fields are present */
  3 RecsPresent     fixed bin(31), /* Number of MQOR records present */
  3 ObjectRecOffset fixed bin(31), /* Offset of first MQOR record from
                                      start of MQDH */
  3 PutMsgRecOffset fixed bin(31); /* Offset of first MQPMR record from
                                      start of MQDH */
```

Visual Basic declaration for MQDH

```
Type MQDH
  StrucId         As String*4 'Structure identifier'
  Version         As Long     'Structure version number'
  StrucLength     As Long     'Length of MQDH structure plus following'
                              'MQOR and MQPMR records'
  Encoding        As Long     'Numeric encoding of data that follows'
                              'the MQOR and MQPMR records'
  CodedCharSetId  As Long     'Character set identifier of data that'
                              'follows the MQOR and MQPMR records'
  Format          As String*8 'Format name of data that follows the'
                              'MQOR and MQPMR records'
  Flags           As Long     'General flags'
  PutMsgRecFields As Long     'Flags indicating which MQPMR fields are'
                              'present'
  RecsPresent     As Long     'Number of MQOR records present'
  ObjectRecOffset As Long     'Offset of first MQOR record from start'
                              'of MQDH'
  PutMsgRecOffset As Long     'Offset of first MQPMR record from start'
                              'of MQDH'
End Type
```

StrucId (MQCHAR4)

The value must be:

MQDH_STRUC_ID
Identifier for distribution header structure.

For the C programming language, the constant MQDH_STRUC_ID_ARRAY is also defined; this has the same value as MQDH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQDH_STRUC_ID.

Version (MQLONG)

The value must be:

MQDH_VERSION_1
Version number for distribution header structure.

The following constant specifies the version number of the current version:

MQDH_CURRENT_VERSION
Current version of distribution header structure.

The initial value of this field is MQDH_VERSION_1.

StrucLength (MQLONG)

This is the number of bytes from the start of the MQDH structure to the start of the message data following the arrays of MQOR and MQPMR records. The data occurs in the following sequence:

- MQDH structure
- Array of MQOR records
- Array of MQPMR records
- Message data

The arrays of MQOR and MQPMR records are addressed by offsets contained within the MQDH structure. If these offsets result in unused bytes between one or more of the MQDH structure, the arrays of records, and the message data, those unused bytes must be included in the value of *StrucLength*, but the content of those bytes is not preserved by the queue manager. It is valid for the array of MQPMR records to precede the array of MQOR records.

The initial value of this field is 0.

Encoding (MQLONG)

This is the numeric encoding of the data that follows the arrays of MQOR and MQPMR records; it does not apply to numeric data in the MQDH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is 0.

CodedCharSetId (MQLONG)

This is the character set identifier of the data that follows the arrays of MQOR and MQPMR records; it does not apply to character data in the MQDH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. You can use the following special value:

MQCCSI_INHERIT

Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the MQGET call does not return the value MQCCSI_INHERIT.

You cannot use MQCCSI_INHERIT if the value of the *PutApplType* field in MQMD is MQAT_BROKER.

This value is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

and for IBM MQ clients connected to these systems.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This is the format name of the data that follows the arrays of MQOD and MQPMR records (whichever occurs last).

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *Format* field in MQMD.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

You can specify the following flag:

MQDHF_NEW_MSG_IDS
Generate a new message identifier for each destination in the distribution list. Set this only when there are no put-message records present, or when the records are present but they do not contain the *MsgId* field.

Using this flag defers generation of the message identifiers until the moment when the distribution-list message is finally split into individual messages. This minimizes the amount of control information that must flow with the distribution-list message.

When an application puts a message to a distribution list, the queue manager sets MQDHF_NEW_MSG_IDS in the MQDH that it generates when both of the following statements are true:

- There are no put-message records provided by the application, or the records provided do not contain the *MsgId* field.
- The *MsgId* field in MQMD is MQMI_NONE, or the *Options* field in MQPMO includes MQPMO_NEW_MSG_ID

If no flags are needed, specify the following:

MQDHF_NONE
No flags have been specified. MQDHF_NONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is MQDHF_NONE.

PutMsgRecFields (MQLONG)

You can specify none or more of the following flags:

MQPMRF_MSG_ID
Message-identifier field is present.

MQPMRF_CORREL_ID
Correlation-identifier field is present.

MQPMRF_GROUP_ID
Group-identifier field is present.

MQPMRF_FEEDBACK
Feedback field is present.

MQPMRF_ACCOUNTING_TOKEN
Accounting-token field is present.

If no MQPMR fields are present, specify the following:

MQPMRF_NONE
No put-message record fields are present. MQPMRF_NONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is MQPMRF_NONE.

RecsPresent (MQLONG)

This is the number of destinations. A distribution list must always contain at least one destination, so *RecsPresent* must always be greater than zero.

The initial value of this field is 0.

ObjectRecOffset (MQLONG)

This gives the offset in bytes of the first record in the array of MQOR object records containing the names of the destination queues. There are *RecsPresent* records in this array. These records (plus any bytes skipped between the first object record and the previous field) are included in the length given by the *StrucLength* field.

A distribution list must always contain at least one destination, so *ObjectRecOffset* must always be greater than zero.

The initial value of this field is 0.

PutMsgRecOffset (MQLONG)

This gives the offset in bytes of the first record in the array of MQPMR put message records containing the message properties. If present, there are *RecsPresent* records in this array. These records (plus any bytes skipped between the first put message record and the previous field) are included in the length given by the *StrucLength* field.

Put message records are optional; if no records are provided, *PutMsgRecOffset* is zero, and *PutMsgRecFields* has the value MQPMRF_NONE.

The initial value of this field is 0.

MQDLH - Dead letter header

The MQDLH structure describes the information that prefixes the application message data of messages on the dead letter (undelivered-message) queue. A message can arrive on the dead letter queue either because the queue manager or message channel agent has redirected it to the queue, or because an application has put the message directly on the queue.

Format name

MQFMT_DEAD_LETTER_HEADER

Character set and encoding

The fields in the MQDLH structure are in the character set and encoding given by the *CodedCharSetId* and *Encoding* fields. These are specified in the header structure that precedes the MQDLH, or in the MQMD structure if the MQDLH is at the start of the application message data.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

If you are using the IBM MQ classes for Java/JMS, and the code page defined in the MQMD is not supported by the Java virtual machine, then the MQDLH is written in the UTF-8 character set.

Usage

Applications that put messages directly on the dead letter queue must prefix the message data with an MQDLH structure, and initialize the fields with appropriate values. However, the queue manager does not require that an MQDLH structure be present, or that valid values have been specified for the fields.

If a message is too long to put on the dead letter queue, the application must do one of the following:

- Truncate the message data to fit on the dead letter queue.

- Record the message on auxiliary storage and place an exception report message on the dead letter queue indicating this.
- Discard the message and return an error to its originator. If the message is (or might be) a critical message, do this only if it is known that the originator still has a copy of the message; for example, a message received by a message channel agent from a communication channel.

Which of the preceding actions is appropriate (if any) depends on the design of the application.

The queue manager performs special processing when a message that is a segment is put with an MQDLH structure at the front; see the description of the MQMDE structure for further details.

Putting messages on the dead letter queue

When a message is put on the dead letter queue, the MQMD structure used for the MQPUT or MQPUT1 call must be identical to the MQMD associated with the message (usually the MQMD returned by the MQGET call), with the exception of the following:

- Set the *CodedCharSetId* and *Encoding* fields to whatever character set and encoding are used for fields in the MQDLH structure.
- Set the *Format* field to MQFMT_DEAD_LETTER_HEADER to indicate that the data begins with a MQDLH structure.
- Set the context fields (*AccountingToken*, *ApplIdentityData*, *ApplOriginData*, *PutApplName*, *PutApplType*, *PutDate*, *PutTime*, *UserIdentifier*) by using a context option appropriate to the circumstances:
  - An application putting on the dead letter queue a message that is not related to any preceding message must use the MQPMO_DEFAULT_CONTEXT option; this causes the queue manager to set all of the context fields in the message descriptor to their default values.
  - A server application putting on the dead letter queue a messagethat it has just received must use the MQPMO_PASS_ALL_CONTEXT option to preserve the original context information.
  - A server application putting on the dead letter queue a *reply* to a message that it has just received must use the MQPMO_PASS_IDENTITY_CONTEXT option; this preserves the identity information but sets the origin information to be that of the server application.
  - A message channel agent putting on the dead letter queue a messagethat it received from its communication channel must use the MQPMO_SET_ALL_CONTEXT option to preserve the original context information.

In the MQDLH structure itself, set the fields as follows:

- Set the *CodedCharSetId*, *Encoding*, and *Format* fields to the values that describe the data that follows the MQDLH structure, usually the values from the original message descriptor.
- Set the context fields *PutApplType*, *PutApplName*, *PutDate*, and *PutTime* to values appropriate to the application that is putting the message on the dead letter queue; these values are not related to the original message.
- Set other fields as appropriate.

Ensure that all fields have valid values, and that character fields are padded with blanks to the defined length of the field; do not end the character data prematurely by using a null character, because the queue manager does not convert the null and subsequent characters to blanks in the MQDLH structure.

Getting messages from the dead letter queue

Applications that get messages from the dead letter queue must verify that the messages begin with an MQDLH structure. The application can determine whether an MQDLH structure is present by examining the *Format* field in the message descriptor MQMD; if the field has the value MQFMT_DEAD_LETTER_HEADER, the message data begins with an MQDLH structure. Be aware also that messages that applications get from the dead letter queue might be truncated if they were originally too long for the queue.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 485. Fields in MQDLH for MQDLH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQDLH_STRUC_ID	'DLH¬'
Version (structure version number)	MQDLH_VERSION_1	1
Reason (reason message arrived on dead letter queue)	MQRC_NONE	0
DestQName (name of original destination queue)	None	Null string or blanks
DestQMgrName (name of original destination queue manager)	None	Null string or blanks
Encoding (numeric encoding of data that follows MQDLH)	None	0
CodedCharSetId (character set identifier of data that follows MQDLH)	MQCCSI_UNDEFINED	0
Format (format name of data that follows MQDLH)	MQFMT_NONE	Blanks
PutApplType (type of application that put message on dead letter queue)	None	0
PutApplName (name of application that put message on dead letter queue)	None	Null string or blanks
PutDate (date when message was put on dead letter queue)	None	Null string or blanks
PutTime (time when message was put on dead letter queue)	None	Null string or blanks

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQDLH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQDLH MyDLH = {MQDLH_DEFAULT};
```

Language declarations

C declaration for MQDLH

```
typedef struct tagMQDLH MQDLH;
struct tagMQDLH {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    Reason;          /* Reason message arrived on dead-letter
                                (undelivered-message) queue */
  MQCHAR48  DestQName;       /* Name of original destination queue */
  MQCHAR48  DestQMgrName;    /* Name of original destination queue
```

```
                                   manager */
  MQLONG    Encoding;        /* Numeric encoding of data that follows
                                MQDLH */
  MQLONG    CodedCharSetId;  /* Character set identifier of data that
                                follows MQDLH */
  MQCHAR8   Format;          /* Format name of data that follows
                                MQDLH */
  MQLONG    PutApplType;     /* Type of application that put message on
                                dead-letter (undelivered-message)
                                queue */
  MQCHAR28  PutApplName;     /* Name of application that put message on
                                dead-letter (undelivered-message)
                                queue */
  MQCHAR8   PutDate;         /* Date when message was put on dead-letter
                                (undelivered-message) queue */
  MQCHAR8   PutTime;         /* Time when message was put on the
                                dead-letter (undelivered-message)
                                queue */
};
```

COBOL declaration for MQDLH

```
**   MQDLH structure
  10 MQDLH.
**    Structure identifier
   15 MQDLH-STRUCID        PIC X(4).
**    Structure version number
   15 MQDLH-VERSION        PIC S9(9) BINARY.
**    Reason message arrived on dead-letter (undelivered-message) queue
   15 MQDLH-REASON         PIC S9(9) BINARY.
**    Name of original destination queue
   15 MQDLH-DESTQNAME      PIC X(48).
**    Name of original destination queue manager
   15 MQDLH-DESTQMGRNAME   PIC X(48).
**    Numeric encoding of data that follows MQDLH
   15 MQDLH-ENCODING       PIC S9(9) BINARY.
**    Character set identifier of data that follows MQDLH
   15 MQDLH-CODEDCHARSETID PIC S9(9) BINARY.
**    Format name of data that follows MQDLH
   15 MQDLH-FORMAT         PIC X(8).
**    Type of application that put message on dead-letter
**    (undelivered-message) queue
   15 MQDLH-PUTAPPLTYPE    PIC S9(9) BINARY.
**    Name of application that put message on dead-letter
**    (undelivered-message) queue
   15 MQDLH-PUTAPPLNAME    PIC X(28).
**    Date when message was put on dead-letter (undelivered-message)
**    queue
   15 MQDLH-PUTDATE        PIC X(8).
**    Time when message was put on the dead-letter (undelivered-message)
**    queue
   15 MQDLH-PUTTIME        PIC X(8).
```

PL/I declaration for MQDLH

```
dcl
 1 MQDLH based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Reason         fixed bin(31), /* Reason message arrived on
                                     dead-letter (undelivered-message)
                                     queue */
  3 DestQName      char(48),      /* Name of original destination
                                     queue */
  3 DestQMgrName   char(48),      /* Name of original destination queue
                                     manager */
  3 Encoding       fixed bin(31), /* Numeric encoding of data that
                                     follows MQDLH */
  3 CodedCharSetId fixed bin(31), /* Character set identifier of data
                                     that follows MQDLH */
  3 Format         char(8),       /* Format name of data that follows
                                     MQDLH */
  3 PutApplType    fixed bin(31), /* Type of application that put
                                     message on dead-letter
                                     (undelivered-message) queue */
  3 PutApplName    char(28),      /* Name of application that put
                                     message on dead-letter
```

```
                                 (undelivered-message) queue */
  3 PutDate        char(8),       /* Date when message was put on
                                 dead-letter (undelivered-message)
                                 queue */
  3 PutTime        char(8);       /* Time when message was put on the
                                 dead-letter (undelivered-message)
                                 queue */
```

High Level Assembler declaration for MQDLH

```
MQDLH                   DSECT
MQDLH_STRUCID           DS   CL4   Structure identifier
MQDLH_VERSION           DS   F     Structure version number
MQDLH_REASON            DS   F     Reason message arrived on dead-letter
*                                  (undelivered-message) queue
MQDLH_DESTQNAME         DS   CL48  Name of original destination queue
MQDLH_DESTQMGRNAME      DS   CL48  Name of original destination queue
*                                  manager
MQDLH_ENCODING          DS   F     Numeric encoding of data that follows
*                                  MQDLH
MQDLH_CODEDCHARSETID    DS   F     Character set identifier of data that
*                                  follows MQDLH
MQDLH_FORMAT            DS   CL8   Format name of data that follows MQDLH
MQDLH_PUTAPPLTYPE       DS   F     Type of application that put message on
*                                  dead-letter (undelivered-message) queue
MQDLH_PUTAPPLNAME       DS   CL28  Name of application that put message on
*                                  dead-letter (undelivered-message) queue
MQDLH_PUTDATE           DS   CL8   Date when message was put on
*                                  dead-letter (undelivered-message) queue
MQDLH_PUTTIME           DS   CL8   Time when message was put on the
*                                  dead-letter (undelivered-message) queue
*
MQDLH_LENGTH            EQU  *-MQDLH
                        ORG  MQDLH
MQDLH_AREA              DS   CL(MQDLH_LENGTH)
```

Visual Basic declaration for MQDLH

```
Type MQDLH
  StrucId        As String*4  'Structure identifier'
  Version        As Long      'Structure version number'
  Reason         As Long      'Reason message arrived on dead-letter'
                              '(undelivered-message) queue'
  DestQName      As String*48 'Name of original destination queue'
  DestQMgrName   As String*48 'Name of original destination queue'
                              'manager'
  Encoding       As Long      'Numeric encoding of data that follows'
                              'MQDLH'
  CodedCharSetId As Long      'Character set identifier of data that'
                              'follows MQDLH'
  Format         As String*8  'Format name of data that follows MQDLH'
  PutApplType    As Long      'Type of application that put message on'
                              'dead-letter (undelivered-message) queue'
  PutApplName    As String*28 'Name of application that put message on'
                              'dead-letter (undelivered-message) queue'
  PutDate        As String*8  'Date when message was put on dead-letter'
                              '(undelivered-message) queue'
  PutTime        As String*8  'Time when message was put on the'
                              'dead-letter (undelivered-message) queue'
End Type
```

StrucId (MQCHAR4)

StrucId is the structure identifier.

The value must be:

MQDLH_STRUC_ID
: Identifier for dead-letter header structure.

  For the C programming language, the constant MQDLH_STRUC_ID_ARRAY is also defined; this has the same value as MQDLH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQDLH_STRUC_ID.

Version (MQLONG)

Version is the structure version number.

The value must be:

MQDLH_VERSION_1
Version number for dead-letter header structure.

The following constant specifies the version number of the current version:

MQDLH_CURRENT_VERSION
Current version of dead-letter header structure.

The initial value of this field is MQDLH_VERSION_1.

Reason (MQLONG)

The Reason field identifies the reason why the message was placed on the dead-letter queue instead of on the original destination queue.

This identifies the reason why the message was placed on the dead-letter queue instead of on the original destination queue. It should be one of the MQFB_* or MQRC_* values (for example, MQRC_Q_FULL). See the description of the *Feedback* field in "MQMD - Message descriptor" on page 413 for details of the common MQFB_* values that can occur.

If the value is in the range MQFB_IMS_FIRST through MQFB_IMS_LAST, the actual IMS error code can be determined by subtracting MQFB_IMS_ERROR from the value of the *Reason* field.

Some MQFB_* values occur only in this field. They relate to repository messages, trigger messages, or transmission-queue messages that have been transferred to the dead-letter queue. These are:

MQFB_APPL_CANNOT_BE_STARTED (X'00000109')
An application processing a trigger message cannot start the application named in the *ApplId* field of the trigger message (see "MQTM - Trigger message" on page 589).

On z/OS, the CKTI CICS transaction is an example of an application that processes trigger messages.

MQFB_APPL_TYPE_ERROR (X'0000010B')
An application processing a trigger message cannot start the application because the *ApplType* field of the trigger message is not valid (see "MQTM - Trigger message" on page 589).

On z/OS, the CKTI CICS transaction is an example of an application that processes trigger messages.

MQFB_BIND_OPEN_CLUSRCVR_DEL (X'00000119')
The message was on the SYSTEM.CLUSTER.TRANSMIT.QUEUE intended for a cluster queue that was opened with the MQOO_BIND_ON_OPEN option, but the remote cluster-receiver channel to be used to transmit the message to the destination queue was deleted before the message could be sent. Because MQOO_BIND_ON_OPEN was specified, only the channel selected when the queue was opened can be used to transmit the message. As this channel is no longer available, the message is placed on the dead-letter queue.

MQFB_NOT_A_REPOSITORY_MSG (X'00000118')
The message is not a repository message.

MQFB_STOPPED_BY_CHAD_EXIT (X'00000115')
The message was stopped by channel auto-definition exit.

MQFB_STOPPED_BY_MSG_EXIT (X'0000010D')
The message was stopped by channel message exit.

MQFB_TM_ERROR (X'0000010A')
The *Format* field in MQMD specifies MQFMT_TRIGGER, but the message does not begin with a valid MQTM structure. For example, the *StrucId* mnemonic eye-catcher might not be valid, the *Version* might not be recognized, or the length of the trigger message might be insufficient to contain the MQTM structure.

On z/OS, the CKTI CICS transaction is an example of an application that processes trigger messages and can generate this feedback code.

MQFB_XMIT_Q_MSG_ERROR (X'0000010F')
A message channel agent has found that a message on the transmission queue is not in the correct format. The message channel agent puts the message on the dead-letter queue using this feedback code.

One common cause is that a message has been put directly to the transmission queue, so the message does not have the expected XQH header. Messages should be put to a transmission queue through a remote queue, unless the application builds the MQXQH header.

The initial value of this field is MQRC_NONE.

DestQName (MQCHAR48)

DestQName is the name of the message queue that was the original destination for the message.

The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

DestQMgrName (MQCHAR48)

DestQMgrName is the name of the queue manager that was the original destination for the message.

The length of this field is given by MQ_Q_MGR_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

Encoding (MQLONG)

Encoding is the numeric encoding of the data that follows the MQDLH structure (usually the data from the original message); it does not apply to numeric data in the MQDLH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is `0`.

CodedCharSetId (MQLONG)

CodedCharSetId is the character set identifier of the data that flows through the MQDLH structure (usually the data from the original message); it does not apply to character data in the MQDLH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

MQCCSI_INHERIT
Character data in the data following this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

You cannot use MQCCSI_INHERIT if the value of the *PutApplType* field in MQMD is MQAT_BROKER.

This value is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris

- Windows Windows

  and for IBM MQ clients connected to these systems.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

Format is the format name of the data that follows the MQDLH structure (usually the data from the original message).

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those rules for coding the *Format* field in MQMD.

The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

PutApplType (MQLONG)

PutApplType is the type of application that put the message on the dead-letter (undelivered-message) queue.

This field has the same meaning as the *PutApplType* field in the message descriptor MQMD (see "MQMD - Message descriptor" on page 413 for details).

If the queue manager redirects the message to the dead-letter queue, *PutApplType* has the value MQAT_QMGR.

The initial value of this field is 0.

PutApplName (MQCHAR28)

PutApplName is the name of the application that put the message on the dead-letter (undelivered-message) queue.

The format of the name depends on the *PutApplType* field. The format can vary release to release. See the description of the *PutApplName* field in "MQMD - Message descriptor" on page 413.

If the queue manager redirects the message to the dead-letter queue, *PutApplName* contains the first 28 characters of the queue manager name, padded with blanks if necessary.

The length of this field is given by MQ_PUT_APPL_NAME_LENGTH. The initial value of this field is the null string in C, and 28 blank characters in other programming languages.

PutDate (MQCHAR8)

PutDate is the date when the message was put on the dead-letter (undelivered-message) queue.

The format used for the date when this field is generated by the queue manager is:

- YYYYMMDD

where the characters represent:

YYYY
: year (four numeric digits)

MM
: month of year (01 through 12)

DD
: day of month (01 through 31)

Greenwich Mean Time (GMT) is used for the *PutDate* and *PutTime* fields, subject to the system clock being set accurately to GMT.

The length of this field is given by MQ_PUT_DATE_LENGTH. The initial value of this field is the null string in C, and eight blank characters in other programming languages.

PutTime (MQCHAR8)

PutTime is the time when the message was put on the dead-letter (undelivered-message) queue.

The format used for the time when this field is generated by the queue manager is:

- HHMMSSTH

where the characters represent:

HH
hours (00 through 23)

MM
minutes (00 through 59)

SS
seconds (00 through 59; see note)

T
tenths of a second (0 through 9)

H
hundredths of a second (0 through 9)

Note: If the system clock is synchronized to an very accurate time standard, it is possible on rare occasions for 60 or 61 to be returned for the seconds in *PutTime*. This happens when leap seconds are inserted into the global time standard.

Greenwich Mean Time (GMT) is used for the *PutDate* and *PutTime* fields, subject to the system clock being set accurately to GMT.

The length of this field is given by MQ_PUT_TIME_LENGTH. The initial value of this field is the null string in C, and eight blank characters in other programming languages.

MQDMHO - Delete message handle options

The **MQDMHO** structure allows applications to specify options that control how message handles are deleted. The structure is an input parameter on the **MQDLTMH** call.

Character set and encoding

Data in **MQDMHO** must be in the character set of the application and encoding of the application (**MQENC_NATIVE**).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 486. Fields in MQDMHO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQDMHO_STRUC_ID	'DMHO'
Version (structure version number)	MQDMHO_VERSION_1	1
Options (options)	MQDMHO_NONE	0

Table 486. Fields in MQDMHO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. In the C programming language, the macro variable MQDMHO_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure: `MQDMHO MyDMHO = {MQDMHO_DEFAULT};`		

Language declarations

C declaration for MQDMHO

```
typedef struct tagMQDMHO;
struct tagMQDMHO {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    Options;         /* Options that control the action of MQDLTMH */
};
```

COBOL declaration for MQDMHO

```
**   MQDMHO structure
  10 MQDMHO.
**    Structure identifier
   15 MQDMHO-STRUCID       PIC X(4).
**    Structure version number
   15 MQDMHO-VERSION       PIC S9(9) BINARY.
**    Options that control the action of MQDLTMH
   15 MQDMHO-OPTIONS       PIC S9(9) BINARY.
```

PL/I declaration for MQDMHO

```
dcl
 1 MQDMHO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action of MQDLTMH */
```

High Level Assembler declaration for MQDMHO

```
MQDMHO                 DSECT
MQDMHO_STRUCID         DS   CL4   Structure identifier
MQDMHO_VERSION         DS   F     Structure version number
MQDMHO_OPTIONS         DS   F     Options that control the action of
*                                 MQDLTMH
MQDMHO_LENGTH          EQU  *-MQDMHO
MQDMHO_AREA            DS   CL(MQDMHO_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQDMHO_STRUC_ID

Identifier for delete message handle options structure.

For the C programming language, the constant **MQDMHO_STRUC_ID_ARRAY** is also defined; this has the same value as **MQDMHO_STRUC_ID**, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is **MQDMHO_STRUC_ID**.

Version (MQLONG)

This is the structure version number; the value must be:

MQDMHO_VERSION_1
Version-1 delete message handle options structure.

The following constant specifies the version number of the current version:

MQDMHO_CURRENT_VERSION
Current version of delete message handle options structure.

This is always an input field. The initial value of this field is **MQDMHO_VERSION_1**.

Options (MQLONG)

The value must be:

MQDMHO_NONE

No options specified.

This is always an input field. The initial value of this field is **MQDMHO_NONE**.

MQDMPO - Delete message property options

The MQDMPO structure allows applications to specify options that control how properties of messages are deleted. The structure is an input parameter on the MQDLTMP call.

Character set and encoding

Data in MQDMPO must be in the character set of the application and encoding of the application (MQENC_NATIVE).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 487. Fields in MQDPMO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQDMPO_STRUC_ID	'DMPO'
Version (structure version number)	MQDMPO_VERSION_1	1
Options (options controlling the action of MQDMPO)	Options that control the action of MQDLTMP	MQDMPO_NONE

Table 487. Fields in MQDPMO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. In the C programming language, the macro variable MQDMPO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure: `MQDMPO MyDMPO = {MQDMPO_DEFAULT};`		

Language declarations

C declaration for MQDMPO

```
typedef struct tagMQDMPO MQDMPO;
struct tagMQDMPO {
  MQCHAR4  StrucId;         /* Structure identifier */
  MQLONG   Version;         /* Structure version number */
  MQLONG   Options;         /* Options that control the action of
                               MQDLTMP */
};
```

COBOL declaration for MQDMPO

```
**   MQDMPO structure
  10 MQDMPO.
**    Structure identifier
   15 MQDMPO-STRUCID                PIC X(4).
**    Structure version number
   15 MQDMPO-VERSION                PIC S9(9) BINARY.
**    Options that control the action of MQDLTMP
   15 MQDMPO-OPTIONS                PIC S9(9) BINARY.
```

PL/I declaration for MQDMPO

```
Dcl
 1 MQDMPO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action
                                     of MQDLTMP */
```

High Level Assembler declaration for MQDMPO

```
MQDMPO                      DSECT
MQDMPO_STRUCID              DS   CL4  Structure identifier
MQDMPO_VERSION              DS   F    Structure version number
MQDMPO_OPTIONS              DS   F    Options that control the
*                                    action of MQDLTMP
MQDMPO_LENGTH               EQU  *-MQDMPO
MQDMPO_AREA                 DS   CL(MQDMPO_LENGTH)
```

StrucId (MQCHAR4)

Delete message property options structure - StrucId field

This is the structure identifier. The value must be:

MQDMPO_STRUC_ID
: Identifier for delete message property options structure.

For the C programming language, the constant MQDMPO_STRUC_ID_ARRAY is also defined; this has the same value as MQDMPO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQDMPO_STRUC_ID.

Version (MQLONG)

Delete message property options structure - Version field

This is the structure version number. The value must be:

MQDMPO_VERSION_1
Version number for delete message property options structure.

The following constant specifies the version number of the current version:

MQDMPO_CURRENT_VERSION
Current version of delete message property options structure.

This is always an input field. The initial value of this field is MQDMPO_VERSION_1.

Options (MQLONG)

Delete message property options structure - Options field

Location options: The following options relate to the relative location of the property compared to the property cursor.

MQDMPO_DEL_FIRST
Deletes the first property that matches the specified name.

MQDMPO_DEL_PROP_UNDER_CURSOR
Deletes the property pointed to by the property cursor; that is the property that was last inquired by using either the MQIMPO_INQ_FIRST or the MQIMPO_INQ_NEXT option.

The property cursor is reset when the message handle is reused. It is also reset when the message handle is specified in the *MsgHandle* field of the MQGMO structure on an MQGET call, or MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established, the call fails with completion code MQCC_FAILED and reason MQRC_PROPERTY_NOT_AVAILABLE. If the property pointed to by the property cursor has already been deleted, the call also fails with completion code MQCC_FAILED and reason MQRC_PROPERTY_NOT_AVAILABLE.

If neither of thees options is required, the following option can be used:

MQDMPO_NONE
No options specified.

This field is always an input field. The initial value of this field is MQDMPO_DEL_FIRST.

MQEPH - Embedded PCF header

The MQEPH structure describes the additional data that is present in a message when that message is a programmable command format (PCF) message. The *PCFHeader* field defines the PCF parameters that follow this structure and this allows you to follow the PCF message data with other headers.

Format name

MQFMT_EMBEDDED_PCF

Character set and encoding

Data in MQEPH must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE.

Set the character set and encoding of the MQEPH into the *CodedCharSetId* and *Encoding* fields in the MQMD (if the MQEPH structure is at the start of the message data), or the header structure that precedes the MQEPH structure (all other cases).

Usage

You cannot use MQEPH structures to send commands to the command server or any other queue manager PCF-accepting server.

Similarly, the command server or any other queue manager PCF-accepting server do not generate responses or events containing MQEPH structures.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 488. Fields in MQEPH for MQEPH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQEPH_STRUC_ID	'EPH¬'
Version (structure version number)	MQEPH_VERSION_1	1
StrucLength (length of MQEPH structure plus the MQCFH and parameter structures that follow it)	MQEPH_STRUC_LENGTH_FIXED	68
Encoding (numeric encoding of data that follows last PCF parameter structure)	None	0
CodedCharSetId (character set identifier of data that follows last PCF parameter structure)	MQCCSI_UNDEFINED	0
Format (format name of data that follows last PCF parameter structure)	MQFMT_NONE	Blanks
Flags (flags)	MQEPH_NONE	0
PCFHeader (programmable command format (PCF) header)	Names and values as defined in Table 489 on page 360	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQEPH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQEPH MyEPH = {MQEPH_DEFAULT};
```

Language declarations

C declaration for MQEPH

```
typedef struct tagMQEPH MQEPH;
struct tagMQDH {
  MQCHAR4  StrucId;          /* Structure identifier */
  MQLONG   Version;          /* Structure version number */
  MQLONG   StrucLength;      /* Total length of MQEPH including the MQCFH
                                and parameter structures that follow it */
```

```
  MQLONG   Encoding;         /* Numeric encoding of data that follows last
                                PCF parameter structure */
  MQLONG   CodedCharSetId;   /* Character set identifier of data that
                                follows last PCF parameter structure */
  MQCHAR8  Format;           /* Format name of data that follows last PCF
                                parameter structure */
  MQLONG   Flags;            /* Flags */
  MQCFH    PCFHeader;        /* Programmable command format header */
 };
```

COBOL declaration for MQEPH

```
**   MQEPH structure
  10 MQEPH.
**    Structure identifier
   15 MQEPH-STRUCID         PIC X(4).
**    Structure version number
   15 MQEPH-VERSION         PIC S9(9) BINARY.
**    Total length of MQEPH structure including the MQCFH
**    and parameter structures that follow it
   15 MQEPH-STRUCLENGTH     PIC S9(9) BINARY.
**    Numeric encoding of data that follows last
**    PCF structure
   15 MQEPH-ENCODING        PIC S9(9) BINARY.
**    Character set identifier of data that
**    follows last PCF parameter structure
   15 MQEPH-CODEDCHARSETID  PIC S9(9) BINARY.
**    Format name of data that follows last PCF
**    parameter structure
   15 MQEPH-FORMAT          PIC X(8).
**    Flags
   15 MQEPH-FLAGS           PIC S9(9) BINARY.
**    Programmable command format header
   15 MQEPH-PCFHEADER.
**      Structure type
     20 MQEPH-PCFHEADER-TYPE           PIC S9(9) BINARY.
**      Structure length
     20 MQEPH-PCFHEADER-STRUCLENGTH    PIC S9(9) BINARY.
**      Structure version number
     20 MQEPH-PCFHEADER-VERSION        PIC S9(9) BINARY.
**      Command identifier
     20 MQEPH-PCFHEADER-COMMAND        PIC S9(9) BINARY.
**      Message sequence number
     20 MQEPH-PCFHEADER-MSGSEQNUMBER   PIC S9(9) BINARY.
**      Control options
     20 MQEPH-PCFHEADER-CONTROL        PIC S9(9) BINARY.
**      Completion code
     20 MQEPH-PCFHEADER-COMPCODE       PIC S9(9) BINARY.
**      Reason code qualifying completion code
     20 MQEPH-PCFHEADER-REASON         PIC S9(9) BINARY.
**      Count of parameter structures
     20 MQEPH-PCFHEADER-PARAMETERCOUNT PIC S9(9) BINARY.
```

PL/I declaration for MQEPH

```
dcl
 1 MQEPH based,
  3 StrucId         char(4),       /* Structure identifier */
  3 Version         fixed bin(31), /* Structure version number */
  3 StrucLength     fixed bin(31), /* Total Length of MQEPH including the
                                      MQCFH and parameter structures that
                                      follow it
  3 Encoding        fixed bin(31), /* Numeric encoding of data that follows
                                      last PCF parameter structure
  3 CodedCharSetId  fixed bin(31), /* Character set identifier of data that
                                      follows last PCF parameter structure
  3 Format          char(8),       /* Format name of data that follows last
                                      PCF parameter structure */
  3 Flags           fixed bin(31), /* Flags */
  3 PCFHeader,                     /* Programmable command format header
   5 Type           fixed bin(31), /* Structure type */
   5 StrucLength    fixed bin(31), /* Structure length */
   5 Version        fixed bin(31), /* Structure version number */
   5 Command        fixed bin(31), /* Command identifier */
   5 MsgseqNumber   fixed bin(31), /* Message sequence number */
   5 Control        fixed bin(31), /* Control options */
   5 CompCode       fixed bin(31), /* Completion code */
```

```
   5 Reason         fixed bin(31), /* Reason code qualifying completion code */
   5 ParameterCount fixed bin(31); /* Count of parameter structures */
```

High Level Assembler declaration for MQEPH

```
MQEPH                            DSECT
MQEPH_STRUCID                    DS   CL4   Structure identifier
MQEPH_VERSION                    DS   F     Structure version number
MQEPH_STRUCLENGTH                DS   F     Total length of MQEPH including the
*                                           MQCFH and parameter structures that
                                            follow it
MQEPH_ENCODING                   DS   F     Numeric encoding of data that follows
*                                           last PCF parameter structure
MQEPH_CODEDCHARSETID             DS   F     Character set identifier of data that
*                                           follows last PCF parameter structure
MQEPH_FORMAT                     DS   CL8   Format name of data that follows last
*                                           PCF parameter structure
MQEPH_FLAGS                      DS   F     Flags
MQEPH_PCFHEADER                  DS   0F    Force fullword alignment
MQEPH_PCFHEADER_TYPE             DS   F     Structure type
MQEPH_PCFHEADER_STRUCLENGTH      DS   F     Structure length
MQEPH_PCFHEADER_VERSION          DS   F     Structure version number
MQEPH_PCFHEADER_COMMAND          DS   F     Command identifier
MQEPH_PCFHEADER_MSGSEQNUMBER     DS   F     Structure length
MQEPH_PCFHEADER_CONTROL          DS   F     Control options
MQEPH_PCFHEADER_COMPCODE         DS   F     Completion code
MQEPH_PCFHEADER_REASON           DS   F     Reason code qualifying completion code
MQEPH_PCFHEADER_PARAMETER COUNT  DS   F     Count of parameter structures
MQEPH_PCFHEADER_LENGTH           EQU  *-MQEPH_PCFHEADER
                                 ORG  MQEPH_PCFHEADER
MQEPH_PCFHEADER_AREA             DS   CL(MQEPH_PCFHEADER_LENGTH)
*
MQEPH_LENGTH                     EQU  *-MQEPH
                                 ORG  MQEPH
MQEPH_AREA                       DS   CL(MQEPH_LENGTH)
```

Visual Basic declaration for MQEPH

```
Type MQEPH
  StrucId         As String*4 'Structure identifier'
  Version         As Long     'Structure version number'
  StrucLength     As Long     'Total length of MQEPH structure including the MQCFH'
                              'and parameter structures that follow it'
  Encoding        As Long     'Numeric encoding of data that follows last'
                              'PCF parameter structure'
  CodedCharSetId  As Long     'Character set identifier of data that'
                              'follows last PCF parameter structure'
  Format          As String*8 'Format name of data that follows last PCF'
                              'parameter structure'
  Flags           As Long     'Flags'
  PCFHeader       As MQCFH    'Programmable command format header'
 End Type

Global MQEPH_DEFAULT As MQEPH
```

StrucId (MQCHAR4)

The value must be:

MQEPH_STRUC_ID
Identifier for distribution header structure.

For the C programming language, the constant MQEPH_STRUC_ID_ARRAY is also defined; this has the same value as MQDH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQEPH_STRUC_ID.

Version (MQLONG)

The value must be:

MQEPH_VERSION_1
Version number for embedded PCF header structure.

The following constant specifies the version number of the current version:

MQCFH_VERSION_3
Current version of embedded PCF header structure.

The initial value of this field is MQEPH_VERSION_1.

StrucLength (MQLONG)

This is the amount of data preceding the next header structure. It includes:

- The length of the MQEPH header
- The length of all PCF parameters following the header
- Any blank padding following those parameters

StrucLength must be a multiple of 4.

The fixed length part of the structure is defined by MQEPH_STRUC_LENGTH_FIXED.

The initial value of this field is 68.

Encoding (MQLONG)

This is the numeric encoding of the data that follows the MQEPH structure and the associated PCF parameters; it does not apply to character data in the MQEPH structure itself.

The initial value of this field is 0.

CodedCharSetId (MQLONG)

This is the character set identifier of the data that follows the MQEPH structure and the associated PCF parameters; it does not apply to character data in the MQEPH structure itself.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This is the format name of the data that follows the MQEPH structure and the associated PCF parameters.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The following values are available:

MQEPH_NONE
No flags have been specified. MQEPH_NONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

MQEPH_CCSID_EMBEDDED
The character set of the parameters containing character data is specified individually within the CodedCharSetId field in each structure. The character set of the StrucId and Format fields is defined by the CodedCharSetId field in the header structure that precedes the MQEPH structure, or by the CodedCharSetId field in the MQMD if the MQEPH is at the start of the message.

The initial value of this field is MQEPH_NONE.

PCFHeader (MQCFH)

This is the programmable command format (PCF) header, defining the PCF parameters that follow the MQEPH structure. This enables you to follow the PCF message data with other headers.

The PCF header is initially defined with the following values:

Table 489. Initial values of fields in MQCFH		
Field name	**Name of constant**	**Value of constant**
Type	MQCFT_NONE	0
StrucLength	MQCFH_STRUC_LENGTH	36
Version	MQCFH_VERSION_3	3
StrucLength	None	0
Command	MQCMD_NONE	0
MsgSeqNumber	None	1
Control	MQCFC_LAST	1
CompCode	MQCC_OK	0
Reason	MQRC_NONE	0
ParameterCount	None	0

The application must change the Type from MQCFT_NONE to a valid structure type for the use it is making of the embedded PCF header.

MQGMO - Get-message options

The MQGMO structure allows the application to control how messages are removed from queues. The structure is an input/output parameter on the MQGET call.

Version

The current version of MQGMO is MQGMO_VERSION_4. Certain fields are available only in certain versions of MQGMO. If you need to port applications between several environments, you must ensure that the version of MQGMO is consistent across all environments. Fields that exist only in particular versions of the structure are identified as such in "MQGMO - Get-message options" on page 360 and in the field descriptions.

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most recent version of MQGMO that is supported by the environment, but with the initial value of the *Version* field set to MQGMO_VERSION_1. To use fields that are not present in the version-1 structure, set the *Version* field to the version number of the version required.

Character set and encoding

Data in MQGMO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 490. Fields in MQGMO for MQGMO		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
StrucId (structure identifier)	MQGMO_STRUC_ID	'GMO¬'
Version (structure version number)	MQGMO_VERSION_1	1

Table 490. Fields in MQGMO for MQGMO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
MQGMO - Options field (options that control the action of MQGET)	MQGMO_NO_WAIT	0
WaitInterval (wait interval)	None	0
Signal1 (signal)	None	Null pointer on z/OS ; 0 otherwise
Signal2 (signal identifier)	None	0
ResolvedQName (resolved name of destination queue)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQGMO_VERSION_2.		
MatchOptions (options controlling selection criteria used for MQGET)	MQMO_MATCH_MSG_ID + MQMO_MATCH_CORREL_ID	3
GroupStatus (flag indicating whether message retrieved is in a group)	MQGS_NOT_IN_GROUP	'¬'
SegmentStatus (flag indicating whether message retrieved is a segment of a logical message)	MQSS_NOT_A_SEGMENT	'¬'
Segmentation (flag indicating whether further segmentation is allowed for the message retrieved)	MQSEG_INHIBITED	'¬'
Reserved1 (reserved)	None	'¬'
Note: The remaining fields are ignored if *Version* is less than MQGMO_VERSION_3.		
MsgToken (message token)	MQMTOK_NONE	Nulls
ReturnedLength (length in bytes of message data returned)	MQRL_UNDEFINED	-1
Note: The remaining fields are ignored if *Version* is less than MQGMO_VERSION_4.		
Reserved2 (reserved)	None	'¬'
MsgHandle (handle to a message that is to be populated with the properties of the message being retrieved from the queue)	MQHM_NONE	0

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQGMO_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQGMO MyGMO = {MQGMO_DEFAULT};
```

Language declarations

C declaration for MQGMO

```
typedef struct tagMQGMO MQGMO;
struct tagMQGMO {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    Options;         /* Options that control the action of */
                                MQGET */
  MQLONG    WaitInterval;    /* Wait interval */
  MQLONG    Signal1;         /* Signal */
  MQLONG    Signal2;         /* Signal identifier */
  MQCHAR48  ResolvedQName;   /* Resolved name of destination queue */
  /* Ver:1 */
  MQLONG    MatchOptions;    /* Options controlling selection */
                                criteria used for MQGET */
  MQCHAR    GroupStatus;     /* Flag indicating whether message */
                                retrieved is in a group */
  MQCHAR    SegmentStatus;   /* Flag indicating whether message */
                                retrieved is a segment of a logical */
                                message */
  MQCHAR    Segmentation;    /* Flag indicating whether further */
                                segmentation is allowed for the */
                                message retrieved */
  MQCHAR    Reserved1;       /* Reserved */
  /* Ver:2 */
  MQBYTE16  MsgToken;        /* Message token */
  MQLONG    ReturnedLength;  /* Length of message data returned */
                                (bytes) */
  /* Ver:3 */
  MQLONG    Reserved2;       /* Reserved */
  MQHMSG    MsgHandle;       /* Message handle */
  /* Ver:4 */
};
```

Note: On z/OS, the *Signal1* field is declared as PMQLONG.

COBOL declaration for MQGMO

```
**   MQGMO structure
  10 MQGMO.
**    Structure identifier
   15 MQGMO-STRUCID        PIC X(4).
**    Structure version number
   15 MQGMO-VERSION        PIC S9(9) BINARY.
**    Options that control the action of MQGET
   15 MQGMO-OPTIONS        PIC S9(9) BINARY.
**    Wait interval
   15 MQGMO-WAITINTERVAL   PIC S9(9) BINARY.
**    Signal
   15 MQGMO-SIGNAL1        PIC S9(9) BINARY.
**    Signal identifier
   15 MQGMO-SIGNAL2        PIC S9(9) BINARY.
**    Resolved name of destination queue
   15 MQGMO-RESOLVEDQNAME  PIC X(48).
**    Options controlling selection criteria used for MQGET
   15 MQGMO-MATCHOPTIONS   PIC S9(9) BINARY.
**    Flag indicating whether message retrieved is in a group
   15 MQGMO-GROUPSTATUS    PIC X.
**    Flag indicating whether message retrieved is a segment of a
**    logical message
   15 MQGMO-SEGMENTSTATUS  PIC X.
**    Flag indicating whether further segmentation is allowed for the
**    message retrieved
   15 MQGMO-SEGMENTATION   PIC X.
**    Reserved
   15 MQGMO-RESERVED1      PIC X.
**    Message token
   15 MQGMO-MSGTOKEN       PIC X(16).
**    Length of message data returned (bytes)
   15 MQGMO-RETURNEDLENGTH PIC S9(9) BINARY.
**    Reserved
   15 MQGMO-RESERVED2      PIC S9(9) BINARY.
**    Message handle
   15 MQGMO-MSGHANDLE      PIC S9(18) BINARY.
```

Note: On z/OS, the *Signal1* field is declared as POINTER.

PL/I declaration for MQGMO

```
dcl
 1 MQGMO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action of
                                     MQGET */
  3 WaitInterval   fixed bin(31), /* Wait interval */
  3 Signal1        fixed bin(31), /* Signal */
  3 Signal2        fixed bin(31), /* Signal identifier */
  3 ResolvedQName  char(48),      /* Resolved name of destination
                                     queue */
  3 MatchOptions   fixed bin(31), /* Options controlling selection
                                     criteria used for MQGET */
  3 GroupStatus    char(1),       /* Flag indicating whether message
                                     retrieved is in a group */
  3 SegmentStatus  char(1),       /* Flag indicating whether message
                                     retrieved is a segment of a logical
                                     message */
  3 Segmentation   char(1),       /* Flag indicating whether further
                                     segmentation is allowed for the
                                     message retrieved */
  3 Reserved1      char(1),       /* Reserved */
  3 MsgToken       char(16),      /* Message token */
  3 ReturnedLength fixed bin(31); /* Length of message data returned
                                     (bytes) */
  3 Reserved2      fixed bin(31); /* Reserved */
  3 MsgHandle      fixed bin(63); /* Message handle */
```

Note: On z/OS, the *Signal1* field is declared as `pointer`.

High Level Assembler declaration for MQGMO

```
MQGMO                      DSECT
MQGMO_STRUCID              DS   CL4   Structure identifier
MQGMO_VERSION              DS   F     Structure version number
MQGMO_OPTIONS              DS   F     Options that control the action of
*                                     MQGET
MQGMO_WAITINTERVAL         DS   F     Wait interval
MQGMO_SIGNAL1              DS   F     Signal
MQGMO_SIGNAL2              DS   F     Signal identifier
MQGMO_RESOLVEDQNAME        DS   CL48  Resolved name of destination queue
MQGMO_MATCHOPTIONS         DS   F     Options controlling selection criteria
*                                     used for MQGET
MQGMO_GROUPSTATUS          DS   CL1   Flag indicating whether message
*                                     retrieved is in a group
MQGMO_SEGMENTSTATUS        DS   CL1   Flag indicating whether message
*                                     retrieved is a segment of a logical
*                                     message
MQGMO_SEGMENTATION         DS   CL1   Flag indicating whether further
*                                     segmentation is allowed for the message
*                                     retrieved
MQGMO_RESERVED1            DS   CL1   Reserved
MQGMO_MSGTOKEN             DS   XL16  Message token
MQGMO_RETURNEDLENGTH       DS   F     Length of message data returned (bytes)
MQGMO_RESERVED2            DS   F     Reserved
MQGMO_MSGHANDLE            DS   D     Message handle
MQGMO_LENGTH               EQU  *-MQGMO
                           ORG  MQGMO
MQGMO_AREA                 DS   CL(MQGMO_LENGTH)
```

High Level Assembler declaration for MQGMO

```
Type MQGMO
  StrucId        As String*4  'Structure identifier'
  Version        As Long      'Structure version number'
  Options        As Long      'Options that control the action of MQGET'
  WaitInterval   As Long      'Wait interval'
  Signal1        As Long      'Signal'
  Signal2        As Long      'Signal identifier'
  ResolvedQName  As String*48 'Resolved name of destination queue'
  MatchOptions   As Long      'Options controlling selection criteria'
```

```
                                'used for MQGET'
  GroupStatus    As String*1  'Flag indicating whether message'
                                'retrieved is in a group'
  SegmentStatus  As String*1  'Flag indicating whether message'
                                'retrieved is a segment of a logical'
                                'message'
  Segmentation   As String*1  'Flag indicating whether further'
                                'segmentation is allowed for the message'
                                'retrieved'
  Reserved1      As String*1  'Reserved'
  MsgToken       As MQBYTE16  'Message token'
  ReturnedLength As Long      'Length of message data returned (bytes)'
End Type
```

PROPCTL channel options for MQGMO

Use the **PROPCTL** channel attribute to control which message properties are included in a message that is sent from an IBM MQ 9.1 queue manager to a partner queue manager from an earlier version of IBM MQ.

Table 491. Channel message property attribute settings

PROPCTL	Description
ALL	Use this option if applications connected to the partner queue manager from an earlier version are able to process any properties placed in a message by an IBM MQ 9.1 application. All properties are sent to the partner queue manager, in addition to any name-value pairs placed in the MQRFH2. You must consider two application design issues: 1. An application connected to the partner queue manager must be able to process messages containing MQRFH2 headers generated on an IBM MQ 9.1 queue manager. 2. The application connected to the partner queue manager must process new message properties that are flagged with MQPD_SUPPORT_REQUIRED correctly. With the ALL channel option set, JMS applications can interoperate between IBM MQ 9.1 and an earlier version using the channel. New IBM MQ 9.1 applications using message properties can interoperate with applications from an earlier version, depending on how the earlier version application handles MQRFH2 headers.

PROPCTL	Description
COMPAT	Use this option to send message properties to applications connected to an earlier version partner queue manager in some cases, but not all. Message properties are only sent if two conditions are met: 1. No property must be marked as requiring message property processing. 2. At least one of the message properties must be in a "reserved" folder; see Note. With the COMPAT channel option set, JMS applications can interoperate between IBM MQ 9.1 and an earlier version using the channel. The channel is not available to every application using message properties, only to those applications that use the reserved folders. The rules concerning whether the message or the property is sent are: 1. If the message has properties, but none of the properties are associated with a "reserved" folder, then no message properties are sent. 2. If any message property has been created in a "reserved" property folder, all message properties associated with the message are sent. However: a. If any of the message properties are marked as support being required, MQPD_SUPPORT_REQUIRED or MQPD_SUPPORT_REQUIRED_IF_LOCAL, the whole message is rejected. It is returned, discarded, or sent to the dead letter queue according to the value of its report options. b. If no message properties are marked as support being required, an individual property might not be sent. If any of the message property descriptor fields are set to non-default values the individual property is not sent. The message is still sent. An example of a non-default property descriptor field value is MQPD_USER_CONTEXT. **Note:** The "reserved" folders names start with mcd., jms., usr., or mqext.. These folders are created for applications that use the JMS interface. In IBM MQ 9.1 any name-value pairs that are placed in these folders are treated as message properties. Message properties are sent in an MQRFH2 header, in addition to any name-value pairs placed in an MQRFH2 header. Any name-value pairs placed in an MQRFH2 header are sent as long as the message is not rejected.
NONE	Use this option to prevent any message properties being sent to applications connected to an earlier version partner queue manager. An MQRFH2 that contains name-value pairs and message properties is still sent, but only with the name-value pairs. With the NONE channel option set, a JMS message is sent as a JMSTextMessage or a JMSBytesMessage without any JMS message properties. If it is possible for an earlier version application to ignore all properties set in an IBM MQ 9.1 application, it can interoperate with it.

Table 491. Channel message property attribute settings (continued)

PROPCTL queue options for MQGMO

Use the **PROPCTL** queue attribute to control how message properties are returned to an application that calls **MQGET** without setting any **MQGMO** message property options.

Table 492. Queue message property attribute settings

PROPCTL	Description
ALL	Use the ALL option so that different applications reading a message from the same queue can process the message in different ways. • An application, migrated unchanged from an earlier version, can continue to read the MQRFH2 directly. Properties are directly accessible in the MQRFH2 header. You must modify the application to handle any new properties, and new property attributes. It is possible that the application might be affected by changes in the layout and number of MQRFH2 headers. Some folder attributes might be removed, or that IBM MQ reports an error in the layout of the MQRFH2 header that it ignored in an earlier version. • A new or changed application can use the message property MQI to query message properties, and read name-value pairs in MQRFH2 header directly. All the properties in the message are returned to the application. • If the application calls MQCRTMH to create a message handle, it must query the message properties using MQINQMP. Name-value pairs that are not message properties remain in the MQRFH2, which is stripped of any message properties. • If the application does not create a message handle, all the message properties and name-value pairs remain in the MQRFH2. ALL only has this effect if the receiving application has not set a MQGMO_PROPERTIES option, or has set it to MQGMO_PROPERTIES_AS_Q_DEF.

Table 492. Queue message property attribute settings (continued)

PROPCTL	Description
COMPAT (default)	COMPAT is the default option. If GMO_PROPERTIES_* is not set, as in an unmodified application from an earlier version, COMPAT is assumed. By defaulting to the COMPAT option, an earlier version application that did not explicitly create an MQRFH2, works without change on IBM MQ 9.1. Use this option if you have written an earlier version application MQI application to read JMS messages. • The JMS properties, which are stored in an MQRFH2 header, are returned to the application in an MQRFH2 header in folders with names starting with mcd., jms., usr., or mqext. • If the message has JMS folders, and if an IBM MQ 9.1 application adds new property folders to the message, these properties are also returned in the MQRFH2. Consequently, you must modify the application to handle any new properties, and new property attributes. It is possible that an unmodified application might be affected by changes in the layout and number of MQRFH2 headers. It might find some folder attributes are removed, or that IBM MQ finds errors in the layout of the MQRFH2 header that it ignored in an earlier version. **Note:** In this scenario, the behavior of the application is the same whether it is connected to an earlier version or IBM MQ 9.1 queue manager. If the channel **PROPCTL** attribute is set to COMPAT or ALL any new message properties are sent in the message to the earlier version partner queue manager. • If the message is not a JMS message, but contains other properties, those properties are not returned to the application in an MQRFH2 header. [1] • The option also enables earlier version applications that explicitly create an MQRFH2 to work correctly, in many cases. For example, An MQI program that creates an MQRFH2 containing JMS message properties continues to work correctly. If a message is created without JMS message properties, but with some other MQRFH2 folders, the folders are returned to the application. Only if the folders are message property folders are those specific folders are removed from the MQRFH2. Message property folders are identified by having the new folder attribute content='properties', or are folders with names listed in Defined property folder name or Ungrouped property folder name. • If the application calls MQCRTMH to create a message handle, it must query the message properties using MQINQMP. Message properties are removed from the MQRFH2 headers. Name-value pairs that are not message properties remain in the MQRFH2. • If the application calls MQCRTMH to create a message handle, it can query all message properties, regardless of whether the message has JMS folders. • If the application does not create a message handle, all the message properties and name-value pairs remain in the MQRFH2. If a message contains new user property folders, you can infer that the message was created by a new or changed IBM MQ 9.1 application. If the receiving application is to process these new properties directly in an MQRFH2, you must modify the application to use the ALL option. With the default COMPAT option set, an unmodified application continues to process the rest of the MQRFH2, without the IBM MQ 9.1 properties. The intent of the PROPCTL interface is to support old applications reading MQRFH2 folders, and new and changed applications using the message property interface. Aim for new applications to use the message property interface for all user message properties, and to avoid reading and writing MQRFH2 headers directly. COMPAT only has this effect if the receiving application has not set a MQGMO_PROPERTIES option, or has set it to MQGMO_PROPERTIES_AS_Q_DEF.

PROPCTL	Description
FORCE	The FORCE option places all messages properties into MQRFH2 headers. All message properties and name-value pairs in the MQRFH2 headers remain in the message. Message properties are not removed from the MQRFH2, and made available through a message handle. The effect of choosing the FORCE option is to enable a newly migrated application to read message properties from MQRFH2 headers. Suppose you have modified an application to process IBM MQ 9.1 message properties, but have also retained its ability to work directly with MQRFH2 headers, as before. You can decide when to switch the application over to using message properties by initially setting the PROPCTL queue attribute to FORCE. Set the **PROPCTL** queue attribute to another value when you are ready to start using message properties. If the new function in the application does not behave as you expected, set the **PROPCTL** option back to FORCE. FORCE only has this effect if the receiving application has not set a MQGMO_PROPERTIES option, or has set it to MQGMO_PROPERTIES_AS_Q_DEF.
NONE	Use the NONE option so that an existing application can process a message, ignoring all message properties, and a new or changed application can query message properties. • If the application calls MQCRTMH to create a message handle, it must query the message properties using MQINQMP. Name-value pairs that are not message properties remain in the MQRFH2, which is stripped of any message properties. • If the application does not create a message handle, all the message properties are removed from the MQRFH2. Name-value pairs in the MQRFH2 headers remain in the message. NONE only has this effect if the receiving application has not set a MQGMO_PROPERTIES option, or has set it to MQGMO_PROPERTIES_AS_Q_DEF.
V6COMPAT	Use this option to receive an MQRFH2 in the same format as it was sent. If the sending application, or the queue manager, creates additional message properties, these are returned in the message handle. This option has to be set on both the sending and receiving queues, and any intervening transmission queues. It overrides any other PROPCTL options set on queue definitions in the queue name resolution path. Use the V6COMPAT option only in exceptional circumstances. For example, if you are migrating applications from an earlier version to IBM MQ 9.1, the option is valuable because it preserves the behavior of the earlier version. The option is likely to have an impact on message throughput. It is also more difficult to administer; you need to ensure the option is set on the sender, receiver, and intervening transmission queues. V6COMPAT only has this effect if the receiving application has not set a MQGMO_PROPERTIES option, or has set it to MQGMO_PROPERTIES_AS_Q_DEF.

For more information about message properties and name-value pairs, see "NameValueData (MQCHARn)" on page 525.

Message property options for MQGMO

Use the **MQGMO** message property options to control how message properties are returned to an application.

[1] The existence of specific property folders created by the IBM MQ classes for JMS indicates a JMS message. The property folders are mcd., jms., usr., or mqext.

MQGMO Option	Description
MQGMO_PROPERTIES_AS_Q_DEF	IBM MQ applications that read from the same queue, and do not set GMO_PROPERTIES_*, receive the message properties differently. IBM MQ applications that do not create a message handle, are controlled by the queue **PROPCTL** attribute. An IBM MQ application can choose to receive message properties in the MQRFH2, or create a message handle and query the message properties. If the application creates a message handle, properties are removed from the MQRFH2. • A new or changed IBM MQ application that does not set GMO_PROPERTIES_* or sets it to MQGMO_PROPERTIES_AS_Q_DEF can choose to query message properties. It must set MQCRTMH to create a message handle and query message properties using the MQINQMP MQI call. • If a new or changed application does not create a message handle, it must read any message properties it receives directly from the MQRFH2 headers. • If the queue attribute **PROPCTL** is set to FORCE, no properties are returned in the message handle. All properties are returned in MQRFH2 headers. • If the queue attribute **PROPCTL** is set to NONE, or COMPAT, an IBM MQ application that creates a message handle, receives all message properties.
MQGMO_PROPERTIES_IN_HANDLE	Force an application to use message properties. Use this option to detect if a modified application fails to create message handle. The application might be trying to read message properties directly from an MQRFH2, rather than call MQINQMP.
MQGMO_NO_PROPERTIES	• All properties are removed. . Queue manager generated properties, such as JMS properties, are removed. • Properties are removed even if a message handle is created. Name-value pairs in other MQRFH2 folders are available in the message data.
MQGMO_PROPERTIES_FORCE_MQRFH2	Properties are returned in the MQRFH2 headers, even if a message handle is created. • MQINQMP returns no message properties, even if a message handle is created. MQRC_PROPERTY_NOT_AVAILABLE is returned if a property is inquired upon.

Table 493. MQGMO message property option settings

Table 493. MQGMO message property option settings (continued)

MQGMO Option	Description
MQGMO_PROPERTIES_COMPATIBILITY	If the message is from a JMS client, the JMS properties are returned in the MQRFH2 headers. New or modified IBM MQ applications, that create a message handle, behave differently. • All properties in any message property folders are returned if the message contains a mcd., jms., usr., or mqext folder. • If the message contains property folders, but not a mcd., jms., usr., or mqext folder, no message properties are returned in an MQRFH2. • If a new or modified IBM MQ application creates a message handle, query message properties using the MQINQMP MQI call. All message properties are removed from the MQRFH2. • If a new or modified IBM MQ application creates a message handle, all properties in the message can be queried. Even if the message does not contain a mcd., jms., usr., or mqext folder, all message properties are queriable.

Related reference

PROPCTL
2471 (09A7) (RC2471): MQRC_PROPERTY_NOT_AVAILABLE

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQGMO_STRUC_ID
Identifier for get-message options structure.

For the C programming language, the constant MQGMO_STRUC_ID_ARRAY is also defined; this has the same value as MQGMO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQGMO_STRUC_ID.

Version (MQLONG)

Version is the structure version number.

The value must be one of the following:

MQGMO_VERSION_1
Version-1 get-message options structure.

This version is supported in all environments.

MQGMO_VERSION_2
Version-2 get-message options structure.

This version is supported in all environments.

MQGMO_VERSION_3
Version-3 get-message options structure.

This version is supported in all environments.

MQGMO_VERSION_4
Version-4 get-message options structure.

This version is supported in all environments.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQGMO_CURRENT_VERSION
Current version of get-message options structure.

This is always an input field. The initial value of this field is MQGMO_VERSION_1.

Options (MQLONG) for MQGMO

MQGMO options control the action of MQGET. You can specify zero or more of the options. If you need more than one optional value:

- Add the values (do not add the same constant more than once), or
- Combine the values using the bitwise OR operation (if the programming language supports bit operations).

Combinations of options that are not valid are noted; all other combinations are valid.

Wait options

The following options relate to waiting for messages to arrive on the queue:

MQGMO_WAIT
The application waits until a suitable message arrives. The maximum time that the application waits is specified in *WaitInterval* .

Important: There is no wait, or delay, if a suitable message is available immediately.

If MQGET requests are inhibited, or MQGET requests become inhibited while waiting, the wait is canceled. The call completes with MQCC_FAILED and reason code MQRC_GET_INHIBITED, regardless of whether there are suitable messages on the queue.

You can use MQGMO_WAIT with the MQGMO_BROWSE_FIRST or MQGMO_BROWSE_NEXT options.

If several applications are waiting on the same shared queue, the following rules select which application is activated when a suitable message arrives:

Table 494. Rules for activating MQGET calls on a shared queue.

Number of MQGET calls waiting to be activated		**Result**
With a BROWSE option	**Without a BROWSE option [2]**	
None	One or more	One MQGET call without a BROWSE option is activated.
One or more	None	All MQGET calls with a BROWSE option are activated.
One or more	One or more	One MQGET call without a BROWSE option is activated. The number of MQGET calls with a BROWSE option that are activated is unpredictable.

If more than one MQGET call without a BROWSE option is waiting on the same queue, only one is activated. The queue manager attempts to give priority to waiting calls in the following order:

1. Specific get-wait requests that can be satisfied only by certain messages, for example, ones with a specific MsgId or CorrelId (or both).
2. General get-wait requests that can be satisfied by any message.

Note:

[2] An MQGET call specifying the MQGMO_LOCK option is treated as a nonbrowse call.

- Within the first category, no additional priority is given to more specific get-wait requests. For example, requests that specify both MsgId and CorrelId .
- Within either category, it cannot be predicted which application is selected. In particular, the application waiting longest is not necessarily the one selected.
- Path length, and priority-scheduling considerations of the operating system, can mean that a waiting application of lower operating system priority than expected retrieves the message.
- It can also happen that an application that is not waiting retrieves the message in preference to one that is.

z/OS On z/OS, the following points apply:

- If you want the application to proceed with other work while waiting for the message to arrive, consider using the signal option (MQGMO_SET_SIGNAL) instead. However the signal option is environment-specific; applications that you to port between different environments must not use it.
- If there is more than one MQGET call waiting for the same message, with a mixture of wait and signal options, each waiting call is considered equally. It is an error to specify MQGMO_SET_SIGNAL with MQGMO_WAIT. It is also an error to specify this option with a queue handle for which a signal is outstanding.
- If you specify MQGMO_WAIT or MQGMO_SET_SIGNAL for a queue that has an IndexType of MQIT_MSG_TOKEN, no selection criteria are permitted. This means that:
  - If you are using a version-1 MQGMO, set the MsgId and CorrelId fields in the MQMD specified on the MQGET call to MQMI_NONE and MQCI_NONE.
  - If you are using a version-2 or later MQGMO, set the MatchOptions field to MQMO_NONE.
- For an MQGET call on a shared queue and the call is a browse request, or a destructive get of a group message, and neither MsgId nor CorrelId are to be matched, your signal ECB is posted MQEC_MSG_ARRIVED after 200 milliseconds.

  This occurs, even though a suitable message might not have arrived on the queue, until the wait interval has expired, when the queue is posted with MQEC_WAIT_INTERVAL_EXPIRED. When MQEC_MSG_ARRIVED is posted, you must reissue a second MQGET call to retrieve the message, if one is available.

  This technique is used to ensure that you are informed in a timely manner of a message arrival, but can appear as an unexpected processing overhead when compared with a similar call sequence on a nonshared queue.

MQGMO_WAIT is ignored if specified with MQGMO_BROWSE_MSG_UNDER_CURSOR or MQGMO_MSG_UNDER_CURSOR ; no error is raised.

MQGMO_NO_WAIT
The application does not wait if no suitable message is available. MQGMO_NO_WAIT is the opposite of the MQGMO_WAIT. MQGMO_NO_WAIT is defined to aid program documentation. It is the default if neither is specified.

MQGMO_SET_SIGNAL
Use this option with the Signal1 and Signal2 fields. It allows applications to proceed with other work while waiting for a message to arrive. It also allows (if suitable operating system facilities are available) applications to wait for messages arriving on more than one queue.

Note: The MQGMO_SET_SIGNAL option is environment-specific; do not use it for applications that you want to port.

In two circumstances, the call completes in the same way as if this option had not been specified:

1. If a currently available message satisfies the criteria specified in the message descriptor.
2. If a parameter error or other synchronous error is detected.

If no message satisfying the criteria specified in the message descriptor is currently available, control returns to the application without waiting for a message to arrive. The **CompCode** and **Reason**

parameters are set to MQCC_WARNING and MQRC_SIGNAL_REQUEST_ACCEPTED. Other output fields in the message descriptor and the output parameters of the MQGET call are not set. When a suitable message arrives later, the signal is delivered by posting the ECB.

The caller must then reissue the MQGET call to retrieve the message. The application can wait for this signal, using functions provided by the operating system.

If the operating system provides a multiple wait mechanism, you can use it to wait for a message arriving on any one of several queues.

If a nonzero WaitInterval is specified, the signal is delivered after the wait interval expires. The queue manager can also cancel the wait, in which case the signal is delivered.

More than one MQGET call can set a signal for the same message. The order in which applications are activated is the same as described for MQGMO_WAIT.

If more than one MQGET call is waiting for the same message, each waiting call is considered equally. The calls can include a mixture of wait and signal options.

Under certain conditions the MQGET call can retrieve a message, and a signal resulting from the arrival of the same message can be delivered. When a signal is delivered, an application must be prepared for no message to be available.

A queue handle can have no more than one signal request outstanding.

This option is not valid with any of the following options:

- MQGMO_UNLOCK
- MQGMO_WAIT

For an MQGET call on a shared queue and the call is a browse request, or a destructive get of a group message, and neither MsgId or CorrelId are to be matched, the user's signal ECB is posted MQEC_MSG_ARRIVED after 200 milliseconds.

This occurs, even though a suitable message might not have arrived on the queue, until the wait interval has expired, when the queue is posted with MQEC_WAIT_INTERVAL_EXPIRED. When MQEC_MSG_ARRIVED is posted, you must reissue a second MQGET call to retrieve the message, if one is available.

This technique is used to ensure that you are informed in a timely manner of a message arrival, but can appear as an unexpected processing overhead when compared with a similar call sequence on a nonshared queue.

This is not an efficient method of message retrieval when messages are added infrequently. To avoid this overhead for the browse case, specify MsgId (if non-indexed or indexed by MsgId) or *CorrelId* (if indexed by CorrelId) matching on the MQGET call.

z/OS This option is supported on z/OS only.

MQGMO_FAIL_IF_QUIESCING

Force the MQGET call to fail if the queue manager is in the quiescing state.

z/OS On z/OS, this option also forces the MQGET call to fail if the connection (for a CICS or IMS application) is in the quiescing state.

If this option is specified with MQGMO_WAIT or MQGMO_SET_SIGNAL, and the wait or signal is outstanding at the time the queue manager enters the quiescing state:

- The wait is canceled and the call returns completion code MQCC_FAILED with reason code MQRC_Q_MGR_QUIESCING or MQRC_CONNECTION_QUIESCING.
- The signal is canceled with an environment-specific signal completion code.

  z/OS On z/OS, the signal completes with event completion code MQEC_Q_MGR_QUIESCING or MQEC_CONNECTION_QUIESCING.

If MQGMO_FAIL_IF_QUIESCING is not specified and the queue manager or connection enters the quiescing state, the wait or signal is not canceled.

Sync point options

The following options relate to the participation of the MQGET call within a unit of work:

MQGMO_SYNCPOINT
The request is to operate within the normal unit-of-work protocols. The message is marked as being unavailable to other applications, but it is deleted from the queue only when the unit of work is committed. The message is made available again if the unit of work is backed out.

You can leave MQGMO_SYNCPOINT and MQGMO_NO_SYNCPOINT unset. In which case, the inclusion of the get request in unit-of-work protocols is determined by the environment running the queue manager. It is not determined by the environment running the application.

- z/OS On z/OS, the get request is within a unit of work.
- In all environments except z/OS, the get request is not within a unit of work.

Because of these differences, an application that you want to port must not allow this option to default; specify MQGMO_SYNCPOINT or MQGMO_NO_SYNCPOINT explicitly.

This option is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT
- MQGMO_LOCK
- MQGMO_NO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_UNLOCK

MQGMO_SYNCPOINT_IF_PERSISTENT
The request is to operate within the normal unit-of-work protocols, but only if the message retrieved is persistent. A persistent message has the value MQPER_PERSISTENT in the Persistence field in MQMD.

- If the message is persistent, the queue manager processes the call as though the application had specified MQGMO_SYNCPOINT.
- If the message is not persistent, the queue manager processes the call as though the application had specified MQGMO_NO_SYNCPOINT.

This option is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT
- MQGMO_COMPLETE_MSG
- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_NO_SYNCPOINT
- MQGMO_SYNCPOINT
- MQGMO_UNLOCK

This option is supported in the following environments:

- AIX AIX
- IBM i IBM i

- Linux Linux
- Solaris Solaris
- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

MQGMO_NO_SYNCPOINT

The request is to operate outside the normal unit-of-work protocols. If you get a message without a browse option, it is deleted from the queue immediately. The message cannot be made available again by backing out the unit of work.

This option is assumed if you specify MQGMO_BROWSE_FIRST or MQGMO_BROWSE_NEXT.

You can leave MQGMO_SYNCPOINT and MQGMO_NO_SYNCPOINT unset. In which case, the inclusion of the get request in unit-of-work protocols is determined by the environment running the queue manager. It is not determined by the environment running the application.

- z/OS On z/OS, the get request is within a unit of work.
- In all environments except z/OS, the get request is not within a unit of work.

Because of these differences, an application that you want to port must not allow this option to default; specify either MQGMO_SYNCPOINT or MQGMO_NO_SYNCPOINT explicitly.

This option is not valid with any of the following options:

- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT

z/OS **MQGMO_MARK_SKIP_BACKOUT**

Back out a unit of work without reinstating on the queue the message that was marked with this option.

This option is supported only on z/OS.

If this option is specified, MQGMO_SYNCPOINT must also be specified. MQGMO_MARK_SKIP_BACKOUT is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT
- MQGMO_LOCK
- MQGMO_NO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_UNLOCK

Note: On IMS and CICS, you might have to issue an extran IBM MQ call after backing out a unit of work containing a message marked with MQGMO_MARK_SKIP_BACKOUT. You must issue an IBM MQ call before you commit the new unit of work containing the marked message. The call can be any IBM MQ call you like.

1. On IMS, if you have not applied IMS APAR PN60855 and you are running an IMS MPP or BMP application.
2. On CICS, if you are running any application.

In both cases, issue any IBM MQ call before committing the new unit of work containing the backed out message.

Note: Within a unit of work, there can be only one get request marked as skipping backout, as well as none or several unmarked get requests.

If an application backs out of a unit of work, a message that was retrieved using MQGMO_MARK_SKIP_BACKOUT is not restored to its previous state. Other resource updates are backed out. The message is treated as if it had been retrieved in a new unit of work started by the backout request. The message is retrieved without the MQGMO_MARK_SKIP_BACKOUT option.

MQGMO_MARK_SKIP_BACKOUT is useful if, after some resources have been changed, it becomes apparent that the unit of work cannot complete successfully. If you omit this option, backing out the unit of work reinstates the message on the queue. The same sequence of events occurs again, when the message is next retrieved.

However, if you specify MQGMO_MARK_SKIP_BACKOUT on the original MQGET call, backing out the unit of work backs out the updates to the other resources. The message is treated as if it had been retrieved under a new unit of work. The application can perform appropriate error handling. It can send a report message to the sender of the original message, or place the original message on the dead-letter queue. It can then commit the new unit of work. Committing the new unit of work removes the message permanently from the original queue.

MQGMO_MARK_SKIP_BACKOUT marks a single physical message. If the message belongs to a message group, the other messages in the group are not marked. Similarly, if the marked message is a segment of a logical message, the other segments in the logical message are not marked.

Any message in a group can be marked, but if messages are retrieved using MQGMO_LOGICAL_ORDER, it is advantageous to mark the first message in the group. If the unit of work is backed out, the first (marked) message is moved to the new unit of work. The second and later messages in the group are reinstated on the queue. The messages left on the queue cannot be retrieved by another application using MQGMO_LOGICAL_ORDER. The first message in the group is no longer on the queue. However, the application that backed the unit of work out can retrieve the second and later messages into the new unit of work using the MQGMO_LOGICAL_ORDER option. The first message has been retrieved already.

Occasionally you might need to back out the new unit of work. For example, because the dead-letter queue is full and the message must not be discarded. Backing out the new unit of work reinstates the message on the original queue, which prevents the message being lost. However, in this situation processing cannot continue. After backing out the new unit of work, the application must inform the operator or administrator that there is an unrecoverable error, and then finish.

MQGMO_MARK_SKIP_BACKOUT only works if the unit of work containing the get request is interrupted by the application backing it out. If the unit of work containing the get request is backed out because the transaction or system fails, MQGMO_MARK_SKIP_BACKOUT is ignored. Any message retrieved using this option is reinstated on the queue in the same way as messages retrieved without this option.

Browse options

The following options relate to browsing messages on the queue:

MQGMO_BROWSE_FIRST

When a queue is opened with the MQOO_BROWSE option, a browse cursor is established, positioned logically before the first message on the queue. You can then use MQGET calls specifying the MQGMO_BROWSE_FIRST, MQGMO_BROWSE_NEXT, or MQGMO_BROWSE_MSG_UNDER_CURSOR option to retrieve messages from the queue nondestructively. The browse cursor marks the position, within the messages on the queue, from which the next MQGET call with MQGMO_BROWSE_NEXT searches for a suitable message.

MQGMO_BROWSE_FIRST is not valid with any of the following options:

- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT
- MQGMO_MARK_SKIP_BACKOUT

- MQGMO_MSG_UNDER_CURSOR
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_UNLOCK

It is also an error if the queue was not opened for browse.

An MQGET call with MQGMO_BROWSE_FIRST ignores the previous position of the browse cursor. The first message on the queue that satisfies the conditions specified in the message descriptor is retrieved. The message remains on the queue, and the browse cursor is positioned on this message.

After this call, the browse cursor is positioned on the message that has been returned. The message might be removed from the queue before the next MQGET call with MQGMO_BROWSE_NEXT is issued. In this case, the browse cursor remains at the position in the queue that the message occupied, even though that position is now empty.

Use the MQGMO_MSG_UNDER_CURSOR option with a non-browse MQGET call, to remove the message from the queue.

The browse cursor is not moved by a non-browse MQGET call, even if using the same *Hobj* handle. Nor is it moved by a browse MQGET call that returns a completion code of MQCC_FAILED, or a reason code of MQRC_TRUNCATED_MSG_FAILED.

Specify the MQGMO_LOCK option with this option, to lock the message that is browsed.

You can specify MQGMO_BROWSE_FIRST with any valid combination of the MQGMO_* and MQMO_* options that control the processing of messages in groups and segments of logical messages.

If you specify MQGMO_LOGICAL_ORDER, the messages are browsed in logical order. If you omit that option, the messages are browsed in physical order. If you specify MQGMO_BROWSE_FIRST, you can switch between logical order and physical order. Subsequent MQGET calls using MQGMO_BROWSE_NEXT browse the queue in the same order as the most recent call that specified MQGMO_BROWSE_FIRST for the queue handle.

The queue manager retains two sets of group and segment information for MQGET calls. The group and segment information for browse calls are retained separately from the information for calls that remove messages from the queue. If you specify MQGMO_BROWSE_FIRST, the queue manager ignores the group and segment information for browsing. It scans the queue as though there were no current group and no current logical message. If the MQGET call is successful, completion code MQCC_OK or MQCC_WARNING, the group and segment information for browsing is set to that of the message returned. If the call fails, the group and segment information remain the same as they were before the call.

MQGMO_BROWSE_NEXT

Advance the browse cursor to the next message on the queue that satisfies the selection criteria specified on the MQGET call. The message is returned to the application, but remains on the queue.

MQGMO_BROWSE_NEXT is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_MSG_UNDER_CURSOR
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_UNLOCK

It is also an error if the queue was not opened for browse.

MQGMO_BROWSE_NEXT behaves the same way as MQGMO_BROWSE_FIRST, if it is the first call to browse a queue, after the queue has been opened for browse.

The message under cursor might be removed from the queue before the next MQGET call with MQGMO_BROWSE_NEXT is issued. The browse cursor logically remains at the position in the queue that the message occupied, even though that position is now empty.

Messages are stored on the queue in one of two ways:

- FIFO within priority (MQMDS_PRIORITY), or
- FIFO regardless of priority (MQMDS_FIFO)

The **MsgDeliverySequence** queue attribute indicates which method applies (see "Attributes for queues" on page 823 for details).

A queue might have a MsgDeliverySequence of MQMDS_PRIORITY. A message arrives on the queue that is of a higher priority than the one currently pointed to by the browse cursor. In which case, the higher priority message is not found during the current sweep of the queue using MQGMO_BROWSE_NEXT. It can be found only after the browse cursor has been reset with MQGMO_BROWSE_FIRST, or by reopening the queue.

The MQGMO_MSG_UNDER_CURSOR option can be used with a non-browse MQGET call if required, to remove the message from the queue.

The browse cursor is not moved by non-browse MQGET calls using the same Hobj handle.

Specify the MQGMO_LOCK option with this option to lock the message that is browsed.

You can specify MQGMO_BROWSE_NEXT with any valid combination of the MQGMO_* and MQMO_* options that control the processing of messages in groups and segments of logical messages.

If you specify MQGMO_LOGICAL_ORDER, the messages are browsed in logical order. If you omit that option, the messages are browsed in physical order. If you specify MQGMO_BROWSE_FIRST, you can switch between logical order and physical order. Subsequent MQGET calls using MQGMO_BROWSE_NEXT browse the queue in the same order as the most recent call that specified MQGMO_BROWSE_FIRST for the queue handle. The call fails with reason code MQRC_INCONSISTENT_BROWSE if this condition is not satisfied.

Note: Take special care when using an MQGET call to browse beyond the end of a message group if MQGMO_LOGICAL_ORDER is not specified. For example, suppose that the last message in the group precedes the first message in the group on the queue. Using MQGMO_BROWSE_NEXT to browse beyond the end of the group, specifying MQMO_MATCH_MSG_SEQ_NUMBER with MsgSeqNumber set to 1 returns the first message in the group already browsed. This result can happen immediately, or a number of MQGET calls later if there are intervening groups. The same consideration applies for a logical message not in a group.

The group and segment information for browse calls are retained separately from the information for calls that remove messages from the queue.

MQGMO_BROWSE_MSG_UNDER_CURSOR

Retrieve the message pointed to by the browse cursor nondestructively, regardless of the MQMO_* options specified in the MatchOptions field in MQGMO.

MQGMO_BROWSE_MSG_UNDER_CURSOR is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_NEXT
- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_MSG_UNDER_CURSOR
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_UNLOCK

It is also an error if the queue was not opened for browse.

The message pointed to by the browse cursor is the one that was last retrieved using either the MQGMO_BROWSE_FIRST or the MQGMO_BROWSE_NEXT option. The call fails if neither of these calls has been issued for this queue since it was opened. The call also fails if the message that was under the browse cursor has since been retrieved destructively.

The position of the browse cursor is not changed by this call.

The MQGMO_MSG_UNDER_CURSOR option can be used with a non-browse MQGET call, to remove the message from the queue.

The browse cursor is not moved by a non-browse MQGET call, even if using the same Hobj handle. Nor is it moved by a browse MQGET call that returns a completion code of MQCC_FAILED, or a reason code of MQRC_TRUNCATED_MSG_FAILED.

If MQGMO_BROWSE_MSG_UNDER_CURSOR is specified with MQGMO_LOCK:

- If there is already a message locked, it must be the one under the cursor, so that is returned without unlocking and locking again. The message remains locked.
- If there is no locked message and there is a message under the browse cursor, it is locked and returned to the application. If there is no message under the browse cursor, the call fails.

If MQGMO_BROWSE_MSG_UNDER_CURSOR is specified without MQGMO_LOCK:

- If there is already a message locked, it must be the one under the cursor. The message is returned to the application and then unlocked. Because the message is now unlocked, there is no guarantee that it can be browsed again, or retrieved destructively by the same application. It might have been retrieved destructively by another application getting messages from the queue.
- If there is no locked message and there is a message under the browse cursor, it is returned to the application. If there is no message under the browse cursor the call fails.

If MQGMO_COMPLETE_MSG is specified with MQGMO_BROWSE_MSG_UNDER_CURSOR, the browse cursor must identify a message whose Offset field in MQMD is zero. If this condition is not satisfied, the call fails with reason code MQRC_INVALID_MSG_UNDER_CURSOR.

The group and segment information for browse calls are retained separately from the information for calls that remove messages from the queue.

MQGMO_MSG_UNDER_CURSOR

Retrieve the message pointed to by the browse cursor, regardless of the MQMO_* options specified in the MatchOptions field in MQGMO. The message is removed from the queue.

The message pointed to by the browse cursor is the one that was last retrieved using either the MQGMO_BROWSE_FIRST or the MQGMO_BROWSE_NEXT option.

If MQGMO_COMPLETE_MSG is specified with MQGMO_MSG_UNDER_CURSOR, the browse cursor must identify a message whose Offset field in MQMD is zero. If this condition is not satisfied, the call fails with reason code MQRC_INVALID_MSG_UNDER_CURSOR.

This option is not valid with any of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT
- MQGMO_UNLOCK

It is also an error if the queue was not opened both for browse and for input. If the browse cursor is not currently pointing to a retrievable message, an error is returned by the MQGET call.

MQGMO_MARK_BROWSE_HANDLE

The message that is returned by a successful MQGET, or identified by the returned MsgToken, is marked. The mark is specific to the object handle used in the call.

The message is not removed from the queue.

MQGMO_MARK_BROWSE_HANDLE is valid only if one of the following options is also specified:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT

MQGMO_MARK_BROWSE_HANDLE is not valid with any of the following options:

- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_COMPLETE_MSG
- MQGMO_LOCK
- MQGMO_LOGICAL_ORDER
- MQGMO_UNLOCK

The message remains in this state until one of the following events occurs:

- The object handle concerned is closed, either normally or otherwise.
- The message is unmarked for this handle by a call to MQGET with the option MQGMO_UNMARK_BROWSE_HANDLE.
- The message is returned from a call to destructive MQGET, which completes with MQCC_OK or MQCC_WARNING. The message state remains changed even if the MQGET is later rolled-back.
- The message expires.

MQGMO_MARK_BROWSE_CO_OP

The message that is returned by a successful MQGET, or identified by the returned *MsgToken*, is marked for all handles in the cooperating set.

The cooperative level mark is in addition to any handle level mark that might have been set.

The message is not removed from the queue.

MQGMO_MARK_BROWSE_CO_OP is valid only if the object handle used was returned by a call to MQOPEN that specified MQOO_CO_OP. You must also specify one of the following MQGMO options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_BROWSE_NEXT

This option is not valid with any of the following options:

- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_COMPLETE_MSG
- MQGMO_LOCK
- MQGMO_LOGICAL_ORDER
- MQGMO_UNLOCK

If the message is already marked, and the option MQGMO_UNMARKED_BROWSE_MSG is not specified, the call fails with MQCC_FAILED and reason code MQRC_MSG_MARKED_BROWSE_CO_OP.

The message remains in this state until one of the following events occurs:

- All object handles in the cooperating set are closed.
- The message is unmarked for cooperating browsers by a call to MQGET with the option MQGMO_UNMARK_BROWSE_CO_OP.
- The message is automatically unmarked by the queue manager.
- The message is returned from a call to a non-browse MQGET. The message state remains changed even if the MQGET is later rolled-back.
- The message expires.

MQGMO_UNMARKED_BROWSE_MSG

A call to MQGET that specifies MQGMO_UNMARKED_BROWSE_MSG returns a message that is considered to be unmarked for its handle. It does not return a message if the message was marked for its handle. It also does not return the message if the queue was opened by a call to MQOPEN, with the option MQOO_CO_OP, and the message has been marked by a member of the cooperating set.

This option is not valid with any of the following options:

- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_COMPLETE_MSG
- MQGMO_LOCK
- MQGMO_LOGICAL_ORDER
- MQGMO_UNLOCK

MQGMO_UNMARK_BROWSE_CO_OP

After a call to MQGET that specifies this option, the message is no longer considered by any open handles in the set of cooperating handles to be marked for the cooperating set. The message is still considered to be marked at handle level if it was marked at handle level before this call.

Using MQGMO_UNMARK_BROWSE_CO_OP is valid only with a handle returned by a successful call to MQOPEN with the option MQOO_CO_OP. The MQGET succeeds even if the message is not considered to be marked by the cooperating set of handles.

MQGMO_UNMARK_BROWSE_CO_OP is not valid on a non-browse MQGET call, or with any of the following options:

- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_COMPLETE_MSG
- MQGMO_LOCK
- MQGMO_LOGICAL_ORDER
- MQGMO_MARK_BROWSE_CO_OP
- MQGMO_UNLOCK
- MQGMO_UNMARKED_BROWSE_MSG

MQGMO_UNMARK_BROWSE_HANDLE

After a call to MQGET that specifies this option, the message located is no longer considered to be marked by this handle.

The call succeeds even if the message is not marked for this handle.

This option is not valid on a non-browse MQGET call, or with any of the following options:

- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_COMPLETE_MSG
- MQGMO_LOCK
- MQGMO_LOGICAL_ORDER
- MQGMO_MARK_BROWSE_CO_OP
- MQGMO_UNLOCK
- MQGMO_UNMARKED_BROWSE_MSG

Lock options

The following options relate to locking messages on the queue:

MQGMO_LOCK

Lock the message that is browsed, so that the message becomes invisible to any other handle open for the queue. The option can be specified only if one of the following options is also specified:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_NEXT
- MQGMO_BROWSE_MSG_UNDER_CURSOR

Only one message can be locked for each queue handle. The message can be a logical message or a physical message:

- If you specify MQGMO_COMPLETE_MSG, all the message segments that make up the logical message are locked to the queue handle. The messages must all be present on the queue and available for retrieval.
- If you omit MQGMO_COMPLETE_MSG, only a single physical message is locked to the queue handle. If this message happens to be a segment of a logical message, the locked segment prevents other applications using MQGMO_COMPLETE_MSG to retrieve or browse the logical message.

The locked message is always the one under the browse cursor. The message can be removed from the queue by a later MQGET call that specifies the MQGMO_MSG_UNDER_CURSOR option. Other MQGET calls using the queue handle can also remove the message (for example, a call that specifies the message identifier of the locked message).

If the call returns completion code MQCC_FAILED, or MQCC_WARNING with reason code MQRC_TRUNCATED_MSG_FAILED, no message is locked.

If the application does not remove the message from the queue, the lock is released by one of the following actions:

- Issuing another MQGET call for this handle, specifying either MQGMO_BROWSE_FIRST or MQGMO_BROWSE_NEXT. The lock is released if the call completes with MQCC_OK or MQCC_WARNING. The message remains locked if the call completes with MQCC_FAILED. However, the following exceptions apply:
  - The message is not unlocked if MQCC_WARNING is returned with MQRC_TRUNCATED_MSG_FAILED.
  - The message is unlocked if MQCC_FAILED is returned with MQRC_NO_MSG_AVAILABLE.

  If you also specify MQGMO_LOCK, the message returned is locked. If you omit MQGMO_LOCK, there is no locked message after the call.

  If you specify MQGMO_WAIT, and no message is immediately available, the original message is unlocked before the start of the wait.
- Issuing another MQGET call for this handle, with MQGMO_BROWSE_MSG_UNDER_CURSOR, without MQGMO_LOCK. The lock is released if the call completes with MQCC_OK or MQCC_WARNING. The message remains locked if the call completes with MQCC_FAILED. However, the following exception applies:
  - The message is not unlocked if MQCC_WARNING is returned with MQRC_TRUNCATED_MSG_FAILED.
- Issuing another MQGET call for this handle with MQGMO_UNLOCK.
- Issuing an MQCLOSE call using the handle. The MQCLOSE might be implicit, caused by the application ending.

No special MQOPEN option is required to specify MQGMO_LOCK, other than MQOO_BROWSE, which is needed to specify an accompanying browse option.

MQGMO_LOCK is not valid with any of the following options:

- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT

- MQGMO_UNLOCK

MQGMO_UNLOCK

The message to be unlocked must have been previously locked by an MQGET call with the MQGMO_LOCK option. If there is no message locked for this handle, the call completes with MQCC_WARNING and MQRC_NO_MSG_LOCKED.

The **MsgDesc**, **BufferLength**, **Buffer**, and **DataLength** parameters are not checked or altered if you specify MQGMO_UNLOCK. No message is returned in *Buffer*.

No special open option is required to specify MQGMO_UNLOCK (although MQOO_BROWSE is needed to issue the lock request in the first place).

This option is not valid with any options except the following:

- MQGMO_NO_WAIT
- MQGMO_NO_SYNCPOINT

Both of these options are assumed whether specified or not.

Message-data options

The following options relate to the processing of the message data when the message is read from the queue:

MQGMO_ACCEPT_TRUNCATED_MSG

If the message buffer is too small to hold the complete message, allow the MQGET call to fill the buffer. MQGET fills the buffer with as much of the message it can. It issues a warning completion code, and completes its processing. This means that:

- When browsing messages, the browse cursor is advanced to the returned message.
- When removing messages, the returned message is removed from the queue.
- Reason code MQRC_TRUNCATED_MSG_ACCEPTED is returned if no other error occurs.

Without this option, the buffer is still filled with as much of the message as it can hold. A warning completion code is issued, but processing is not completed. This means that:

- When browsing messages, the browse cursor is not advanced.
- When removing messages, the message is not removed from the queue.
- Reason code MQRC_TRUNCATED_MSG_FAILED is returned if no other error occurs.

MQGMO_CONVERT

This option converts the application data in the message to conform to the CodedCharSetId and Encoding values specified in the **MsgDesc** parameter on the MQGET call. The data is converted before it is copied to the **Buffer** parameter.

The Format field specified when the message was put is assumed by the conversion process to identify the nature of the data in the message. The message data is converted by the queue manager for built-in formats, and by a user-written exit for other formats. See "Data-conversion exit" on page 894 for details of the data-conversion exit.

- If conversion is successful, the CodedCharSetId and Encoding fields specified in the **MsgDesc** parameter are unchanged on return from the MQGET call.
- If only conversion fails the message data is returned unconverted The CodedCharSetId and Encoding fields in MsgDesc are set to the values for the unconverted message. The completion code is MQCC_WARNING in this case.

In either case, these fields describe the character-set identifier and encoding of the message data that is returned in the **Buffer** parameter.

See the *Format* field described in "MQMD - Message descriptor" on page 413 for a list of format names for which the queue manager performs the conversion.

Group and segment options

The following options relate to the processing of messages in groups and segments of logical messages. Before the option descriptions, here are some definitions of important terms:

Physical message
A physical message is the smallest unit of information that can be placed on or removed from a queue. It often corresponds to the information specified or retrieved on a single MQPUT, MQPUT1, or MQGET call. Every physical message has its own message descriptor, MQMD. Typically, physical messages are distinguished by differing values for the message identifier, the MsgId field in MQMD. The queue manager does not enforce different values.

Logical message
A logical message is a single unit of application information. In the absence of system constraints, a logical message is the same as a physical message. If logical messages are large, system constraints might make it advisable or necessary to split a logical message into two or more physical messages, called segments.

A logical message that has been segmented consists of two or more physical messages that have the same nonnull group identifier, GroupId field in MQMD. They have the same message sequence number, MsgSeqNumber field in MQMD. The segments are distinguished by differing values for the segment offset, Offset field in MQMD. The segment offset is the offset of the data in the physical message from the start of the data in the logical message. Because each segment is a physical message, the segments in a logical message typically have different message identifiers.

A logical message that has not been segmented, but for which segmentation has been permitted by the sending application, also has a nonnull group identifier. In this case there is only one physical message with that group identifier if the logical message does not belong to a message group. Logical messages, for which segmentation has been inhibited by the sending application, have a null group identifier, MQGI_NONE, unless the logical message belongs to a message group.

Message group
A message group is a set of one or more logical messages that have the same nonnull group identifier. The logical messages in the group are distinguished by different values for the message sequence number. The sequence number is an integer in the range 1 through n, where n is the number of logical messages in the group. If one or more of the logical messages is segmented, there are more than n physical messages in the group.

MQGMO_LOGICAL_ORDER
MQGMO_LOGICAL_ORDER controls the order in which messages are returned by successive MQGET calls for the queue handle. The option must be specified on each call.

If MQGMO_LOGICAL_ORDER is specified for successive MQGET calls for the same queue handle, messages in groups are returned in the order of their message sequence numbers. Segments of logical messages are returned in the order given by their segment offsets. This order might be different from the order in which those messages and segments occur on the queue.

Note: Specifying MQGMO_LOGICAL_ORDER has no adverse consequences on messages that do not belong to groups and that are not segments. In effect, such messages are treated as though each belonged to a message group consisting of only one message. It is safe to specify MQGMO_LOGICAL_ORDER when retrieving messages from queues that contain a mixture of messages in groups, message segments, and unsegmented messages not in groups.

To return the messages in the required order, the queue manager retains the group and segment information between successive MQGET calls. The group and segment information identifies the current message group and current logical message for the queue handle. It also identifies the current position within the group and logical message, and whether the messages are being retrieved within a unit of work. Because the queue manager retains this information, the application does not need to set the group and segment information before each MQGET call. Specifically, it means that the application does not need to set the GroupId, MsgSeqNumber, and Offset fields in MQMD. However, the application must set the MQGMO_SYNCPOINT or MQGMO_NO_SYNCPOINT option correctly on each call.

When the queue is opened, there is no current message group and no current logical message. A message group becomes the current message group when a message that has the MQMF_MSG_IN_GROUP flag is returned by the MQGET call. With MQGMO_LOGICAL_ORDER specified on successive calls, that group remains the current group until a message is returned that has:

- MQMF_LAST_MSG_IN_GROUP without MQMF_SEGMENT (that is, the last logical message in the group is not segmented), or
- MQMF_LAST_MSG_IN_GROUP with MQMF_LAST_SEGMENT (that is, the message returned is the last segment of the last logical message in the group).

When such a message is returned, the message group is terminated, and on successful completion of the MQGET call there is no longer a current group. In a similar way, a logical message becomes the current logical message when a message that has the MQMF_SEGMENT flag is returned by the MQGET call. The logical message is terminated when the message that has the MQMF_LAST_SEGMENT flag is returned.

If no selection criteria are specified, successive MQGET calls return, in the correct order, the messages for the first message group on the queue. They then return the messages for the second message group, and so on, until there are no more messages available. It is possible to select the particular message groups returned by specifying one or more of the following options in the MatchOptions field:

- MQMO_MATCH_MSG_ID
- MQMO_MATCH_CORREL_ID
- MQMO_MATCH_GROUP_ID

However, these options are effective only when there is no current message group or logical message. See the MatchOptions field described in "MQGMO - Get-message options" on page 360 for further details.

Table 495 on page 385 shows the values of the MsgId, CorrelId, GroupId, MsgSeqNumber, and Offset fields that the queue manager looks for when attempting to find a message to return on the MQGET call. The rules apply both to removing messages from the queue, and browsing messages on the queue. In the table, Either means Yes or No:

LOG ORD
Indicates whether the MQGMO_LOGICAL_ORDER option is specified on the call.

Cur grp
Indicates whether a current message group exists before the call.

Cur log msg
Indicates whether a current logical message exists before the call.

Other columns
Show the values that the queue manager looks for. Previous denotes the value returned for the field in the previous message for the queue handle.

Table 495. MQGET options relating to messages in groups and segments of logical messages

Options you specify	Group and log-msg status before call		Values the queue manager looks for				
LOG ORD	**Cur grp**	**Cur log msg**	*MsgId*	*CorrelId*	*GroupId*	*MsgSeqNumber*	*Offset*
Yes	No	No	Controlled by *MatchOptions*	Controlled by *MatchOptions*	Controlled by *MatchOptions*	1	0

Table 495. MQGET options relating to messages in groups and segments of logical messages (continued)							
Options you specify	**Group and log-msg status before call**		**Values the queue manager looks for**				
Yes	No	Yes	Any message identifier	Any correlation identifier	Previous group identifier	1	Previous offset + previous segment length
Yes	Yes	No	Any message identifier	Any correlation identifier	Previous group identifier	Previous sequence number + 1	0
Yes	Yes	Yes	Any message identifier	Any correlation identifier	Previous group identifier	Previous sequence number	Previous offset + previous segment length
No	Either	Either	Controlled by *MatchOptions*	Controlled by *MatchOptions*	Controlled by *MatchOptions*	Controlled by *MatchOptions*	Controlled by *MatchOptions*

If multiple message groups are present on the queue and eligible for return, the groups are returned in the order determined by the position on the queue of the first segment of the first logical message in each group. That is, the physical messages that have message sequence numbers of 1, and offsets of 0, determine the order in which eligible groups are returned.

The MQGMO_LOGICAL_ORDER option affects units of work as follows:

- If the first logical message or segment in a group is retrieved within a unit of work, all the other logical messages and segments in the group must be retrieved within a unit of work, if the same queue handle is used. However, they need not be retrieved within the same unit of work. This allows a message group consisting of many physical messages to be split across two or more consecutive units of work for the queue handle.
- If the first logical message or segment in a group is not retrieved within a unit of work, and the same queue handle is used, none of the other logical messages and segments in the group can be retrieved within a unit of work.

If these conditions are not satisfied, the MQGET call fails with reason code MQRC_INCONSISTENT_UOW.

When MQGMO_LOGICAL_ORDER is specified, the MQGMO supplied on the MQGET call must not be less than MQGMO_VERSION_2, and the MQMD must not be less than MQMD_VERSION_2. If this condition is not satisfied, the call fails with reason code MQRC_WRONG_GMO_VERSION or MQRC_WRONG_MD_VERSION, as appropriate.

If MQGMO_LOGICAL_ORDER is not specified for successive MQGET calls for the queue handle, messages are returned without regard for whether they belong to message groups, or whether they are segments of logical messages. This means that messages or segments from a particular group or logical message might be returned out of order, or intermingled with messages or segments from other groups or logical messages, or with messages that are not in groups and are not segments. In this situation, the particular messages that are returned by successive MQGET calls is controlled by the MQMO_* options specified on those calls (see the *MatchOptions* field described in "MQGMO - Get-message options" on page 360 for details of these options).

This is the technique that can be used to restart a message group or logical message in the middle, after a system failure has occurred. When the system restarts, the application can set the GroupId, MsgSeqNumber, Offset, and MatchOptions fields to the appropriate values, and then issue the MQGET call with MQGMO_SYNCPOINT or MQGMO_NO_SYNCPOINT set, but without specifying MQGMO_LOGICAL_ORDER. If this call is successful, the queue manager retains the

group and segment information, and subsequent MQGET calls using that queue handle can specify MQGMO_LOGICAL_ORDER as normal.

The group and segment information that the queue manager retains for the MQGET call is separate from the group and segment information that it retains for the MQPUT call. In addition, the queue manager retains separate information for:

- MQGET calls that remove messages from the queue.
- MQGET calls that browse messages on the queue.

For any given queue handle, the application can mix MQGET calls that specify MQGMO_LOGICAL_ORDER with MQGET calls that do not. However, note the following points:

- If you omit MQGMO_LOGICAL_ORDER, each successful MQGET call causes the queue manager to set the saved group and segment information to the values corresponding to the message returned; this replaces the existing group and segment information retained by the queue manager for the queue handle. Only the information appropriate to the action of the call (browse or remove) is modified.
- If you omit MQGMO_LOGICAL_ORDER, the call does not fail if there is a current message group or logical message; the call might succeed with an MQCC_WARNING completion code. Table 496 on page 387 shows the various cases that can arise. In these cases, if the completion code is not MQCC_OK, the reason code is one of the following (as appropriate):
  - MQRC_INCOMPLETE_GROUP
  - MQRC_INCOMPLETE_MSG
  - MQRC_INCONSISTENT_UOW

  Note: The queue manager does not check the group and segment information when browsing a queue, or when closing a queue that was opened for browse but not input; in those cases the completion code is always MQCC_OK (assuming no other errors).

Table 496. Outcome when MQGET or MQCLOSE call is not consistent with group and segment information

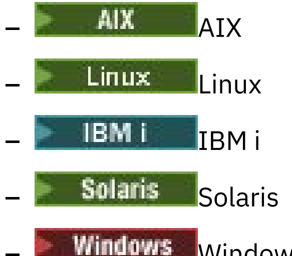
Current call is	**Previous call was MQGET with MQGMO_LOGICAL_ORDER**	**Previous call was MQGET without MQGMO_LOGICAL_ORDER**
MQGET with MQGMO_LOGICAL_ORDER	MQCC_FAILED	MQCC_FAILED
MQGET without MQGMO_LOGICAL_ORDER	MQCC_WARNING	MQCC_OK
MQCLOSE with an unterminated group or logical message	MQCC_WARNING	MQCC_OK

Applications that want to retrieve messages and segments in logical order are recommended to specify MQGMO_LOGICAL_ORDER, as this is the simplest option to use. This option relieves the application of the need to manage the group and segment information, because the queue manager manages that information. However, specialized applications might need more control than that provided by the MQGMO_LOGICAL_ORDER option, and this can be achieved by not specifying that option. The application must then ensure that the MsgId, CorrelId, GroupId, MsgSeqNumber, and Offset fields in MQMD, and the MQMO_* options in MatchOptions in MQGMO, are set correctly, before each MQGET call.

For example, an application that wants to forward physical messages that it receives, without regard for whether those messages are in groups or segments of logical messages, must not specify MQGMO_LOGICAL_ORDER. In a complex network with multiple paths between sending and receiving queue managers, the physical messages might arrive out of order. By specifying neither MQGMO_LOGICAL_ORDER, nor the corresponding MQPMO_LOGICAL_ORDER on the MQPUT call, the forwarding application can retrieve and forward each physical message as soon as it arrives, without having to wait for the next one in logical order to arrive.

You can specify MQGMO_LOGICAL_ORDER with any of the other MQGMO_* options, and with various of the MQMO_* options in appropriate circumstances (see preceding section).

- z/OS On z/OS, this option is supported for private and shared queues, but the queue must have an index type of MQIT_GROUP_ID. For shared queues, the CFSTRUCT object that the queue maps to must be at CFLEVEL(3) or higher.
- This option is supported for all local queues for the following platforms:



  - AIX
  - Linux
  - IBM i
  - Solaris
  - Windows

  and for IBM MQ MQI clients connected to these systems,.

MQGMO_COMPLETE_MSG

Only a complete logical message can be returned by the MQGET call. If the logical message is segmented, the queue manager reassembles the segments and returns the complete logical message to the application; the fact that the logical message was segmented is not apparent to the application retrieving it.

Note: This is the only option that causes the queue manager to reassemble message segments. If not specified, segments are returned individually to the application if they are present on the queue (and they satisfy the other selection criteria specified on the MQGET call). Applications that do not want to receive individual segments must always specify MQGMO_COMPLETE_MSG.

To use this option, the application must provide a buffer that is big enough to accommodate the complete message, or specify the MQGMO_ACCEPT_TRUNCATED_MSG option.

If the queue contains segmented messages with some of the segments missing (perhaps because they have been delayed in the network and have not yet arrived), specifying MQGMO_COMPLETE_MSG prevents the retrieval of segments belonging to incomplete logical messages. However, those message segments still contribute to the value of the **CurrentQDepth** queue attribute; this means that there might be no retrievable logical messages, even though *CurrentQDepth* is greater than zero.

For persistent messages, the queue manager can reassemble the segments only within a unit of work:

- If the MQGET call is operating within a user-defined unit of work, that unit of work is used. If the call fails during the reassembly process, the queue manager reinstates on the queue any segments that were removed during reassembly. However, the failure does not prevent the unit of work being committed successfully.
- If the call is operating outside a user-defined unit of work, and there is no user-defined unit of work in existence, the queue manager creates a unit of work for the duration of the call. If the call is successful, the queue manager commits the unit of work automatically (the application does not need to do this). If the call fails, the queue manager backs out the unit of work.
- If the call is operating outside a user-defined unit of work, but a user-defined unit of work exists, the queue manager cannot reassemble. If the message does not require reassembly, the call can still succeed. But if the message requires reassembly, the call fails with reason code MQRC_UOW_NOT_AVAILABLE.

For nonpersistent messages, the queue manager does not require a unit of work to be available to perform reassembly.

Each physical message that is a segment has its own message descriptor. For the segments constituting a single logical message, most of the fields in the message descriptor are the same for all segments in the logical message; typically it is only the MsgId, Offset, and MsgFlags fields

that differ between segments in the logical message. However, if a segment is placed on a dead-letter queue at an intermediate queue manager, the DLQ handler retrieves the message specifying the MQGMO_CONVERT option, and this can result in the character set or encoding of the segment being changed. If the DLQ handler successfully sends the segment on its way, the segment might have a character set or encoding that differs from the other segments in the logical message when the segment arrives at the destination queue manager.

A logical message consisting of segments in which the CodedCharSetId and Encoding fields differ cannot be reassembled by the queue manager into a single logical message. Instead, the queue manager reassembles and returns the first few consecutive segments at the start of the logical message that have the same character-set identifiers and encodings, and the MQGET call completes with completion code MQCC_WARNING and reason code MQRC_INCONSISTENT_CCSIDS or MQRC_INCONSISTENT_ENCODINGS, as appropriate. This happens regardless of whether MQGMO_CONVERT is specified. To retrieve the remaining segments, the application must reissue the MQGET call without the MQGMO_COMPLETE_MSG option, retrieving the segments one by one. MQGMO_LOGICAL_ORDER can be used to retrieve the remaining segments in order.

An application that puts segments can also set other fields in the message descriptor to values that differ between segments. However, there is no advantage in doing this if the receiving application uses MQGMO_COMPLETE_MSG to retrieve the logical message. When the queue manager reassembles a logical message, it returns in the message descriptor the values from the message descriptor for the first segment; the only exception is the MsgFlags field, which the queue manager sets to indicate that the reassembled message is the only segment.

If MQGMO_COMPLETE_MSG is specified for a report message, the queue manager performs special processing. The queue manager checks the queue to see if all the report messages of that report type relating to the different segments in the logical message are present on the queue. If they are, they can be retrieved as a single message by specifying MQGMO_COMPLETE_MSG. For this to be possible, either the report messages must be generated by a queue manager or MCA which supports segmentation, or the originating application must request at least 100 bytes of message data (that is, the appropriate MQRO_*_WITH_DATA or MQRO_*_WITH_FULL_DATA options must be specified). If less than the full amount of application data is present for a segment, the missing bytes are replaced by nulls in the report message returned.

If MQGMO_COMPLETE_MSG is specified with MQGMO_MSG_UNDER_CURSOR or MQGMO_BROWSE_MSG_UNDER_CURSOR, the browse cursor must be positioned on a message whose *Offset* field in MQMD has a value of 0. If this condition is not satisfied, the call fails with reason code MQRC_INVALID_MSG_UNDER_CURSOR.

MQGMO_COMPLETE_MSG implies MQGMO_ALL_SEGMENTS_AVAILABLE, which need not therefore be specified.

MQGMO_COMPLETE_MSG can be specified with any of the other MQGMO_* options apart from MQGMO_SYNCPOINT_IF_PERSISTENT, and with any of the MQMO_* options apart from MQMO_MATCH_OFFSET.

- z/OS On z/OS, this option is supported for private and shared queues, but the queue must have an index type of MQIT_GROUP_ID. For shared queues, the CFSTRUCT object that the queue map to must be at CFLEVEL(3) or higher.
- On the following platforms:

  - AIX
  - IBM i
  - Linux
  - Solaris
  - Windows

and for IBM MQ MQI clients connected to these systems, this option is supported for all local queues.

MQGMO_ALL_MSGS_AVAILABLE

Messages in a group become available for retrieval only when all messages in the group are available. If the queue contains message groups with some of the messages missing (perhaps because they have been delayed in the network and have not yet arrived), specifying MQGMO_ALL_MSGS_AVAILABLE prevents retrieval of messages belonging to incomplete groups. However, those messages still contribute to the value of the **CurrentQDepth** queue attribute; this means that there may be no retrievable message groups, even though CurrentQDepth is greater than zero. If there are no other messages that are retrievable, reason code MQRC_NO_MSG_AVAILABLE is returned after the specified wait interval (if any) has expired.

The processing of MQGMO_ALL_MSGS_AVAILABLE depends on whether MQGMO_LOGICAL_ORDER is also specified:

- If both options are specified, MQGMO_ALL_MSGS_AVAILABLE has an effect only when there is no current group or logical message. If there is a current group or logical message, MQGMO_ALL_MSGS_AVAILABLE is ignored. This means that MQGMO_ALL_MSGS_AVAILABLE can remain on when processing messages in logical order.
- If MQGMO_ALL_MSGS_AVAILABLE is specified without MQGMO_LOGICAL_ORDER, MQGMO_ALL_MSGS_AVAILABLE always has an effect. This means that the option must be turned off after the first message in the group has been removed from the queue, in order to be able to remove the remaining messages in the group.

Successful completion of an MQGET call specifying MQGMO_ALL_MSGS_AVAILABLE means that at the time that the MQGET call was issued, all the messages in the group were on the queue. However, be aware that other applications can still remove messages from the group (the group is not locked to the application that retrieves the first message in the group).

If you omit this option, messages belonging to groups can be retrieved even when the group is incomplete.

MQGMO_ALL_MSGS_AVAILABLE implies MQGMO_ALL_SEGMENTS_AVAILABLE, which need not therefore be specified.

MQGMO_ALL_MSGS_AVAILABLE can be specified with any of the other MQGMO_* options, and with any of the MQMO_* options.

- z/OS On z/OS, this option is supported for private and shared queues, but the queue must have an index type of MQIT_GROUP_ID. For shared queues, the CFSTRUCT object that the queue map to must be at CFLEVEL(3) or higher.
- On the following platforms:

  - AIX
  - IBM i
  - Linux
  - Solaris
  - Windows

  and for IBM MQ MQI clients connected to these systems, this option is supported for all local queues.

MQGMO_ALL_SEGMENTS_AVAILABLE

Segments in a logical message become available for retrieval only when all segments in the logical message are available. If the queue contains segmented messages with some of the segments missing (perhaps because they have been delayed in the network and have not yet arrived), specifying MQGMO_ALL_SEGMENTS_AVAILABLE prevents retrieval of segments belonging

to incomplete logical messages. However, those segments still contribute to the value of the **CurrentQDepth** queue attribute; this means that there might be no retrievable logical messages, even though CurrentQDepth is greater than zero. If there are no other messages that are retrievable, reason code MQRC_NO_MSG_AVAILABLE is returned after the specified wait interval (if any) has expired.

The processing of MQGMO_ALL_SEGMENTS_AVAILABLE depends on whether MQGMO_LOGICAL_ORDER is also specified:

- If both options are specified, MQGMO_ALL_SEGMENTS_AVAILABLE has an effect only when there is no current logical message. If there is a current logical message, MQGMO_ALL_SEGMENTS_AVAILABLE is ignored. This means that MQGMO_ALL_SEGMENTS_AVAILABLE can remain on when processing messages in logical order.
- If MQGMO_ALL_SEGMENTS_AVAILABLE is specified without MQGMO_LOGICAL_ORDER, MQGMO_ALL_SEGMENTS_AVAILABLE always has an effect. This means that the option must be turned off after the first segment in the logical message has been removed from the queue, in order to be able to remove the remaining segments in the logical message.

If this option is not specified, message segments can be retrieved even when the logical message is incomplete.

While both MQGMO_COMPLETE_MSG and MQGMO_ALL_SEGMENTS_AVAILABLE require all segments to be available before any of them can be retrieved, the former returns the complete message, whereas the latter allows the segments to be retrieved one by one.

If MQGMO_ALL_SEGMENTS_AVAILABLE is specified for a report message, the queue manager checks the queue to see if there is at least one report message for each of the segments that make up the complete logical message. If there is, the MQGMO_ALL_SEGMENTS_AVAILABLE condition is satisfied. However, the queue manager does not check the *type* of the report messages present, and so there might be a mixture of report types in the report messages relating to the segments of the logical message. As a result, the success of MQGMO_ALL_SEGMENTS_AVAILABLE does not imply that MQGMO_COMPLETE_MSG will succeed. If there is a mixture of report types present for the segments of a particular logical message, those report messages must be retrieved one by one.

You can specify MQGMO_ALL_SEGMENTS_AVAILABLE with any of the other MQGMO_* options, and with any of the MQMO_* options.

- On z/OS, this option is supported for private and shared queues, but the queue must have an index type of MQIT_GROUP_ID. For shared queues, the CFSTRUCT object that the queue map to must be at CFLEVEL(3) or higher.
- On the following platforms:

  - AIX
  - IBM i
  - Linux
  - Solaris
  - Windows

  and for IBM MQ MQI clients connected to these systems, this option is supported for all local queues.

Property options

The following options relate to the properties of the message:

MQGMO_PROPERTIES_AS_Q_DEF

Properties of the message, except those contained in the message descriptor (or extension) should be represented as defined by the **PropertyControl** queue attribute. If a MsgHandle is provided this option is ignored and the properties of the message are available via the MsgHandle, unless the value of the **PropertyControl** queue attribute is MQPROP_FORCE_MQRFH2.

This is the default action if no property options are specified.

MQGMO_PROPERTIES_IN_HANDLE

Properties of the message should be made available via the MsgHandle. If no message handle is provided the call fails with reason MQRC_HMSG_ERROR.

Note: If the message is later read by an application that does not create a message handle, the queue manager places any message properties into an MQRFH2 structure. You might find that the presence of an unexpected MQRFH2 header disrupts the behavior of an existing application.

MQGMO_NO_PROPERTIES

No properties of the message, except those contained in the message descriptor (or extension) will be retrieved. If a MsgHandle is provided it will be ignored.

MQGMO_PROPERTIES_FORCE_MQRFH2

Properties of the message, except those contained in the message descriptor (or extension) should be represented using MQRFH2 headers. This provides compatibility with earlier version for applications which are expecting to retrieve properties but are unable to be changed to use message handles. If a MsgHandle is provided it is ignored.

MQGMO_PROPERTIES_COMPATIBILITY

If the message contains a property with a prefix of **"mcd."**, **"jms."**, **"usr."**, or **"mqext."**, all message properties are delivered to the application in an MQRFH2 header. Otherwise all properties of the message, except those contained in the message descriptor (or extension), are discarded and are no longer accessible to the application.

Default option

If none of the options described is required, the following option can be used:

MQGMO_NONE

Use this value to indicate that no other options have been specified; all options assume their default values. MQGMO_NONE aids program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

The initial value of the Options field is MQGMO_NO_WAIT plus MQGMO_PROPERTIES_AS_Q_DEF.

WaitInterval (MQLONG)

This is the approximate time, expressed in milliseconds, that the MQGET call waits for a suitable message to arrive (that is, a message satisfying the selection criteria specified in the **MsgDesc** parameter of the MQGET call.

Important: There is no wait, or delay, if a suitable message is available immediately.

See the *MsgId* field described in "MQMD - Message descriptor" on page 413 for more details). If no suitable message has arrived after this time has elapsed, the call completes with MQCC_FAILED and reason code MQRC_NO_MSG_AVAILABLE.

On z/OS, the period of time that the MQGET call actually waits is affected by system loading and work-scheduling considerations, and can vary between the value specified for *WaitInterval* and approximately 100 milliseconds greater than *WaitInterval*.

WaitInterval is used in conjunction with the MQGMO_WAIT or MQGMO_SET_SIGNAL option. It is ignored if neither of these is specified. If one of these is specified, *WaitInterval* must be greater than or equal to zero, or the following special value:

MQWI_UNLIMITED
Unlimited wait interval.

The initial value of this field is 0.

Signal1 (MQLONG)

This is an input field that is used only in conjunction with the MQGMO_SET_SIGNAL option; it identifies a signal that is to be delivered when a message is available.

Note: The data type and usage of this field are determined by the environment; for this reason, applications that you want to port between different environments must not use signals.

- On z/OS, this field must contain the address of an Event Control Block (ECB). The ECB must be cleared by the application before the MQGET call is issued. The storage containing the ECB must not be freed until the queue is closed. The ECB is posted by the queue manager with one of the signal completion codes described. These completion codes are set in bits 2 through 31 of the ECB, the area defined in the z/OS mapping macro IHAECB as being for a user completion code.
- In all other environments, this is a reserved field; its value is not significant.

The signal completion codes are:

MQEC_MSG_ARRIVED
A suitable message has arrived on the queue. This message has not been reserved for the caller; a second MQGET request must be issued, but another application might retrieve the message before the second request is made.

MQEC_WAIT_INTERVAL_EXPIRED
The specified *WaitInterval* has expired without a suitable message arriving.

MQEC_WAIT_CANCELED
The wait was canceled for an indeterminate reason (such as the queue manager terminating or the queue being disabled). Reissue the request if you want further diagnosis.

MQEC_Q_MGR_QUIESCING
The wait was canceled because the queue manager has entered the quiescing state (MQGMO_FAIL_IF_QUIESCING was specified on the MQGET call).

MQEC_CONNECTION_QUIESCING
The wait was canceled because the connection has entered the quiescing state (MQGMO_FAIL_IF_QUIESCING was specified on the MQGET call).

The initial value of this field is determined by the environment:

- On z/OS, the initial value is the null pointer.
- In all other environments, the initial value is 0.

Signal2 (MQLONG)

This is an input field that is used only in conjunction with the MQGMO_SET_SIGNAL option. It is a reserved field; its value is not significant.

The initial value of this field is 0.

ResolvedQName (MQCHAR48)

This is an output field that the queue manager sets to the local name of the queue from which the message was retrieved, as defined to the local queue manager. This is different from the name used to open the queue if:

- An alias queue was opened (in which case, the name of the local queue to which the alias resolved is returned), or
- A model queue was opened (in which case, the name of the dynamic local queue is returned).

The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

MatchOptions (MQLONG)

These options allow the application to choose which fields in the **MsgDesc** parameter to use to select the message returned by the MQGET call. The application sets the required options in this field, and then sets the corresponding fields in the **MsgDesc** parameter to the values required for those fields. Only messages that have those values in the MQMD for the message are candidates for retrieval using that **MsgDesc** parameter on the MQGET call. Fields for which the corresponding match option is not specified are ignored when selecting the message to be returned. If you specify no selection criteria on the MQGET call (that is, *any* message is acceptable), set *MatchOptions* to MQMO_NONE.

- On z/OS, the selection criteria that can be used might be restricted by the type of index used for the queue. See the **IndexType** queue attribute for further details.

If you specify MQGMO_LOGICAL_ORDER, only certain messages are eligible for return by the next MQGET call:

- If there is no current group or logical message, only messages that have *MsgSeqNumber* equal to 1 and *Offset* equal to 0 are eligible for return. In this situation, you can use one or more of the following match options to select which of the eligible messages is returned:
  - MQMO_MATCH_MSG_ID
  - MQMO_MATCH_CORREL_ID
  - MQMO_MATCH_GROUP_ID
- If there is a current group or logical message, only the next message in the group or next segment in the logical message is eligible for return, and this cannot be altered by specifying MQMO_* options.

In both of the preceding cases, you can specify match options that do not apply, but the value of the relevant field in the **MsgDesc** parameter must match the value of the corresponding field in the message to be returned; the call fails with reason code MQRC_MATCH_OPTIONS_ERROR is this condition is not satisfied.

MatchOptions is ignored if you specify either MQGMO_MSG_UNDER_CURSOR or MQGMO_BROWSE_MSG_UNDER_CURSOR.

Getting messages based on message property is not done using match options; for more information, see "SelectionString (MQCHARV)" on page 484.

You can specify one or more of the following match options:

MQMO_MATCH_MSG_ID

The message to be retrieved must have a message identifier that matches the value of the *MsgId* field in the **MsgDesc** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the correlation identifier).

If you omit this option, the *MsgId* field in the **MsgDesc** parameter is ignored, and any message identifier will match.

Note: The message identifier MQMI_NONE is a special value that matches any message identifier in the MQMD for the message. Therefore, specifying MQMO_MATCH_MSG_ID with MQMI_NONE is the same as not specifying MQMO_MATCH_MSG_ID.

MQMO_MATCH_CORREL_ID

The message to be retrieved must have a correlation identifier that matches the value of the *CorrelId* field in the **MsgDesc** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the message identifier).

If you omit this option, the *CorrelId* field in the **MsgDesc** parameter is ignored, and any correlation identifier will match.

Note: The correlation identifier MQCI_NONE is a special value that matches *any* correlation identifier in the MQMD for the message. Therefore, specifying MQMO_MATCH_CORREL_ID with MQCI_NONE is the same as not specifying MQMO_MATCH_CORREL_ID.

MQMO_MATCH_GROUP_ID
: The message to be retrieved must have a group identifier that matches the value of the *GroupId* field in the **MsgDesc** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the correlation identifier).

If you omit this option, the *GroupId* field in the **MsgDesc** parameter is ignored, and any group identifier will match.

Note: The group identifier MQGI_NONE is a special value that matches *any* group identifier in the MQMD for the message. Therefore, specifying MQMO_MATCH_GROUP_ID with MQGI_NONE is the same as not specifying MQMO_MATCH_GROUP_ID.

MQMO_MATCH_MSG_SEQ_NUMBER
: The message to be retrieved must have a message sequence number that matches the value of the *MsgSeqNumber* field in the **MsgDesc** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the group identifier).

If you omit this option, the *MsgSeqNumber* field in the **MsgDesc** parameter is ignored, and any message sequence number will match.

MQMO_MATCH_OFFSET
: The message to be retrieved must have an offset that matches the value of the *Offset* field in the **MsgDesc** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the message sequence number).

If you omit this option is not specified, the *Offset* field in the **MsgDesc** parameter is ignored, and any offset will match.

- This option is not supported on z/OS.

MQMO_MATCH_MSG_TOKEN
: The message to be retrieved must have a message token that matches the value of the *MsgToken* field in the MQGMO structure specified on the MQGET call.

You can specify this option for all local queues. If you specify it for a queue that has an *IndexType* of MQIT_MSG_TOKEN (a WLM-managed queue), you can specify no other match options with MQMO_MATCH_MSG_TOKEN.

You cannot specify MQMO_MATCH_MSG_TOKEN with MQGMO_WAIT or MQGMO_SET_SIGNAL. If the application wants to wait for a message to arrive on a queue that has an *IndexType* of MQIT_MSG_TOKEN, specify MQMO_NONE.

If you omit this option, the *MsgToken* field in MQGMO is ignored, and any message token will match.

If you specify none of the options described, you can use the following option:

MQMO_NONE
: Use no matches in selecting the message to be returned; all messages on the queue are eligible for retrieval (but subject to control by the MQGMO_ALL_MSGS_AVAILABLE, MQGMO_ALL_SEGMENTS_AVAILABLE, and MQGMO_COMPLETE_MSG options).

MQMO_NONE aids program documentation. It is not intended that this option be used with any other MQMO_* option, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of this field is MQMO_MATCH_MSG_ID with MQMO_MATCH_CORREL_ID. This field is ignored if *Version* is less than MQGMO_VERSION_2.

Note: The initial value of the *MatchOptions* field is defined for compatibility with earlier MQSeries® queue managers. However, when reading a series of messages from a queue without using selection criteria, this initial value requires the application to reset the *MsgId* and *CorrelId* fields to MQMI_NONE and MQCI_NONE before each MQGET call. Avoid the need to reset *MsgId* and *CorrelId* by setting *Version* to MQGMO_VERSION_2, and *MatchOptions* to MQMO_NONE.

Related concepts

Message selectors in JMS

GroupStatus (MQCHAR)

This flag indicates whether the message retrieved is in a group.

It has one of the following values:

MQGS_NOT_IN_GROUP
Message is not in a group.

MQGS_MSG_IN_GROUP
Message is in a group, but is not the last in the group.

MQGS_LAST_MSG_IN_GROUP
Message is the last in the group.

This is also the value returned if the group consists of only one message.

This is an output field. The initial value of this field is MQGS_NOT_IN_GROUP. This field is ignored if *Version* is less than MQGMO_VERSION_2.

SegmentStatus (MQCHAR)

This is a flag that indicates whether the message retrieved is a segment of a logical message. It has one of the following values:

MQSS_NOT_A_SEGMENT
Message is not a segment.

MQSS_SEGMENT
Message is a segment, but is not the last segment of the logical message.

MQSS_LAST_SEGMENT
Message is the last segment of the logical message.

This is also the value returned if the logical message consists of only one segment.

On z/OS, the queue manager always sets this field to MQSS_NOT_A_SEGMENT.

This is an output field. The initial value of this field is MQSS_NOT_A_SEGMENT. This field is ignored if *Version* is less than MQGMO_VERSION_2.

Segmentation (MQCHAR)

This is a flag that indicates whether further segmentation is allowed for the message retrieved. It has one of the following values:

MQSEG_INHIBITED
Segmentation not allowed.

MQSEG_ALLOWED
Segmentation allowed.

On z/OS, the queue manager always sets this field to MQSEG_INHIBITED.

This is an output field. The initial value of this field is MQSEG_INHIBITED. This field is ignored if *Version* is less than MQGMO_VERSION_2.

Reserved1 (MQCHAR)

This is a reserved field. The initial value of this field is a blank character. This field is ignored if *Version* is less than MQGMO_VERSION_2.

MsgToken (MQBYTE16)

MsgToken field - MQGMO structure. This field is used by the queue manager to uniquely identify a message.

This is a byte string that is generated by the queue manager to identify a message uniquely on a queue. The message token is generated when the message is first placed on the queue manager, and remains

with the message until the message is permanently removed from the queue manager, unless the queue manager is restarted.

When the message is removed from the queue, the *MsgToken* that identified that instance of the message is no longer valid, and is never reused. If the queue manager is restarted, the *MsgToken* that identified a message on the queue before restart might not be valid after restart. However, the *MsgToken* is never reused to identify a different message instance. The *MsgToken* is generated by the queue manager and is not visible to any external application.

When a message is returned by a call to MQGET where a Version 3 or higher MQGMO is supplied, the *MsgToken* identifying the message on the queue is returned in the MQGMO by the queue manager. There is one exception to this: when the message is being removed from the queue outside syncpoint, the queue manager might not return a *MsgToken* because it is not useful to identify the returned message on a subsequent MQGET call. Applications should only use *MsgToken* to refer to the message on subsequent MQGET calls.

If a *MsgToken* is supplied and the *MatchOption* MQMO_MATCH_MSG_TOKEN is specified and neither MQGMO_MSG_UNDER_CURSOR nor MQGMO_BROWSE_MSG_UNDER_CURSOR is specified, only the message identified by that *MsgToken* can be returned. The option is valid on all local queues regardless of INDXTYPE, and on z/OS you must use INDXTYPE(MSGTOKEN) only on Workload Manager (WLM) queues.

Any other *MatchOptions* specified are checked, and if they do not match, MQRC_NO_MSG_AVAILABLE is returned. If MQGMO_BROWSE_NEXT is coded with MQMO_MATCH_MSG_TOKEN, the message identified by the *MsgToken* is returned only if it is beyond the browse-cursor for the calling handle.

If MQGMO_MSG_UNDER_CURSOR or MQGMO_BROWSE_MSG_UNDER_CURSOR is specified, MQMO_MATCH_MSG_TOKEN is ignored.

MQMO_MATCH_MSG_TOKEN is not valid with the following get message options:

- MQGMO_WAIT
- MQGMO_SET_SIGNAL

For an MQGET call specifying MQMO_MATCH_MSG_TOKEN, an MQGMO of version 3 or later must be supplied to the call, otherwise MQRC_WRONG_GMO_VERSION is returned.

If the *MsgToken* is not valid at this time, MQCC_FAILED with MQRC_NO_MSG_AVAILABLE is returned, unless there is another error.

ReturnedLength (MQLONG)

This is an output field that the queue manager sets to the length in bytes of the message data returned by the MQGET call in the **Buffer** parameter. If the queue manager does not support this capability, *ReturnedLength* is set to the value MQRL_UNDEFINED.

When messages are converted between encodings or character sets, the message data can sometimes change size. On return from the MQGET call:

- If *ReturnedLength* is not MQRL_UNDEFINED, the number of bytes of message data returned is given by *ReturnedLength*.
- If *ReturnedLength* has the value MQRL_UNDEFINED, the number of bytes of message data returned is usually given by the smaller of *BufferLength* and *DataLength*, but can be *less than* this if the MQGET call completes with reason code MQRC_TRUNCATED_MSG_ACCEPTED. If this happens, the insignificant bytes in the **Buffer** parameter are set to nulls.

The following special value is defined:

MQRL_UNDEFINED
Length of returned data not defined.

On z/OS, the value returned for the *ReturnedLength* field is always MQRL_UNDEFINED.

The initial value of this field is MQRL_UNDEFINED. This field is ignored if *Version* is less than MQGMO_VERSION_3.

Reserved2 (MQLONG)

This is a reserved field. The initial value of this field is a blank character. This field is ignored if `Version` is less than **MQGMO_VERSION_4**.

MsgHandle (MQHMSG)

If the MQGMO_PROPERTIES_AS_Q_DEF option is specified and the `PropertyControl` queue attribute is not set to MQPROP_FORCE_MQRFH2 then this is the handle to a message which will be populated with the properties of the message being retrieved from the queue. The handle is created by an MQCRTMH call. Any properties already associated with the handle will be cleared before retrieving a message.

The following value can also be specified:
MQHM_NONE
No message handle supplied.

No message descriptor is required on the MQGET call if a valid message handle is supplied and used on output to contain the message properties, the message descriptor associated with the message handle is used for input fields.

If a message descriptor is specified on the MQGET call, it always takes precedence over the message descriptor associated with a message handle.

If MQGMO_PROPERTIES_FORCE_MQRFH2 is specified, or the MQGMO_PROPERTIES_AS_Q_DEF is specified and the `PropertyControl` queue attribute is MQPROP_FORCE_MQRFH2 then the call fails with reason code MQRC_MD_ERROR when no message descriptor parameter is specified.

On return from the MQGET call, the properties and message descriptor associated with this message handle are updated to reflect the state of the message retrieved (as well as the message descriptor if one was supplied on the MQGET call). The properties of the message can then be inquired using the MQINQMP call.

Except for message descriptor extensions, when present, a property that can be inquired with the MQINQMP call is not contained in the message data; if the message on the queue contained properties in the message data these are removed from the message data before the data is returned to the application.

If no message handle is provided or Version is less than MQGMO_VERSION_4 then you must supply a valid message descriptor on the MQGET call. Any message properties (except those contained in the message descriptor) are returned in the message data subject to the value of the property options in the MQGMO structure and the `PropertyControl` queue attribute.

This is an always an input field. The initial value of this field is MQHM_NONE. This field is ignored if `Version` is less than MQGMO_VERSION_4.

MQIIH - IMS information header

The MQIIH structure describes the header information for a message sent to IMS across the IMS bridge. For any IBM MQ supported platform you can create and transmit a message that includes the MQIIH structure, but only an IBM MQ for z/OS queue manager can use the IMS bridge. Therefore, for the message to get to IMS from a non-z/OS queue manager, your queue manager network must include at least one z/OS queue manager through which the message can be routed.

Availability

All IBM MQ systems and IBM MQ clients.

Format name

MQFMT_IMS

Character set and encoding

Special conditions apply to the character set and encoding used for the MQIIH structure and application message data:

- Applications that connect to the queue manager that owns the IMS bridge queue must provide an MQIIH structure that is in the character set and encoding of the queue manager. This is because data conversion of the MQIIH structure is not performed in this case.
- Applications that connect to other queue managers can provide an MQIIH structure that is in any of the supported character sets and encodings; the receiving message channel agent connected to the queue manager that owns the IMS bridge queue converts the MQIIH.
- The application message data following the MQIIH structure must be in the same character set and encoding as the MQIIH structure. Do not use the *CodedCharSetId* and *Encoding* fields in the MQIIH structure to specify the character set and encoding of the application message data.

  You must provide a data-conversion exit to convert the application message data if the data is not one of the built-in formats supported by the queue manager.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 497. Fields in MQIIH for MQIIH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQIIH_STRUC_ID	'IIH¬'
Version (structure version number)	MQIIH_VERSION_1	1
StrucLength (length of MQIIH structure)	MQIIH_LENGTH_1	84
Encoding (reserved - see "Character set and encoding" on page 399)	None	0
CodedCharSetId (reserved - see "Character set and encoding" on page 399)	None	0
Format (MQ format name of data that follows MQIIH)	MQFMT_NONE	Blanks
Flags (flags)	MQIIH_NONE	0
LTermOverride (logical terminal override)	None	Blanks
MFSMapName (message format services map name)	None	Blanks
ReplyToFormat (MQ format name of reply message)	MQFMT_NONE	Blanks
Authenticator (RACF® password or passticket)	MQIAUT_NONE	Blanks
TranInstanceId (transaction instance identifier)	MQITII_NONE	Nulls
TranState (transaction state)	MQITS_NOT_IN_CONVERSATION	'¬'

Table 497. Fields in MQIIH for MQIIH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
CommitMode (commit mode)	MQICM_COMMIT_THEN_SEND	'0'
SecurityScope (security scope)	MQISS_CHECK	'C'
Reserved (reserved)	None	'¬'

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQIIH_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQIIH MyIIH = {MQIIH_DEFAULT};
```

Language declarations

C declaration for MQIIH

```
typedef struct tagMQIIH MQIIH;
struct tagMQIIH {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQLONG    StrucLength;      /* Length of MQIIH structure */
  MQLONG    Encoding;         /* Reserved */
  MQLONG    CodedCharSetId;   /* Reserved */
  MQCHAR8   Format;           /* MQ format name of data that follows
                                 MQIIH */
  MQLONG    Flags;            /* Flags */
  MQCHAR8   LTermOverride;    /* Logical terminal override */
  MQCHAR8   MFSMapName;       /* Message format services map name */
  MQCHAR8   ReplyToFormat;    /* MQ format name of reply message */
  MQCHAR8   Authenticator;    /* RACF password or passticket */
  MQBYTE16  TranInstanceId;   /* Transaction instance identifier */
  MQCHAR    TranState;        /* Transaction state */
  MQCHAR    CommitMode;       /* Commit mode */
  MQCHAR    SecurityScope;    /* Security scope */
  MQCHAR    Reserved;         /* Reserved */
};
```

COBOL declaration for MQIIH

```
**   MQIIH structure
  10 MQIIH.
**    Structure identifier
   15 MQIIH-STRUCID        PIC X(4).
**    Structure version number
   15 MQIIH-VERSION        PIC S9(9) BINARY.
**    Length of MQIIH structure
   15 MQIIH-STRUCLENGTH    PIC S9(9) BINARY.
**    Reserved
   15 MQIIH-ENCODING       PIC S9(9) BINARY.
**    Reserved
   15 MQIIH-CODEDCHARSETID PIC S9(9) BINARY.
**    MQ format name of data that follows MQIIH
   15 MQIIH-FORMAT         PIC X(8).
**    Flags
   15 MQIIH-FLAGS          PIC S9(9) BINARY.
**    Logical terminal override
   15 MQIIH-LTERMOVERRIDE  PIC X(8).
**    Message format services map name
   15 MQIIH-MFSMAPNAME     PIC X(8).
**    MQ format name of reply message
```

```
   15 MQIIH-REPLYTOFORMAT  PIC X(8).
**    RACF password or passticket
   15 MQIIH-AUTHENTICATOR  PIC X(8).
**    Transaction instance identifier
   15 MQIIH-TRANINSTANCEID PIC X(16).
**    Transaction state
   15 MQIIH-TRANSTATE      PIC X.
**    Commit mode
   15 MQIIH-COMMITMODE     PIC X.
**    Security scope
   15 MQIIH-SECURITYSCOPE  PIC X.
**    Reserved
   15 MQIIH-RESERVED       PIC X.
```

PL/I declaration for MQIIH

```
dcl
 1 MQIIH based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 StrucLength    fixed bin(31), /* Length of MQIIH structure */
  3 Encoding       fixed bin(31), /* Reserved */
  3 CodedCharSetId fixed bin(31), /* Reserved */
  3 Format         char(8),       /* MQ format name of data that follows
                                     MQIIH */
  3 Flags          fixed bin(31), /* Flags */
  3 LTermOverride  char(8),       /* Logical terminal override */
  3 MFSMapName     char(8),       /* Message format services map name */
  3 ReplyToFormat  char(8),       /* MQ format name of reply message */
  3 Authenticator  char(8),       /* RACF password or passticket */
  3 TranInstanceId char(16),      /* Transaction instance identifier */
  3 TranState      char(1),       /* Transaction state */
  3 CommitMode     char(1),       /* Commit mode */
  3 SecurityScope  char(1),       /* Security scope */
  3 Reserved       char(1);       /* Reserved */
```

High Level Assembler declaration for MQIIH

```
MQIIH                 DSECT
MQIIH_STRUCID         DS   CL4   Structure identifier
MQIIH_VERSION         DS   F     Structure version number
MQIIH_STRUCLENGTH     DS   F     Length of MQIIH structure
MQIIH_ENCODING        DS   F     Reserved
MQIIH_CODEDCHARSETID  DS   F     Reserved
MQIIH_FORMAT          DS   CL8   MQ format name of data that follows
*                                MQIIH
MQIIH_FLAGS           DS   F     Flags
MQIIH_LTERMOVERRIDE   DS   CL8   Logical terminal override
MQIIH_MFSMAPNAME      DS   CL8   Message format services map name
MQIIH_REPLYTOFORMAT   DS   CL8   MQ format name of reply message
MQIIH_AUTHENTICATOR   DS   CL8   RACF password or passticket
MQIIH_TRANINSTANCEID  DS   XL16  Transaction instance identifier
MQIIH_TRANSTATE       DS   CL1   Transaction state
MQIIH_COMMITMODE      DS   CL1   Commit mode
MQIIH_SECURITYSCOPE   DS   CL1   Security scope
MQIIH_RESERVED        DS   CL1   Reserved
*
MQIIH_LENGTH          EQU  *-MQIIH
                      ORG  MQIIH
MQIIH_AREA            DS   CL(MQIIH_LENGTH)
```

Visual Basic declaration for MQIIH

```
Type MQIIH
  StrucId        As String*4 'Structure identifier'
  Version        As Long     'Structure version number'
  StrucLength    As Long     'Length of MQIIH structure'
  Encoding       As Long     'Reserved'
  CodedCharSetId As Long     'Reserved'
  Format         As String*8 'MQ format name of data that follows MQIIH'
  Flags          As Long     'Flags'
  LTermOverride  As String*8 'Logical terminal override'
  MFSMapName     As String*8 'Message format services map name'
  ReplyToFormat  As String*8 'MQ format name of reply message'
  Authenticator  As String*8 'RACF password or passticket'
```

```
   TranInstanceId As MQBYTE16 'Transaction instance identifier'
   TranState      As String*1 'Transaction state'
   CommitMode     As String*1 'Commit mode'
   SecurityScope  As String*1 'Security scope'
   Reserved       As String*1 'Reserved'
 End Type
```

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQIIH_STRUC_ID
Identifier for the IMS information header structure.

For the C programming language, the constant MQIIH_STRUC_ID_ARRAY is also defined; this has the same value as MQIIH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQIIH_STRUC_ID.

Version (MQLONG)

This is the structure version number. The value must be:

MQIIH_VERSION_1
Version number for IMS information header structure.

The following constant specifies the version number of the current version:

MQIIH_CURRENT_VERSION
Current version of IMS information header structure.

The initial value of this field is MQIIH_VERSION_1.

StrucLength (MQLONG)

This is the length of MQIIH structure. The value must be:

MQIIH_LENGTH_1
Length of the IMS information header structure.

The initial value of this field is MQIIH_LENGTH_1.

Encoding (MQLONG)

This is a reserved field; its value is not significant. The initial value of this field is 0.

The Encoding for supported structures which follow a MQIIH structure is the same as that of the MQIIH structure itself and taken from any preceding MQ header.

CodedCharSetId (MQLONG)

This is a reserved field; its value is not significant. The initial value of this field is 0.

The Character Set Id for supported structures which follow a MQIIH structure is the same as that of the MQIIH structure itself and taken from any preceding MQ header.

Format (MQCHAR8)

This specifies the MQ format name of the data that follows the MQIIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The flags value must be:

MQIIH_NONE
No flags.

MQIIH_PASS_EXPIRATION
The reply message contains:

- The same expiry report options as the request message
- The remaining expiry time from the request message with no adjustment made for the bridge's processing time

If this value is not set, the expiry time is set to *unlimited*.

MQIIH_REPLY_FORMAT_NONE
Sets the MQIIH.Format field of the reply to MQFMT_NONE.

MQIIH_IGNORE_PURG
Sets the TMAMIPRG indicator in the OTMA prefix, which requests that OTMA ignores PURG calls on the TP PCB for CM0 transactions.

MQIIH_CM0_REQUEST_RESPONSE
For Commit Mode 0 (CM0) transactions this flag sets the TMAMHRSP indicator in the OTMA prefix. Setting this indicator requests that OTMA/IMS generate a DFS2082 RESPONSE MODE TRANSACTION TERMINATED WITHOUT REPLY message when the original IMS application program does not reply to the IOPCB nor message switch to another transaction.

The initial value of this field is MQIIH_NONE.

LTermOverride (MQCHAR8)

The logical terminal override, placed in the IO PCB field. It is optional; if it is not specified, the TPIPE name is used. It is ignored if the first byte is blank, or null.

The length of this field is given by MQ_LTERM_OVERRIDE_LENGTH. The initial value of this field is 8 blank characters.

MFSMapName (MQCHAR8)

The message format services map name, placed in the IO PCB field. It is optional. On input it represents the MID, on output it represents the MOD. It is ignored if the first byte is blank or null.

The length of this field is given by MQ_MFS_MAP_NAME_LENGTH. The initial value of this field is 8 blank characters.

ReplyToFormat (MQCHAR8)

This is the MQ format name of the reply message that is sent in response to the current message. The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

To convert the data in the reply message using MQGMO_CONVERT, specify either MQIIH.replyToFormat=MQFMT_STRING or MQIIH.replyToFormat=MQFMT_IMS_VAR_STRING. For an explanation of the use of these fields, see "Format (MQCHAR8)" on page 438.

If the default value (MQIIH.replyToFormat=MQFMT_NONE) is used on the request message and the reply message is retrieved using MQGMO_CONVERT then no data conversion is performed.

Authenticator (MQCHAR8)

This is the RACF password or PassTicket. It is optional; if specified, it is used with the user ID in the MQMD security context to build a UTOKEN that is sent to IMS to provide a security context. If it is not specified, the user ID is used without verification. This depends on the setting of the RACF switches, which might require an authenticator to be present.

This is ignored if the first byte is blank or null. The following special value can be used:

MQIAUT_NONE
No authentication.

For the C programming language, the constant MQIAUT_NONE_ARRAY is also defined; this has the same value as MQIAUT_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_AUTHENTICATOR_LENGTH. The initial value of this field is MQIAUT_NONE.

TranInstanceId (MQBYTE16)

This is the transaction instance identifier. This field is used by output messages from IMS, so is ignored on first input. If you set `TranState` to MQITS_IN_CONVERSATION, this must be provided in the next input, and all subsequent inputs, to enable IMS to correlate the messages to the correct conversation. You can use the following special value:

MQITII_NONE
No transaction instance identifier.

For the C programming language, the constant MQITII_NONE_ARRAY is also defined; this has the same value as MQITII_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_TRAN_INSTANCE_ID_LENGTH. The initial value of this field is MQITII_NONE.

TranState (MQCHAR)

This indicates the IMS conversation state. This is ignored on first input because no conversation exists. On subsequent inputs it indicates whether a conversation is active or not. On output it is set by IMS. The value must be one of the following:

MQITS_IN_CONVERSATION
In conversation.

MQITS_NOT_IN_CONVERSATION
Not in conversation.

MQITS_ARCHITECTED
Return transaction state data in architected form.

This value is used only with the IMS `/DISPLAY TRAN` command. It returns the transaction state data in the IMS architected form instead of character form. z/OS For more information, see Writing IMS transaction programs through IBM MQ.

The initial value of this field is MQITS_NOT_IN_CONVERSATION.

CommitMode (MQCHAR)

This is the IMS commit mode. See the *OTMA Reference* for more information about IMS commit modes. The value must be one of the following:

MQICM_COMMIT_THEN_SEND
Commit then send.

This mode implies double queuing of output, but shorter region occupancy times. Fast-path and conversational transactions cannot run with this mode.

MQICM_SEND_THEN_COMMIT
Send then commit.

Any IMS transaction initiated as a result of a commit mode of MQICM_SEND_THEN_COMMIT runs in RESPONSE mode regardless of how the transaction is defined in the IMS system definition (MSGTYPE parameter in the TRANSACT macro). This also applies to transactions initiated by means of a transaction switch.

The initial value of this field is MQICM_COMMIT_THEN_SEND.

SecurityScope (MQCHAR)

This indicates the IMS security processing required. The following values are defined:

MQISS_CHECK
Check security scope: an ACEE is built in the control region, but not in the dependent region.

MQISS_FULL
Full security scope: a cached ACEE is built in the control region and a non-cached ACEE is built in the dependent region. If you use MQISS_FULL, ensure that the user ID for which the ACEE is built has access to the resources used in the dependent region.

If neither MQISS_CHECK nor MQISS_FULL is specified for this field, MQISS_CHECK is assumed.

The initial value of this field is MQISS_CHECK.

Reserved (MQCHAR)

This is a reserved field; it must be blank.

MQIMPO - Inquire message property options

The MQIMPO structure allows applications to specify options that control how properties of messages are inquired. The structure is an input parameter on the MQINQMP call.

Availability

All IBM MQ systems and IBM MQ clients.

Character set and encoding

Data in MQIMPO must be in the character set of the application and encoding of the application (MQENC_NATIVE).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 498. Fields in MQIPMO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQIMPO_STRUC_ID	'IMPO'
Version (structure version number)	MQIMPO_VERSION_1	1
Options (options controlling the action of MQINQMP)	MQIMPO_INQ_FIRST	
RequestedEncoding (encoding into which the inquired property is to be converted)	MQENC_NATIVE	
RequestedCCSID (character set of the inquired property)	MQCCSI_APPL	
ReturnedEncoding (encoding of the returned value)	MQENC_NATIVE	
ReturnedCCSID	0	
Reserved1 (reserved field)	blank character (4 byte field)	
ReturnedName (name of the inquired property)	MQCHARV_DEFAULT	
TypeString (string representation of the data type of the property)	Null string or blanks	

Table 498. Fields in MQIPMO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**

Notes:

1. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
2. In the C programming language, the macro variable MQIMPO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQIMPO MyIMPO = {MQIMPO_DEFAULT};
```

Language declarations

C declaration for MQIMPO

```
typedef struct tagMQIMPO MQIMPO;
struct tagMQIMPO {
  MQCHAR4  StrucId;            /* Structure identifier */
  MQLONG   Version;            /* Structure version number */
  MQLONG   Options;            /* Options that control the action of
                                  MQINQMP */
  MQLONG   RequestedEncoding;  /* Requested encoding of Value */
  MQLONG   RequestedCCSID;     /* Requested character set identifier
                                  of Value */
  MQLONG   ReturnedEncoding;   /* Returned encoding of Value */
  MQLONG   ReturnedCCSID;      /* Returned character set identifier
                                  of Value */
  MQCHAR   Reserved1           /* Reserved field */
  MQCHARV  ReturnedName;       /* Returned property name */
  MQCHAR8  TypeString;         /* Property data type as a string */
};
```

COBOL declaration for MQIMPO

```
**   MQIMPO structure
  10 MQIMPO.
**    Structure identifier
   15 MQIMPO-STRUCID                PIC X(4).
**    Structure version number
   15 MQIMPO-VERSION                PIC S9(9) BINARY.
**    Options that control the action of MQINQMP
   15 MQIMPO-OPTIONS                PIC S9(9) BINARY.
**    Requested encoding of VALUE
   15 MQIMPO-REQUESTEDENCODING      PIC S9(9) BINARY.
**    Requested character set identifier of VALUE
   15 MQIMPO-REQUESTEDCCSID         PIC S9(9) BINARY.
**    Returned encoding of VALUE
   15 MQIMPO-RETURNEDENCODING       PIC S9(9) BINARY.
**    Returned character set identifier of VALUE
   15 MQIMPO-RETURNEDCCSID          PIC S9(9) BINARY.
**    Reserved field
   15 MQIMPO-RESERVED1
**    Returned property name
   15 MQIMPO-RETURNEDNAME.
**     Address of variable length string
    20 MQIMPO-RETURNEDNAME-VSPTR    POINTER.
**     Offset of variable length string
    20 MQIMPO-RETURNEDNAME-VSOFFSET PIC S9(9) BINARY.
**     CCSID of variable length string
    20 MQIMPO-RETURNEDNAME-VSCCSID  PIC S9(9) BINARY.
**    Property data type as string
   15 MQIMPO-TYPESTRING             PIC S9(9) BINARY.
```

PL/I declaration for MQIMPO

```
dcl
 1 MQIMPO based,
  3 StrucId            char(4),       /* Structure identifier */
  3 Version            fixed bin(31), /* Structure version number */
  3 Options            fixed bin(31), /* Options that control the
                                         action of MQINQMP */
  3 RequestedEncoding  fixed bin(31), /* Requested encoding of
                                         Value */
  3 RequestedCCSID     fixed bin(31), /* Requested character set
                                         identifier of Value */
  3 ReturnedEncoding   fixed bin(31), /* Returned encoding of
                                         Value */
  3 ReturnedCCSID      fixed bin(31), /* Returned character set
                                         identifier of Value */
  3 Reserved1          fixed bin(31), /* Reserved field */
  3 ReturnedName,                     /* Returned property name */
   5 ReturnedName_VSPtr      pointer,       /* Address of returned
                                               name */
   5 5 ReturnedName_VSOffset fixed bin(31), /* Offset of returned
                                               name */
    5 5 ReturnedName_VSCCSID  fixed bin(31), /* CCSID of returned
                                               name */
  3 TypeString         char(8);       /* Property data type as
                                         string */
```

High Level Assembler declaration for MQIMPO

```
MQIMPO                       DSECT
MQIMPO_STRUCID               DS   CL4  Structure identifier
MQIMPO_VERSION               DS   F    Structure version number
MQIMPO_OPTIONS               DS   F    Options that control the
*                                      action of MQINQMP
MQIMPO_REQUESTEDENCODING     DS   F    Requested encoding of VALUE
MQIMPO_REQUESTEDCCSID        DS   F    Requested character set
*                                      identifier of VALUE
MQIMPO_RETURNEDENCODING      DS   F    Returned encoding of VALUE
MQIMPO_RETURNEDCCSID         DS   F    Returned character set
*                                      identifier of VALUE
MQIMPO_RESERVED1             DS   F    Reserved field
MQIMPO_RETURNEDNAME          DS   0F   Force fullword alignment
MQIMPO_RETURNEDNAME_VSPTR    DS   F    Address of returned name
MQIMPO_RETURNEDNAME_VSOFFSET DS   F    Offset of returned name
MQIMPO_RETURNEDNAME_VSLENGTH DS   F    Length of returned name
MQIMPO_RETURNEDNAME_VSCCSID  DS   F    CCSID of returned name
MQIMPO_RETURNEDNAME_LENGTH   EQU  *-MQIMPO_RETURNEDNAME
                             ORG  MQIMPO_RETURNEDNAME
MQIMPO_RETURNEDNAME_AREA     DS   CL(MQIMPO_RETURNEDNAME_LENGTH)
*
MQIMPO_TYPESTRING            DS   CL8  Property data type as string
MQIMPO_LENGTH                EQU  *-MQIMPO
MQIMPO_AREA                  DS   CL(MQIMPO_LENGTH)
```

StrucId (MQCHAR4)

Inquire message property options structure - StrucId field

This is the structure identifier. The value must be:

MQIMPO_STRUC_ID

Identifier for inquire message property options structure.

For the C programming language, the constant MQIMPO_STRUC_ID_ARRAY is also defined; this has the same value as MQIMPO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQIMPO_STRUC_ID.

Version (MQLONG)

Inquire message property options structure - Version field

This is the structure version number. The value must be:

MQIMPO_VERSION_1
Version number for inquire message property options structure.

The following constant specifies the version number of the current version:

MQIMPO_CURRENT_VERSION
Current version of inquire message property options structure.

This is always an input field. The initial value of this field is MQIMPO_VERSION_1.

Options (MQLONG)

Inquire message property options structure - Options field

The following options control the action of MQINQMP. You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

Combinations of options that are not valid are noted; all other combinations are valid.

Value data options: The following options relate to the processing of the value data when the property is retrieved from the message.

MQIMPO_CONVERT_VALUE
This option requests that the value of the property be converted to conform to the *RequestedCCSID* and *RequestedEncoding* values specified before the MQINQMP call returns the property value in the *Value* area.

- If conversion is successful, the *ReturnedCCSID* and *ReturnedEncoding* fields are set to the same as *RequestedCCSID* and *RequestedEncoding* on return from the MQINQMP call.
- If conversion fails, but the MQINQMP call otherwise completes without error, the property value is returned unconverted.

  If the property is a string, the *ReturnedCCSID* and *ReturnedEncoding* fields are set to the character set and encoding of the unconverted string.

  The completion code is MQCC_WARNING in this case, with reason code MQRC_PROP_VALUE_NOT_CONVERTED. The property cursor is advanced to the returned property.

If the property value expands during conversion, and exceeds the size of the **Value** parameter, the value is returned unconverted, with completion code MQCC_FAILED; the reason code is set to MQRC_PROPERTY_VALUE_TOO_BIG.

The **DataLength** parameter of the MQINQMP call returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

This option also requests that:

- If the property name contains a wildcard, and
- The *ReturnedName* field is initialized with an address or offset for the returned name,

then the returned name is converted to conform to the *RequestedCCSID* and *RequestedEncoding* values.

- If conversion is successful, the *VSCCSID* field of *ReturnedName* and the encoding of the returned name are set to the input value of *RequestedCCSID* and *RequestedEncoding*.
- If conversion fails, but the MQINQMP call otherwise completes without error or warning, the returned name is unconverted. The completion code is MQCC_WARNING in this case, with reason code MQRC_PROP_NAME_NOT_CONVERTED.

  The property cursor is advanced to the returned property. MQRC_PROP_VALUE_NOT_CONVERTED is returned if both the value and the name are not converted.

If the returned name expands during conversion, and exceeds the size of the *VSBufsize* field of the *RequestedName*, the returned string is left unconverted, with completion code MQCC_FAILED and the reason code is set to MQRC_PROPERTY_NAME_TOO_BIG.

The *VSLength* field of the MQCHARV structure returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

MQIMPO_CONVERT_TYPE
This option requests that the value of the property be converted from its current data type, into the data type specified on the **Type** parameter of the MQINQMP call.

- If conversion is successful, the **Type** parameter is unchanged on return of the MQINQMP call.
- If conversion fails, but the MQINQMP call otherwise completes without error, the call fails with reason MQRC_PROP_CONV_NOT_SUPPORTED. The property cursor is unchanged.

If the conversion of the data type causes the value to expand during conversion, and the converted value exceeds the size of the **Value** parameter, the value is returned unconverted, with completion code MQCC_FAILED and the reason code is set to MQRC_PROPERTY_VALUE_TOO_BIG.

The **DataLength** parameter of the MQINQMP call returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

If the value of the **Type** parameter of the MQINQMP call is not valid, the call fails with reason MQRC_PROPERTY_TYPE_ERROR.

If the requested data type conversion is not supported, the call fails with reason MQRC_PROP_CONV_NOT_SUPPORTED. The following data type conversions are supported:

Table 499. Supported data type conversions

Property data type	Supported target data types
MQTYPE_BOOLEAN	MQTYPE_STRING, MQTYPE_INT8, MQTYPE_INT16, MQTYPE_INT32, MQTYPE_INT64
MQTYPE_BYTE_STRING	MQTYPE_STRING
MQTYPE_INT8	MQTYPE_STRING, MQTYPE_INT16, MQTYPE_INT32, MQTYPE_INT64
MQTYPE_INT16	MQTYPE_STRING, MQTYPE_INT32, MQTYPE_INT64
MQTYPE_INT32	MQTYPE_STRING, MQTYPE_INT64
MQTYPE_INT64	MQTYPE_STRING
MQTYPE_FLOAT32	MQTYPE_STRING, MQTYPE_FLOAT64
MQTYPE_FLOAT64	MQTYPE_STRING
MQTYPE_STRING	MQTYPE_BOOLEAN, MQTYPE_INT8, MQTYPE_INT16, MQTYPE_INT32, MQTYPE_INT64, MQTYPE_FLOAT32, MQTYPE_FLOAT64
MQTYPE_NULL	None

The general rules governing the supported conversions are as follows:

- Numeric property values can be converted from one data type to another, provided that no data is lost during the conversion.

  For example, the value of a property with data type MQTYPE_INT32 can be converted into a value with data type MQTYPE_INT64, but cannot be converted into a value with data type MQTYPE_INT16.
- A property value of any data type can be converted into a string.

- A string property value can be converted to any other data type provided the string is formatted correctly for the conversion. If an application attempts to convert a string property value that is not formatted correctly, IBM MQ returns reason code MQRC_PROP_NUMBER_FORMAT_ERROR.
- If an application attempts a conversion that is not supported, IBM MQ returns reason code MQRC_PROP_CONV_NOT_SUPPORTED.

The specific rules for converting a property value from one data type to another are as follows:

- When converting an MQTYPE_BOOLEAN property value to a string, the value TRUE is converted to the string "TRUE", and the value false is converted to the string "FALSE".
- When converting an MQTYPE_BOOLEAN property value to a numeric data type, the value TRUE is converted to one, and the value FALSE is converted to zero.
- When converting a string property value to an MQTYPE_BOOLEAN value, the string "TRUE" , or "1" , is converted to TRUE, and the string "FALSE", or "0", is converted to FALSE.

  Note that the terms "TRUE" and "FALSE" are not case sensitive.

  Any other string cannot be converted; IBM MQ returns reason code MQRC_PROP_NUMBER_FORMAT_ERROR.
- When converting a string property value to a value with data type MQTYPE_INT8, MQTYPE_INT16, MQTYPE_INT32 or MQTYPE_INT64, the string must have the following format:

  ```
  [blanks][sign]digits
  ```

  The meanings of the components of the string are as follows:

  blanks
  Optional leading blank characters

  sign
  An optional plus sign (+) or minus sign (-) character.

  digits
  A contiguous sequence of digit characters (0-9). At least one digit character must be present.

  After the sequence of digit characters, the string can contain other characters that are not digit characters, but the conversion stops as soon as the first of these characters is reached. The string is assumed to represent a decimal integer.

  IBM MQ returns reason code MQRC_PROP_NUMBER_FORMAT_ERROR if the string is not formatted correctly.
- When converting a string property value to a value with data type MQTYPE_FLOAT32 or MQTYPE_FLOAT64, the string must have the following format:

  ```
  [blanks][sign]digits[.digits][e_char[e_sign]e_digits]
  ```

  The meanings of the components of the string are as follows:

  blanks
  Optional leading blank characters

  sign
  An optional plus sign (+) or minus sign (-) character.

  digits
  A contiguous sequence of digit characters (0-9). At least one digit character must be present.

  e_char
  An exponent character, which is either "E" or "e".

  e_sign
  An optional plus sign (+) or minus sign (-) character for the exponent.

e_digits
A contiguous sequence of digit characters (0-9) for the exponent. At least one digit character must be present if the string contains an exponent character.

After the sequence of digit characters, or the optional characters representing an exponent, the string can contain other characters that are not digit characters, but the conversion stops as soon as the first of these characters is reached. The string is assumed to represent a decimal floating point number with an exponent that is a power of 10.

IBM MQ returns reason code MQRC_PROP_NUMBER_FORMAT_ERROR if the string is not formatted correctly.

- When converting a numeric property value to a string, the value is converted to the string representation of the value as a decimal number, not the string containing the ASCII character for that value. For example, the integer 65 is converted to the string "65", not the string "A".
- When converting a byte string property value to a string, each byte is converted to the two hexadecimal characters that represent the byte. For example, the byte array {0xF1, 0x12, 0x00, 0xFF} is converted to the string "F11200FF".

MQIMPO_QUERY_LENGTH
Query the type and length of the property value. The length is returned in the **DataLength** parameter of the MQINQMP call. The property value is not returned.

If a **ReturnedName** buffer is specified, the *VSLength* field of the MQCHARV structure is filled in with the length of the property name. The property name is not returned.

Iteration options: The following options relate to iterating over properties, using a name with a wildcard character

MQIMPO_INQ_FIRST
Inquire on the first property that matches the specified name. After this call, a cursor is established on the property that is returned.

This is the default value.

The MQIMPO_INQ_PROP_UNDER_CURSOR option can subsequently be used with an MQINQMP call, if required, to inquire on the same property again.

Note that there is only one property cursor; therefore, if the property name, specified in the MQINQMP call, changes the cursor is reset.

This option is not valid with either of the following options:

MQIMPO_INQ_NEXT
MQIMPO_INQ_PROP_UNDER_CURSOR

MQIMPO_INQ_NEXT
Inquires on the next property that matches the specified name, continuing the search from the property cursor. The cursor is advanced to the property that is returned.

If this is the first MQINQMP call for the specified name, then the first property that matches the specified name is returned.

The MQIMPO_INQ_PROP_UNDER_CURSOR option can subsequently be used with an MQINQMP call if required, to inquire on the same property again.

If the property under the cursor has been deleted, MQINQMP returns the next matching property following the one that has been deleted.

If a property is added that matches the wildcard, while an iteration is in progress, the property might or might not be returned during the completion of the iteration. The property is returned once the iteration restarts using MQIMPO_INQ_FIRST.

A property matching the wildcard that was deleted, while the iteration was in progress, is not returned subsequent to its deletion.

This option is not valid with either of the following options:

MQIMPO_INQ_FIRST
MQIMPO_INQ_PROP_UNDER_CURSOR

MQIMPO_INQ_PROP_UNDER_CURSOR

Retrieve the value of the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired, using either the MQIMPO_INQ_FIRST or the MQIMPO_INQ_NEXT option.

The property cursor is reset when the message handle is reused, when the message handle is specified in the *MsgHandle* field of the MQGMO on an MQGET call, or when the message handle is specified in *OriginalMsgHandle* or *NewMsgHandle* fields of the MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established, or if the property pointed to by the property cursor has been deleted, the call fails with completion code MQCC_FAILED and reason MQRC_PROPERTY_NOT_AVAILABLE.

This option is not valid with either of the following options:

MQIMPO_INQ_FIRST
MQIMPO_INQ_NEXT

If none of the options previously described is required, the following option can be used:

MQIMPO_NONE

Use this value to indicate that no other options have been specified; all options assume their default values.

MQIMPO_NONE aids program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

This is always an input field. The initial value of this field is MQIMPO_INQ_FIRST.

RequestedEncoding (MQLONG)

Inquire message property options structure - RequestedEncoding field

This is the encoding into which the inquired property value is to be converted when MQIMPO_CONVERT_VALUE or MQIMPO_CONVERT_TYPE is specified.

The initial value of this field is MQENC_NATIVE.

RequestedCCSID (MQLONG)

Inquire message property options structure - RequestedCCSID field

The character set that the inquired property value is to be converted into if the value is a character string. This is also the character set into which the *ReturnedName* is to be converted when MQIMPO_CONVERT_VALUE or MQIMPO_CONVERT_TYPE is specified.

The initial value of this field is MQCCSI_APPL.

ReturnedEncoding (MQLONG)

Inquire message property options structure - ReturnedEncoding field

On output, this is the encoding of the value returned.

If the MQIMPO_CONVERT_VALUE option is specified and conversion was successful, the *ReturnedEncoding* field, on return, is the same value as the value passed in.

The initial value of this field is MQENC_NATIVE.

ReturnedCCSID (MQLONG)

Inquire message property options structure - ReturnedCCSID field

On output, this is the character set of the value returned if the **Type** parameter of the MQINQMP call is MQTYPE_STRING.

If the MQIMPO_CONVERT_VALUE option is specified and conversion was successful, the *ReturnedCCSID* field, on return, is the same value as the value passed in.

The initial value of this field is zero.

Reserved1 (MQCHAR)

This is a reserved field. The initial value of this field is a blank character (4 byte field).

ReturnedName (MQCHARV)

Inquire message property options structure - ReturnedName field

The actual name of the inquired property.

On input a string buffer can be passed in using the *VSPtr* or *VSOffset* field of the MQCHARV structure. The length of the string buffer is specified using the *VSBufsize* field of the MQCHARV structure.

On return from the MQINQMP call, the string buffer is completed with the name of the property that was inquired, provided the string buffer was long enough to fully contain the name. The *VSLength* field of the MQCHARV structure is filled in with the length of the property name. The *VSCCSID* field of the MQCHARV structure is filled in to indicate the character set of the returned name, whether or not conversion of the name failed.

This is an input/output field. The initial value of this field is MQCHARV_DEFAULT.

TypeString (MQCHAR8)

Inquire message property options structure - TypeString field

A string representation of the data type of the property.

If the property was specified in an MQRFH2 header and the MQRFH2 `dt` attribute is not recognized, this field can be used to determine the data type of the property. *TypeString* is returned in coded character set 1208 (UTF-8), and is the first eight bytes of the value of the `dt` attribute of the property that failed to be recognized

This is always an output field. The initial value of this field is the null string in the C programming language, and 8 blank characters in other programming languages.

MQMD - Message descriptor

The MQMD structure contains the control information that accompanies the application data when a message travels between the sending and receiving applications. The structure is an input/output parameter on the MQGET, MQPUT, and MQPUT1 calls.

Availability

All IBM MQ systems, plus IBM MQ MQI clients connected to these systems.

Version

The current version of MQMD is MQMD_VERSION_2. Applications that are intended to be portable between several environments must ensure that the required version of MQMD is supported in all the

environments concerned. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most-recent version of MQMD that is supported by the environment, but with the initial value of the *Version* field set to MQMD_VERSION_1. To use fields that are not present in the version-1 structure, the application must set the *Version* field to the version number of the version required.

A declaration for the version-1 structure is available with the name MQMD1.

Character set and encoding

Data in MQMD must be in the character set and encoding of the local queue manager; these are given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE. However, if the application is running as an IBM MQ MQI client, the structure must be in the character set and encoding of the client.

If the sending and receiving queue managers use different character sets or encodings, the data in MQMD is converted automatically. It is not necessary for the application to convert the MQMD.

Using different versions of MQMD

A version-2 MQMD is equivalent to using a version-1 MQMD and prefixing the message data with an MQMDE structure. However, if all the fields in the MQMDE structure have their default values, the MQMDE can be omitted. A version-1 MQMD plus MQMDE are used as described:

- On the MQPUT and MQPUT1 calls, if the application provides a version-1 MQMD, the application can optionally prefix the message data with an MQMDE, setting the *Format* field in MQMD to MQFMT_MD_EXTENSION to indicate that an MQMDE is present. If the application does not provide an MQMDE, the queue manager assumes default values for the fields in the MQMDE.

  Note: Several of the fields that exist in the version-2 MQMD but not the version-1 MQMD are input/output fields on the MQPUT and MQPUT1 calls. However, the queue manager does not return any values in the equivalent fields in the MQMDE on output from the MQPUT and MQPUT1 calls; if the application requires those output values, it must use a version-2 MQMD.
- On the MQGET call, if the application provides a version-1 MQMD, the queue manager prefixes the message returned with an MQMDE, but only if one or more of the fields in the MQMDE has a non-default value. The *Format* field in MQMD will have the value MQFMT_MD_EXTENSION to indicate that an MQMDE is present.

The default values that the queue manager uses for the fields in the MQMDE are the same as the initial values of those fields, shown in Table 503 on page 465.

When a message is on a transmission queue, some of the fields in MQMD are set to particular values; see “MQXQH - Transmission-queue header” on page 608 for details.

Message context

Certain fields in MQMD contain the message context. There are two types of message context: *identity context* and *origin context*. Typically:

- Identity context relates to the application that *originally* put the message
- Origin context relates to the application that *most recently* put the message.

These two applications can be the same application, but they can also be different applications (for example, when a message is forwarded from one application to another).

Although identity and origin context typically have the meanings described, the content of both types of context fields in MQMD depends on the MQPMO_*_CONTEXT options that are specified when the message is put. As a result, identity context does not necessarily relate to the application that originally put the message, and origin context does not necessarily relate to the application that most-recently put the message; it depends on the design of the application suite.

The message channel agent (MCA) never alters message context. MCAs that receive messages from remote queue managers use the context option MQPMO_SET_ALL_CONTEXT on the MQPUT or MQPUT1 call. This allows the receiving MCA to preserve exactly the message context that traveled with the message from the sending MCA. However, the result is that the origin context does not relate to either of the MCAs that sent and received the message. The origin context refers to an earlier application that put the message. If all the intermediate applications have passed the message context, the origin context refers to the originating application itself.

In the descriptions, the context fields are described as though they are used as described previously. For more information about message context, see Message context.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 500. Fields in MQMD for MQMD

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQMD_STRUC_ID	'MD'
Version (structure version number)	MQMD_VERSION_1	1
Report (options for report messages)	MQRO_NONE	0
MsgType (message type)	MQMT_DATAGRAM	8
MQMD - Expiry field (message lifetime)	MQEI_UNLIMITED	-1
MQMD - Feedback field (feedback or reason code)	MQFB_NONE	0
Encoding (numeric encoding of message data)	MQENC_NATIVE	Depends on environment
CodedCharSetId (character set identifier of message data)	MQCCSI_Q_MGR	0
Format (format name of message data)	MQFMT_NONE	Blanks
Priority (message priority)	MQPRI_PRIORITY_AS_Q_DEF	-1
Persistence (message persistence)	MQPER_PERSISTENCE_AS_Q_DEF	2
MQMD - MsgId field (message identifier)	MQMI_NONE	Nulls
CorrelId (correlation identifier)	MQCI_NONE	Nulls
BackoutCount (backout counter)	None	0
ReplyToQ (name of reply queue)	None	Null string or blanks
ReplyToQMgr (name of reply queue manager)	None	Null string or blanks
UserIdentifier (user identifier)	None	Null string or blanks
AccountingToken (accounting token)	MQACT_NONE	Nulls
ApplIdentityData (application data relating to identity)	None	Null string or blanks
PutApplType (type of application that put the message)	MQAT_NO_CONTEXT	0

Table 500. Fields in MQMD for MQMD (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
PutApplName (name of application that put the message)	None	Null string or blanks
PutDate (date when message was put)	None	Null string or blanks
PutTime (time when message was put)	None	Null string or blanks
ApplOriginData (application data relating to origin)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQMD_VERSION_2.		
GroupId (group identifier)	MQGI_NONE	Nulls
MsgSeqNumber (sequence number of logical message within group)	None	1
Offset (offset of data in physical message from start of logical message)	None	0
MQMD - MsgFlags field (message flags)	MQMF_NONE	0
OriginalLength (length of original message)	MQOL_UNDEFINED	-1

Notes:

1. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
2. In the C programming language, the macro variable MQMD_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQMD MyMD = {MQMD_DEFAULT};
```

Language declarations

C declaration for MQMD

```
typedef struct tagMQMD MQMD;
struct tagMQMD {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQLONG    Report;           /* Options for report messages */
  MQLONG    MsgType;          /* Message type */
  MQLONG    Expiry;           /* Message lifetime */
  MQLONG    Feedback;         /* Feedback or reason code */
  MQLONG    Encoding;         /* Numeric encoding of message data */
  MQLONG    CodedCharSetId;   /* Character set identifier of message
                                 data */
  MQCHAR8   Format;           /* Format name of message data */
  MQLONG    Priority;         /* Message priority */
  MQLONG    Persistence;      /* Message persistence */
  MQBYTE24  MsgId;            /* Message identifier */
  MQBYTE24  CorrelId;         /* Correlation identifier */
  MQLONG    BackoutCount;     /* Backout counter */
  MQCHAR48  ReplyToQ;         /* Name of reply queue */
  MQCHAR48  ReplyToQMgr;      /* Name of reply queue manager */
  MQCHAR12  UserIdentifier;   /* User identifier */
  MQBYTE32  AccountingToken;  /* Accounting token */
  MQCHAR32  ApplIdentityData; /* Application data relating to
                                 identity */
  MQLONG    PutApplType;      /* Type of application that put the
                                 message */
```

```
  MQCHAR28  PutApplName;       /* Name of application that put the
                                  message */
  MQCHAR8   PutDate;           /* Date when message was put */
  MQCHAR8   PutTime;           /* Time when message was put */
  MQCHAR4   ApplOriginData;    /* Application data relating to origin */
  MQBYTE24  GroupId;           /* Group identifier */
  MQLONG    MsgSeqNumber;      /* Sequence number of logical message
                                  within group */
  MQLONG    Offset;            /* Offset of data in physical message
                                  from start of logical message */
  MQLONG    MsgFlags;          /* Message flags */
  MQLONG    OriginalLength;    /* Length of original message */
};
```

COBOL declaration for MQMD

```
**   MQMD structure
  10 MQMD.
**    Structure identifier
   15 MQMD-STRUCID          PIC X(4).
**    Structure version number
   15 MQMD-VERSION          PIC S9(9) BINARY.
**    Options for report messages
   15 MQMD-REPORT           PIC S9(9) BINARY.
**    Message type
   15 MQMD-MSGTYPE          PIC S9(9) BINARY.
**    Message lifetime
   15 MQMD-EXPIRY           PIC S9(9) BINARY.
**    Feedback or reason code
   15 MQMD-FEEDBACK         PIC S9(9) BINARY.
**    Numeric encoding of message data
   15 MQMD-ENCODING         PIC S9(9) BINARY.
**    Character set identifier of message data
   15 MQMD-CODEDCHARSETID   PIC S9(9) BINARY.
**    Format name of message data
   15 MQMD-FORMAT           PIC X(8).
**    Message priority
   15 MQMD-PRIORITY         PIC S9(9) BINARY.
**    Message persistence
   15 MQMD-PERSISTENCE      PIC S9(9) BINARY.
**    Message identifier
   15 MQMD-MSGID            PIC X(24).
**    Correlation identifier
   15 MQMD-CORRELID         PIC X(24).
**    Backout counter
   15 MQMD-BACKOUTCOUNT     PIC S9(9) BINARY.
**    Name of reply queue
   15 MQMD-REPLYTOQ         PIC X(48).
**    Name of reply queue manager
   15 MQMD-REPLYTOQMGR      PIC X(48).
**    User identifier
   15 MQMD-USERIDENTIFIER   PIC X(12).
**    Accounting token
   15 MQMD-ACCOUNTINGTOKEN  PIC X(32).
**    Application data relating to identity
   15 MQMD-APPLIDENTITYDATA PIC X(32).
**    Type of application that put the message
   15 MQMD-PUTAPPLTYPE      PIC S9(9) BINARY.
**    Name of application that put the message
   15 MQMD-PUTAPPLNAME      PIC X(28).
**    Date when message was put
   15 MQMD-PUTDATE          PIC X(8).
**    Time when message was put
   15 MQMD-PUTTIME          PIC X(8).
**    Application data relating to origin
   15 MQMD-APPLORIGINDATA   PIC X(4).
**    Group identifier
   15 MQMD-GROUPID          PIC X(24).
**    Sequence number of logical message within group
   15 MQMD-MSGSEQNUMBER     PIC S9(9) BINARY.
**    Offset of data in physical message from start of logical message
   15 MQMD-OFFSET           PIC S9(9) BINARY.
**    Message flags
   15 MQMD-MSGFLAGS         PIC S9(9) BINARY.
**    Length of original message
   15 MQMD-ORIGINALLENGTH   PIC S9(9) BINARY.
```

PL/I declaration for MQMD

```
dcl
 1 MQMD based,
  3 StrucId          char(4),       /* Structure identifier */
  3 Version          fixed bin(31), /* Structure version number */
  3 Report           fixed bin(31), /* Options for report messages */
  3 MsgType          fixed bin(31), /* Message type */
  3 Expiry           fixed bin(31), /* Message lifetime */
  3 Feedback         fixed bin(31), /* Feedback or reason code */
  3 Encoding         fixed bin(31), /* Numeric encoding of message
                                       data */
  3 CodedCharSetId   fixed bin(31), /* Character set identifier of
                                       message data */
  3 Format           char(8),       /* Format name of message data */
  3 Priority         fixed bin(31), /* Message priority */
  3 Persistence      fixed bin(31), /* Message persistence */
  3 MsgId            char(24),      /* Message identifier */
  3 CorrelId         char(24),      /* Correlation identifier */
  3 BackoutCount     fixed bin(31), /* Backout counter */
  3 ReplyToQ         char(48),      /* Name of reply queue */
  3 ReplyToQMgr      char(48),      /* Name of reply queue manager */
  3 UserIdentifier   char(12),      /* User identifier */
  3 AccountingToken  char(32),      /* Accounting token */
  3 ApplIdentityData char(32),      /* Application data relating to
                                       identity */
  3 PutApplType      fixed bin(31), /* Type of application that put the
                                       message */
  3 PutApplName      char(28),      /* Name of application that put the
                                       message */
  3 PutDate          char(8),       /* Date when message was put */
  3 PutTime          char(8),       /* Time when message was put */
  3 ApplOriginData   char(4),       /* Application data relating to
                                       origin */
  3 GroupId          char(24),      /* Group identifier */
  3 MsgSeqNumber     fixed bin(31), /* Sequence number of logical
                                       message within group */
  3 Offset           fixed bin(31), /* Offset of data in physical
                                       message from start of logical
                                       message */
  3 MsgFlags         fixed bin(31), /* Message flags */
  3 OriginalLength   fixed bin(31); /* Length of original message */
```

High Level Assembler declaration for MQMD

```
MQMD                    DSECT
MQMD_STRUCID            DS   CL4   Structure identifier
MQMD_VERSION            DS   F     Structure version number
MQMD_REPORT             DS   F     Options for report messages
MQMD_MSGTYPE            DS   F     Message type
MQMD_EXPIRY             DS   F     Message lifetime
MQMD_FEEDBACK           DS   F     Feedback or reason code
MQMD_ENCODING           DS   F     Numeric encoding of message data
MQMD_CODEDCHARSETID     DS   F     Character set identifier of message
*                                  data
MQMD_FORMAT             DS   CL8   Format name of message data
MQMD_PRIORITY           DS   F     Message priority
MQMD_PERSISTENCE        DS   F     Message persistence
MQMD_MSGID              DS   XL24  Message identifier
MQMD_CORRELID           DS   XL24  Correlation identifier
MQMD_BACKOUTCOUNT       DS   F     Backout counter
MQMD_REPLYTOQ           DS   CL48  Name of reply queue
MQMD_REPLYTOQMGR        DS   CL48  Name of reply queue manager
MQMD_USERIDENTIFIER     DS   CL12  User identifier
MQMD_ACCOUNTINGTOKEN    DS   XL32  Accounting token
MQMD_APPLIDENTITYDATA   DS   CL32  Application data relating to identity
MQMD_PUTAPPLTYPE        DS   F     Type of application that put the
*                                  message
MQMD_PUTAPPLNAME        DS   CL28  Name of application that put the
*                                  message
MQMD_PUTDATE            DS   CL8   Date when message was put
MQMD_PUTTIME            DS   CL8   Time when message was put
MQMD_APPLORIGINDATA     DS   CL4   Application data relating to origin
MQMD_GROUPID            DS   XL24  Group identifier
MQMD_MSGSEQNUMBER       DS   F     Sequence number of logical message
*                                  within group
MQMD_OFFSET             DS   F     Offset of data in physical message
*                                  from start of logical message
```

```
MQMD_MSGFLAGS          DS   F      Message flags
MQMD_ORIGINALLENGTH    DS   F      Length of original message
*
MQMD_LENGTH            EQU  *-MQMD
                       ORG  MQMD
MQMD_AREA              DS   CL(MQMD_LENGTH)
```

Visual Basic declaration for MQMD

```
Type MQMD
  StrucId          As String*4  'Structure identifier'
  Version          As Long      'Structure version number'
  Report           As Long      'Options for report messages'
  MsgType          As Long      'Message type'
  Expiry           As Long      'Message lifetime'
  Feedback         As Long      'Feedback or reason code'
  Encoding         As Long      'Numeric encoding of message data'
  CodedCharSetId   As Long      'Character set identifier of message'
                                'data'
  Format           As String*8  'Format name of message data'
  Priority         As Long      'Message priority'
  Persistence      As Long      'Message persistence'
  MsgId            As MQBYTE24  'Message identifier'
  CorrelId         As MQBYTE24  'Correlation identifier'
  BackoutCount     As Long      'Backout counter'
  ReplyToQ         As String*48 'Name of reply queue'
  ReplyToQMgr      As String*48 'Name of reply queue manager'
  UserIdentifier   As String*12 'User identifier'
  AccountingToken  As MQBYTE32  'Accounting token'
  ApplIdentityData As String*32 'Application data relating to identity'
  PutApplType      As Long      'Type of application that put the'
                                'message'
  PutApplName      As String*28 'Name of application that put the'
                                'message'
  PutDate          As String*8  'Date when message was put'
  PutTime          As String*8  'Time when message was put'
  ApplOriginData   As String*4  'Application data relating to origin'
  GroupId          As MQBYTE24  'Group identifier'
  MsgSeqNumber     As Long      'Sequence number of logical message'
                                'within group'
  Offset           As Long      'Offset of data in physical message'
                                'from start of logical message'
  MsgFlags         As Long      'Message flags'
  OriginalLength   As Long      'Length of original message'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier, and must be:

MQMD_STRUC_ID
Identifier for message descriptor structure.

For the C programming language, the constant MQMD_STRUC_ID_ARRAY is also defined; this has the same value as MQMD_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQMD_STRUC_ID.

Version (MQLONG)

This is the structure version number, and must be one of the following:

MQMD_VERSION_1
Version-1 message descriptor structure.

This version is supported in all environments.

MQMD_VERSION_2
Version-2 message descriptor structure.

This version is supported in all IBM MQ V6.0 and later environments, plus IBM MQ MQI clients connected to these systems.

Note: When a version-2 MQMD is used, the queue manager performs additional checks on any MQ header structures that might be present at the beginning of the application message data; for further details see the usage notes for the MQPUT call.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQMD_CURRENT_VERSION
Current version of message descriptor structure.

This is always an input field. The initial value of this field is MQMD_VERSION_1.

Report (MQLONG)

A report message is a message about another message, used to inform an application about expected or unexpected events that relate to the original message. The *Report* field enables the application sending the original message to specify which report messages are required, whether the application message data is to be included in them, and also (for both reports and replies) how the message and correlation identifiers in the report or reply message are to be set. Any or all (or none) of the following types of report message can be requested:

- Exception
- Expiration
- Confirm on arrival (COA)
- Confirm on delivery (COD)
- Positive action notification (PAN)
- Negative action notification (NAN)

You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

The application that receives the report message can determine the reason that the report was generated by examining the *Feedback* field in the MQMD; see the *Feedback* field for more details.

The use of report options when putting a message to a topic can cause zero, one, or many report messages to be generated and sent to the application. This is because the publication message may be sent to zero, one, or many subscribing applications.

Exception options: Specify one of the options listed to request an exception report message.

MQRO_EXCEPTION
A message channel agent generates this type of report when a message is sent to another queue manager and the message cannot be delivered to the specified destination queue. For example, the destination queue or an intermediate transmission queue might be full, or the message might be too big for the queue.

Generation of the exception report message depends on the persistence of the original message, and the speed of the message channel (normal or fast) through which the original message travels:

- For all persistent messages, and for nonpersistent messages traveling through normal message channels, the exception report is generated only if the action specified by the sending application for the error condition can be completed successfully. The sending application can specify one of the following actions to control the disposition of the original message when the error condition arises:
  - MQRO_DEAD_LETTER_Q (this places the original message on the dead-letter queue).
  - MQRO_DISCARD_MSG (this discards the original message).

  If the action specified by the sending application cannot be completed successfully, the original message is left on the transmission queue, and no exception report message is generated.
- For nonpersistent messages traveling through fast message channels, the original message is removed from the transmission queue and the exception report generated *even if* the

specified action for the error condition cannot be completed successfully. For example, if MQRO_DEAD_LETTER_Q is specified, but the original message cannot be placed on the dead-letter queue because that queue is full, the exception report message is generated and the original message discarded.

For more information about normal and fast message channels, see Nonpersistent message speed (NPMSPEED).

An exception report is not generated if the application that put the original message can be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call.

Applications can also send exception reports, to indicate that a message cannot be processed (for example, because it is a debit transaction that would cause the account to exceed its credit limit).

Message data from the original message is not included with the report message.

Do not specify more than one of MQRO_EXCEPTION, MQRO_EXCEPTION_WITH_DATA, and MQRO_EXCEPTION_WITH_FULL_DATA.

MQRO_EXCEPTION_WITH_DATA

This is the same as MQRO_EXCEPTION, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of MQRO_EXCEPTION, MQRO_EXCEPTION_WITH_DATA, and MQRO_EXCEPTION_WITH_FULL_DATA.

MQRO_EXCEPTION_WITH_FULL_DATA

Exception reports with full data required.

This is the same as MQRO_EXCEPTION, except that all the application message data from the original message is included in the report message.

Do not specify more than one of MQRO_EXCEPTION, MQRO_EXCEPTION_WITH_DATA, and MQRO_EXCEPTION_WITH_FULL_DATA.

Expiration options: Specify one of the options listed to request an expiration report message.

MQRO_EXPIRATION

This type of report is generated by the queue manager if the message is discarded before delivery to an application because its expiry time has passed (see the *Expiry* field). If this option is not set, no report message is generated if a message is discarded for this reason (even if you specify one of the MQRO_EXCEPTION_* options).

Message data from the original message is not included with the report message.

Do not specify more than one of MQRO_EXPIRATION, MQRO_EXPIRATION_WITH_DATA, and MQRO_EXPIRATION_WITH_FULL_DATA.

MQRO_EXPIRATION_WITH_DATA

This is the same as MQRO_EXPIRATION, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of MQRO_EXPIRATION, MQRO_EXPIRATION_WITH_DATA, and MQRO_EXPIRATION_WITH_FULL_DATA.

MQRO_EXPIRATION_WITH_FULL_DATA

This is the same as MQRO_EXPIRATION, except that all the application message data from the original message is included in the report message.

Do not specify more than one of MQRO_EXPIRATION, MQRO_EXPIRATION_WITH_DATA, and MQRO_EXPIRATION_WITH_FULL_DATA.

Confirm-on-arrival options: Specify one of the options listed to request a confirm-on-arrival report message.

MQRO_COA

This type of report is generated by the queue manager that owns the destination queue when the message is placed on the destination queue. Message data from the original message is not included with the report message.

If the message is put as part of a unit of work, and the destination queue is a local queue, the COA report message generated by the queue manager can be retrieved only if the unit of work is committed.

A COA report is not generated if the *Format* field in the message descriptor is MQFMT_XMIT_Q_HEADER or MQFMT_DEAD_LETTER_HEADER. This prevents a COA report being generated if the message is put on a transmission queue, or is undeliverable and put on a dead-letter queue.

In the case of an IMS bridge queue, the COA report is generated when the message reaches the IMS queue (acknowledgment received from IMS) and not when the message is put in the MQ bridge queue. That means that if IMS is not active, no COA report is generated until IMS is started and a message is queued on the IMS queue.

The user that runs a program that puts a message with MQMD.Report=MQRO_COA must have +passid authority on the reply queue. If the user does not have +passid authority, the COA report message does not reach the reply queue. An attempt is made to put the report message on the dead letter queue.

Do not specify more than one of MQRO_COA, MQRO_COA_WITH_DATA, and MQRO_COA_WITH_FULL_DATA.

MQRO_COA_WITH_DATA

This is the same as MQRO_COA, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of MQRO_COA, MQRO_COA_WITH_DATA, and MQRO_COA_WITH_FULL_DATA.

MQRO_COA_WITH_FULL_DATA

This is the same as MQRO_COA, except that all the application message data from the original message is included in the report message.

Do not specify more than one of MQRO_COA, MQRO_COA_WITH_DATA, and MQRO_COA_WITH_FULL_DATA.

Confirm-on-delivery options: Specify one of the options listed to request a confirm-on-delivery report message.

MQRO_COD

This type of report is generated by the queue manager when an application retrieves the message from the destination queue in a way that deletes the message from the queue. Message data from the original message is not included with the report message.

If the message is retrieved as part of a unit of work, the report message is generated within the same unit of work, so that the report is not available until the unit of work is committed. If the unit of work is backed out, the report is not sent.

A COD report is not always generated if a message is retrieved with the MQGMO_MARK_SKIP_BACKOUT option. If the primary unit of work is backed out but the secondary unit of work is committed, the message is removed from the queue, but a COD report is not generated.

A COD report is not generated if the *Format* field in the message descriptor is MQFMT_DEAD_LETTER_HEADER. This prevents a COD report being generated if the message is undeliverable and put on a dead-letter queue.

MQRO_COD is not valid if the destination queue is an XCF queue.

Do not specify more than one of MQRO_COD, MQRO_COD_WITH_DATA, and MQRO_COD_WITH_FULL_DATA.

MQRO_COD_WITH_DATA

This is the same as MQRO_COD, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

If MQGMO_ACCEPT_TRUNCATED_MSG is specified on the MQGET call for the original message, and the message retrieved is truncated, the amount of application message data placed in the report message depends on the environment:

- On z/OS, it is the minimum of:
  - The length of the original message
  - The length of the buffer used to retrieve the message
  - 100 bytes.
- In other environments, it is the minimum of:
  - The length of the original message
  - 100 bytes.

MQRO_COD_WITH_DATA is not valid if the destination queue is an XCF queue.

Do not specify more than one of MQRO_COD, MQRO_COD_WITH_DATA, and MQRO_COD_WITH_FULL_DATA.

MQRO_COD_WITH_FULL_DATA

This is the same as MQRO_COD, except that all the application message data from the original message is included in the report message.

MQRO_COD_WITH_FULL_DATA is not valid if the destination queue is an XCF queue.

Do not specify more than one of MQRO_COD, MQRO_COD_WITH_DATA, and MQRO_COD_WITH_FULL_DATA.

Action-notification options: Specify one or both of the options listed to request that the receiving application send a positive-action or negative-action report message.

MQRO_PAN

This type of report is generated by the application that retrieves the message and acts upon it. It indicates that the action requested in the message has been performed successfully. The application generating the report determines whether any data is to be included with the report.

Other than conveying this request to the application retrieving the message, the queue manager takes no action based on this option. The retrieving application must generate the report if appropriate.

MQRO_NAN

This type of report is generated by the application that retrieves the message and acts upon it. It indicates that the action requested in the message has not been performed successfully. The application generating the report determines whether any data is to be included with the report. For example, you might want to include some data indicating why the request could not be performed.

Other than conveying this request to the application retrieving the message, the queue manager takes no action based on this option. The retrieving application must generate the report if appropriate.

The application must determine which conditions correspond to a positive action and which correspond to a negative action. However, if the request has been only partially performed, generate a NAN report rather than a PAN report if requested. Every possible condition must correspond to either a positive action, or a negative action, but not both.

Message-identifier options: Specify one of the options listed to control how the *MsgId* of the report message (or of the reply message) is to be set.

MQRO_NEW_MSG_ID
This is the default action, and indicates that if a report or reply is generated as a result of this message, a new *MsgId* is generated for the report or reply message.

MQRO_PASS_MSG_ID
If a report or reply is generated as a result of this message, the *MsgId* of this message is copied to the *MsgId* of the report or reply message.

The *MsgId* of a publication message will be different for each subscriber that receives a copy of the publication and therefore the *MsgId* copied into the report or reply message will be different for each one.

If this option is not specified, MQRO_NEW_MSG_ID is assumed.

Correlation-identifier options: Specify one of the options listed to control how the *CorrelId* of the report message (or of the reply message) is to be set.

MQRO_COPY_MSG_ID_TO_CORREL_ID
This is the default action, and indicates that if a report or reply is generated as a result of this message, the *MsgId* of this message is copied to the *CorrelId* of the report or reply message.

The *MsgId* of a publication message will be different for each subscriber that receives a copy of the publication and therefore the *MsgId* copied into the *CorrelId* of the report or reply message will be different for each one.

MQRO_PASS_CORREL_ID
If a report or reply is generated as a result of this message, the *CorrelId* of this message is copied to the *CorrelId* of the report or reply message.

The *CorrelId* of a publication message will be specific to a subscriber unless it uses the MQSO_SET_CORREL_ID option and sets the SubCorrelId field in the MQSD to MQCI_NONE. Therefore it is possible that the *CorrelId* copied into the *CorrelId* of the report or reply message will be different for each one.

If this option is not specified, MQRO_COPY_MSG_ID_TO_CORREL_ID is assumed.

Servers replying to requests or generating report messages must check whether the MQRO_PASS_MSG_ID or MQRO_PASS_CORREL_ID options were set in the original message. If they were, the servers must take the action described for those options. If neither is set, the servers must take the corresponding default action.

Disposition options: Specify one of the options listed to control the disposition of the original message when it cannot be delivered to the destination queue. The application can set the disposition options independently of requesting exception reports.

MQRO_DEAD_LETTER_Q
This is the default action, and places the message on the dead-letter queue if the message cannot be delivered to the destination queue. This happens in the following situations:

- When the application that put the original message cannot be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call. An exception report message is generated, if one was requested by the sender.
- When the application that put the original message was putting to a topic

MQRO_DISCARD_MSG
This discards the message if it cannot be delivered to the destination queue. This happens in the following situations:

- When the application that put the original message cannot be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call. An exception report message is generated, if one was requested by the sender.
- When the application that put the original message was putting to a topic

If you want to return the original message to the sender, without the original message being placed on the dead-letter queue, the sender must specify MQRO_DISCARD_MSG with MQRO_EXCEPTION_WITH_FULL_DATA.

MQRO_PASS_DISCARD_AND_EXPIRY

If this option is set on a message, and a report or reply is generated because of it, the message descriptor of the report inherits:

- MQRO_DISCARD_MSG if it was set.
- The remaining expiry time of the message (if this is not an expiry report). If this is an expiry report the expiry time is set to 60 seconds.

Activity option

MQRO_ACTIVITY

Using this value allows the route of **any** message to be traced throughout a queue manager network. The report option can be specified on any current user message, instantly allowing you to begin calculating the route of the message through the network.

If the application generating the message cannot enable activity report generation, reporting can be enabled using an API crossing exit supplied by queue manager administrators.

Note:

1. The fewer the queue managers in the network that are able to generate activity reports, the less detailed the route.
2. The activity reports might be difficult to place in the correct order to determine the route taken.
3. The activity reports might not be able to find a route to their requested destination.
4. Messages with this report option set must be accepted by any queue manager, even if they do not understand the option. This allows the report option to be set on any user message, even if they are processed by a pre-IBM WebSphere MQ 6.0 queue manager.
5. If a process, either a queue manager or a user process, performs an activity on a message with this option set it can choose to generate and put an activity report.

Default option: Specify the following if no report options are required:

MQRO_NONE

Use this value to indicate that no other options have been specified. MQRO_NONE is defined to aid program documentation. It is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

General information:

1. All report types required must be specifically requested by the application sending the original message. For example, if a COA report is requested but an exception report is not, a COA report is generated when the message is placed on the destination queue, but no exception report is generated if the destination queue is full when the message arrives there. If no *Report* options are set, no report messages are generated by the queue manager or message channel agent (MCA).

   Some report options can be specified even though the local queue manager does not recognize them; this is useful when the option is to be processed by the *destination* queue manager. See “Report options and message flags” on page 890 for more details.

   If a report message is requested, the name of the queue to which to send the report must be specified in the *ReplyToQ* field. When a report message is received, the nature of the report can be determined by examining the *Feedback* field in the message descriptor.

2. If the queue manager or MCA that generates a report message cannot put the report message on the reply queue (for example, because the reply queue or transmission queue is full), the report message is placed instead on the dead-letter queue. If that *also* fails, or there is no dead-letter queue, the action taken depends on the type of the report message:

   - If the report message is an exception report, the message that generated the exception report is left on its transmission queue; this ensures that the message is not lost.

- For all other report types, the report message is discarded and processing continues normally. This is done because either the original message has already been delivered safely (for COA or COD report messages), or is no longer of any interest (for an expiration report message).

Once a report message has been placed successfully on a queue (either the destination queue or an intermediate transmission queue), the message is no longer subject to special processing; it is treated just like any other message.

3. When the report is generated, the `ReplyToQ` queue is opened and the report message put using the authority of the `UserIdentifier` in the MQMD of the message causing the report, except in the following cases:

   - Exception reports generated by a receiving MCA are put with whatever authority the MCA used when it tried to put the message causing the report.
   - COA reports generated by the queue manager are put with whatever authority was used when the message causing the report was put on the queue manager generating the report. For example, if the message was put by a receiving MCA using the MCA's user identifier, the queue manager puts the COA report using the MCA's user identifier.

   Applications generating reports must use the same authority as they use to generate a reply; this is usually the authority of the user identifier in the original message.

   If the report has to travel to a remote destination, senders and receivers can decide whether to accept it, in the same way as they do for other messages.

4. If a report message with data is requested:

   - The report message is always generated with the amount of data requested by the sender of the original message. If the report message is too big for the reply queue, the processing described above occurs; the report message is never truncated to fit on the reply queue.
   - If the `Format` of the original message is MQFMT_XMIT_Q_HEADER, the data included in the report does not include the MQXQH. The report data starts with the first byte of the data beyond the MQXQH in the original message. This occurs whether or not the queue is a transmission queue.

5. If a COA, COD, or expiration report message is received at the reply queue, it is guaranteed that the original message arrived, was delivered, or expired, as appropriate. However, if one or more of these report messages is requested and is not received, the reverse cannot be assumed, because one of the following might have occurred:

   a. The report message is held up because a link is down.
   b. The report message is held up because a blocking condition exists at an intermediate transmission queue or at the reply queue (for example, the queue is full or inhibited for puts).
   c. The report message is on a dead-letter queue.
   d. When the queue manager was attempting to generate the report message, it could neither put it on the appropriate queue, nor on the dead-letter queue, so the report message could not be generated.
   e. A failure of the queue manager occurred between the action being reported (arrival, delivery, or expiry), and generation of the corresponding report message. (This does not happen for COD report messages if the application retrieves the original message within a unit of work, as the COD report message is generated within the same unit of work.)

   Exception report messages can be held up in the same way for reasons 1, 2, and 3 above. However, when an MCA cannot generate an exception report message (the report message cannot be put either on the reply queue or the dead-letter queue), the original message remains on the transmission queue at the sender, and the channel is closed. This occurs irrespective of whether the report message was to be generated at the sending or the receiving end of the channel.

6. If the original message is temporarily blocked (resulting in an exception report message being generated and the original message being put on a dead-letter queue), but the blockage clears and an application then reads the original message from the dead-letter queue and puts it again to its destination, the following might occur:

- Even though an exception report message has been generated, the original message eventually arrives successfully at its destination.
- More than one exception report message is generated in respect of a single original message, because the original message might encounter another blockage later.

Report messages when putting to a topic:

1. Reports can be generated when putting a message to a topic. This message will be sent to all subscribers to the topic, which could be zero, one, or many. This should be taken into account when choosing to use report options as many report messages could be generated as a result.
2. When putting a message to a topic, there may be many destination queues that are to be given a copy of the message. If some of these destination queues have a problem, such as queue full, then the successful completion of the MQPUT depends on the setting of NPMSGDLV or PMSGDLV (depending on the persistence of the message). If the setting is such that message delivery to the destination queue must be successful (for example, it is a persistent message to a durable subscriber and PMSGDLV is set to ALL or ALLDUR), then success is defined as one of the following criteria being met:
   - Successful put to the subscriber queue
   - Use of MQRO_DEAD_LETTER_Q and a successful put to the Dead-letter queue if the subscriber queue cannot take the message
   - Use of MQRO_DISCARD_MSG if the subscriber queue cannot take the message.

Report messages for message segments:

1. Report messages can be requested for messages that have segmentation allowed (see the description of the MQMF_SEGMENTATION_ALLOWED flag). If the queue manager finds it necessary to segment the message, a report message can be generated for each of the segments that subsequently encounters the relevant condition. Applications must be prepared to receive multiple report messages for each type of report message requested. Use the *GroupId* field in the report message to correlate the multiple reports with the group identifier of the original message, and the *Feedback* field identify the type of each report message.
2. If MQGMO_LOGICAL_ORDER is used to retrieve report messages for segments, be aware that reports of *different types* might be returned by the successive MQGET calls. For example, if both COA and COD reports are requested for a message that is segmented by the queue manager, the MQGET calls for the report messages might return the COA and COD report messages interleaved in an unpredictable fashion. Avoid this by using the MQGMO_COMPLETE_MSG option (optionally with MQGMO_ACCEPT_TRUNCATED_MSG). MQGMO_COMPLETE_MSG causes the queue manager to reassemble report messages that have the same report type. For example, the first MQGET call might reassemble all the COA messages relating to the original message, and the second MQGET call might reassemble all the COD messages. Which is reassembled first depends on which type of report message occurs first on the queue.
3. Applications that themselves put segments can specify different report options for each segment. However, note the following points:
   - If the segments are retrieved using the MQGMO_COMPLETE_MSG option, only the report options in the *first* segment are honored by the queue manager.
   - If the segments are retrieved one by one, and most of them have one of the MQRO_COD_* options, but at least one segment does not, you cannot use the MQGMO_COMPLETE_MSG option to retrieve the report messages with a single MQGET call, or use the MQGMO_ALL_SEGMENTS_AVAILABLE option to detect when all the report messages have arrived.
4. In an MQ network, the queue managers can have different capabilities. If a report message for a segment is generated by a queue manager or MCA that does not support segmentation, the queue manager or MCA does not by default include the necessary segment information in the report message, and this might make it difficult to identify the original message that caused the report to be generated. Avoid this difficulty by requesting data with the report message, that is, by specifying the appropriate MQRO_*_WITH_DATA or MQRO_*_WITH_FULL_DATA options. However, be aware that if MQRO_*_WITH_DATA is specified, *less than* 100 bytes of application message data might be returned

to the application that retrieves the report message, if the report message is generated by a queue manager or MCA that does not support segmentation.

Contents of the message descriptor for a report message: When the queue manager or message channel agent (MCA) generates a report message, it sets the fields in the message descriptor to the following values, and then puts the message in the normal way.

Table 501. Values used for MQMD fields when a report message is system-generated

Field in MQMD	Value used
StrucId	MQMD_STRUC_ID
Version	MQMD_VERSION_2
Report	MQRO_NONE
MsgType	MQMT_REPORT
Expiry	MQEI_UNLIMITED
Feedback	As appropriate for the nature of the report (MQFB_COA, MQFB_COD, MQFB_EXPIRATION, or an MQRC_* value)
Encoding	Copied from the original message descriptor
CodedCharSetId	Copied from the original message descriptor
Format	Copied from the original message descriptor
Priority	Copied from the original message descriptor
Persistence	Copied from the original message descriptor
MsgId	As specified by the report options in the original message descriptor
CorrelId	As specified by the report options in the original message descriptor
BackoutCount	0
ReplyToQ	Blanks
ReplyToQMgr	Name of queue manager
UserIdentifier	As set by the MQPMO_PASS_IDENTITY_CONTEXT option
AccountingToken	As set by the MQPMO_PASS_IDENTITY_CONTEXT option
ApplIdentityData	As set by the MQPMO_PASS_IDENTITY_CONTEXT option
PutApplType	MQAT_QMGR, or as appropriate for the message channel agent
PutApplName	First 28 bytes of the queue manager name or message channel agent name. For report messages generated by the IMS bridge, this field contains the XCF group name and XCF member name of the IMS system to which the message relates.
PutDate	Date when report message is sent
PutTime	Time when report message is sent
ApplOriginData	Blanks
GroupId	Copied from the original message descriptor
MsgSeqNumber	Copied from the original message descriptor
Offset	Copied from the original message descriptor
MsgFlags	Copied from the original message descriptor
OriginalLength	Copied from the original message descriptor if not MQOL_UNDEFINED, and set to the length of the original message data otherwise

An application generating a report is recommended to set similar values, except for the following:

- The *ReplyToQMgr* field can be set to blanks (the queue manager changes this to the name of the local queue manager when the message is put).
- Set the context fields using the option that would have been used for a reply, normally MQPMO_PASS_IDENTITY_CONTEXT.

Analyzing the report field: The *Report* field contains subfields; because of this, applications that need to check whether the sender of the message requested a particular report must use one of the techniques described in "Analyzing the report field" on page 891.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQRO_NONE.

MsgType (MQLONG)

This indicates the type of the message. Message types are grouped as follows:

MQMT_SYSTEM_FIRST
Lowest value for system-defined message types.

MQMT_SYSTEM_LAST
Highest value for system-defined message types.

The following values are currently defined within the system range:

MQMT_DATAGRAM
The message is one that does not require a reply.

MQMT_REQUEST
The message is one that requires a reply.

Specify the name of the queue to which to send the reply in the *ReplyToQ* field. The *Report* field indicates how to set the *MsgId* and *CorrelId* of the reply.

MQMT_REPLY
The message is the reply to an earlier request message (MQMT_REQUEST). The message must be sent to the queue indicated by the *ReplyToQ* field of the request message. Use the *Report* field of the request to control how to set the *MsgId* and *CorrelId* of the reply.

Note: The queue manager does not enforce the request-reply relationship; this is an application responsibility.

MQMT_REPORT
The message is reporting on some expected or unexpected occurrence, usually related to some other message (for example, a request message was received that contained data that was not valid). Send the message to the queue indicated by the *ReplyToQ* field of the message descriptor of the original message. Set the *Feedback* field s to indicate the nature of the report. Use the *Report* field of the original message to control how to set the *MsgId* and *CorrelId* of the report message.

Report messages generated by the queue manager or message channel agent are always sent to the *ReplyToQ* queue, with the *Feedback* and *CorrelId* fields set as described above.

Application-defined values can also be used. They must be within the following range:

MQMT_APPL_FIRST
Lowest value for application-defined message types.

MQMT_APPL_LAST
Highest value for application-defined message types.

For the MQPUT and MQPUT1 calls, the *MsgType* value must be within either the system-defined range or the application-defined range; if it is not, the call fails with reason code MQRC_MSG_TYPE_ERROR.

This is an output field for the MQGET call, and an input field for MQPUT and MQPUT1 calls. The initial value of this field is MQMT_DATAGRAM.

Expiry (MQLONG)

This is a period of time expressed in tenths of a second, set by the application that puts the message. The message becomes eligible to be discarded if it has not been removed from the destination queue before this period of time elapses.

For example, to set one minute for the expiry time, you need to set **MQMD**.**Expiry** to 600.

The value is decremented to reflect the time that the message spends on the destination queue, and also on any intermediate transmission queues if the put is to a remote queue. It can also be decremented by message channel agents to reflect transmission times, if these are significant. Likewise, an application forwarding this message to another queue might decrement the value if necessary, if it has retained the message for a significant time. However, the expiration time is treated as approximate, and the value need not be decremented to reflect small time intervals.

When the message is retrieved by an application using the MQGET call, the *Expiry* field represents the expiry time that still remains.

After a message's expiry time has elapsed, it becomes eligible to be discarded by the queue manager. The message is discarded when a browse or nonbrowse MQGET call occurs that would have returned the message had it not already expired. For example, a nonbrowse MQGET call with the *MatchOptions* field in MQGMO set to MQMO_NONE reading from a FIFO ordered queue discards all the expired messages up to the first unexpired message. With a priority ordered queue, the same call will discard expired messages of higher priority and messages of an equal priority that arrived on the queue before the first unexpired message.

A message that has expired is never returned to an application (either by a browse or a non-browse MQGET call), so the value in the *Expiry* field of the message descriptor after a successful MQGET call is either greater than zero, or the special value MQEI_UNLIMITED.

If a message is put on a remote queue, the message might expire (and be discarded) while it is on an intermediate transmission queue, before the message reaches the destination queue.

A report is generated when an expired message is discarded, if the message specified one of the MQRO_EXPIRATION_* report options. If none of these options is specified, no such report is generated; the message is assumed to be no longer relevant after this time period (perhaps because a later message has superseded it).

For a message put within syncpoint, the expiry interval begins at the time the message is put, not the time the syncpoint is committed. It is possible that the expiry interval can pass before the syncpoint is committed. In this case the message will be discarded at some time after the commit operation and the message will not be returned to an application in response to an MQGET operation.

Any other program that discards messages based on expiry time must also send an appropriate report message if one was requested.

Notes:

1. If a message is put with an *Expiry* time of zero or a number greater than 999 999 999, the MQPUT or MQPUT1 call fails with reason code MQRC_EXPIRY_ERROR; no report message is generated in this case.

   To enable reason code 2013, MQRC_EXPIRY_ERROR, you must enable the environment variable AMQ_ENFORCE_MAX_EXPIRY_ERROR.

   The following uses an example for Linux:

   ```
   $ export AMQ_ENFORCE_MAX_EXPIRY_ERROR=True
   ```

   Note that the:

   - Important thing is to export the variable
   - Actual value is ignored, however, using `True` might be helpful when reviewing the setup.
2. Because a message with an expiry time that has elapsed might not be discarded until later, there might be messages on a queue that have passed their expiry time, and that are not therefore eligible

for retrieval. These messages nevertheless count toward the number of messages on the queue for all purposes, including depth triggering.

If a subscriber/consumer (client) tries to get a message, and that message has expired, the client does not receive anything as the message was discarded as it was too old. In addition, the client will not receive any error message.

3. An expiration report is generated, if requested, when the message is discarded, not when it becomes eligible for discarding.
4. Discarding an expired message, and generating an expiration report if requested, are never part of the application's unit of work, even if the message was scheduled for discarding as a result of an MQGET call operating within a unit of work.
5. If a nearly-expired message is retrieved by an MQGET call within a unit of work, and the unit of work is subsequently backed out, the message might become eligible to be discarded before it can be retrieved again.
6. If a nearly-expired message is locked by an MQGET call with MQGMO_LOCK, the message might become eligible to be discarded before it can be retrieved by an MQGET call with MQGMO_MSG_UNDER_CURSOR; reason code MQRC_NO_MSG_UNDER_CURSOR is returned on this subsequent MQGET call if that happens.
7. When a request message with an expiry time greater than zero is retrieved, the application can take one of the following actions when it sends the reply message:
   - Copy the remaining expiry time from the request message to the reply message.
   - Set the expiry time in the reply message to an explicit value greater than zero.
   - Set the expiry time in the reply message to MQEI_UNLIMITED.

   The action to take depends on the design of the application. However, the default action for putting messages to a dead-letter (undelivered-message) queue must be to preserve the remaining expiry time of the message, and to continue to decrement it.
8. Trigger messages are always generated with MQEI_UNLIMITED.
9. A message (normally on a transmission queue) that has a *Format* name of MQFMT_XMIT_Q_HEADER has a second message descriptor within the MQXQH. It therefore has two *Expiry* fields associated with it. The following additional points should be noted in this case:
   - When an application puts a message on a remote queue, the queue manager places the message initially on a local transmission queue, and prefixes the application message data with an MQXQH structure. The queue manager sets the values of the two *Expiry* fields to be the same as that specified by the application.

     If an application puts a message directly on a local transmission queue, the message data must already begin with an MQXQH structure, and the format name must be MQFMT_XMIT_Q_HEADER. In this case, the application need not set the values of these two *Expiry* fields to be the same. (The queue manager checks that the *Expiry* field within the MQXQH contains a valid value, and that the message data is long enough to include it). For an application that can write directly to the transmission queue, the application has to create a transmission queue header with the embedded message descriptor. However, if the expiry value in the message descriptor written to the transmission queue is inconsistent with the value in the embedded message descriptor, an expiry error rejection occurs.
   - When a message with a *Format* name of MQFMT_XMIT_Q_HEADER is retrieved from a queue (whether this is a normal or a transmission queue), the queue manager decrements *both* these *Expiry* fields with the time spent waiting on the queue. No error is raised if the message data is not long enough to include the *Expiry* field in the MQXQH.
   - The queue manager uses the *Expiry* field in the separate message descriptor (that is, not the one in the message descriptor embedded within the MQXQH structure) to test whether the message is eligible for discarding.
   - If the initial values of the two *Expiry* fields are different, the *Expiry* time in the separate message descriptor when the message is retrieved might be greater than zero (so the message

is not eligible for discarding), while the time according to the *Expiry* field in the MQXQH has elapsed. In this case the *Expiry* field in the MQXQH is set to zero.

10. The expiry time on a reply message returned from the IMS bridge is unlimited unless MQIIH_PASS_EXPIRATION is set in the Flags field of the MQIIH. See Flags for more information.

The following special value is recognized:

MQEI_UNLIMITED
The message has an unlimited expiration time.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQEI_UNLIMITED.

Expired messages on z/OS
On IBM MQ for z/OS, messages that have expired are discarded by the next appropriate MQGET call.

However, if no such call occurs, the expired message is not discarded, and, for some queues, a large number of expired messages can accumulate. To remedy this, set the queue manager to scan queues periodically and discard expired messages on one or more queues in one of the following ways:

Periodic scan
You can specify a period using the EXPRYINT (expiry interval) queue manager attribute. Each time the expiry interval is reached, the queue manager looks for candidate queues that are worth scanning to discard expired messages.

The queue manager maintains information about the expired messages on each queue, and knows whether a scan for expired messages is worthwhile. So, only a selection of queues is scanned at any time.

Shared queues are scanned by only one queue manager in a queue sharing group. Generally, it is the first queue manager to restart, or the first to have EXPRYINT set. If this queue manager terminates, another queue manager in the queue sharing group takes over the queue scanning. Set the expiry interval value for all queue managers within a queue sharing group to the same value.

Note that expiry processing takes place for every queue when a queue manager restarts, regardless of the EXPRYINT setting.

Explicit request
Issue the REFRESH QMGR TYPE(EXPIRY) command, specifying the queue or queues that you want scanned.

Enforcing lower expiration times
Administrators can limit the expiry time of any message put to a queue or topic by using the **CAPEXPRY** attribute specified in the **CUSTOM** attribute on the queue or topic.

An expiry time specified in the **Expiry** field of the MQMD, by an application,which is greater than the **CAPEXPRY** value specified in the **CUSTOM** attribute on the queue or topic will be replaced by that **CAPEXPRY** value. An expiry time specified by an application, which is lower than the **CAPEXPRY** value will be used.

Note that the value of **CAPEXPRY** is expressed in tenths of seconds, so one minute has a value of 600.

If more than one object is used on the resolution path, for example, when a message is put to an alias or remote queue, then the lowest of all the **CAPEXPRY** values is used as the upper limit for message expiry.

Changes to the **CAPEXPRY** values take effect immediately. The expiry value is evaluated for each put to a queue or topic and so is sensitive to the object resolution, which may differ between each put operation.

However, note that existing messages in the queue, prior to a change in **CAPEXPRY**, are not affected by the change (that is, their expiry time remains intact). Only new messages that are put into the queue after the change in **CAPEXPRY** have the new expiry time.

For example, in a cluster where a put is performed to a queue opened with MQOO_BIND_NOT_FIXED, messages can be assigned different expiry values on each put, depending on the **CAPEXPRY** value set

for the transmission queue, used by the channel, that sends the message to the selected target queue manager.

Note that a put to a queue or topic by a JMS application specifying a delivery delay fails with MQRC_EXPIRY_ERROR, if the delivery delay is beyond the resolved expiry time for the target queue or topic. A **CAPEXPRY** attribute set on a queue resolved for a JMS destination can cause this error.

Note: CAPEXPRY must not be used on any queues that will hold IBM MQ internally-generated messages such as any SYSTEM.CLUSTER.* queue and the SYSTEM.PROTECTION.POLICY.QUEUE.

Related reference

DEFINE queues

DEFINE topic

Feedback (MQLONG)

The Feedback field is used with a message of type MQMT_REPORT to indicate the nature of the report, and is only meaningful with that type of message.

The field can contain one of the MQFB_* values, or one of the MQRC_* values. Feedback codes are grouped as follows:

MQFB_NONE
: No feedback provided.

MQFB_SYSTEM_FIRST
: Lowest value for system-generated feedback.

MQFB_SYSTEM_LAST
: Highest value for system-generated feedback.

  The range of system-generated feedback codes MQFB_SYSTEM_FIRST through MQFB_SYSTEM_LAST includes the general feedback codes listed in this topic (MQFB_*), and also the reason codes (MQRC_*) that can occur when the message cannot be put on the destination queue.

MQFB_APPL_FIRST
: Lowest value for application-generated feedback.

MQFB_APPL_LAST
: Highest value for application-generated feedback.

Applications that generate report messages must not use feedback codes in the system range (other than MQFB_QUIT), unless they want to simulate report messages generated by the queue manager or message channel agent.

On the MQPUT or MQPUT1 calls, the value specified must either be MQFB_NONE, or be within the system range or application range. This is checked whatever the value of *MsgType*.

General feedback codes:

MQFB_COA
: Confirmation of arrival on the destination queue (see MQRO_COA).

MQFB_COD
: Confirmation of delivery to the receiving application (see MQRO_COD).

MQFB_EXPIRATION
: Message was discarded because it had not been removed from the destination queue before its expiry time had elapsed.

MQFB_PAN
: Positive action notification (see MQRO_PAN).

MQFB_NAN
: Negative action notification (see MQRO_NAN).

MQFB_QUIT
: End application.

This can be used by a workload scheduling program to control the number of instances of an application program that are running. Sending an MQMT_REPORT message with this feedback code to an instance of the application program indicates to that instance that it should stop processing. However, adherence to this convention is a matter for the application; it is not enforced by the queue manager.

Channel feedback codes:

MQFB_CHANNEL_COMPLETED
A channel ended normally.

MQFB_CHANNEL_FAIL
A channel ended abnormally and goes into STOPPED state.

MQFB_CHANNEL_FAIL_RETRY
A channel ended abnormally and goes into RETRY state.

IMS-bridge feedback codes

These codes are used when an unexpected IMS-OTMA sense code is received. The sense code or, when the sense code is 0x1A the reason code associated with that sense code, is indicated in the *Feedback*.

1. For *Feedback* codes in range MQFB_IMS_FIRST (300) through MQFB_IMS_LAST (399), a sense code other than 0x1A was received. The *sense code* is given by the expression (*Feedback* - MQFB_IMS_FIRST+1)
2. For *Feedback* codes in range MQFB_IMS_NACK_1A_REASON_FIRST (600) through MQFB_IMS_NACK_1A_REASON_LAST (855), a sense code of 0x1A was received. The *reason code* associated with the sense code is given by the expression (*Feedback* - MQFB_IMS_NACK_1A_REASON_FIRST)

The meaning of the IMS-OTMA sense codes and corresponding reason codes are described in *Open Transaction Manager Access Guide and Reference*.

The following feedback codes can be generated by the IMS bridge:

MQFB_DATA_LENGTH_ZERO
A segment length was zero in the application data of the message.

MQFB_DATA_LENGTH_NEGATIVE
A segment length was negative in the application data of the message.

MQFB_DATA_LENGTH_TOO_BIG
A segment length was too large in the application data of the message.

MQFB_BUFFER_OVERFLOW
The value of one of the length fields would cause the data to overflow the message buffer.

MQFB_LENGTH_OFF_BY_ONE
The value of one of the length fields was 1 byte too short.

MQFB_IIH_ERROR
The *Format* field in MQMD specifies MQFMT_IMS, but the message does not begin with a valid MQIIH structure.

MQFB_NOT_AUTHORIZED_FOR_IMS
The user ID contained in the message descriptor MQMD, or the password contained in the *Authenticator* field in the MQIIH structure, failed the validation performed by the IMS bridge. As a result the message was not passed to IMS.

MQFB_IMS_ERROR
An unexpected error was returned by IMS. Consult the IBM MQ error log on the system on which the IMS bridge resides for more information about the error.

MQFB_IMS_FIRST
When the IMS-OTMA sense code is not 0x1A, IMS-generated feedback codes are in the range MQFB_IMS_FIRST (300) through MQFB_IMS_LAST (399). The IMS-OTMA sense code itself is *Feedback* minus MQFB_IMS_ERROR.

MQFB_IMS_LAST
Highest value for IMS-generated feedback when the sense code is not 0x1A.

MQFB_IMS_NACK_1A_REASON_FIRST
When the sense code is 0x1A, IMS-generated feedback codes are in the range MQFB_IMS_NACK_1A_REASON_FIRST (600) through MQFB_IMS_NACK_1A_REASON_LAST (855).

MQFB_IMS_NACK_1A_REASON_LAST
Highest value for IMS-generated feedback when the sense code is 0x1A

CICS-bridge feedback codes: The following feedback codes can be generated by the CICS bridge:

MQFB_CICS_APPL_ABENDED
The application program specified in the message abnormally ended. This feedback code occurs only in the *Reason* field of the MQDLH structure.

MQFB_CICS_APPL_NOT_STARTED
The EXEC CICS LINK for the application program specified in the message failed. This feedback code occurs only in the *Reason* field of the MQDLH structure.

MQFB_CICS_BRIDGE_FAILURE
CICS bridge terminated abnormally without completing normal error processing.

MQFB_CICS_CCSID_ERROR
Character set identifier not valid.

MQFB_CICS_CIH_ERROR
CICS information header structure missing or not valid.

MQFB_CICS_COMMAREA_ERROR
Length of CICS COMMAREA not valid.

MQFB_CICS_CORREL_ID_ERROR
Correlation identifier not valid.

MQFB_CICS_DLQ_ERROR
The CICS bridge task was unable to copy a reply to this request to the dead-letter queue. The request was backed out.

MQFB_CICS_ENCODING_ERROR
Encoding not valid.

MQFB_CICS_INTERNAL_ERROR
CICS bridge encountered an unexpected error.

This feedback code occurs only in the *Reason* field of the MQDLH structure.

MQFB_CICS_NOT_AUTHORIZED
User identifier not authorized or password not valid.

This feedback code occurs only in the *Reason* field of the MQDLH structure.

MQFB_CICS_UOW_BACKED_OUT
The unit of work was backed out, for one of the following reasons:

- A failure was detected while processing another request within the same unit of work.
- A CICS abend occurred while the unit of work was in progress.

MQFB_CICS_UOW_ERROR
Unit-of-work control field *UOWControl* not valid.

Trace-route message feedback codes:

MQFB_ACTIVITY
Used with the MQFMT_EMBEDDED_PCF format to allow the option of user data following activity reports.

MQFB_MAX_ACTIVITIES
Returned when the trace-route message is discarded because the number of activities the message has been involved in exceeds the maximum activities limit.

MQFB_NOT_FORWARDED
Returned when the trace-route message is discarded because it is about to be sent to a remote queue manager that does not support trace-route messages.

MQFB_NOT_DELIVERED
Returned when the trace-route message is discarded because it is about to be put on a local queue.

MQFB_UNSUPPORTED_FORWARDING
Returned when the trace-route message is discarded because a value in the forwarding parameter is unrecognized, and is in the rejected bit mask.

MQFB_UNSUPPORTED_DELIVERY
Returned when the trace-route message is discarded because a value in the delivery parameter is unrecognized, and is in the rejected bit mask.

IBM MQ reason codes: For exception report messages, *Feedback* contains an IBM MQ reason code. Among possible reason codes are:

MQRC_PUT_INHIBITED
(2051, X'803') Put calls inhibited for the queue.

MQRC_Q_FULL
(2053, X'805') Queue already contains maximum number of messages.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_Q_SPACE_NOT_AVAILABLE
(2056, X'808') No space available on disk for queue.

MQRC_PERSISTENT_NOT_ALLOWED
(2048, X'800') Queue does not support persistent messages.

MQRC_MSG_TOO_BIG_FOR_Q_MGR
(2031, X'7EF') Message length greater than maximum for queue manager.

MQRC_MSG_TOO_BIG_FOR_Q
(2030, X'7EE') Message length greater than maximum for queue.

For a full list of reason codes, see:

- For IBM MQ for z/OS, see API completion and reason codes.
- For all other platforms, see API completion and reason codes.

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This is an output field for the MQGET call, and an input field for MQPUT and MQPUT1 calls. The initial value of this field is MQFB_NONE.

Encoding (MQLONG)

This specifies the numeric encoding of numeric data in the message; it does not apply to numeric data in the MQMD structure itself. The numeric encoding defines the representation used for binary integers, packed-decimal integers, and floating-point numbers.

On z/OS, the binary integer portion of the `Encoding` field is also used to specify the integer encoding of character data in the message body when the corresponding character set identifier indicates that the representation of the character set is dependent on the encoding used for binary integers. This only affects certain multibyte character sets (for example UTF-16 character sets).

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that the field is valid. The following special value is defined:

MQENC_NATIVE
The encoding is the default for the programming language and machine on which the application is running.

Note: The value of this constant depends on the programming language and environment. For this reason, applications must be compiled using the header, macro, COPY, or INCLUDE files appropriate to the environment in which the application will run.

Applications that put messages usually specify MQENC_NATIVE. Applications that retrieve messages must compare this field against the value MQENC_NATIVE; if the values differ, the application might need to convert numeric data in the message. Use the MQGMO_CONVERT option to request the queue manager to convert the message as part of the processing of the MQGET call. See "Machine encodings" on page 887 for details of how the `Encoding` field is constructed.

If you specify the MQGMO_CONVERT option on the MQGET call, this field is an input/output field. The value specified by the application is the encoding to which to convert the message data if necessary. If conversion is successful or unnecessary, the value is unchanged. If conversion is unsuccessful, the value after the MQGET call represents the encoding of the unconverted message that is returned to the application.

In other cases, this is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQENC_NATIVE.

CodedCharSetId (MQLONG)

This field specifies the character set identifier of character data within the message body.

Note: Character data in MQMD and the other MQ data structures that are parameters on calls must be in the character set of the queue manager. This is defined by the queue manager's **`CodedCharSetId`** attribute; see "Attributes for the queue manager" on page 786 for details of this attribute.

If this field is set to MQCCSI_Q_MGR when calling MQGET with MQGMO_CONVERT in the options, the behavior is different between client and server applications. For server applications, the code page used for character conversion is the `CodedCharSetId` of the queue manager; for client applications, the code page used for character conversion is the current locale code page.

For client applications, MQCCSI_Q_MGR is filled in, based on the locale of the client rather than the one on the queue manager. The exception to that rule is when you put a message to an IMS bridge queue; what is returned, in the *`CodedCharSetId`* field of MQMD, is the CCSID of the queue manager.

You must not use the following special value:

MQCCSI_APPL
This results in an incorrect value in the `CodedCharSetId` field of the MQMD and causes a return code of MQRC_SOURCE_CCSID_ERROR (or MQRC_FORMAT_ERROR for z/OS) when the message is received using the MQGET call with the MQGMO_CONVERT option.

You can use the following special values:

MQCCSI_Q_MGR
Character data in the message is in the queue manager's character set.

On the MQPUT and MQPUT1 calls, the queue manager changes this value in the MQMD that is sent with the message to the true character set identifier of the queue manager. As a result, the value MQCCSI_Q_MGR is never returned by the MQGET call.

MQCCSI_DEFAULT
The `CodedCharSetId` of the data in the *`String`* field is defined by the `CodedCharSetId` field in the header structure that precedes the MQCFH structure, or by the `CodedCharSetId` field in the MQMD if the MQCFH is at the start of the message.

MQCCSI_INHERIT
Character data in the message is in the same character set as this structure; this is the queue manager's character set. (For MQMD only, MQCCSI_INHERIT has the same meaning as MQCCSI_Q_MGR).

The queue manager changes this value in the MQMD that is sent with the message to the actual character set identifier of MQMD. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

Do not use MQCCSI_INHERIT if the value of the `PutApplType` field in MQMD is MQAT_BROKER.

MQCCSI_EMBEDDED
Character data in the message is in a character set with the identifier that is contained within the message data itself. There can be any number of character set identifiers embedded within the message data, applying to different parts of the data. This value must be used for PCF messages (with a format of MQFMT_ADMIN, MQFMT_EVENT, or MQFMT_PCF) that contain data in a mixture of character sets. Each MQCFST, MQCFSL, and MQCFSF structure contained within the PCF message must have an explicit character set identifier specified and not MQCCSI_DEFAULT.

If a message of format MQFMT_EMBEDDED_PCF is to contain data in a mixture of character sets, do not use MQCCSI_EMBEDDED. Instead set MQEPH_CCSID_EMBEDDED in the Flags field in the MQEPH structure. This is equivalent to setting MQCCSI_EMBEDDED in the preceding structure. Each MQCFST, MQCFSL, and MQCFSF structure contained within the PCF message must then have an explicit character set identifier specified and not MQCCSI_DEFAULT. For more information on the MQEPH structure, see "MQEPH - Embedded PCF header" on page 355.

Specify this value only on the MQPUT and MQPUT1 calls. If it is specified on the MQGET call, it prevents conversion of the message.

On the MQPUT and MQPUT1 calls, the queue manager changes the values MQCCSI_Q_MGR and MQCCSI_INHERIT in the MQMD that is sent with the message as described above, but does not change the MQMD specified on the MQPUT or MQPUT1 call. No other check is carried out on the value specified.

Applications that retrieve messages must compare this field against the value the application is expecting; if the values differ, the application might need to convert character data in the message.

On z/OS, the `Encoding` field of the MQMD is used to specify the integer encoding of character data in the message body, when the `CodedCharSetId` field of the MQMD indicates that the representation of the character set is dependent on the encoding used for binary integers. On Multiplatforms, the byte order of character data is assumed to be the same as the native integer encoding for the platform where the queue manager is running. This only affects certain multibyte character sets (for example UTF-16 character sets).

If you specify the MQGMO_CONVERT option on the MQGET call, this field is an input/output field. The value specified by the application is the coded character set identifier to which to convert the message data if necessary. If conversion is successful or unnecessary, the value is unchanged (except that the value MQCCSI_Q_MGR or MQCCSI_INHERIT is converted to the actual value). If conversion is unsuccessful, the value after the MQGET call represents the coded character set identifier of the unconverted message that is returned to the application.

Otherwise, this is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQCCSI_Q_MGR.

Format (MQCHAR8)

This is a name that the sender of the message uses to indicate to the receiver the nature of the data in the message. Any characters that are in the character set of the queue manager can be specified for the name, but you must restrict the name to the following:

- Uppercase A through Z
- Numeric digits 0 through 9

If other characters are used, it might not be possible to translate the name between the character sets of the sending and receiving queue managers.

Pad the name with blanks to the length of the field, or use a null character to terminate the name before the end of the field; the null and any subsequent characters are treated as blanks. Do not specify a name with leading or embedded blanks. For the MQGET call, the queue manager returns the name padded with blanks to the length of the field.

The queue manager does not check that the name complies with the recommendations described above.

Names beginning MQ in upper, lower, and mixed case have meanings that are defined by the queue manager; do not use names beginning with these letters for your own formats. The queue manager built-in formats are:

MQFMT_NONE
The nature of the data is undefined: the data cannot be converted when the message is retrieved from a queue using the MQGMO_CONVERT option.

If you specify MQGMO_CONVERT on the MQGET call, and the character set or encoding of data in the message differs from that specified in the **MsgDesc** parameter, the message is returned with the following completion and reason codes (assuming no other errors):

- Completion code MQCC_WARNING and reason code MQRC_FORMAT_ERROR if the MQFMT_NONE data is at the beginning of the message.
- Completion code MQCC_OK and reason code MQRC_NONE if the MQFMT_NONE data is at the end of the message (that is, preceded by one or more MQ header structures). The MQ header structures are converted to the requested character set and encoding in this case.

For the C programming language, the constant MQFMT_NONE_ARRAY is also defined; this has the same value as MQFMT_NONE, but is an array of characters instead of a string.

MQFMT_ADMIN
The message is a command-server request or reply message in programmable command format (PCF). Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call. See Using Programmable Command Formats for more information about using programmable command format messages.

For the C programming language, the constant MQFMT_ADMIN_ARRAY is also defined; this has the same value as MQFMT_ADMIN, but is an array of characters instead of a string.

MQFMT_CICS
The message data begins with the CICS information header MQCIH, followed by the application data. The format name of the application data is given by the `Format` field in the MQCIH structure.

z/OS On z/OS, specify the MQGMO_CONVERT option on the MQGET call to convert messages that have format MQFMT_CICS.

For the C programming language, the constant MQFMT_CICS_ARRAY is also defined; this has the same value as MQFMT_CICS, but is an array of characters instead of a string.

MQFMT_COMMAND_1
The message is an MQSC command-server reply message containing the object count, completion code, and reason code. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_COMMAND_1_ARRAY is also defined; this has the same value as MQFMT_COMMAND_1, but is an array of characters instead of a string.

MQFMT_COMMAND_2
The message is an MQSC command-server reply message containing information about the objects requested. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_COMMAND_2_ARRAY is also defined; this has the same value as MQFMT_COMMAND_2, but is an array of characters instead of a string.

MQFMT_DEAD_LETTER_HEADER
The message data begins with the dead-letter header MQDLH. The data from the original message immediately follows the MQDLH structure. The format name of the original message data is given by the `Format` field in the MQDLH structure; see "MQDLH - Dead letter header" on page 343 for details of this structure. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

COA and COD reports are not generated for messages that have a `Format` of MQFMT_DEAD_LETTER_HEADER.

For the C programming language, the constant MQFMT_DEAD_LETTER_HEADER_ARRAY is also defined; this has the same value as MQFMT_DEAD_LETTER_HEADER, but is an array of characters instead of a string.

MQFMT_DIST_HEADER

The message data begins with the distribution-list header MQDH; this includes the arrays of MQOR and MQPMR records. The distribution-list header can be followed by additional data. The format of the additional data (if any) is given by the *Format* field in the MQDH structure; see "MQDH - Distribution header" on page 337 for details of this structure. Messages with format MQFMT_DIST_HEADER can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

This format is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

For the C programming language, the constant MQFMT_DIST_HEADER_ARRAY is also defined; this has the same value as MQFMT_DIST_HEADER, but is an array of characters instead of a string.

MQFMT_EMBEDDED_PCF

Format for a trace-route message, provided that the PCF command value is set to MQCMD_TRACE_ROUTE. Using this format allows user data to be sent along with the trace-route message, provided that their applications can cope with preceding PCF parameters.

The PCF header must be the first header, or the message will not be treated as a trace-route message. This means that the message cannot be in a group, and that trace-route messages cannot be segmented. If a trace-route message is sent in a group the message is rejected with reason code MQRC_MSG_NOT_ALLOWED_IN_GROUP.

Note that MQFMT_ADMIN can also be used for the format of a trace-route message, but in this case no user data can be sent along with the trace-route message.

MQFMT_EVENT

The message is an MQ event message that reports an event that occurred. Event messages have the same structure as programmable commands; see PCF command messages for more information about this structure, and Event monitoring for information about events.

Version-1 event messages can be converted in all environments if the MQGMO_CONVERT option is specified on the MQGET call. Version-2 event messages can be converted only on z/OS.

For the C programming language, the constant MQFMT_EVENT_ARRAY is also defined; this has the same value as MQFMT_EVENT, but is an array of characters instead of a string.

MQFMT_IMS

The message data begins with the IMS information header MQIIH, which is followed by the application data. The format name of the application data is given by the `Format` field in the MQIIH structure.

For details of how MQIIH structure is handled when using MQGET with MQGMO_CONVERT, see "Format (MQCHAR8)" on page 402 and "ReplyToFormat (MQCHAR8)" on page 403.

For the C programming language, the constant MQFMT_IMS_ARRAY is also defined; this has the same value as MQFMT_IMS, but is an array of characters instead of a string.

MQFMT_IMS_VAR_STRING

The message is an IMS variable string, which is a string of the form `llzzccc`, where:

ll

is a 2-byte length field specifying the total length of the IMS variable string item. This length is equal to the length of `ll` (2 bytes), plus the length of *zz* (2 bytes), plus the length of the character string itself. `ll` is a 2-byte binary integer in the encoding specified by the `Encoding` field.

zz

is a 2-byte field containing flags that are significant to IMS. *zz* is a byte string consisting of two MQBYTE fields, and is transmitted without change from sender to receiver (that is, *zz* is not subject to any conversion).

ccc

is a variable-length character string containing `ll-4` characters. *ccc* is in the character set specified by the `CodedCharSetId` field.

On z/OS, the message data can consist of a sequence of IMS variable strings butted together, with each string being of the form `llzzccc`. There must be no bytes skipped between successive IMS variable strings. This means that if the first string has an odd length, the second string will be misaligned, that is, it will not begin on a boundary that is a multiple of two. Take care when constructing such strings on machines that require alignment of elementary data types.

Use the MQGMO_CONVERT option on the MQGET call to convert messages that have format MQFMT_IMS_VAR_STRING.

For the C programming language, the constant MQFMT_IMS_VAR_STRING_ARRAY is also defined; this has the same value as MQFMT_IMS_VAR_STRING, but is an array of characters instead of a string.

MQFMT_MD_EXTENSION

The message data begins with the message-descriptor extension MQMDE, and is optionally followed by other data (usually the application message data). The format name, character set, and encoding of the data that follow the MQMDE are given by the `Format`, `CodedCharSetId`, and `Encoding` fields in the MQMDE. See "MQMDE - Message descriptor extension" on page 463 for details of this structure. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_MD_EXTENSION_ARRAY is also defined; this has the same value as MQFMT_MD_EXTENSION, but is an array of characters instead of a string.

MQFMT_PCF

The message is a user-defined message that conforms to the structure of a programmable command format (PCF) message. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call. See Using Programmable Command Formats for more information about using programmable command format messages.

For the C programming language, the constant MQFMT_PCF_ARRAY is also defined; this has the same value as MQFMT_PCF, but is an array of characters instead of a string.

MQFMT_REF_MSG_HEADER

The message data begins with the reference message header MQRMH, and is optionally followed by other data. The format name, character set, and encoding of the data is given by the `Format`, `CodedCharSetId`, and `Encoding` fields in the MQRMH. See "MQRMH - Reference message header" on page 539 for details of this structure. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

This format is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris

- Windows Windows

and for IBM MQ MQI clients connected to these systems.

For the C programming language, the constant MQFMT_REF_MSG_HEADER_ARRAY is also defined; this has the same value as MQFMT_REF_MSG_HEADER, but is an array of characters instead of a string.

MQFMT_RF_HEADER
The message data begins with the rules and formatting header MQRFH, and is optionally followed by other data. The format name, character set, and encoding of the data (if any) are given by the `Format`, `CodedCharSetId`, and `Encoding` fields in the MQRFH. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_RF_HEADER_ARRAY is also defined; this has the same value as MQFMT_RF_HEADER, but is an array of characters instead of a string.

MQFMT_RF_HEADER_2
The message data begins with the version-2 rules and formatting header MQRFH2, and is optionally followed by other data. The format name, character set, and encoding of the optional data (if any) are given by the `Format`, `CodedCharSetId`, and `Encoding` fields in the MQRFH2. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_RF_HEADER_2_ARRAY is also defined; this has the same value as MQFMT_RF_HEADER_2, but is an array of characters instead of a string.

MQFMT_STRING
The application message data can be either an SBCS string (single-byte character set), or a DBCS string (double-byte character set). Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_STRING_ARRAY is also defined; this has the same value as MQFMT_STRING, but is an array of characters instead of a string.

MQFMT_TRIGGER
The message is a trigger message, described by the MQTM structure; see "MQTM - Trigger message" on page 589 for details of this structure. Messages of this format can be converted if the MQGMO_CONVERT option is specified on the MQGET call.

For the C programming language, the constant MQFMT_TRIGGER_ARRAY is also defined; this has the same value as MQFMT_TRIGGER, but is an array of characters instead of a string.

MQFMT_WORK_INFO_HEADER
The message data begins with the work information header MQWIH, which is followed by the application data. The format name of the application data is given by the `Format` field in the MQWIH structure.

z/OS On z/OS, specify the MQGMO_CONVERT option on the MQGET call to convert the user data in messages that have format MQFMT_WORK_INFO_HEADER. However, the MQWIH structure itself is always returned in the queue manager's character set and encoding (that is, the MQWIH structure is converted whether or not the MQGMO_CONVERT option is specified).

For the C programming language, the constant MQFMT_WORK_INFO_HEADER_ARRAY is also defined; this has the same value as MQFMT_WORK_INFO_HEADER, but is an array of characters instead of a string.

MQFMT_XMIT_Q_HEADER
The message data begins with the transmission queue header MQXQH. The data from the original message immediately follows the MQXQH structure. The format name of the original message data is given by the `Format` field in the MQMD structure, which is part of the transmission queue header MQXQH. See "MQXQH - Transmission-queue header" on page 608 for details of this structure.

COA and COD reports are not generated for messages that have a `Format` of MQFMT_XMIT_Q_HEADER.

For the C programming language, the constant MQFMT_XMIT_Q_HEADER_ARRAY is also defined; this has the same value as MQFMT_XMIT_Q_HEADER, but is an array of characters instead of a string.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

Priority (MQLONG)

For the MQPUT and MQPUT1 calls, the value must be greater than or equal to zero; zero is the lowest priority. The following special value can also be used:

MQPRI_PRIORITY_AS_Q_DEF

- If the queue is a cluster queue, the priority for the message is taken from the **DefPriority** attribute defined at the *destination* queue manager that owns the particular instance of the queue on which the message is placed.

  When there are multiple instances of the cluster queue, and they differ in this attribute, the value from one of them is picked and it cannot be predicted which one will be used. You should therefore set this attribute to the same value on all instances. If this is not the case, error message AMQ9407 is issued to the queue manager logs. See also How are destination object attributes resolved for aliases, remote and cluster queues?

  The value of *DefPriority* is copied into the *Priority* field when the message is placed on the destination queue. If *DefPriority* is changed subsequently, messages that have already been placed on the queue are not affected.

- If the queue is not a cluster queue, the priority for the message is taken from the **DefPriority** attribute defined at the *local* queue manager, even if the destination queue manager is remote.

  If there is more than one definition in the queue-name resolution path, the default priority is taken from the value of this attribute in the *first* definition in the path. This can be:

  - An alias queue
  - A local queue
  - A local definition of a remote queue
  - A queue manager alias
  - A transmission queue (for example, the *DefXmitQName* queue)

  The value of *DefPriority* is copied into the *Priority* field when the message is put. If *DefPriority* is changed subsequently, messages that have already been put are not affected.

The value returned by the MQGET call is always greater than or equal to zero; the value MQPRI_PRIORITY_AS_Q_DEF is never returned.

If a message is put with a priority greater than the maximum supported by the local queue manager (this maximum is given by the **MaxPriority** queue manager attribute), the message is accepted by the queue manager, but placed on the queue at the queue manager's maximum priority; the MQPUT or MQPUT1 call completes with MQCC_WARNING and reason code MQRC_PRIORITY_EXCEEDS_MAXIMUM. However, the *Priority* field retains the value specified by the application that put the message.

On z/OS, if a message with a MsgSeqNumber of 1 is put to a queue that has a message delivery sequence of MQMDS_PRIORITY and an index type of MQIT_GROUP_ID, the queue might treat the message with a different priority. If the message was placed on the queue with a priority of 0 or 1, it is processed as though it has a priority of 2. This is because the order of messages placed on this type of queue is optimized to enable efficient group completeness tests. For more information on the message delivery sequence MQMDS_PRIORITY and the index type MQIT_GROUP_ID, see MsgDeliverySequence attribute.

When replying to a message, applications must use the priority of the request message for the reply message. In other situations, specifying MQPRI_PRIORITY_AS_Q_DEF allows priority tuning to be carried out without changing the application.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQPRI_PRIORITY_AS_Q_DEF.

Persistence (MQLONG)

This indicates whether the message survives system failures and restarts of the queue manager. For the MQPUT and MQPUT1 calls, the value must be one of the following:

MQPER_PERSISTENT

The message survives system failures and restarts of the queue manager. Once the message has been put, and the unit of work in which it was put has been committed (if the message is put as part of a unit of work), the message is preserved on auxiliary storage. It remains there until the message is removed from the queue, and the unit of work in which it was got has been committed (if the message is retrieved as part of a unit of work).

When a persistent message is sent to a remote queue, a store-and-forward mechanism holds the message at each queue manager along the route to the destination, until the message is known to have arrived at the next queue manager.

Persistent messages cannot be placed on:

- Temporary dynamic queues
- Shared queues that map to a CFSTRUCT object at CFLEVEL(2) or below, or where the CFSTRUCT object is defined as RECOVER(NO).

Persistent messages can be placed on permanent dynamic queues, and predefined queues.

MQPER_NOT_PERSISTENT

The message does not usually survive system failures or queue manager restarts. This applies even if an intact copy of the message is found on auxiliary storage when the queue manager restarts.

In the case of NPMCLASS (HIGH) queues nonpersistent messages survive a normal queue manager shutdown and restart.

In the case of shared queues, nonpersistent messages survive queue manager restarts in the queue sharing group, but do not survive failures of the coupling facility used to store messages on the shared queues.

MQPER_PERSISTENCE_AS_Q_DEF

- If the queue is a cluster queue, the persistence of the message is taken from the **DefPersistence** attribute defined at the *destination* queue manager that owns the particular instance of the queue on which the message is placed.

  When there are multiple instances of the cluster queue, and they differ in this attribute, the value from one of them is picked and it cannot be predicted which one will be used. You should therefore set this attribute to the same value on all instances. If this is not the case, error message AMQ9407 is issued to the queue manager logs. See also How are destination object attributes resolved for aliases, remote and cluster queues?

  The value of *DefPersistence* is copied into the *Persistence* field when the message is placed on the destination queue. If *DefPersistence* is changed subsequently, messages that have already been placed on the queue are not affected.

- If the queue is not a cluster queue, the persistence of the message is taken from the **DefPersistence** attribute defined at the *local* queue manager, even if the destination queue manager is remote.

  If there is more than one definition in the queue-name resolution path, the default persistence is taken from the value of this attribute in the *first* definition in the path. This can be:

  - An alias queue
  - A local queue
  - A local definition of a remote queue
  - A queue manager alias
  - A transmission queue (for example, the *DefXmitQName* queue)

The value of *DefPersistence* is copied into the *Persistence* field when the message is put. If *DefPersistence* is changed subsequently, messages that have already been put are not affected.

Both persistent and nonpersistent messages can exist on the same queue.

When replying to a message, applications must use the persistence of the request message for the reply message.

For an MQGET call, the value returned is either MQPER_PERSISTENT or MQPER_NOT_PERSISTENT.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is MQPER_PERSISTENCE_AS_Q_DEF.

MsgId (MQBYTE24)

This is a byte string that is used to distinguish one message from another. Generally, no two messages should have the same message identifier, although this is not disallowed by the queue manager. The message identifier is a permanent property of the message, and persists across restarts of the queue manager. Because the message identifier is a byte string and not a character string, the message identifier is not converted between character sets when the message flows from one queue manager to another.

For the MQPUT and MQPUT1 calls, if MQMI_NONE or MQPMO_NEW_MSG_ID is specified by the application, the queue manager generates a unique message identifier [3] when the message is put, and places it in the message descriptor sent with the message. The queue manager also returns this message identifier in the message descriptor belonging to the sending application. The application can use this value to record information about particular messages, and to respond to queries from other parts of the application.

If the message is being put to a topic, the queue manager generates unique message identifiers as necessary for each message published. If MQPMO_NEW_MSG_ID is specified by the application, the queue manager generates a unique message identifier to return on output. If MQMI_NONE is specified by the application, the value of the *MsgId* field in the MQMD is unchanged on return from the call.

See the description of MQPMO_RETAIN in "MQPMO options (MQLONG)" on page 496 for more details about retained publications.

If the message is being put to a distribution list, the queue manager generates unique message identifiers as necessary, but the value of the *MsgId* field in MQMD is unchanged on return from the call, even if MQMI_NONE or MQPMO_NEW_MSG_ID was specified. If the application needs to know the message identifiers generated by the queue manager, the application must provide MQPMR records containing the *MsgId* field.

The sending application can also specify a value for the message identifier other than MQMI_NONE; this stops the queue manager generating a unique message identifier. An application that is forwarding a message can use this to propagate the message identifier of the original message.

The queue manager does not use this field except to:

- Generate a unique value if requested, as described above
- Deliver the value to the application that issues the get request for the message
- Copy the value to the *CorrelId* field of any report message that it generates about this message (depending on the *Report* options)

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[3] A *MsgId* generated by the queue manager consists of a 4-byte product identifier (AMQ¬ or CSQ¬ in either ASCII or EBCDIC, where ¬ represents a blank character), followed by a product-specific implementation of a unique string. In IBM MQ this contains the first 12 characters of the queue manager name, and a value derived from the system clock. All queue managers that can intercommunicate must therefore have names that differ in the first 12 characters, in order to ensure that message identifiers are unique. The ability to generate a unique string also depends on the system clock not being changed backward. To eliminate the possibility of a message identifier generated by the queue manager duplicating one generated by the application, the application must avoid generating identifiers with initial characters in the range A through I in ASCII or EBCDIC (X'41' through X'49' and X'C1' through X'C9'). However, the application is not prevented from generating identifiers with initial characters in these ranges.

When the queue manager or a message channel agent generates a report message, it sets the *MsgId* field in the way specified by the *Report* field of the original message, either MQRO_NEW_MSG_ID or MQRO_PASS_MSG_ID. Applications that generate report messages must also do this.

For the MQGET call, *MsgId* is one of the five fields that can be used to retrieve a particular message from the queue. Normally the MQGET call returns the next message on the queue, but a particular message can be obtained by specifying one or more of the five selection criteria, in any combination; these fields are:

- *MsgId*
- *CorrelId*
- *GroupId*
- *MsgSeqNumber*
- *Offset*

The application sets one or more of these field to the values required, and then sets the corresponding MQMO_* match options in the *MatchOptions* field in MQGMO to use those fields as selection criteria. Only messages that have the specified values in those fields are candidates for retrieval. The default for the *MatchOptions* field (if not altered by the application) is to match both the message identifier and the correlation identifier.

On z/OS, the selection criteria that you can use are restricted by the type of index used for the queue. See the **IndexType** queue attribute for further details.

Normally, the message returned is the *first* message on the queue that satisfies the selection criteria. But if MQGMO_BROWSE_NEXT is specified, the message returned is the *next* message that satisfies the selection criteria; the scan for this message starts with the message *following* the current cursor position.

Note: The queue is scanned sequentially for a message that satisfies the selection criteria, so retrieval times are slower than if no selection criteria are specified, especially if many messages have to be scanned before a suitable one is found. The exceptions to this are:

- Multi an MQGET call by *CorrelId* on 64-bit Multiplatforms where the *CorrelId* index eliminates the need to perform a true sequential scan.
- z/OS an MQGET call by *IndexType* on z/OS.

In both these cases, retrieval performance is improved.

See Table 495 on page 385 for more information about how selection criteria are used in various situations.

Specifying MQMI_NONE as the message identifier has the same effect as not specifying MQMO_MATCH_MSG_ID, that is, *any* message identifier matches.

This field is ignored if the MQGMO_MSG_UNDER_CURSOR option is specified in the **GetMsgOpts** parameter on the MQGET call.

On return from an MQGET call, the *MsgId* field is set to the message identifier of the message returned (if any).

The following special value can be used:

MQMI_NONE
No message identifier is specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQMI_NONE_ARRAY is also defined; this has the same value as MQMI_NONE, but is an array of characters instead of a string.

This is an input/output field for the MQGET, MQPUT, and MQPUT1 calls. The length of this field is given by MQ_MSG_ID_LENGTH. The initial value of this field is MQMI_NONE.

CorrelId (MQBYTE24)

The CorrelId field is property in the message header that may be used to identify a specific message or group of messages.

This is a byte string that the application can use to relate one message to another, or to relate the message to other work that the application is performing. The correlation identifier is a permanent property of the message, and persists across restarts of the queue manager. Because the correlation identifier is a byte string and not a character string, the correlation identifier is not converted between character sets when the message flows from one queue manager to another.

For the MQPUT and MQPUT1 calls, the application can specify any value. The queue manager transmits this value with the message and delivers it to the application that issues the get request for the message.

If the application specifies MQPMO_NEW_CORREL_ID, the queue manager generates a unique correlation identifier which is sent with the message, and also returned to the sending application on output from the MQPUT or MQPUT1 call.

A correlation identifier generated by the queue manager consists of a 3-byte product identifier (AMQ or CSQ in either ASCII or EBCDIC), followed by one reserved byte and a product-specific implementation of a unique string. In IBM MQ this product-specific implementation string contains the first 12 characters of the queue manager name, and a value derived from the system clock. All queue managers that can intercommunicate must therefore have names that differ in the first 12 characters to ensure that message identifiers are unique. The ability to generate a unique string also depends on the system clock not being changed backward. To eliminate the possibility of a message identifier generated by the queue manager duplicating one generated by the application, the application must avoid generating identifiers with initial characters in the range A through I in ASCII or EBCDIC (X'41' through X'49' and X'C1' through X'C9'). However, the application is not prevented from generating identifiers with initial characters in these ranges.

This generated correlation identifier is kept with the message if it is retained, and is used as the correlation identifier when the message is sent as a publication to subscribers who specify MQCI_NONE in the SubCorrelId field in the MQSD passed on the MQSUB call. See MQPMO options for more details about retained publications.

When the queue manager or a message channel agent generates a report message, it sets the *CorrelId* field in the way specified by the *Report* field of the original message, either MQRO_COPY_MSG_ID_TO_CORREL_ID or MQRO_PASS_CORREL_ID. Applications that generate report messages must also do this.

For the MQGET call, *CorrelId* is one of the five fields that can be used to select a particular message to be retrieved from the queue. See the description of the *MsgId* field for details of how to specify values for this field.

Specifying MQCI_NONE as the correlation identifier has the same effect as not specifying MQMO_MATCH_CORREL_ID, that is, *any* correlation identifier will match.

If the MQGMO_MSG_UNDER_CURSOR option is specified in the **GetMsgOpts** parameter on the MQGET call, this field is ignored.

On return from an MQGET call, the *CorrelId* field is set to the correlation identifier of the message returned (if any).

The following special values can be used:

MQCI_NONE

No correlation identifier is specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQCI_NONE_ARRAY is also defined; this has the same value as MQCI_NONE, but is an array of characters instead of a string.

MQCI_NEW_SESSION

Message is the start of a new session.

This value is recognized by the CICS bridge as indicating the start of a new session, that is, the start of a new sequence of messages.

For the C programming language, the constant MQCI_NEW_SESSION_ARRAY is also defined; this has the same value as MQCI_NEW_SESSION, but is an array of characters instead of a string.

For the MQGET call, this is an input/output field. For the MQPUT and MQPUT1 calls, this is an input field if MQPMO_NEW_CORREL_ID is not specified, and an output field if MQPMO_NEW_CORREL_ID is specified. The length of this field is given by MQ_CORREL_ID_LENGTH. The initial value of this field is MQCI_NONE.

Note:

You cannot pass the correlation identifier of a publication in a hierarchy. The field is used by the queue manager.

BackoutCount (MQLONG)

This is a count of the number of times that the message has been previously returned by the MQGET call as part of a unit of work, and subsequently backed out. It helps the application to detect processing errors that are based on message content. The count excludes MQGET calls that specify any of the MQGMO_BROWSE_* options.

The accuracy of this count is affected by the **HardenGetBackout** queue attribute; see "Attributes for queues" on page 823.

On z/OS, a value of 255 means that the message has been backed out 255 or more times; the value returned is never greater than 255.

This is an output field for the MQGET call. It is ignored for the MQPUT and MQPUT1 calls. The initial value of this field is `0`.

ReplyToQ (MQCHAR48)

This is the name of the message queue to which the application that issued the get request for the message sends MQMT_REPLY and MQMT_REPORT messages. The name is the local name of a queue that is defined on the queue manager identified by *ReplyToQMgr*. This queue must not be a model queue, although the sending queue manager does not verify this when the message is put.

For the MQPUT and MQPUT1 calls, this field must not be blank if the *MsgType* field has the value MQMT_REQUEST, or if any report messages are requested by the *Report* field. However, the value specified (or substituted) is passed on to the application that issues the get request for the message, whatever the message type.

If the *ReplyToQMgr* field is blank, the local queue manager looks up the *ReplyToQ* name in its own queue definitions. If a local definition of a remote queue exists with this name, the *ReplyToQ* value in the transmitted message is replaced by the value of the **RemoteQName** attribute from the definition of the remote queue, and this value is returned in the message descriptor when the receiving application issues an MQGET call for the message. If a local definition of a remote queue does not exist, *ReplyToQ* is unchanged.

If the name is specified, it can contain trailing blanks; the first null character and characters following it are treated as blanks. Otherwise no check is made that the name satisfies the naming rules for queues; this is also true for the name transmitted, if the *ReplyToQ* is replaced in the transmitted message. The only check made is that a name has been specified, if the circumstances require it.

If a reply-to queue is not required, set the *ReplyToQ* field to blanks, or (in the C programming language) to the null string, or to one or more blanks followed by a null character; do not leave the field uninitialized.

For the MQGET call, the queue manager always returns the name padded with blanks to the length of the field.

If a message that requires a report message cannot be delivered, and the report message also cannot be delivered to the queue specified, both the original message and the report message go to the dead-letter (undelivered-message) queue (see the **DeadLetterQName** attribute described in "Attributes for the queue manager" on page 786).

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

ReplyToQMgr (MQCHAR48)

This is the name of the queue manager to which to send the reply message or report message. *ReplyToQ* is the local name of a queue that is defined on this queue manager.

If the *ReplyToQMgr* field is blank, the local queue manager looks up the *ReplyToQ* name in its queue definitions. If a local definition of a remote queue exists with this name, the *ReplyToQMgr* value in the transmitted message is replaced by the value of the **RemoteQMgrName** attribute from the definition of the remote queue, and this value is returned in the message descriptor when the receiving application issues an MQGET call for the message. If a local definition of a remote queue does not exist, the *ReplyToQMgr* that is transmitted with the message is the name of the local queue manager.

If the name is specified, it can contain trailing blanks; the first null character and characters following it are treated as blanks. Otherwise no check is made that the name satisfies the naming rules for queue managers, or that this name is known to the sending queue manager; this is also true for the name transmitted, if the *ReplyToQMgr* is replaced in the transmitted message.

If a reply-to queue is not required, set the *ReplyToQMgr* field to blanks, or (in the C programming language) to the null string, or to one or more blanks followed by a null character; do not leave the field uninitialized.

For the MQGET call, the queue manager always returns the name padded with blanks to the length of the field.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by MQ_Q_MGR_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

UserIdentifier (MQCHAR12)

This is part of the **identity context** of the message. For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

UserIdentifier specifies the user identifier of the application that originated the message. The queue manager treats this information as character data, but does not define the format of it.

After a message has been received, use *UserIdentifier* in the *AlternateUserId* field of the **ObjDesc** parameter of a subsequent MQOPEN or MQPUT1 call to perform the authorization check for the *UserIdentifier* user instead of the application performing the open.

When the queue manager generates this information for an MQPUT or MQPUT1 call:

- On z/OS, the queue manager uses the *AlternateUserId* from the **ObjDesc** parameter of the MQOPEN or MQPUT1 call if the MQOO_ALTERNATE_USER_AUTHORITY or MQPMO_ALTERNATE_USER_AUTHORITY option was specified. If the relevant option was not specified, the queue manager uses a user identifier determined from the environment.
- In other environments, the queue manager always uses a user identifier determined from the environment.

When the user identifier is determined from the environment:

- On z/OS, the queue manager uses:
  - For MVS (batch), the user identifier from the JES JOB card or started task
  - For TSO, the user identifier propagated to the job during job submission
  - For CICS, the user identifier associated with the task
  - For IMS, the user identifier depends on the type of application:
    - For:

      - Nonmessage BMP regions
      - Nonmessage IFP regions
      - Message BMP and message IFP regions that have not issued a successful GU call

      the queue manager uses the user identifier from the region JES JOB card or the TSO user identifier. If these are blank or null, it uses the name of the program specification block (PSB).

    - For:
      - Message BMP and message IFP regions that *have* issued a successful GU call
      - MPP regions

      the queue manager uses one of:

      - The signed-on user identifier associated with the message
      - The logical terminal (LTERM) name
      - The user identifier from the region JES JOB card
      - The TSO user identifier
      - The PSB name

- On IBM i, the queue manager uses the name of the user profile associated with the application job.
- On UNIX, the queue manager uses:
  - The application's logon name
  - The effective user identifier of the process if no logon is available
  - The user identifier associated with the transaction, if the application is a CICS transaction
- On Windows systems, the queue manager uses the first 12 characters of the logged-on user name.

This field is normally an output field generated by the queue manager but for an MQPUT or MQPUT1 call you can make this field an input/output field and specify the UserIdentification field instead of letting the queue manager generate this information. Specify either MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT in the PutMsgOpts parameter and specify a user ID in the UserIdentifier field if you do not want the queue manager to generate the UserIdentifier field for an MQPUT or MQPUT1 call.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT is specified in the **`PutMsgOpts`** parameter. Any information following a null character within the field is discarded. The queue manager converts the null character and any following characters to blanks. If MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the *`UserIdentifier`* that was transmitted with the message if it was put to a queue. This will be the value of *`UserIdentifier`* that is kept with the message if it is retained (see description of MQPMO_RETAIN for more details about retained publications) but is not used as the *`UserIdentifier`* when the message is sent as a publication to subscribers because they provide a value to override *`UserIdentifier`* in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by MQ_USER_ID_LENGTH. The initial value of this field is the null string in C, and 12 blank characters in other programming languages.

AccountingToken (MQBYTE32)

This is the accounting token, part of the *identity context* of the message. For more information about message context, see “MQMD - Message descriptor” on page 413 ; also see Message context.

`AccountingToken` allows an application to charge appropriately for work done as a result of the message. The queue manager treats this information as a string of bits and does not check its content.

The queue manager generates this information as follows:

- The first byte of the field is set to the length of the accounting information present in the bytes that follow; this length is in the range zero through 30, and is stored in the first byte as a binary integer.

- The second and subsequent bytes (as specified by the length field) are set to the accounting information appropriate to the environment.
  - z/OS On z/OS the accounting information is set to:
    - For z/OS batch, the accounting information from the JES JOB card or from a JES ACCT statement in the EXEC card (comma separators are changed to X'FF'). This information is truncated, if necessary, to 31 bytes.
    - For TSO, the user's account number.
    - For CICS, the LU 6.2 unit of work identifier (UEPUOWDS) (26 bytes).
    - For IMS, the 8-character PSB name concatenated with the 16-character IMS recovery token.
  - IBM i On IBM i, the accounting information is set to the accounting code for the job.
  - UNIX On UNIX, the accounting information is set to the numeric user identifier, in ASCII characters.
  - Windows On Windows, the accounting information is set to a Windows security identifier (SID) in a compressed format. The SID uniquely identifies the user identifier stored in the *UserIdentifier* field. When the SID is stored in the *AccountingToken* field, the 6-byte Identifier Authority (located in the third and subsequent bytes of the SID) is omitted. For example, if the Windows SID is 28 bytes long, 22 bytes of SID information are stored in the *AccountingToken* field.
- The last byte (byte 32) of the accounting field is set to the accounting token type (in this case MQACTT_NT_SECURITY_ID, x '0b'):

  MQACTT_CICS_LUOW_ID
  CICS LUOW identifier.

  Windows **MQACTT_NT_SECURITY_ID**
  Windows security identifier.

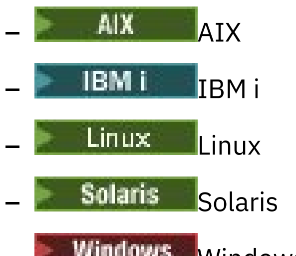
  IBM i **MQACTT_OS400_ACCOUNT_TOKEN**
  IBM i accounting token.

  UNIX **MQACTT_UNIX_NUMERIC_ID**
  UNIX numeric identifier.

  MQACTT_USER
  User-defined accounting token.

  MQACTT_UNKNOWN
  Unknown accounting-token type.

  The accounting-token type is set to an explicit value only in the following environments:



  - AIX
  - IBM i
  - Linux
  - Solaris
  - Windows

  and for IBM MQ MQI clients connected to these systems. In other environments, the accounting-token type is set to the value MQACTT_UNKNOWN. In these environments use the *PutApplType* field to deduce the type of accounting token received.
- All other bytes are set to binary zero.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. If neither

MQPMO_SET_IDENTITY_CONTEXT nor MQPMO_SET_ALL_CONTEXT is specified, this field is ignored on input and is an output-only field. For more information about message context, see Message context.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the `AccountingToken` that was transmitted with the message if it was put to a queue. This will be the value of `AccountingToken` that is kept with the message if it is retained (see description of MQPMO_RETAIN in "MQPMO options (MQLONG)" on page 496 for more details about retained publications) but is not used as the `AccountingToken` when the message is sent as a publication to subscribers since they provide a value to override `AccountingToken` in all publications sent to them. If the message has no context, the field is entirely binary zero.

This is an output field for the MQGET call.

This field is not subject to any translation based on the character set of the queue manager; the field is treated as a string of bits, and not as a string of characters.

The queue manager does nothing with the information in this field. The application must interpret the information if it wants to use the information for accounting purposes.

You can use the following special value for the `AccountingToken` field:

MQACT_NONE

No accounting token is specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQACT_NONE_ARRAY is also defined; this has the same value as MQACT_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_ACCOUNTING_TOKEN_LENGTH. The initial value of this field is MQACT_NONE.

ApplIdentityData (MQCHAR32)

This is part of the **identity context** of the message. For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

ApplIdentityData is information that is defined by the application suite, and can be used to provide additional information about the message or its originator. The queue manager treats this information as character data, but does not define the format of it. When the queue manager generates this information, it is entirely blank.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. If a null character is present, the null and any following characters are converted to blanks by the queue manager. If neither MQPMO_SET_IDENTITY_CONTEXT nor MQPMO_SET_ALL_CONTEXT is specified, this field is ignored on input and is an output-only field. For more information about message context, see Message context.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the *ApplIdentityData* that was transmitted with the message if it was put to a queue. This will be the value of *ApplIdentityData* that is kept with the message if it is retained (see description of MQPMO_RETAIN for more details about retained publications) but is not used as the *ApplIdentityData* when the message is sent as a publication to subscribers because they provide a value to override *ApplIdentityData* in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by MQ_APPL_IDENTITY_DATA_LENGTH. The initial value of this field is the null string in C, and 32 blank characters in other programming languages.

PutApplType (MQLONG)

This is the type of application that put the message, and is part of the **origin context** of the message. For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

PutApplType can have one of the following standard types. You can also define your own types, but only with values in the range MQAT_USER_FIRST through MQAT_USER_LAST.

MQAT_AIX
AIX application (same value as MQAT_UNIX).

MQAT_AMQP
AMQP protocol application

MQAT_BROKER
Broker.

MQAT_CICS
CICS transaction.

MQAT_CICS_BRIDGE
CICS bridge.

MQAT_CICS_VSE
CICS/VSE transaction.

MQAT_DOS
IBM MQ MQI client application on PC DOS.

MQAT_DQM
Distributed queue manager agent.

MQAT_GUARDIAN
Tandem Guardian application (same value as MQAT_NSK).

MQAT_IMS
IMS application.

MQAT_IMS_BRIDGE
IMS bridge.

MQAT_JAVA
Java.

MQAT_MVS
MVS or TSO application (same value as MQAT_ZOS).

MQAT_NOTES_AGENT
Lotus Notes® Agent application.

MQAT_OS390
OS/390® application (same value as MQAT_ZOS).

MQAT_OS400
IBM i application.

MQAT_QMGR
Queue manager.

MQAT_UNIX
UNIX application.

MQAT_VOS
Stratus VOS application.

MQAT_WINDOWS
16-bit Windows application.

MQAT_WINDOWS_NT
32-bit Windows application.

MQAT_WLM
z/OS workload manager application.

MQAT_XCF
XCF.

MQAT_ZOS
z/OS application.

MQAT_DEFAULT
Default application type.

This is the default application type for the platform on which the application is running.

Note: The value of this constant is environment-specific. Because of this, always compile the application using the header, include, or COPY files that are appropriate to the platform on which the application will run.

MQAT_UNKNOWN
Use this value to indicate that the application type is unknown, even though other context information is present.

MQAT_USER_FIRST
Lowest value for user-defined application type.

MQAT_USER_LAST
Highest value for user-defined application type.

The following special value can also occur:

MQAT_NO_CONTEXT
This value is set by the queue manager when a message is put with no context (that is, the MQPMO_NO_CONTEXT context option is specified).

When a message is retrieved, *PutApplType* can be tested for this value to decide whether the message has context (it is recommended that *PutApplType* is never set to MQAT_NO_CONTEXT, by an application using MQPMO_SET_ALL_CONTEXT, if any of the other context fields are nonblank).

When the queue manager generates this information as a result of an application put, the field is set to a value that is determined by the environment. On IBM i, it is set to MQAT_OS400; the queue manager never uses MQAT_CICS on IBM i.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. If MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

This is an output field for the MQGET call. The initial value of this field is MQAT_NO_CONTEXT.

PutApplName (MQCHAR28)

This is the name of application that put the message, and is part of the *origin context* of the message. The contents differ between platforms, and might differ between releases.

For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

V 9.1.2 From IBM MQ 9.1.2 you can specify the application name in additional programming languages. See specifying the application name in supported programming languages for more information.

The format of *PutApplName* depends on the value of *PutApplType* and can change from one release to another. Changes are rare, but do happen if the environment changes.

When the queue manager sets this field (that is, for all options except MQPMO_SET_ALL_CONTEXT), it sets the field to a value that is determined by the environment:

- z/OS On z/OS, the queue manager uses:
  - For z/OS batch, the 8-character job name from the JES JOB card
  - For TSO, the 7-character TSO user identifier
  - For CICS, the 8-character applid, followed by the 4-character tranid
  - For IMS, the 8-character IMS system identifier, followed by the 8-character PSB name

- For XCF, the 8-character XCF group name, followed by the 16-character XCF member name
- For a message generated by a queue manager, the first 28 characters of the queue manager name
- For distributed queuing without CICS, the 8-character jobname of the channel initiator followed by the 8-character name of the module putting to the dead-letter queue followed by an 8-character task identifier.

The name or names are each padded to the right with blanks, as is any space in the remainder of the field. Where there is more than one name, there is no separator between them.

- Windows On Windows systems, the queue manager uses the following names:
  - For a CICS application, the CICS transaction name
  - For a non-CICS application, the rightmost 28 characters of the fully-qualified name of the executable
- IBM i On IBM i, the queue manager uses the fully-qualified job name.
- UNIX On UNIX, the queue manager uses the following names:
  - For a CICS application, the CICS transaction name
  - For a non-CICS application, MQ asks the operating system for the name of the process. This is returned as the program file name, without full path. Then MQ places this process name in the MQMD.PutApplName field as follows:

AIX **AIX**
: If the name is less than or equal to 28 bytes, then the name is inserted, padded to the right with spaces.

  If the name is greater than 28 bytes, then the leftmost 28 bytes of the name are inserted.

Solaris Linux **Linux and Solaris**
: If the name is less than or equal to 15 bytes, then the name is inserted, padded to the right with spaces.

  If the name is greater than 15 bytes, then the leftmost 15 bytes of the name are inserted, padded to the right with spaces.

For example, if you run `/opt/mqm/samp/bin/amqsput QNAME QMNAME`, then the PutApplName is `'amqsput                     '`. There are 21 space characters of padding in this MQCHAR28 field. Note that the full path including `/opt/mqm/samp/bin` is not included in the PutApplName.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. Any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

PutDate (MQCHAR8)

This is the date when the message was put, and is part of the **origin context** of the message. For more information about message context, see “MQMD - Message descriptor” on page 413 and Message context.

The format used for the date when this field is generated by the queue manager is:

- YYYYMMDD

where the characters represent:

YYYY
: year (four numeric digits)

MM
: month of year (01 through 12)

DD
day of month (01 through 31)

Greenwich Mean Time (GMT) is used for the *PutDate* and *PutTime* fields, subject to the system clock being set accurately to GMT.

If the message was put as part of a unit of work, the date is that when the message was put, and not the date when the unit of work was committed.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. The contents of the field are not checked by the queue manager, except that any information following a null character within the field is discarded. The queue manager converts the null character and any following characters to blanks. If MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

This is an output field for the MQGET call. The length of this field is given by MQ_PUT_DATE_LENGTH. The initial value of this field is the null string in C, and 8 blank characters in other programming languages.

PutTime (MQCHAR8)

This is the time when the message was put, and is part of the **origin context** of the message. For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

The format used for the time when this field is generated by the queue manager is:

- HHMMSSTH

where the characters represent (in order):

HH
hours (00 through 23)

MM
minutes (00 through 59)

SS
seconds (00 through 59; see note)

T
tenths of a second (0 through 9)

H
hundredths of a second (0 through 9)

Note: If the system clock is synchronized to a very accurate time standard, it is possible on rare occasions for 60 or 61 to be returned for the seconds in *PutTime*. This happens when leap seconds are inserted into the global time standard.

Greenwich Mean Time (GMT) is used for the *PutDate* and *PutTime* fields, subject to the system clock being set accurately to GMT.

If the message was put as part of a unit of work, the time is that when the message was put, and not the time when the unit of work was committed.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. The queue manager does not check the contents of the field, except that any information following a null character within the field is discarded. The queue manager converts the null character and any following characters to blanks. If MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

This is an output field for the MQGET call. The length of this field is given by MQ_PUT_TIME_LENGTH. The initial value of this field is the null string in C, and 8 blank characters in other programming languages.

ApplOriginData (MQCHAR4)

This is part of the *origin context* of the message. For more information about message context, see "MQMD - Message descriptor" on page 413 and Message context.

`ApplOriginData` is information that is defined by the application suite that can be used to provide additional information about the origin of the message. For example, it could be set by applications running with suitable user authority to indicate whether the identity data is trusted.

The queue manager treats this information as character data, but does not define the format of it. When the queue manager generates this information, it is entirely blank.

For the MQPUT and MQPUT1 calls, this is an input/output field if MQPMO_SET_ALL_CONTEXT is specified in the **PutMsgOpts** parameter. Any information following a null character within the field is discarded. The queue manager converts the null character and any following characters to blanks. If MQPMO_SET_ALL_CONTEXT is not specified, this field is ignored on input and is an output-only field.

This is an output field for the MQGET call. The length of this field is given by MQ_APPL_ORIGIN_DATA_LENGTH. The initial value of this field is the null string in C, and 4 blank characters in other programming languages.

When the message is published, although `ApplOriginData` is set, it is blank in the subscription that it receives.

GroupId (MQBYTE24)

This is a byte string that is used to identify the particular message group or logical message to which the physical message belongs. *GroupId* is also used if segmentation is allowed for the message. In all these cases, *GroupId* has a non-null value, and one or more of the following flags is set in the *MsgFlags* field:

- MQMF_MSG_IN_GROUP
- MQMF_LAST_MSG_IN_GROUP
- MQMF_SEGMENT
- MQMF_LAST_SEGMENT
- MQMF_SEGMENTATION_ALLOWED

If none of these flags is set, *GroupId* has the special null value MQGI_NONE.

The application does not need to set this field on the MQPUT or MQGET call if:

- On the MQPUT call, MQPMO_LOGICAL_ORDER is specified.
- On the MQGET call, MQMO_MATCH_GROUP_ID is not specified.

These are the recommended ways of using these calls for messages that are not report messages. However, if the application requires more control, or the call is MQPUT1, the application must ensure that *GroupId* is set to an appropriate value.

Message groups and segments can be processed correctly only if the group identifier is unique. For this reason, *applications must not generate their own group identifiers* ; instead, applications must do one of the following:

- If MQPMO_LOGICAL_ORDER is specified, the queue manager automatically generates a unique group identifier for the first message in the group or segment of the logical message, and uses that group identifier for the remaining messages in the group or segments of the logical message, so the application does not need to take any special action. This is the recommended procedure.
- If MQPMO_LOGICAL_ORDER is not specified, the application must request the queue manager to generate the group identifier, by setting *GroupId* to MQGI_NONE on the first MQPUT or MQPUT1 call for a message in the group or segment of the logical message. The group identifier returned by the queue manager on output from that call must then be used for the remaining messages in the group or segments of the logical message. If a message group contains segmented messages, the same group identifier must be used for all segments and messages in the group.

When MQPMO_LOGICAL_ORDER is not specified, messages in groups and segments of logical messages can be put in any order (for example, in reverse order), but the group identifier must be allocated by the *first* MQPUT or MQPUT1 call that is issued for any of those messages.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value described in Physical order on a queue. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message if the object opened is a single queue and not a distribution list, but leaves it unchanged if the object opened is a distribution list. In the latter case, if the application needs to know the group identifiers generated, the application must provide MQPMR records containing the `GroupId` field.

On input to the MQGET call, the queue manager uses the value described in Table 495 on page 385. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The following special value is defined:

MQGI_NONE

No group identifier specified.

The value is binary zero for the length of the field. This is the value that is used for messages that are not in groups, not segments of logical messages, and for which segmentation is not allowed.

For the C programming language, the constant MQGI_NONE_ARRAY is also defined; this has the same value as MQGI_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_GROUP_ID_LENGTH. The initial value of this field is MQGI_NONE. This field is ignored if `Version` is less than MQMD_VERSION_2.

MsgSeqNumber (MQLONG)

This is the sequence number of a logical message within a group.

Sequence numbers start at 1, and increase by 1 for each new logical message in the group, up to a maximum of 999 999 999. A physical message that is not in a group has a sequence number of 1.

The application does not have to set this field on the MQPUT or MQGET call if:

- On the MQPUT call, MQPMO_LOGICAL_ORDER is specified.
- On the MQGET call, MQMO_MATCH_MSG_SEQ_NUMBER is not specified.

These are the recommended ways of using these calls for messages that are not report messages. However, if the application requires more control, or the call is MQPUT1, the application must ensure that `MsgSeqNumber` is set to an appropriate value.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value described in Physical order on a queue. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message.

On input to the MQGET call, the queue manager uses the value shown in Table 495 on page 385. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The initial value of this field is one. This field is ignored if `Version` is less than MQMD_VERSION_2.

Offset (MQLONG)

This is the offset in bytes of the data in the physical message from the start of the logical message of which the data forms part. This data is called a *segment*. The offset is in the range 0 through 999 999 999. A physical message that is not a segment of a logical message has an offset of zero.

The application does not need to set this field on the MQPUT or MQGET call if:

- On the MQPUT call, MQPMO_LOGICAL_ORDER is specified.
- On the MQGET call, MQMO_MATCH_OFFSET is not specified.

These are the recommended ways of using these calls for messages that are not report messages. However, if the application does not comply with these conditions, or the call is MQPUT1, the application must ensure that `Offset` is set to an appropriate value.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value described in Physical order on a queue. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message.

For a report message reporting on a segment of a logical message, the *OriginalLength* field (provided it is not MQOL_UNDEFINED) is used to update the offset in the segment information retained by the queue manager.

On input to the MQGET call, the queue manager uses the value shown in Table 495 on page 385. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The initial value of this field is zero. This field is ignored if *Version* is less than MQMD_VERSION_2.

MsgFlags (MQLONG)

MsgFlags are flags that specify attributes of the message, or control its processing.

MsgFlags are divided into the following categories:

- Segmentation flags
- Status flags

Segmentation flags: When a message is too big for a queue, an attempt to put the message on the queue typically fails. Segmentation is a technique whereby the queue manager or application splits the message into smaller pieces called segments, and places each segment on the queue as a separate physical message. The application that retrieves the message can either retrieve the segments one by one, or request the queue manager to reassemble the segments into a single message that is returned by the MQGET call. The latter is achieved by specifying the MQGMO_COMPLETE_MSG option on the MQGET call, and supplying a buffer that is big enough to accommodate the complete message. (See “MQGMO - Get-message options” on page 360 for details of the MQGMO_COMPLETE_MSG option.) A message can be segmented at the sending queue manager, at an intermediate queue manager, or at the destination queue manager.

You can specify one of the following to control the segmentation of a message:

MQMF_SEGMENTATION_INHIBITED

This option prevents the message being broken into segments by the queue manager. If specified for a message that is already a segment, this option prevents the segment being broken into smaller segments.

The value of this flag is binary zero. This is the default.

MQMF_SEGMENTATION_ALLOWED

This option allows the message to be broken into segments by the queue manager. If specified for a message that is already a segment, this option allows the segment to be broken into smaller segments. MQMF_SEGMENTATION_ALLOWED can be set without either MQMF_SEGMENT or MQMF_LAST_SEGMENT being set.

- On z/OS, the queue manager does not support the segmentation of messages. If a message is too big for the queue, the MQPUT or MQPUT1 call fails with reason code MQRC_MSG_TOO_BIG_FOR_Q. However, the MQMF_SEGMENTATION_ALLOWED option can still be specified, and allows the message to be segmented at a remote queue manager.

When the queue manager segments a message, the queue manager turns on the MQMF_SEGMENT flag in the copy of the MQMD that is sent with each segment, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call. For the last segment in the logical message, the queue manager also turns on the MQMF_LAST_SEGMENT flag in the MQMD that is sent with the segment.

Note: Take care when putting messages with MQMF_SEGMENTATION_ALLOWED but without MQPMO_LOGICAL_ORDER. If the message is:

- Not a segment, and

- Not in a group, and
- Not being forwarded,

the application must reset the *GroupId* field to MQGI_NONE before *each* MQPUT or MQPUT1 call, so that the queue manager can generate a unique group identifier for each message. If this is not done, unrelated messages can have the same group identifier, which might lead to incorrect processing subsequently. See the descriptions of the *GroupId* field and the MQPMO_LOGICAL_ORDER option for more information about when to reset the *GroupId* field.

The queue manager splits messages into segments as necessary so that the segments (plus any required header data) fit on the queue. However, there is a lower limit for the size of a segment generated by the queue manager, and only the last segment created from a message can be smaller than this limit (the lower limit for the size of an application-generated segment is one byte). Segments generated by the queue manager might be of unequal length. The queue manager processes the message as follows:

- User-defined formats are split on boundaries that are multiples of 16 bytes; the queue manager does not generate segments that are smaller than 16 bytes (other than the last segment).
- Built-in formats other than MQFMT_STRING are split at points appropriate to the nature of the data present. However, the queue manager never splits a message in the middle of an IBM MQ header structure. This means that a segment containing a single MQ header structure cannot be split further by the queue manager, and as a result the minimum possible segment size for that message is greater than 16 bytes.

  The second or later segment generated by the queue manager begins with one of the following:

  - An MQ header structure
  - The start of the application message data
  - Part of the way through the application message data
- MQFMT_STRING is split without regard for the nature of the data present (SBCS, DBCS, or mixed SBCS/DBCS). When the string is DBCS or mixed SBCS/DBCS, this might result in segments that cannot be converted from one character set to another. The queue manager never splits MQFMT_STRING messages into segments that are smaller than 16 bytes (other than the last segment).
- The queue manager sets the *Format*, *CodedCharSetId*, and *Encoding* fields in the MQMD of each segment to describe correctly the data present at the *start* of the segment; the format name is either the name of a built-in format, or the name of a user-defined format.
- The *Report* field in the MQMD of segments with *Offset* greater than zero is modified. For each report type, if the report option is MQRO_*_WITH_DATA, but the segment cannot contain any of the first 100 bytes of user data (that is, the data following any IBM MQ header structures that may be present), the report option is changed to MQRO_*.

The queue manager follows the above rules, but otherwise splits messages unpredictably; do not make assumptions about where a message is split.

For *persistent* messages, the queue manager can perform segmentation only within a unit of work:

- If the MQPUT or MQPUT1 call is operating within a user-defined unit of work, that unit of work is used. If the call fails during the segmentation process, the queue manager removes any segments that were placed on the queue as a result of the failing call. However, the failure does not prevent the unit of work being committed successfully.
- If the call is operating outside a user-defined unit of work, and there is no user-defined unit of work in existence, the queue manager creates a unit of work just for the duration of the call. If the call is successful, the queue manager commits the unit of work automatically. If the call fails, the queue manager backs out the unit of work.
- If the call is operating outside a user-defined unit of work, but a user-defined unit of work exists, the queue manager cannot perform segmentation. If the message does not require segmentation, the call can still succeed. But if the message requires segmentation, the call fails with reason code MQRC_UOW_NOT_AVAILABLE.

For *nonpersistent* messages, the queue manager does not require a unit of work to be available in order to perform segmentation.

Take special care when converting data in messages that might be segmented:

- If the receiving application converts data on the MQGET call, and specifies the MQGMO_COMPLETE_MSG option, the data-conversion exit is passed the complete message for the exit to convert, and the fact that the message was segmented is apparent to the exit.
- If the receiving application retrieves one segment at a time, the data-conversion exit is invoked to convert one segment at a time. The exit must therefore convert the data in a segment independently of the data in any of the other segments.

  If the nature of the data in the message is such that arbitrary segmentation of the data on 16-byte boundaries might result in segments that cannot be converted by the exit, or the format is MQFMT_STRING and the character set is DBCS or mixed SBCS/DBCS, the sending application must create and put the segments, specifying MQMF_SEGMENTATION_INHIBITED to suppress further segmentation. In this way, the sending application can ensure that each segment contains sufficient information to allow the data-conversion exit to convert the segment successfully.
- If sender conversion is specified for a sending message channel agent (MCA), the MCA converts only messages that are not segments of logical messages; the MCA never attempts to convert messages that are segments.

This flag is an input flag on the MQPUT and MQPUT1 calls, and an output flag on the MQGET call. On the latter call, the queue manager also echoes the value of the flag to the `Segmentation` field in MQGMO.

The initial value of this flag is MQMF_SEGMENTATION_INHIBITED.

Status flags: These are flags that indicate whether the physical message belongs to a message group, is a segment of a logical message, both, or neither. One or more of the following can be specified on the MQPUT or MQPUT1 call, or returned by the MQGET call:

MQMF_MSG_IN_GROUP
Message is a member of a group.

MQMF_LAST_MSG_IN_GROUP
Message is the last logical message in a group.

If this flag is set, the queue manager turns on MQMF_MSG_IN_GROUP in the copy of MQMD that is sent with the message, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call.

It is valid for a group to consist of only one logical message. If this is the case, MQMF_LAST_MSG_IN_GROUP is set, but the `MsgSeqNumber` field has the value one.

MQMF_SEGMENT
Message is a segment of a logical message.

When MQMF_SEGMENT is specified without MQMF_LAST_SEGMENT, the length of the application message data in the segment (*excluding* the lengths of any IBM MQ header structures that might be present) must be at least one. If the length is zero, the MQPUT or MQPUT1 call fails with reason code MQRC_SEGMENT_LENGTH_ZERO.

On z/OS, this option is not supported if the message is being put on a queue that has an index type of MQIT_GROUP_ID.

MQMF_LAST_SEGMENT
Message is the last segment of a logical message.

If this flag is set, the queue manager turns on MQMF_SEGMENT in the copy of MQMD that is sent with the message, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call.

A logical message can consist of only one segment. If so, MQMF_LAST_SEGMENT is set, but the `Offset` field has the value zero.

When MQMF_LAST_SEGMENT is specified, the length of the application message data in the segment (*excluding* the lengths of any header structures that might be present) can be zero.

On z/OS, this option is not supported if the message is being put on a queue that has an index type of MQIT_GROUP_ID.

The application must ensure that these flags are set correctly when putting messages. If MQPMO_LOGICAL_ORDER is specified, or was specified on the preceding MQPUT call for the queue handle, the settings of the flags must be consistent with the group and segment information retained by the queue manager for the queue handle. The following conditions apply to *successive* MQPUT calls for the queue handle when MQPMO_LOGICAL_ORDER is specified:

- If there is no current group or logical message, all these flags (and combinations of them) are valid.
- Once MQMF_MSG_IN_GROUP has been specified, it must remain on until MQMF_LAST_MSG_IN_GROUP is specified. The call fails with reason code MQRC_INCOMPLETE_GROUP if this condition is not satisfied.
- Once MQMF_SEGMENT has been specified, it must remain on until MQMF_LAST_SEGMENT is specified. The call fails with reason code MQRC_INCOMPLETE_MSG if this condition is not satisfied.
- Once MQMF_SEGMENT has been specified without MQMF_MSG_IN_GROUP, MQMF_MSG_IN_GROUP must remain *off* until after MQMF_LAST_SEGMENT has been specified. The call fails with reason code MQRC_INCOMPLETE_MSG if this condition is not satisfied.

Physical order on a queue shows the valid combinations of the flags, and the values used for various fields.

These flags are input flags on the MQPUT and MQPUT1 calls, and output flags on the MQGET call. On the latter call, the queue manager also echoes the values of the flags to the `GroupStatus` and `SegmentStatus` fields in MQGMO.

You cannot use grouped or segmented messages with Publish/Subscribe.

Default flags: The following can be specified to indicate that the message has default attributes:

MQMF_NONE
No message flags (default message attributes).

This inhibits segmentation, and indicates that the message is not in a group and is not a segment of a logical message. MQMF_NONE is defined to aid program documentation. It is not intended that this flag be used with any other, but as its value is zero, such use cannot be detected.

The `MsgFlags` field is partitioned into subfields; for details see "Report options and message flags" on page 890.

The initial value of this field is MQMF_NONE. This field is ignored if `Version` is less than MQMD_VERSION_2.

OriginalLength (MQLONG)

This field is relevant only for report messages that are segments. It specifies the length of the message segment to which the report message relates; it does not specify the length of the logical message of which the segment forms part, or the length of the data in the report message.

Note: When generating a report message for a message that is a segment, the queue manager and message channel agent copy into the MQMD for the report message the `GroupId`, `MsgSeqNumber`, `Offset`, and `MsgFlags`, fields from the original message. As a result, the report message is also a segment. Applications that generate report messages must do the same, and set the `OriginalLength` field correctly.

The following special value is defined:

MQOL_UNDEFINED
Original length of message not defined.

`OriginalLength` is an input field on the MQPUT and MQPUT1 calls, but the value that the application provides is accepted only in particular circumstances:

- If the message being put is a segment and is also a report message, the queue manager accepts the value specified. The value must be:
  - Greater than zero if the segment is not the last segment
  - Not less than zero if the segment is the last segment
  - Not less than the length of data present in the message

  If these conditions are not satisfied, the call fails with reason code MQRC_ORIGINAL_LENGTH_ERROR.
- If the message being put is a segment but not a report message, the queue manager ignores the field and uses the length of the application message data instead.
- In all other cases, the queue manager ignores the field and uses the value MQOL_UNDEFINED instead.

This is an output field on the MQGET call.

The initial value of this field is MQOL_UNDEFINED. This field is ignored if *Version* is less than MQMD_VERSION_2.

MQMDE - Message descriptor extension

The MQMDE structure describes the data that sometimes occurs preceding the application message data. The structure contains those MQMD fields that exist in the version-2 MQMD, but not in the version-1 MQMD.

Availability

All IBM MQ systems, plus IBM MQ MQI clients connected to these systems.

Format name

MQFMT_MD_EXTENSION

Character set and encoding

Data in MQMDE must be in the character set and encoding of the local queue manager; these are given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE for the C programming language.

Set the character set and encoding of the MQMDE into the *CodedCharSetId* and *Encoding* fields in:

- The MQMD (if the MQMDE structure is at the start of the message data), or
- The header structure that precedes the MQMDE structure (all other cases).

If the MQMDE is not in the queue manager's character set and encoding, the MQMDE is accepted but not honored, that is, the MQMDE is treated as message data.

Note: On Windows, applications compiled with Micro Focus COBOL use a value of MQENC_NATIVE that is different from the queue manager's encoding. Although numeric fields in the MQMD structure on the MQPUT, MQPUT1, and MQGET calls must be in the Micro Focus COBOL encoding, numeric fields in the MQMDE structure must be in the queue manager's encoding. This latter is given by MQENC_NATIVE for the C programming language, and has the value 546.

Usage

Applications that use a version-2 MQMD will not encounter an MQMDE structure. However, specialized applications, and applications that continue to use a version-1 MQMD, might encounter an MQMDE in some situations. The MQMDE structure can occur in the following circumstances:

- Specified on the MQPUT and MQPUT1 calls
- Returned by the MQGET call
- In messages on transmission queues

MQMDE specified on MQPUT and MQPUT1 calls

On the MQPUT and MQPUT1 calls, if the application provides a version-1 MQMD, the application can optionally prefix the message data with an MQMDE, setting the *Format* field in MQMD to MQFMT_MD_EXTENSION to indicate that an MQMDE is present. If the application does not provide an MQMDE, the queue manager assumes default values for the fields in the MQMDE. The default values that the queue manager uses are the same as the initial values for the structure; see Table 503 on page 465.

If the application provides a version-2 MQMD *and* prefixes the application message data with an MQMDE, the structures are processed as shown in the following table.

Table 502. Queue manager action when MQMDE specified on MQPUT or MQPUT1 for MQMDE

MQMD version	Values of version-2 fields	Values of corresponding fields in MQMDE	Action taken by queue manager
1	-	Valid	MQMDE is honored
2	Default	Valid	MQMDE is honored
2	Not default	Valid	MQMDE is treated as message data
1 or 2	Any	Not valid	Call fails with an appropriate reason code
1 or 2	Any	MQMDE is in the wrong character set or encoding, or is an unsupported version	MQMDE is treated as message data
Note: On z/OS, if the application specifies a version-1 MQMD with an MQMDE, the queue manager validates the MQMDE only if the queue has an *IndexType* of MQIT_GROUP_ID.			

There is one special case. If the application uses a version-2 MQMD to put a message that is a segment (that is, the MQMF_SEGMENT or MQMF_LAST_SEGMENT flag is set), and the format name in the MQMD is MQFMT_DEAD_LETTER_HEADER, the queue manager generates an MQMDE structure and inserts it *between* the MQDLH structure and the data that follows it. In the MQMD that the queue manager retains with the message, the version-2 fields are set to their default values.

Several of the fields that exist in the version-2 MQMD but not the version-1 MQMD are input/output fields on MQPUT and MQPUT1. However, the queue manager does not return any values in the equivalent fields in the MQMDE on output from the MQPUT and MQPUT1 calls; if the application requires those output values, it must use a version-2 MQMD.

MQMDE returned by MQGET call

On the MQGET call, if the application provides a version-1 MQMD, the queue manager prefixes the message returned with an MQMDE, but only if one or more of the fields in the MQMDE has a nondefault value. The queue manager sets the *Format* field in MQMD to the value MQFMT_MD_EXTENSION to indicate that an MQMDE is present.

If the application provides an MQMDE at the start of the **Buffer** parameter, the MQMDE is ignored. On return from the MQGET call, it is replaced by the MQMDE for the message (if one is needed), or overwritten by the application message data (if the MQMDE is not needed).

If the MQGET call returns an MQMDE, the data in the MQMDE is usually in the queue manager's character set and encoding. However the MQMDE might be in some other character set and encoding if:

- The MQMDE was treated as data on the MQPUT or MQPUT1 call (see Table 502 on page 464 for the circumstances that can cause this).
- The message was received from a remote queue manager connected by a TCP connection, and the receiving message channel agent (MCA) was not set up correctly.

Note: On Windows, applications compiled with Micro Focus COBOL use a value of MQENC_NATIVE that is different from the queue manager's encoding (see above).

MQMDE in messages on transmission queues

Messages on transmission queues are prefixed with the MQXQH structure, which contains within it a version-1 MQMD. An MQMDE might also be present, positioned between the MQXQH structure and application message data, but it is usually present only if one or more of the fields in the MQMDE has a non-default value.

Other MQ header structures can also occur between the MQXQH structure and the application message data. For example, when the dead-letter header MQDLH is present, and the message is not a segment, the order is:

- MQXQH (containing a version-1 MQMD)
- MQMDE
- MQDLH
- application message data

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 503. Fields in MQMDE for MQMDE

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQMDE_STRUC_ID	'MDE¬'
Version (structure version number)	MQMDE_VERSION_2	2
StrucLength (length of MQMDE structure)	MQMDE_LENGTH_2	72
Encoding (numeric encoding of data that follows MQMDE)	MQENC_NATIVE	Depends on environment
CodedCharSetId (character set identifier of data that follows MQMDE)	MQCCSI_UNDEFINED	0
Format (format name of data that follows MQMDE)	MQFMT_NONE	Blanks
Flags (general flags)	MQMDEF_NONE	0
GroupId (group identifier)	MQGI_NONE	Nulls
MsgSeqNumber (sequence number of logical message within group)	None	1
Offset (offset of data in physical message from start of logical message)	None	0
MsgFlags (message flags)	MQMF_NONE	0
OriginalLength (length of original message)	MQOL_UNDEFINED	-1

Table 503. Fields in MQMDE for MQMDE (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. The symbol ¬ represents a single blank character. 2. In the C programming language, the macro variable MQMDE_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure: `MQMDE MyMDE = {MQMDE_DEFAULT};`		

Language declarations

C declaration for MQMDE

```
typedef struct tagMQMDE MQMDE;
struct tagMQMDE {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    StrucLength;     /* Length of MQMDE structure */
  MQLONG    Encoding;        /* Numeric encoding of data that follows
                                MQMDE */
  MQLONG    CodedCharSetId;  /* Character-set identifier of data that
                                follows MQMDE */
  MQCHAR8   Format;          /* Format name of data that follows
                                MQMDE */
  MQLONG    Flags;           /* General flags */
  MQBYTE24  GroupId;         /* Group identifier */
  MQLONG    MsgSeqNumber;    /* Sequence number of logical message
                                within group */
  MQLONG    Offset;          /* Offset of data in physical message from
                                start of logical message */
  MQLONG    MsgFlags;        /* Message flags */
  MQLONG    OriginalLength;  /* Length of original message */
};
```

COBOL declaration for MQMDE

```
**   MQMDE structure
  10 MQMDE.
**    Structure identifier
   15 MQMDE-STRUCID        PIC X(4).
**    Structure version number
   15 MQMDE-VERSION        PIC S9(9) BINARY.
**    Length of MQMDE structure
   15 MQMDE-STRUCLENGTH    PIC S9(9) BINARY.
**    Numeric encoding of data that follows MQMDE
   15 MQMDE-ENCODING       PIC S9(9) BINARY.
**    Character-set identifier of data that follows MQMDE
   15 MQMDE-CODEDCHARSETID PIC S9(9) BINARY.
**    Format name of data that follows MQMDE
   15 MQMDE-FORMAT         PIC X(8).
**    General flags
   15 MQMDE-FLAGS          PIC S9(9) BINARY.
**    Group identifier
   15 MQMDE-GROUPID        PIC X(24).
**    Sequence number of logical message within group
   15 MQMDE-MSGSEQNUMBER   PIC S9(9) BINARY.
**    Offset of data in physical message from start of logical message
   15 MQMDE-OFFSET         PIC S9(9) BINARY.
**    Message flags
   15 MQMDE-MSGFLAGS       PIC S9(9) BINARY.
**    Length of original message
   15 MQMDE-ORIGINALLENGTH PIC S9(9) BINARY.
```

PL/I declaration for MQMDE

```
dcl
 1 MQMDE based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 StrucLength    fixed bin(31), /* Length of MQMDE structure */
  3 Encoding       fixed bin(31), /* Numeric encoding of data that
                                     follows MQMDE */
  3 CodedCharSetId fixed bin(31), /* Character-set identifier of data
                                     that follows MQMDE */
  3 Format         char(8),       /* Format name of data that follows
                                     MQMDE */
  3 Flags          fixed bin(31), /* General flags */
  3 GroupId        char(24),      /* Group identifier */
  3 MsgSeqNumber   fixed bin(31), /* Sequence number of logical message
                                     within group */
  3 Offset         fixed bin(31), /* Offset of data in physical message
                                     from start of logical message */
  3 MsgFlags       fixed bin(31), /* Message flags */
  3 OriginalLength fixed bin(31); /* Length of original message */
```

High Level Assembler declaration for MQMDE

```
MQMDE                    DSECT
MQMDE_STRUCID            DS   CL4   Structure identifier
MQMDE_VERSION            DS   F     Structure version number
MQMDE_STRUCLENGTH        DS   F     Length of MQMDE structure
MQMDE_ENCODING           DS   F     Numeric encoding of data that follows
*                                   MQMDE
MQMDE_CODEDCHARSETID     DS   F     Character-set identifier of data that
*                                   follows MQMDE
MQMDE_FORMAT             DS   CL8   Format name of data that follows MQMDE
MQMDE_FLAGS              DS   F     General flags
MQMDE_GROUPID            DS   XL24  Group identifier
MQMDE_MSGSEQNUMBER       DS   F     Sequence number of logical message
*                                   within group
MQMDE_OFFSET             DS   F     Offset of data in physical message from
*                                   start of logical message
MQMDE_MSGFLAGS           DS   F     Message flags
MQMDE_ORIGINALLENGTH     DS   F     Length of original message
*
MQMDE_LENGTH             EQU  *-MQMDE
                         ORG  MQMDE
MQMDE_AREA               DS   CL(MQMDE_LENGTH)
```

Visual Basic declaration for MQMDE

```
Type MQMDE
  StrucId        As String*4 'Structure identifier'
  Version        As Long     'Structure version number'
  StrucLength    As Long     'Length of MQMDE structure'
  Encoding       As Long     'Numeric encoding of data that follows'
                             'MQMDE'
  CodedCharSetId As Long     'Character-set identifier of data that'
                             'follows MQMDE'
  Format         As String*8 'Format name of data that follows MQMDE'
  Flags          As Long     'General flags'
  GroupId        As MQBYTE24 'Group identifier'
  MsgSeqNumber   As Long     'Sequence number of logical message within'
                             'group'
  Offset         As Long     'Offset of data in physical message from'
                             'start of logical message'
  MsgFlags       As Long     'Message flags'
  OriginalLength As Long     'Length of original message'
End Type
```

StrucId (MQCHAR4)

The value must be:

MQMDE_STRUC_ID
: Identifier for message descriptor extension structure.

For the C programming language, the constant MQMDE_STRUC_ID_ARRAY is also defined; this has the same value as MQMDE_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQMDE_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQMDE_VERSION_2
Version-2 message descriptor extension structure.

The following constant specifies the version number of the current version:

MQMDE_CURRENT_VERSION
Current version of message descriptor extension structure.

The initial value of this field is MQMDE_VERSION_2.

StrucLength (MQLONG)

This is the length of the MQMDE structure; the following value is defined:

MQMDE_LENGTH_2
Length of version-2 message descriptor extension structure.

The initial value of this field is MQMDE_LENGTH_2.

Encoding (MQLONG)

This specifies the numeric encoding of the data that follows the MQMDE structure; it does not apply to numeric data in the MQMDE structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that the field is valid. See the `Encoding` field described in "MQMD - Message descriptor" on page 413 for more information about data encodings.

The initial value of this field is MQENC_NATIVE.

CodedCharSetId (MQLONG)

This specifies the character set identifier of the data that follows the MQMDE structure; it does not apply to character data in the MQMDE structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that this field is valid. The following special value can be used:

MQCCSI_INHERIT
Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

MQCCSI_INHERIT cannot be used if the value of the `PutApplType` field in MQMD is MQAT_BROKER.

This value is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ clients connected to these systems.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This specifies the format name of the data that follows the MQMDE structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that this field is valid. See the *Format* field described in“MQMD - Message descriptor” on page 413for more information about format names.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The following flag can be specified:

MQMDEF_NONE
No flags.

The initial value of this field is MQMDEF_NONE.

GroupId (MQBYTE24)

See the *GroupId* field described in“MQMD - Message descriptor” on page 413. The initial value of this field is MQGI_NONE.

MsgSeqNumber (MQLONG)

See the *MsgSeqNumber* field described in“MQMD - Message descriptor” on page 413. The initial value of this field is 1.

Offset (MQLONG)

See the *Offset* field described in“MQMD - Message descriptor” on page 413. The initial value of this field is 0.

MsgFlags (MQLONG)

See the *MsgFlags* field described in “MQMD - Message descriptor” on page 413. The initial value of this field is MQMF_NONE.

OriginalLength (MQLONG)

See the *OriginalLength* field described in“MQMD - Message descriptor” on page 413. The initial value of this field is MQOL_UNDEFINED.

MQMHBO - Message handle to buffer options

The MQMHBO structure allows applications to specify options that control how buffers are produced from message handles. The structure is an input parameter on the MQMHBUF call.

Character set and encoding

Data in MQMHBO must be in the character set of the application and encoding of the application (MQENC_NATIVE).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 504. Fields in MQMHBO		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
StrucId (structure identifier)	MQMHBO_STRUC_ID	'MHBO'
Version (structure version number)	MQMHBO_VERSION_1	1
Options (options controlling the action of MQMHBUF)	MQMHBO_PROPERTIES_IN_MQRFH2	

Notes:

1. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
2. In the C programming language, the macro variable MQMHBO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQMHBO MyMHBO = {MQMHBO_DEFAULT};
```

Language declarations

C declaration for MQMHBO

```
typedef struct tagMQMHBO MQMHBO;
struct tagMQMHBO {
  MQCHAR4  StrucId;        /* Structure identifier */
  MQLONG   Version;        /* Structure version number */
  MQLONG   Options;        /* Options that control the action of
                              MQMHBUF */
};
```

COBOL declaration for MQMHBO

```
**  MQMHBO structure
  10 MQMHBO.
**    Structure identifier
   15 MQMHBO-STRUCID                PIC X(4).
**    Structure version number
   15 MQMHBO-VERSION                PIC S9(9) BINARY.
**    Options that control the action of MQMHBUF
   15 MQMHBO-OPTIONS                PIC S9(9) BINARY.
```

PL/I declaration for MQMHBO

```
Dcl
 1 MQMHBO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action
                                     of MQMHBUF */
```

High Level Assembler declaration for MQMHBO

```
MQMHBO                      DSECT
MQMHBO_STRUCID              DS   CL4  Structure identifier
MQMHBO_VERSION              DS   F    Structure version number
MQMHBO_OPTIONS              DS   F    Options that control the
*                                     action of MQMHBUF
MQMHBO_LENGTH               EQU  *-MQMHBO
MQMHBO_AREA                 DS   CL(MQMHBO_LENGTH)
```

StrucId (MQCHAR4)

Message handle to buffer options structure - StrucId field

This is the structure identifier. The value must be:

MQMHBO_STRUC_ID
: Identifier for message handle to buffer options structure.

  For the C programming language, the constant MQMHBO_STRUC_ID_ARRAY is also defined; this has the same value as MQMHBO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQMHBO_STRUC_ID.

Version (MQLONG)

Message handle to buffer options structure - Version field

This is the structure version number. The value must be:

MQMHBO_VERSION_1
: Version number for message handle to buffer options structure.

The following constant specifies the version number of the current version:

MQMHBO_CURRENT_VERSION
: Current version of message handle to buffer options structure.

This is always an input field. The initial value of this field is MQMHBO_VERSION_1.

Options (MQLONG)

Message handle to buffer options structure - Options field

These options control the action of MQMHBUF.

You must specify the following option:

MQMHBO_PROPERTIES_IN_MQRFH2
: When converting properties from a message handle into a buffer, convert them into the MQRFH2 format.

Optionally, you can also specify the following option. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

MQMHBO_DELETE_PROPERTIES
: Properties that are added to the buffer are deleted from the message handle. If the call fails no properties are deleted.

This is always an input field. The initial value of this field is MQMHBO_PROPERTIES_IN_MQRFH2.

MQOD - Object descriptor

The MQOD structure is used to specify an object by name. The structure is an input/output parameter on the MQOPEN and MQPUT1 calls.
The following types of object are valid:

- Queue or distribution list
- Namelist
- Process definition
- Queue manager
- Topic

Availability

All IBM MQ systems, plus IBM MQ MQI clients connected to those systems.

Version

The current version of MQOD is MQOD_VERSION_4. Applications that you want to port between several environments must ensure that the required version of MQOD is supported in all the environments concerned. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most-recent version of MQOD that is supported by the environment, but with the initial value of the *Version* field set to MQOD_VERSION_1. To use fields that are not present in the version-1 structure, the application must set the *Version* field to the version number of the version required.

To open a distribution list, *Version* must be MQOD_VERSION_2 or greater.

Character set and encoding

Data in MQOD must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQOD_STRUC_ID	'OD¬¬'
Version (structure version number)	MQOD_VERSION_1	1
ObjectType (object type)	MQOT_Q	1
ObjectName (object name)	None	Null string or blanks
ObjectQMgrName (object queue manager name)	None	Null string or blanks
DynamicQName (dynamic queue name)	None	'CSQ.*' on z/OS ; 'AMQ.*' otherwise
AlternateUserId (alternate user identifier)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQOD_VERSION_2.		
RecsPresent (number of object records present)	None	0
KnownDestCount (number of local queues opened successfully)	None	0
UnknownDestCount (number of remote queues opened successfully)	None	0
InvalidDestCount (number of queues that failed to open)	None	0
ObjectRecOffset (offset of first object record from start of MQOD)	None	0
ResponseRecOffset (offset of first response record from start of MQOD)	None	0
ObjectRecPtr (address of first object record)	None	Null pointer or null bytes
ResponseRecPtr (address of first response record)	None	Null pointer or null bytes

Field name and description	Name of constant	Initial value (if any) of constant
Note: The remaining fields are ignored if *Version* is less than MQOD_VERSION_3.		
AlternateSecurityId (alternate security identifier)	MQSID_NONE	Nulls
ResolvedQName (resolved queue name)	None	Null string or blanks
ResolvedQMgrName (resolved queue manager name)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQOD_VERSION_4.		
ObjectString (long object name)	MQCHARV_DEFAULT	As defined for MQCHARV
SelectionString (selection string)	MQCHARV_DEFAULT	As defined for MQCHARV
ResObjectString (resolved long object name)	MQCHARV_DEFAULT	As defined for MQCHARV
ResolvedType (resolved object type)	MQOT_NONE	0

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQOD_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQOD MyOD = {MQOD_DEFAULT};
```

Language declarations

C declaration for MQOD

```
typedef struct tagMQOD MQOD;
struct tagMQOD {
  MQCHAR4    StrucId;              /* Structure identifier */
  MQLONG     Version;              /* Structure version number */
  MQLONG     ObjectType;           /* Object type */
  MQCHAR48   ObjectName;           /* Object name */
  MQCHAR48   ObjectQMgrName;       /* Object queue manager name */
  MQCHAR48   DynamicQName;         /* Dynamic queue name */
  MQCHAR12   AlternateUserId;      /* Alternate user identifier */
  /* Ver:1 */
  MQLONG     RecsPresent;          /* Number of object records present */
  MQLONG     KnownDestCount;       /* Number of local queues opened
                                      successfully */
  MQLONG     UnknownDestCount;     /* Number of remote queues opened
                                      successfully */
  MQLONG     InvalidDestCount;     /* Number of queues that failed to
                                      open */
  MQLONG     ObjectRecOffset;      /* Offset of first object record from
                                      start of MQOD */
  MQLONG     ResponseRecOffset;    /* Offset of first response record
                                      from start of MQOD */
  MQPTR      ObjectRecPtr;         /* Address of first object record */
  MQPTR      ResponseRecPtr;       /* Address of first response record */
  /* Ver:2 */
  MQBYTE40   AlternateSecurityId;  /* Alternate security identifier */
  MQCHAR48   ResolvedQName;        /* Resolved queue name */
```

```
  MQCHAR48   ResolvedQMgrName;     /* Resolved queue manager name */
  /* Ver:3 */
  MQCHARV    ObjectString;         /* Object Long name */
  MQCHARV    SelectionString;      /* Message Selector */
  MQCHARV    ResObjectString;      /* Resolved Long object name*/
  MQLONG     ResolvedType          /* Alias queue resolved
                                      oject type */
  /* Ver:4 */
};
```

COBOL declaration for MQOD

```
** MQOD structure
 10  MQOD.
** Structure identifier
 15  MQOD-STRUCID                     PIC X(4).
** Structure version number
 15  MQOD-VERSION                     PIC S9(9) BINARY.
** Object type
 15  MQOD-OBJECTTYPE                  PIC S9(9) BINARY.
** Object name
 15  MQOD-OBJECTNAME                  PIC X(48).
** Object queue manager name
 15  MQOD-OBJECTQMGRNAME              PIC X(48).
** Dynamic queue name
 15  MQOD-DYNAMICQNAME                PIC X(48).
** Alternate user identifier
 15  MQOD-ALTERNATEUSERID             PIC X(12).
** Number of object records present
 15  MQOD-RECSPRESENT                 PIC S9(9) BINARY.
** Number of local queues opened successfully
 15  MQOD-KNOWNDESTCOUNT              PIC S9(9) BINARY.
** Number of remote queues opened successfully
 15  MQOD-UNKNOWNDESTCOUNT            PIC S9(9) BINARY.
** Number of queues that failed to open
 15  MQOD-INVALIDDESTCOUNT            PIC S9(9) BINARY.
** Offset of first object record from start of MQOD
 15  MQOD-OBJECTRECOFFSET             PIC S9(9) BINARY.
** Offset of first response record from start of MQOD
 15  MQOD-RESPONSERECOFFSET           PIC S9(9) BINARY.
** Address of first object record
 15  MQOD-OBJECTRECPTR                POINTER.
** Address of first response record
 15  MQOD-RESPONSERECPTR              POINTER.
** Alternate security identifier
 15  MQOD-ALTERNATESECURITYID         PIC X(40).
** Resolved queue name
 15  MQOD-RESOLVEDQNAME               PIC X(48).
** Resolved queue manager name
 15  MQOD-RESOLVEDQMGRNAME            PIC X(48).
** Object Long name
 15 MQOD-OBJECTSTRING.
** Address of variable length string
   20  MQOD-OBJECTSTRING-VSPTR        POINTER.
** Offset of variable length string
   20  MQOD-OBJECTSTRING-VSOFFSET     PIC S9(9) BINARY.
** size of buffer
   20  MQOD-OBJECTSTRING-VSBUFSIZE    PIC S9(9) BINARY.
** Length of variable length string
   20  MQOD-OBJECTSTRING-VSLENGTH     PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQOD-OBJECTSTRING-VSCCSID      PIC S9(9) BINARY.
** Message Selector
 15 MQOD-SELECTIONSTRING.
** Address of variable length string
   20  MQOD-SELECTIONSTRING-VSPTR     POINTER.
** Offset of variable length string
   20  MQOD-SELECTIONSTRING-VSOFFSET  PIC S9(9) BINARY.
** size of buffer
   20  MQOD-SELECTIONSTRING-VSBUFSIZE PIC S9(9) BINARY.
** Length of variable length string
   20  MQOD-SELECTIONSTRING-VSLENGTH  PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQOD-SELECTIONSTRING-VSCCSID   PIC S9(9) BINARY.
** Resolved Long object name
 15 MQOD-RESOBJECTSTRING.
** Address of variable length string
   20  MQOD-RESOBJECTSTRING-VSPTR     POINTER.
** Offset of variable length string
```

```
   20  MQOD-RESOBJECTSTRING-VSOFFSET  PIC S9(9) BINARY.
** size of buffer
   20  MQOD-RESOBJECTSTRING-VSBUFSIZE PIC S9(9) BINARY.
** Length of variable length string
   20  MQOD-RESOBJECTSTRING-VSLENGTH  PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQOD-RESOBJECTSTRING-VSCCSID   PIC S9(9) BINARY.
** Alias queue resolved object type
   15  MQOD-RESOLVEDTYPE              PIC S9(9) BINARY.
```

PL/I declaration for MQOD

```
dcl
 1 MQOD based,
  3 StrucId             char(4),        /* Structure identifier */
  3 Version             fixed bin(31), /* Structure version number */
  3 ObjectType          fixed bin(31), /* Object type */
  3 ObjectName          char(48),       /* Object name */
  3 ObjectQMgrName      char(48),       /* Object queue manager name */
  3 DynamicQName        char(48),       /* Dynamic queue name */
  3 AlternateUserId     char(12),       /* Alternate user identifier */
  3 RecsPresent         fixed bin(31), /* Number of object records
                                          present */
  3 KnownDestCount      fixed bin(31), /* Number of local queues opened
                                          successfully */
  3 UnknownDestCount    fixed bin(31), /* Number of remote queues opened
                                          successfully */
  3 InvalidDestCount    fixed bin(31), /* Number of queues that failed to
                                          open */
  3 ObjectRecOffset     fixed bin(31), /* Offset of first object record
                                          from start of MQOD */
  3 ResponseRecOffset   fixed bin(31), /* Offset of first response record
                                          from start of MQOD */
  3 ObjectRecPtr        pointer,        /* Address of first object record */
  3 ResponseRecPtr      pointer,        /* Address of first response
                                          record */
  3 AlternateSecurityId char(40),       /* Alternate security identifier */
  3 ResolvedQName       char(48),       /* Resolved queue name */
  3 ResolvedQMgrName    char(48),       /* Resolved queue manager name */
  3 ObjectString,                       /* Object Long name */
   5 VSPtr              pointer,        /* Address of variable length string */
   5 VSOffset           fixed bin(31), /* Offset of variable length string */
   5 VSBufSize          fixed bin(31), /* size of buffer */
   5 VSLength           fixed bin(31), /* Length of variable length string */
   5 VSCCSID            fixed bin(31), /* CCSID of variable length string */
  3 SelectionString,                    /* Message Selection */
   5 VSPtr              pointer,        /* Address of variable length string */
   5 VSOffset           fixed bin(31), /* Offset of variable length string */
   5 VSBufSize          fixed bin(31), /* size of buffer */
   5 VSLength           fixed bin(31), /* Length of variable length string */
   5 VSCCSID            fixed bin(31), /* CCSID of variable length string */
  3 ResObjectString,                    /* Resolved Long object name */
   5 VSPtr              pointer,        /* Address of variable length string */
   5 VSOffset           fixed bin(31), /* Offset of variable length string */
   5 VSBufSize          fixed bin(31), /* size of buffer */
   5 VSLength           fixed bin(31), /* Length of variable length string */
   5 VSCCSID            fixed bin(31), /* CCSID of variable length string */
  3 ResolvedType        fixed bin(31); /* Alias queue resolved object type */
```

High Level Assembler declaration for MQOD

```
MQOD                           DSECT
MQOD_STRUCID                   DS   CL4   Structure identifier
MQOD_VERSION                   DS   F     Structure version number
MQOD_OBJECTTYPE                DS   F     Object type
MQOD_OBJECTNAME                DS   CL48  Object name
MQOD_OBJECTQMGRNAME            DS   CL48  Object queue manager name
MQOD_DYNAMICQNAME              DS   CL48  Dynamic queue name
MQOD_ALTERNATEUSERID           DS   CL12  Alternate user identifier
MQOD_RECSPRESENT               DS   F     Number of object records present
MQOD_KNOWNDESTCOUNT            DS   F     Number of local queues opened
*                                         successfully
MQOD_UNKNOWNDESTCOUNT          DS   F     Number of remote queues opened
*                                         successfully
MQOD_INVALIDDESTCOUNT          DS   F     Number of queues that failed to
*                                         open
MQOD_OBJECTRECOFFSET           DS   F     Offset of first object record from
```

```
*                                          start of MQOD
MQOD_RESPONSERECOFFSET         DS   F     Offset of first response record
*                                          from start of MQOD
MQOD_OBJECTRECPTR              DS   F     Address of first object record
MQOD_RESPONSERECPTR            DS   F     Address of first response record
MQOD_ALTERNATESECURITYID       DS   XL40  Alternate security identifier
MQOD_RESOLVEDQNAME             DS   CL48  Resolved queue name
MQOD_RESOLVEDQMGRNAME          DS   CL48  Resolved queue manager name
MQOD_OBJECTSTRING              DS   F     Object Long name
MQOD_OBJECTSTRING_VSPTR        DS   F     Address of variable length string
MQOD_OBJECTSTRING_VSOFFSET     DS   F     Offset of variable length string
MQOD_OBJECTSTRING_VSBUFSIZE    DS   F     size of buffer
MQOD_OBJECTSTRING_VSLENGTH     DS   F     Length of variable length string
MQOD_OBJECTSTRING_VSCCSID      DS   F     CCSID of variable length string
MQOD_OBJECTSTRING_LENGTH       EQU  *- MQOD_OBJECTSTRING
                               ORG  MQOD_OBJECTSTRING
MQOD_OBJECTSTRING_AREA         DS   CL(MQOD_OBJECTSTRING_LENGTH)
*
MQOD_SELECTIONSTRING           DS   F     Message Selector
MQOD_SELECTIONSTRING_VSPTR     DS   F     Address of variable length string
MQOD_SELECTIONSTRING_VSOFFSET  DS   F     Offset of variable length string
MQOD_SELECTIONSTRING_VSBUFSIZE DS   F     size of buffer
MQOD_SELECTIONSTRING_VSLENGTH  DS   F     Length of variable length string
MQOD_SELECTIONSTRING_VSCCSID   DS   F     CCSID of variable length string
MQOD_SELECTIONSTRING_LENGTH    EQU  *- MQOD_SELECTIONSTRING
                               ORG  MQOD_SELECTIONSTRING
MQOD_SELECTIONSTRING_AREA      DS   CL(MQOD_SELECTIONSTRING_LENGTH)
*
MQOD_RESOBJECTSTRING           DS   F     Resolved Long object name
MQOD_RESOBJECTSTRING_VSPTR     DS   F     Address of variable length string
MQOD_RESOBJECTSTRING_VSOFFSET  DS   F     Offset of variable length string
MQOD_RESOBJECTSTRING_VSBUFSIZE DS   F     size of buffer
MQOD_RESOBJECTSTRING_VSLENGTH  DS   F     Length of variable length string
MQOD_RESOBJECTSTRING_VSCCSID   DS   F     CCSID of variable length string
MQOD_RESOBJECTSTRING_LENGTH    EQU  *- MQOD_RESOBJECTSTRING
                               ORG  MQOD_RESOBJECTSTRING
MQOD_RESOBJECTSTRING_AREA      DS   CL(MQOD_RESOBJECTSTRING_LENGTH)
MQOD_RESOLVEDTYPE              DS   F     Alias queue object resolved type
*
MQOD_LENGTH                    EQU  *-MQOD
                               ORG  MQOD
MQOD_AREA                      DS   CL(MQOD_LENGTH)
```

Visual Basic declaration for MQOD

```
Type MQOD
  StrucId             As String*4  'Structure identifier'
  Version             As Long      'Structure version number'
  ObjectType          As Long      'Object type'
  ObjectName          As String*48 'Object name'
  ObjectQMgrName      As String*48 'Object queue manager name'
  DynamicQName        As String*48 'Dynamic queue name'
  AlternateUserId     As String*12 'Alternate user identifier'
  RecsPresent         As Long      'Number of object records present'
  KnownDestCount      As Long      'Number of local queues opened'
                                   'successfully'
  UnknownDestCount    As Long      'Number of remote queues opened'
                                   'successfully'
  InvalidDestCount    As Long      'Number of queues that failed to'
                                   'open'
  ObjectRecOffset     As Long      'Offset of first object record from'
                                   'start of MQOD'
  ResponseRecOffset   As Long      'Offset of first response record'
                                   'from start of MQOD'
  ObjectRecPtr        As MQPTR     'Address of first object record'
  ResponseRecPtr      As MQPTR     'Address of first response record'
  AlternateSecurityId As MQBYTE40  'Alternate security identifier'
  ResolvedQName       As String*48 'Resolved queue name'
  ResolvedQMgrName    As String*48 'Resolved queue manager name'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQOD_STRUC_ID
Identifier for object descriptor structure.

For the C programming language, the constant MQOD_STRUC_ID_ARRAY is also defined; this has the same value as MQOD_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQOD_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be one of the following:

MQOD_VERSION_1
Version-1 object descriptor structure.

MQOD_VERSION_2
Version-2 object descriptor structure.

MQOD_VERSION_3
Version-3 object descriptor structure.

MQOD_VERSION_4
Version-4 object descriptor structure.

All versions are supported in all IBM MQ V7.0 environments.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQOD_CURRENT_VERSION
Current version of object descriptor structure.

This is always an input field. The initial value of this field is MQOD_VERSION_1.

ObjectType (MQLONG)

The type of object being named in the object descriptor. Possible values are:

MQOT_CLNTCONN_CHANNEL
Client connection channel. The name of the object is found in the *ObjectName* field.

MQOT_Q
Queue. The name of the object is found in the *ObjectName* field.

MQOT_NAMELIST
Namelist. The name of the object is found in the *ObjectName* field

MQOT_PROCESS
Process definition. The name of the object is found in the *ObjectName* field

MQOT_Q_MGR
Queue manager. The name of the object is found in the *ObjectName* field

MQOT_TOPIC
Topic. The full topic name can be built from two different fields: *ObjectName* and *ObjectString*.

For details of how those two fields are used, see Combining topic strings.

This is always an input field. The initial value of this field is MQOT_Q.

ObjectName (MQCHAR48)

This is the local name of the object as defined on the queue manager identified by *ObjectQMgrName*. The name can contain the following characters:

- Uppercase alphabetic characters (A through Z)
- Lowercase alphabetic characters (a through z)
- Numeric digits (0 through 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but can contain trailing blanks. Use a null character to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply in the environments indicated:

- On systems that use EBCDIC Katakana, lowercase characters cannot be used.
- On z/OS:
  - Avoid names that begin or end with an underscore; they cannot be processed by the operations and control panels.
  - The percent character has a special meaning to RACF. If RACF is used as the external security manager, names must not contain the percent. If they do, those names are not included in any security checks when RACF generic profiles are used.
- On IBM i, names containing lowercase characters, forward slash, or percent, must be enclosed in quotation marks when specified on commands. These quotation marks must not be specified for names that occur as fields in structures or as parameters on calls.

The full topic name can be built from two different fields: `ObjectName` and `ObjectString`. For details of how these two fields are used, see Combining topic strings.

The following points apply to the types of object indicated:

- If `ObjectName` is the name of a model queue, the queue manager creates a dynamic queue with the attributes of the model queue, and returns in the `ObjectName` field the name of the queue created. A model queue can be specified only on the MQOPEN call; a model queue is not valid on the MQPUT1 call.
- If `ObjectName` is the name of an alias queue with TARGTYPE(TOPIC), a security check is first made on the named alias queue; this is normal when alias queues are used. When the security check completes successfully, the MQOPEN call will continue and will behave like an MQOPEN call on an MQOT_TOPIC; this includes making a security check against the administrative topic object.
- If `ObjectName` and `ObjectQMgrName` identify a shared queue owned by the queue sharing group to which the local queue manager belongs, there must not also be a queue definition of the same name on the local queue manager. If there is such a definition (a local queue, alias queue, remote queue, or model queue), the call fails with reason code MQRC_OBJECT_NOT_UNIQUE.
- If the object being opened is a distribution list (that is, `RecsPresent` is present and greater than zero), `ObjectName` must be blank or the null string. If this condition is not satisfied, the call fails with reason code MQRC_OBJECT_NAME_ERROR.
- If `ObjectType` is MQOT_Q_MGR, special rules apply; in this case the name must be entirely blank up to the first null character or the end of the field.

This is an input/output field for the MQOPEN call when `ObjectName` is the name of a model queue, and an input-only field in all other cases. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

ObjectQMgrName (MQCHAR48)

This is the name of the queue manager on which the `ObjectName` object is defined. The characters that are valid in the name are the same as those for `ObjectName` (see "ObjectName (MQCHAR48)" on page 477). A name that is entirely blank up to the first null character or the end of the field denotes the queue manager to which the application is connected (the local queue manager).

The following points apply to the types of object indicated:

- If `ObjectType` is MQOT_TOPIC, MQOT_NAMELIST, MQOT_PROCESS, or MQOT_Q_MGR, `ObjectQMgrName` must be blank or the name of the local queue manager.
- If `ObjectName` is the name of a model queue, the queue manager creates a dynamic queue with the attributes of the model queue, and returns in the `ObjectQMgrName` field the name of the queue manager on which the queue is created; this is the name of the local queue manager. A model queue can be specified only on the MQOPEN call; a model queue is not valid on the MQPUT1 call.

- If *ObjectName* is the name of a cluster queue, and *ObjectQMgrName* is blank, the destination of messages sent using the queue handle returned by the MQOPEN call is chosen by the queue manager (or cluster workload exit, if one is installed) as follows:
  - If MQOO_BIND_ON_OPEN is specified, the queue manager selects a particular instance of the cluster queue while processing the MQOPEN call, and all messages put using this queue handle are sent to that instance.
  - If MQOO_BIND_NOT_FIXED is specified, the queue manager can choose a different instance of the destination queue (residing on a different queue manager in the cluster) for each successive MQPUT call that uses this queue handle.

  If the application needs to send a message to a *specific* instance of a cluster queue (that is, a queue instance that resides on a particular queue manager in the cluster), the application must specify the name of that queue manager in the *ObjectQMgrName* field. This forces the local queue manager to send the message to the specified destination queue manager.
- If *ObjectName* is the name of a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *ObjectQMgrName* can be the name of the queue sharing group, the name of the local queue manager, or blank; the message is placed on the same queue whichever of these values is specified.

  Queue sharing groups are supported only on z/OS.
- If *ObjectName* is the name of a shared queue that is owned by a remote queue sharing group (that is, a queue sharing group to which the local queue manager does not belong), *ObjectQMgrName* must be the name of the queue sharing group. You can use the name of a queue manager that belongs to that group, but this can delay the message if that particular queue manager is not available when the message arrives at the queue sharing group.
- If the object being opened is a distribution list (that is, *RecsPresent* is greater than zero), *ObjectQMgrName* must be blank or the null string. If this condition is not satisfied, the call fails with reason code MQRC_OBJECT_Q_MGR_NAME_ERROR.

This is an input/output field for the MQOPEN call when *ObjectName* is the name of a model queue, and an input-only field in all other cases. The length of this field is given by MQ_Q_MGR_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

DynamicQName (MQCHAR48)

This is the name of a dynamic queue that is to be created by the MQOPEN call. This is of relevance only when *ObjectName* specifies the name of a model queue; in all other cases *DynamicQName* is ignored.

The characters that are valid in the name are the same as those for *ObjectName*, except that an asterisk is also valid. A name that is blank (or one in which only blanks occur before the first null character) is not valid if *ObjectName* is the name of a model queue.

If the last nonblank character in the name is an asterisk (*), the queue manager replaces the asterisk with a string of characters that guarantees that the name generated for the queue is unique at the local queue manager. To allow a sufficient number of characters for this, the asterisk is valid only in positions 1 through 33. There must be no characters other than blanks or a null character following the asterisk.

It is valid for the asterisk to occur in the first character position, in which case the name consists solely of the characters generated by the queue manager.

On z/OS, do not use a name with the asterisk in the first character position, as there can be no security checks made on a queue with a full name that is generated automatically.

This is an input field. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is determined by the environment:

- On z/OS, the value is `'CSQ.*'`.
- On other platforms, the value is `'AMQ.*'`.

The value is a null-terminated string in C, and a blank-padded string in other programming languages.

AlternateUserId (MQCHAR12)

If you specify MQOO_ALTERNATE_USER_AUTHORITY for the MQOPEN call, or MQPMO_ALTERNATE_USER_AUTHORITY for the MQPUT1 call, this field contains an alternative user identifier that is used to check the authorization for the open, in place of the user identifier that the application is currently running under. Some checks, however, are still carried out with the current user identifier (for example, context checks).

If MQOO_ALTERNATE_USER_AUTHORITY or MQPMO_ALTERNATE_USER_AUTHORITY is specified and this field is entirely blank up to the first null character or the end of the field, the open can succeed only if no user authorization is needed to open this object with the options specified.

If neither MQOO_ALTERNATE_USER_AUTHORITY nor MQPMO_ALTERNATE_USER_AUTHORITY is specified, this field is ignored.

The following differences exist in the environments indicated:

- On z/OS, only the first 8 characters of *AlternateUserId* are used to check the authorization for the open. However, the current user identifier must be authorized to specify this particular alternative user identifier; all 12 characters of the alternative user identifier are used for this check. The user identifier must contain only characters allowed by the external security manager.

  If *AlternateUserId* is specified for a queue, the value can be used subsequently by the queue manager when messages are put. If the MQPMO_*_CONTEXT options specified on the MQPUT or MQPUT1 call cause the queue manager to generate the identity context information, the queue manager places the *AlternateUserId* into the *UserIdentifier* field in the MQMD of the message, in place of the current user identifier.
- In other environments, *AlternateUserId* is used only for access control checks on the object being opened. If the object is a queue, *AlternateUserId* does not affect the content of the *UserIdentifier* field in the MQMD of messages sent using that queue handle.

This is an input field. The length of this field is given by MQ_USER_ID_LENGTH. The initial value of this field is the null string in C, and 12 blank characters in other programming languages.

RecsPresent (MQLONG)

This is the number of MQOR object records that have been provided by the application. If this number is greater than zero, it indicates that a distribution list is being opened, with *RecsPresent* being the number of destination queues in the list. A distribution list can contain only one destination.

The value of *RecsPresent* must not be less than zero, and if it is greater than zero *ObjectType* must be MQOT_Q; the call fails with reason code MQRC_RECS_PRESENT_ERROR if these conditions are not satisfied.

On z/OS, this field must be zero.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_2.

KnownDestCount (MQLONG)

This is the number of queues in the distribution list that resolve to local queues and that were opened successfully. The count does not include queues that resolve to remote queues (even though a local transmission queue is used initially to store the message). If present, this field is also set when opening a single queue that is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_1.

UnknownDestCount (MQLONG)

This is the number of queues in the distribution list that resolve to remote queues and that were opened successfully. If present, this field is also set when opening a single queue that is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_1.

InvalidDestCount (MQLONG)

This is the number of queues in the distribution list that failed to open successfully. If present, this field is also set when opening a single queue that is not in a distribution list.

Note: If present, this field is set only if the **CompCode** parameter on the MQOPEN or MQPUT1 call is MQCC_OK or MQCC_WARNING; it is not set if the **CompCode** parameter is MQCC_FAILED.

This is an output field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_1.

ObjectRecOffset (MQLONG)

This is the offset in bytes of the first MQOR object record from the start of the MQOD structure. The offset can be positive or negative. *ObjectRecOffset* is used only when a distribution list is being opened. The field is ignored if *RecsPresent* is zero.

When a distribution list is being opened, an array of one or more MQOR object records must be provided in order to specify the names of the destination queues in the distribution list. This can be done in one of two ways:

- By using the offset field *ObjectRecOffset*.

  In this case, the application must declare its own structure containing an MQOD followed by the array of MQOR records (with as many array elements as are needed), and set *ObjectRecOffset* to the offset of the first element in the array from the start of the MQOD. Ensure that this offset is correct and has a value that can be accommodated within an MQLONG (the most restrictive programming language is COBOL, for which the valid range is -999 999 999 through +999 999 999).

  Use *ObjectRecOffset* for programming languages that do not support the pointer data type, or that implement the pointer data type in a way that is not portable to different environments (for example, the COBOL programming language).
- By using the pointer field *ObjectRecPtr*.

  In this case, the application can declare the array of MQOR structures separately from the MQOD structure, and set *ObjectRecPtr* to the address of the array.

  Use *ObjectRecPtr* for programming languages that support the pointer data type in a way that is portable to different environments (for example, the C programming language).

Whatever technique you choose, use one of *ObjectRecOffset* and *ObjectRecPtr* ; the call fails with reason code MQRC_OBJECT_RECORDS_ERROR if both are zero, or both are nonzero.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_2.

ResponseRecOffset (MQLONG)

This is the offset in bytes of the first MQRR response record from the start of the MQOD structure. The offset can be positive or negative. *ResponseRecOffset* is used only when a distribution list is being opened. The field is ignored if *RecsPresent* is zero.

When a distribution list is being opened, you can provide an array of one or more MQRR response records in order to identify the queues that failed to open (*CompCode* field in MQRR), and the reason for each failure (*Reason* field in MQRR). The data is returned in the array of response records in the same order as the queue names occur in the array of object records. The queue manager sets the response records only when the outcome of the call is mixed (that is, some queues were opened successfully while others failed, or all failed but for different reasons); reason code MQRC_MULTIPLE_REASONS from the call indicates this case. If the same reason code applies to all queues, that reason is returned in the **Reason** parameter of the MQOPEN or MQPUT1 call, and the response records are not set. Response records are optional, but if they are supplied there must be *RecsPresent* of them.

The response records can be provided in the same way as the object records, either by specifying an offset in *ResponseRecOffset*, or by specifying an address in *ResponseRecPtr* ; for details of how to do this, see "ObjectRecOffset (MQLONG)" on page 481. However, no more than one of *ResponseRecOffset* and *ResponseRecPtr* can be used; the call fails with reason code MQRC_RESPONSE_RECORDS_ERROR if both are nonzero.

For the MQPUT1 call, these response records are used to return information about errors that occur when the message is sent to the queues in the distribution list, as well as errors that occur when the queues are opened. The completion code and reason code from the put operation for a queue replace those from the open operation for that queue only if the completion code from the latter was MQCC_OK or MQCC_WARNING.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQOD_VERSION_2.

ObjectRecPtr (MQPTR)

This is the address of the first MQOR object record. *ObjectRecPtr* is used only when a distribution list is being opened. The field is ignored if *RecsPresent* is zero.

You can use either *ObjectRecPtr* or *ObjectRecOffset* to specify the object records, but not both; for the description of the *ObjectRecOffset* field, see "ObjectRecOffset (MQLONG)" on page 481. If you do not use *ObjectRecPtr*, set it to the null pointer or null bytes.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if *Version* is less than MQOD_VERSION_2.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length, with the initial value being the all-null byte string.

ResponseRecPtr (MQPTR)

This is the address of the first MQRR response record. *ResponseRecPtr* is used only when a distribution list is being opened. The field is ignored if *RecsPresent* is zero.

Use either *ResponseRecPtr* or *ResponseRecOffset* to specify the response records, but not both; for details, see "ResponseRecOffset (MQLONG)" on page 481. If you do not use *ResponseRecPtr*, set it to the null pointer or null bytes.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if *Version* is less than MQOD_VERSION_2.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length, with the initial value being the all-null byte string.

AlternateSecurityId (MQBYTE40)

This is a security identifier that is passed with the *AlternateUserId* to the authorization service to allow appropriate authorization checks to be performed. *AlternateSecurityId* is used only if:

- MQOO_ALTERNATE_USER_AUTHORITY is specified on the MQOPEN call, or
- MQPMO_ALTERNATE_USER_AUTHORITY is specified on the MQPUT1 call,

and the *AlternateUserId* field is not entirely blank up to the first null character or the end of the field.

On Windows, *AlternateSecurityId* can be used to supply the Windows security identifier (SID) that uniquely identifies the *AlternateUserId*. The SID for a user can be obtained from the Windows system by use of the `LookupAccountName()` Windows API call.

On z/OS, this field is ignored.

The *AlternateSecurityId* field has the following structure:

- The first byte is a binary integer containing the length of the significant data that follows; the value excludes the length byte itself. If no security identifier is present, the length is zero.
- The second byte indicates the type of security identifier that is present; the following values are possible:

  MQSIDT_NT_SECURITY_ID
  Windows security identifier.

  MQSIDT_NONE
  No security identifier.
- The third and subsequent bytes up to the length defined by the first byte contain the security identifier itself.
- Remaining bytes in the field are set to binary zero.

You can use the following special value:

MQSID_NONE
No security identifier specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQSID_NONE_ARRAY is also defined; this has the same value as MQSID_NONE, but is an array of characters instead of a string.

This is an input field. The length of this field is given by MQ_SECURITY_ID_LENGTH. The initial value of this field is MQSID_NONE. This field is ignored if *Version* is less than MQOD_VERSION_3.

ResolvedQName (MQCHAR48)

This is the name of the destination queue after the local queue manager resolves the name. The name returned is the name of a queue that exists on the queue manager identified by *ResolvedQMgrName*.

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *ResolvedQName* is set to blanks:

- Not a queue
- A queue, but not opened for browse, input, or output
- A distribution list
- An alias queue that references a topic object (refer to ResObjectString instead).
- An alias queue that resolves to a topic object.

This is an output field. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages. This field is ignored if *Version* is less than MQOD_VERSION_3.

ResolvedQMgrName (MQCHAR48)

This is the name of the destination queue manager after the local queue manager resolves the name. The name returned is the name of the queue manager that owns the queue identified by *ResolvedQName*. *ResolvedQMgrName* can be the name of the local queue manager.

If *ResolvedQName* is a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *ResolvedQMgrName* is the name of the queue sharing group. If the queue is owned by some other queue sharing group, *ResolvedQName* can be the name of the queue sharing group or the name of a queue manager that is a member of the queue sharing group (the nature of the value returned is determined by the queue definitions that exist at the local queue manager).

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *ResolvedQMgrName* is set to blanks:

- Not a queue
- A queue, but not opened for browse, input, or output

- A cluster queue with MQOO_BIND_NOT_FIXED specified (or with MQOO_BIND_AS_Q_DEF in effect when the **DefBind** queue attribute has the value MQBND_BIND_NOT_FIXED)
- A distribution list

This is an output field. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages. This field is ignored if *Version* is less than MQOD_VERSION_3.

ObjectString (MQCHARV)

The ObjectString field specifies the long object name.

This specifies the long object name to be used. This field is only referenced for certain values of *ObjectType*, and is ignored for all other values. See the description of *ObjectType* for details of which values indicate that this field is used.

If *ObjectString* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code MQRC_OBJECT_STRING_ERROR.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

The full topic name can be built from two different fields: *ObjectName* and *ObjectString*. For details of how these two fields are used, see Combining topic strings.

SelectionString (MQCHARV)

This is the string used to provide the selection criteria used when retrieving messages off a queue.

SelectionString must not be provided in the following cases:

- If *ObjectType* is not MQOT_Q
- If the queue being opened is not being opened using one of the MQOO_BROWSE, or MQOO_INPUT_* options

If *SelectionString* is provided in these cases, the call fails with reason code MQRC_SELECTOR_INVALID_FOR_TYPE.

If *SelectionString* is specified incorrectly, according to the description of how to use the "MQCHARV - Variable Length String" on page 289 structure, or if it exceeds the maximum length, the call fails with reason code MQRC_SELECTION_STRING_ERROR. The maximum length of *SelectionString* is MQ_SELECTOR_LENGTH.

SelectionString usage is described in Selectors.

ResObjectString (MQCHARV)

The ResObjectString field is the long object name after the queue manager resolves the name provided in the *ObjectName* field.

This field is returned only for topics and queue aliases that reference a topic object.

If the long object name is provided in *ObjectString* and nothing is provided in *ObjectName*, then the value returned in this field is the same as provided in *ObjectString*.

If this field is omitted (that is ResObjectString.VSBufSize is zero) then the *ResObjectString* will not be returned, but the length will be returned in ResObjectString.VSLength.

If the buffer length (provided in ResObjectStrng.VSBufSize) is shorter than the full *ResObjectString*, the string will be truncated and will return as many of the rightmost characters as can fit in the provided buffer.

If *ResObjectString* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code MQRC_RES_OBJECT_STRING_ERROR.

ResolvedType (MQLONG)
The type of the resolved (base) object being opened.

The possible values are:

MQOT_Q
The resolved object is a queue. This value applies when a queue is opened directly or when an alias queue pointing to a queue is opened.

MQOT_TOPIC
The resolved object is a topic. This value applies when a topic is opened directly or when an alias queue pointing to a topic object is opened.

MQOT_NONE
The resolved type is neither a queue nor a topic.

MQOR - Object record

Use the MQOR structure to specify the queue name and queue manager name of a single destination queue. MQOR is an input structure for the MQOPEN and MQPUT1 calls.

Availability

The MQOR structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

Character set and encoding

Data in MQOR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Usage

By providing an array of these structures on the MQOPEN call, you can open a list of queues; this list is called a distribution list. Each message put using the queue handle returned by that MQOPEN call is placed on each of the queues in the list, provided that the queue was opened successfully.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 505. Fields in MQOR for MQOR

Field name and description	Name of constant	Initial value (if any) of constant
ObjectName (object name)	None	Null string or blanks
ObjectQMgrName (object queue manager name)	None	Null string or blanks

Table 505. Fields in MQOR for MQOR (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**

Notes:

1. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
2. In the C programming language, the macro variable MQOR_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQOR MyOR = {MQOR_DEFAULT};
```

Language declarations

C declaration for MQOR

```
typedef struct tagMQOR MQOR;
struct tagMQOR {
  MQCHAR48  ObjectName;      /* Object name */
  MQCHAR48  ObjectQMgrName;  /* Object queue manager name */
};
```

COBOL declaration for MQOR

```
**   MQOR structure
  10 MQOR.
**    Object name
   15 MQOR-OBJECTNAME     PIC X(48).
**    Object queue manager name
   15 MQOR-OBJECTQMGRNAME PIC X(48).
```

PL/I declaration for MQOR

```
dcl
 1 MQOR based,
  3 ObjectName     char(48), /* Object name */
  3 ObjectQMgrName char(48); /* Object queue manager name */
```

Visual Basic declaration for MQOR

```
Type MQOR
  ObjectName     As String*48 'Object name'
  ObjectQMgrName As String*48 'Object queue manager name'
End Type
```

ObjectName (MQCHAR48)

This is the same as the *ObjectName* field in the MQOD structure (see MQOD for details), except that:

- It must be the name of a queue.
- It must not be the name of a model queue.

This is always an input field. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

ObjectQMgrName (MQCHAR48)

This is the same as the *ObjectQMgrName* field in the MQOD structure (see MQOD for details).

This is always an input field. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

MQPD - Property descriptor

The **MQPD** structure is used to define the attributes of a property. The structure is an input/output parameter on the MQSETMP call and an output parameter on the MQINQMP call.

Availability

The **MQPD** structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and for IBM MQ MQI clients.

Character set and encoding

Data in **MQPD** must be in the character set of the application and encoding of the application (**MQENC_NATIVE**).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 506. Fields in MQPD

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQPD_STRUC_ID	'PD'
Version (structure version number)	MQPD_VERSION_1	1
Options (options)	MQPD_NONE	0
Support (required support for message property)	MQPD_SUPPORT_OPTIONAL	0
Context (message context to which property belongs)	MQPD_NO_CONTEXT	0
CopyOptions (copy options to which property belongs)	MQCOPY_DEFAULT	0

Table 506. Fields in MQPD (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. In the C programming language, the macro variable MQPD_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure: `MQPD MyPD = {MQPD_DEFAULT};`		

Language declarations

C declaration for MQPD

```
typedef struct tagMQPD MQPD;
struct tagMQPD {
  MQCHAR4  StrucId;     /* Structure identifier */
  MQLONG   Version;     /* Structure version number */
  MQLONG   Options;     /* Options that control the action of
                           MQSETMP and MQINQMP */
  MQLONG   Support;     /* Property support option */
  MQLONG   Context;     /* Property context */
  MQLONG   CopyOptions; /* Property copy options */
};
```

COBOL declaration for MQPD

```
**   MQPD structure
  10 MQPD.
**    Structure identifier
   15 MQPD-STRUCID PIC X(4).
**    Structure version number
   15 MQPD-VERSION PIC S9(9) BINARY.
**    Options that control the action of MQSETMP and
**    MQINQMP
   15 MQPD-OPTIONS PIC S9(9) BINARY.
**    Property support option
   15 MQPD-SUPPORT PIC S9(9) BINARY.
**    Property context
   15 MQPD-CONTEXT PIC S9(9) BINARY.
**    Property copy options
   15 MQPD-COPYOPTIONS PIC S9(9) BINARY.
```

PL/I declaration for MQPD

```
dcl
 1 MQPD based,
  3 StrucId     char(4),       /* Structure identifier */
  3 Version     fixed bin(31), /* Structure version number */
  3 Options     fixed bin(31), /* Options that control the action
                                  of MQSETMP and MQINQMP */
  3 Support     fixed bin(31), /* Property support option */
  3 Context     fixed bin(31), /* Property context */
  3 CopyOptions fixed bin(31); /* Property copy options */
```

High Level Assembler declaration for MQPD

```
MQPD             DSECT
MQPD_STRUCID     DS   CL4    Structure identifier
MQPD_VERSION     DS   F      Structure version number
MQPD_OPTIONS     DS   F      Options that control the
*                            action of MQSETMP and MQINQMP
MQPD_SUPPORT     DS   F      Property support option
```

```
MQPD_CONTEXT     DS   F       Property context
MQPD_COPYOPTIONS DS   F       Property copy options
MQPD_LENGTH      EQU  *-MQPD
MQPD_AREA        DS   CL(MQPD_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQPD_STRUC_ID
: Identifier for property descriptor structure.

  For the C programming language, the constant **MQPD_STRUC_ID_ARRAY** is also defined; this has the same value as **MQPD_STRUC_ID**, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is **MQPD_STRUC_ID**.

Version (MQLONG)

This is the structure version number; the value must be:

MQPD_VERSION_1
Version-1 property descriptor structure.

The following constant specifies the version number of the current version:

MQPD_CURRENT_VERSION
Current version of property descriptor structure.

This is always an input field. The initial value of this field is **MQPD_VERSION_1**.

Options (MQLONG)

The value must be:

MQPD_NONE
: No options specified

This is always an input field. The initial value of this field is MQPD_NONE.

Support (MQLONG)

This field describes what level of support for the message property is required of the queue manager, in order for the message containing this property to be put to a queue. This applies only to IBM MQ-defined properties; support for all other properties is optional.

The field is automatically set to the correct value when the IBM MQ-defined property is known by the queue manager. If the property is not recognized, MQPD_SUPPORT_OPTIONAL is assigned. When a queue manager receives a message containing an IBM MQ-defined property that the queue manager recognizes as being incorrect, the queue manager corrects the value of the *Support* field.

When setting an IBM MQ-defined property using the MQSETMP call on a message handle where the MQCMHO_NO_VALIDATION option was set, *Support* becomes an input field. This allows an application to put an IBM MQ-defined property, with the correct value, where the property is unsupported by the connected queue manager, but where the message is intended to be processed on another queue manager.

The value MQPD_SUPPORT_OPTIONAL is always assigned to properties that are not IBM MQ-defined properties.

If an IBM WebSphere MQ 7.0 queue manager, that supports message properties, receives a property that contains an unrecognized *Support* value, the property is treated as if:

- MQPD_SUPPORT_REQUIRED was specified if any of the unrecognized values are contained in the MQPD_REJECT_UNSUP_MASK.

- MQPD_SUPPORT_REQUIRED_IF_LOCAL was specified if any of the unrecognized values are contained in the MQPD_ACCEPT_UNSUP_IF_XMIT_MASK
- MQPD_SUPPORT_OPTIONAL was specified otherwise.

One of the following values is returned by the MQINQMP call, or one of the values can be specified, when using the MQSETMP call on a message handle where the MQCMHO_NO_VALIDATION option is set:

MQPD_SUPPORT_OPTIONAL
The property is accepted by a queue manager even if it is not supported. The property can be discarded in order for the message to flow to a queue manager that does not support message properties. This value is also assigned to properties that are not IBM MQ-defined.

MQPD_SUPPORT_REQUIRED
Support for the property is required. The message is rejected by a queue manager that does not support the IBM MQ-defined property. The MQPUT or MQPUT1 call fails with completion code MQCC_FAILED and reason code MQRC_UNSUPPORTED_PROPERTY.

MQPD_SUPPORT_REQUIRED_IF_LOCAL
The message is rejected by a queue manager that does not support the IBM MQ-defined property if the message is destined for a local queue. The MQPUT or MQPUT1 call fails with completion code MQCC_FAILED and reason code MQRC_UNSUPPORTED_PROPERTY.

The MQPUT or MQPUT1 call succeeds if the message is destined for a remote queue manager.

This is an output field on the MQINQMP call and an input field on the MQSETMP call if the message handle was created with the MQCMHO_NO_VALIDATION option set. The initial value of this field is MQPD_SUPPORT_OPTIONAL.

Context (MQLONG)

This describes what message context the property belongs to.

When a queue manager receives a message containing an IBM MQ-defined property that the queue manager recognizes as being incorrect, the queue manager corrects the value of the *Context* field.

The following option can be specified:

MQPD_USER_CONTEXT
The property is associated with the user context.

No special authorization is required to be able to set a property associated with the user context using the MQSETMP call.

On an IBM WebSphere MQ 7.0 queue manager, a property associated with the user context is saved as described for MQOO_SAVE_ALL_CONTEXT. An MQPUT call with MQPMO_PASS_ALL_CONTEXT specified, causes the property to be copied from the saved context into the new message.

If the option previously described is not required, the following option can be used:

MQPD_NO_CONTEXT
The property is not associated with a message context.

An unrecognized value is rejected with a *Reason* code of MQRC_PD_ERROR

This is an input/output field to the MQSETMP call and an output field from the MQINQMP call. The initial value of this field is MQPD_NO_CONTEXT.

CopyOptions (MQLONG)

This describes which type of messages the property should be copied into. This is an output only field for recognized IBM MQ defined properties; IBM MQ sets the appropriate value.

When a queue manager receives a message containing an IBM MQ defined property that the queue manager recognizes as being incorrect, the queue manager corrects the value of the *CopyOptions* field.

You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

MQCOPY_FORWARD
This property is copied into a message being forwarded.

MQCOPY_PUBLISH
This property is copied into the message received by a subscriber when a message is being published.

MQCOPY_REPLY
This property is copied into a reply message.

MQCOPY_REPORT
This property is copied into a report message.

MQCOPY_ALL
This property is copied into all types of subsequent messages.

Default option: The following option can be specified to supply the default set of copy options:

MQCOPY_DEFAULT
This property is copied into a message being forwarded, into a report message, or into a message received by a subscriber when a message is being published.

This is equivalent to specifying the combination of options MQCOPY_FORWARD, plus MQCOPY_REPORT, plus MQCOPY_PUBLISH.

If none of the options that are described previously is required, use the following option:

MQCOPY_NONE
Use this value to indicate that no other copy options are specified; programmatically no relationship exists between this property and subsequent messages. This is always returned for message descriptor properties.

This is an input/output field to the MQSETMP call and an output field from the MQINQMP call. The initial value of this field is MQCOPY_DEFAULT.

MQPMO - Put message options

The MQPMO structure allows the application to specify options that control how messages are placed on queues, or published to topics. The structure is an input/output parameter on the MQPUT and MQPUT1 calls.

Version

The current version of MQPMO is MQPMO_VERSION_3. Certain fields are available only in certain versions of MQPMO. If you need to port applications between several environments, you must ensure that the version of MQPMO is consistent across all environments. Fields that exist only in particular versions of the structure are identified as such in this topic and in the field descriptions.

The header, COPY, and INCLUDE files provided for the supported programming languages contain the most-recent version of MQPMO that is supported by the environment, but with the initial value of the *Version* field set to MQPMO_VERSION_1. To use fields that are not present in the version-1 structure, the application must set the *Version* field to the version number of the version required.

Character set and encoding

Data in MQPMO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 507. Fields in MQPMO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQPMO_STRUC_ID	'PMO¬'
Version (structure version number)	MQPMO_VERSION_1	1
Options (options that control the action of MQPUT and MQPUT1)	MQPMO_NONE	0
Timeout (reserved)	None	-1
Context (object handle of input queue)	None	0
KnownDestCount (number of messages sent successfully to local queues)	None	0
UnknownDestCount (number of messages sent successfully to remote queues)	None	0
InvalidDestCount (number of messages that could not be sent)	None	0
ResolvedQName (resolved name of destination queue)	None	Null string or blanks
ResolvedQMgrName (resolved name of destination queue manager)	None	Null string or blanks
Note: The remaining fields are ignored if *Version* is less than MQPMO_VERSION_2.		
RecsPresent (number of put message records or response records present)	None	0
PutMsgRecFields (flags indicating which MQPMR fields are present)	MQPMRF_NONE	0
PutMsgRecOffset (offset of first put message record from start of MQPMO)	None	0
ResponseRecOffset (offset of first response record from start of MQPMO)	None	0
PutMsgRecPtr (address of first put message record)	None	Null pointer or null bytes
ResponseRecPtr (address of first response record)	None	Null pointer or null bytes
Note: The remaining fields are ignored if *Version* is less than MQPMO_VERSION_3.		
OriginalMsgHandle (original message handle)	MQHM_NONE	0
NewMsgHandle (new message handle)	MQHM_NONE	0
Action (type of put being performed and the relationship between the original message specified by the *OriginalMsgHandle* field and the new message specified by the *NewMsgHandle* field)	MQACTP_NEW	0

Table 507. Fields in MQPMO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
PubLevel (level of subscription targeted by the publication)	None	9

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQPMO_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQPMO MyPMO = {MQPMO_DEFAULT};
```

Language declarations

C declaration for MQPMO

```
typedef struct tagMQPMO MQPMO;
struct tagMQPMO {
  MQCHAR4   StrucId;            /* Structure identifier */
  MQLONG    Version;            /* Structure version number */
  MQLONG    Options;            /* Options that control the action of
                                   MQPUT and MQPUT1 */
  MQLONG    Timeout;            /* Reserved */
  MQHOBJ    Context;            /* Object handle of input queue */
  MQLONG    KnownDestCount;     /* Number of messages sent
                                   successfully to local queues */
  MQLONG    UnknownDestCount;   /* Number of messages sent
                                   successfully to remote queues */
  MQLONG    InvalidDestCount;   /* Number of messages that could not
                                   be sent */
  MQCHAR48  ResolvedQName;      /* Resolved name of destination
                                   queue */
  MQCHAR48  ResolvedQMgrName;   /* Resolved name of destination queue
                                   manager */
  /* Ver:1 */
  MQLONG    RecsPresent;        /* Number of put message records or
                                   response records present */
  MQLONG    PutMsgRecFields;    /* Flags indicating which MQPMR fields
                                   are present */
  MQLONG    PutMsgRecOffset;    /* Offset of first put message record
                                   from start of MQPMO */
  MQLONG    ResponseRecOffset;  /* Offset of first response record
                                   from start of MQPMO */
  MQPTR     PutMsgRecPtr;       /* Address of first put message
                                   record */
  MQPTR     ResponseRecPtr;     /* Address of first response record */
  /* Ver:2 */
  MQHMSG    OriginalMsgHandle;  /* Original message handle */
  MQHMSG    NewMsgHandle;       /* New message handle */
  MQLONG    Action;             /* The action being performed */
  MQLONG    PubLevel;           /* Subscription level */
  /* Ver:3 */
};
```

COBOL declaration for MQPMO

```
**   MQPMO structure
  10 MQPMO.
**    Structure identifier
   15 MQPMO-STRUCID           PIC X(4).
**    Structure version number
   15 MQPMO-VERSION           PIC S9(9) BINARY.
```

```
**    Options that control the action of MQPUT and MQPUT1
   15 MQPMO-OPTIONS           PIC S9(9) BINARY.
**    Reserved
   15 MQPMO-TIMEOUT           PIC S9(9) BINARY.
**    Object handle of input queue
   15 MQPMO-CONTEXT           PIC S9(9) BINARY.
**    Number of messages sent successfully to local queues
   15 MQPMO-KNOWNDESTCOUNT    PIC S9(9) BINARY.
**    Number of messages sent successfully to remote queues
   15 MQPMO-UNKNOWNDESTCOUNT  PIC S9(9) BINARY.
**    Number of messages that could not be sent
   15 MQPMO-INVALIDDESTCOUNT  PIC S9(9) BINARY.
**    Resolved name of destination queue
   15 MQPMO-RESOLVEDQNAME     PIC X(48).
**    Resolved name of destination queue manager
   15 MQPMO-RESOLVEDQMGRNAME  PIC X(48).
**    Number of put message records or response records present
   15 MQPMO-RECSPRESENT       PIC S9(9) BINARY.
**    Flags indicating which MQPMR fields are present
   15 MQPMO-PUTMSGRECFIELDS   PIC S9(9) BINARY.
**    Offset of first put message record from start of MQPMO
   15 MQPMO-PUTMSGRECOFFSET   PIC S9(9) BINARY.
**    Offset of first response record from start of MQPMO
   15 MQPMO-RESPONSERECOFFSET PIC S9(9) BINARY.
**    Address of first put message record
   15 MQPMO-PUTMSGRECPTR      POINTER.
**    Address of first response record
   15 MQPMO-RESPONSERECPTR    POINTER.
**    Original message handle
   15 MQPMO-ORIGINALMSGHANDLE PIC S9(18) BINARY.
**    New message handle
   15 MQPMO-NEWMSGHANDLE      PIC S9(18) BINARY.
**    The action being performed
   15 MQPMO-ACTION            PIC S9(9) BINARY.
**    Publish level
   15 MQPMO-PUBLEVEL          PIC S9(9) BINARY.
```

PL/I declaration for MQPMO

```
dcl
 1 MQPMO based,
  3 StrucId           char(4),       /* Structure identifier */
  3 Version           fixed bin(31), /* Structure version number */
  3 Options           fixed bin(31), /* Options that control the action
                                        of MQPUT and MQPUT1 */
  3 Timeout           fixed bin(31), /* Reserved */
  3 Context           fixed bin(31), /* Object handle of input queue */
  3 KnownDestCount    fixed bin(31), /* Number of messages sent
                                        successfully to local queues */
  3 UnknownDestCount  fixed bin(31), /* Number of messages sent
                                        successfully to remote queues */
  3 InvalidDestCount  fixed bin(31), /* Number of messages that could
                                        not be sent */
  3 ResolvedQName     char(48),      /* Resolved name of destination
                                        queue */
  3 ResolvedQMgrName  char(48),      /* Resolved name of destination
                                        queue manager */
  3 RecsPresent       fixed bin(31), /* Number of put message records or
                                        response records present */
  3 PutMsgRecFields   fixed bin(31), /* Flags indicating which MQPMR
                                        fields are present */
  3 PutMsgRecOffset   fixed bin(31), /* Offset of first put message
                                        record from start of MQPMO */
  3 ResponseRecOffset fixed bin(31), /* Offset of first response record
                                        from start of MQPMO */
  3 PutMsgRecPtr      pointer,       /* Address of first put message
                                        record */
  3 ResponseRecPtr    pointer,       /* Address of first response
                                        record */
  3 OriginalMsgHandle fixed bin(63), /* Original message handle */
  3 NewMsgHandle      fixed bin(63); /* New message handle */
  3 Action            fixed bin(31); /* The action being performed */
  3 PubLevel          fixed bin(31); /* Publish level */
```

High Level Assembler declaration for MQPMO

```
MQPMO                   DSECT
```

```
MQPMO_STRUCID           DS   CL4   Structure identifier
MQPMO_VERSION           DS   F     Structure version number
MQPMO_OPTIONS           DS   F     Options that control the action of
*                                  MQPUT and MQPUT1
MQPMO_TIMEOUT           DS   F     Reserved
MQPMO_CONTEXT           DS   F     Object handle of input queue
MQPMO_KNOWNDESTCOUNT    DS   F     Number of messages sent successfully
*                                  to local queues
MQPMO_UNKNOWNDESTCOUNT  DS   F     Number of messages sent successfully
*                                  to remote queues
MQPMO_INVALIDDESTCOUNT  DS   F     Number of messages that could not be
*                                  sent
MQPMO_RESOLVEDQNAME     DS   CL48  Resolved name of destination queue
MQPMO_RESOLVEDQMGRNAME  DS   CL48  Resolved name of destination queue
*                                  manager
MQPMO_RECSPRESENT       DS   F     Number of put message records or
*                                  response records present
MQPMO_PUTMSGRECFIELDS   DS   F     Flags indicating which MQPMR
*                                  fields are present
MQPMO_PUTMSGRECOFFSET   DS   F     Offset of first put message record
*                                  from start of MQPMO
MQPMO_RESPONSERECOFFSET DS   F     Offset of first response record
*                                  from start of MQPMO
MQPMO_PUTMSGRECPTR      DS   F     Address of first put message
*                                  record
MQPMO_RESPONSERECPTR    DS   F     Address of first response record
MQPMO_ORIGINALMSGHANDLE DS   D     Original message handle
MQPMO_NEWMSGHANDLE      DS   D     New message handle
MQPMO_ACTION            DS   F     The action being performed
MQPMO_PUBLEVEL          DS   F     Publish level
*
MQPMO_LENGTH            EQU  *-MQPMO
                        ORG  MQPMO
MQPMO_AREA              DS   CL(MQPMO_LENGTH)
```

Visual Basic declaration for MQPMO

```
Type MQPMO
  StrucId           As String*4  'Structure identifier'
  Version           As Long      'Structure version number'
  Options           As Long      'Options that control the action of'
                                 'MQPUT and MQPUT1'
  Timeout           As Long      'Reserved'
  Context           As Long      'Object handle of input queue'
  KnownDestCount    As Long      'Number of messages sent successfully'
                                 'to local queues'
  UnknownDestCount  As Long      'Number of messages sent successfully'
                                 'to remote queues'
  InvalidDestCount  As Long      'Number of messages that could not be'
                                 'sent'
  ResolvedQName     As String*48 'Resolved name of destination queue'
  ResolvedQMgrName  As String*48 'Resolved name of destination queue'
                                 'manager'
  RecsPresent       As Long      'Number of put message records or'
                                 'response records present'
  PutMsgRecFields   As Long      'Flags indicating which MQPMR fields'
                                 'are present'
  PutMsgRecOffset   As Long      'Offset of first put message record'
                                 'from start of MQPMO'
  ResponseRecOffset As Long      'Offset of first response record from'
                                 'start of MQPMO'
  PutMsgRecPtr      As MQPTR     'Address of first put message record'
  ResponseRecPtr    As MQPTR     'Address of first response record'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQPMO_STRUC_ID

Identifier for put-message options structure.

For the C programming language, the constant MQPMO_STRUC_ID_ARRAY is also defined; this has the same value as MQPMO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQPMO_STRUC_ID.

Version (MQLONG)

Structure version number.

The value must be one of the following:

MQPMO_VERSION_1
Version-1 put-message options structure.

This version is supported in all environments.

MQPMO_VERSION_2
Version-2 put-message options structure.

This version is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

MQPMO_VERSION_3
Version-3 put-message options structure.

This version is supported in all environments.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQPMO_CURRENT_VERSION
Current version of put-message options structure.

This is always an input field. The initial value of this field is MQPMO_VERSION_1.

MQPMO options (MQLONG)

The Options field controls the operation of **MQPUT** and **MQPUT1** calls.

Scope option. You can specify any or none of the MQPMO options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations). Combinations that are not valid are noted; any other combinations are valid.

The following option controls the scope of the publications sent:

MQPMO_SCOPE_QMGR

The publication is sent only to subscribers that have subscribed on this queue manager. The publication is not forwarded to any remote publish/subscribe queue managers that have made a subscription to this queue manager, which overrides any behavior that has been set using the PUBSCOPE topic attribute.

Note: If not set, the publication scope is determined by the PUBSCOPE topic attribute.

Publishing options. The following options control the way messages are published to a topic:

MQPMO_SUPPRESS_REPLYTO

Any information specified in the *ReplyToQ* and *ReplyToQMgr* fields of the MQMD of this publication is not passed on to subscribers. If this option is used with a report option that requires a *ReplyToQ*, the call fails with MQRC_MISSING_REPLY_TO_Q.

MQPMO_RETAIN

The publication being sent is to be retained by the queue manager. This retention allows a subscriber to request a copy of this publication after the time it was published, by using the MQSUBRQ call. It also allows a publication to be sent to applications which make their subscription after the time this publication was made (unless they choose not to be sent it by using the option MQSO_NEW_PUBLICATIONS_ONLY). If an application is sent a publication which was retained, it is indicated by the MQIsRetained message property of that publication.

Only one publication can be retained at each node of the topic tree. Therefore, if there already is a retained publication for this topic, published by any other application, it is replaced with this publication. It is therefore better to avoid having more than one publisher retaining messages on the same topic.

When retained publications are requested by a subscriber, the subscription used might contain a wildcard in the topic, in which case a number of retained publications might match (at various nodes in the topic tree) and several publications might be sent to the requesting application. See the description of the "MQSUBRQ - Subscription request" on page 783 call for more details.

For information about how retained publications interact with subscription levels, see Intercepting publications.

If this option is used and the publication cannot be retained, the message is not published and the call fails with MQRC_PUT_NOT_RETAINED.

MQPMO_NOT_OWN_SUBS

Tells the queue manager that the application does not want to send any of its publications to subscriptions it owns. Subscriptions are considered to be owned by the same application if the connection handles are the same.

MQPMO_WARN_IF_NO_SUBS_MATCHED

If no subscription matches the publication, return a completion code (*CompCode*) of MQCC_WARNING and reason code MQRC_NO_SUBS_MATCHED.

If MQRC_NO_SUBS_MATCHED is returned by the put operation, the publication was not delivered to any subscriptions. However, if the MQPMO_RETAIN option is specified on the put operation, the message is retained and delivered to any subsequently defined matching subscription.

A subscription on the topic matches the publication if any of the following conditions are met:

- The message is delivered to the subscription queue
- The message would have been delivered to the subscription queue but a problem with the queue means that the message cannot be put to the queue, and it was consequently placed on the dead letter queue or discarded.
- A routing exit is defined that suppresses delivery of the message to the subscription

A subscription on the topic does not match the publication if any of the following conditions are met:

- The subscription has a selection string that does not match the publication
- The subscription specified the MQSO_PUBLICATION_ON_REQUEST option
- The publication is not delivered because the MQPMO_NOT_OWN_SUBS option was specified on the put operation and the subscription matches the identity of the publisher

Syncpoint options. The following options relate to the participation of the MQPUT or MQPUT1 call within a unit of work:

MQPMO_SYNCPOINT

The request is to operate within the normal unit-of-work protocols. The message is not visible outside the unit of work until the unit of work is committed. If the unit of work is backed out, the message is deleted.

If MQPMO_SYNCPOINT and MQPMO_NO_SYNCPOINT are not specified, the inclusion of the put request in unit-of-work protocols is determined by the environment running the queue manager and

not the environment running the application. On z/OS, the put request is within a unit of work. In all other environments, the put request is not within a unit of work.

Because of these differences, an application that you want to port must not allow this option to default; specify either MQPMO_SYNCPOINT or MQPMO_NO_SYNCPOINT explicitly.

Do not specify MQPMO_SYNCPOINT with MQPMO_NO_SYNCPOINT.

MQPMO_NO_SYNCPOINT

The request is to operate outside the normal unit-of-work protocols. The message is available immediately, and it cannot be deleted by backing out a unit of work.

If MQPMO_NO_SYNCPOINT and MQPMO_SYNCPOINT are not specified, the inclusion of the put request in unit-of-work protocols is determined by the environment running the queue manager and not the environment running the application. On z/OS, the put request is within a unit of work. In all other environments, the put request is not within a unit of work.

Because of these differences, an application that you want to port must not allow this option to default; specify either MQPMO_SYNCPOINT or MQPMO_NO_SYNCPOINT explicitly.

Do not specify MQPMO_NO_SYNCPOINT with MQPMO_SYNCPOINT.

Message-identifier and correlation-identifier options. The following options request the queue manager to generate a new message identifier or correlation identifier:

MQPMO_NEW_MSG_ID

The queue manager replaces the contents of the *MsgId* field in MQMD with a new message identifier. This message identifier is sent with the message, and returned to the application on output from the MQPUT or MQPUT1 call.

The MQPMO_NEW_MSG_ID option can also be specified when the message is being put to a distribution list; see the description of the *MsgId* field in the MQPMR structure for details.

Using this option relieves the application of the need to reset the *MsgId* field to MQMI_NONE before each MQPUT or MQPUT1 call.

MQPMO_NEW_CORREL_ID

The queue manager replaces the contents of the *CorrelId* field in MQMD with a new correlation identifier. This correlation identifier is sent with the message, and returned to the application on output from the MQPUT or MQPUT1 call.

The MQPMO_NEW_CORREL_ID option can also be specified when the message is being put to a distribution list; see the description of the *CorrelId* field in the MQPMR structure for details.

MQPMO_NEW_CORREL_ID is useful in situations where the application requires a unique correlation identifier.

Group and segment options. The following options relate to the processing of messages in groups and segments of logical messages. Read the definitions that follow to help you to understand the option.

Attention: You cannot use segmented or grouped messages with Publish/Subscribe.

Physical message

The is the smallest unit of information that can be placed on or removed from a queue; it often corresponds to the information specified or retrieved on a single MQPUT, MQPUT1, or MQGET call. Every physical message has its own message descriptor (MQMD). Generally, physical messages are distinguished by differing values for the message identifier (*MsgId* field in MQMD), although this is not enforced by the queue manager.

Logical message

A logical message is a single unit of application information for non- z/OS platforms only. In the absence of system constraints, a logical message is the same as a physical message. But where logical messages are extremely large, system constraints might make it advisable or necessary to split a logical message into two or more physical messages, called *segments*.

A logical message that has been segmented consists of two or more physical messages that have the same non-null group identifier (*GroupId* field in MQMD), and the same message sequence number (*MsgSeqNumber* field in MQMD). The segments are distinguished by differing values for the segment offset (*Offset* field in MQMD), which gives the offset of the data in the physical message from the start of the data in the logical message. Because each segment is a physical message, the segments in a logical message usually have differing message identifiers.

A logical message that has not been segmented, but for which segmentation has been permitted by the sending application, also has a non-null group identifier, although in this case there is only one physical message with that group identifier if the logical message does not belong to a message group. Logical messages for which segmentation has been inhibited by the sending application have a null group identifier (MQGI_NONE), unless the logical message belongs to a message group.

Message group

A message group is a set of one or more logical messages that have the same non-null group identifier. The logical messages in the group are distinguished by differing values for the message sequence number, which is an integer in the range 1 through *n*, where *n* is the number of logical messages in the group. If one or more of the logical messages is segmented, there are more than *n* physical messages in the group.

MQPMO_LOGICAL_ORDER

This option tells the queue manager how the application puts messages in groups and segments of logical messages. It can be specified only on the MQPUT call; it is not valid on the MQPUT1 call.

If MQPMO_LOGICAL_ORDER is specified, it indicates that the application uses successive MQPUT calls to:

1. Put the segments in each logical message in the order of increasing segment offset, starting from 0, with no gaps.
2. Put all the segments in one logical message before putting the segments in the next logical message.
3. Put the logical messages in each message group in the order of increasing message sequence number, starting from 1, with no gaps. IBM MQ increments the message sequence number automatically.
4. Put all the logical messages in one message group before putting logical messages in the next message group.

For detailed information about MQPMO_LOGICAL_ORDER, see Logical and physical ordering

Context options. The following options control the processing of message context:

MQPMO_NO_CONTEXT

Both identity and origin context are set to indicate no context. This means that the context fields in MQMD are set to:

- Blanks for character fields
- Nulls for byte fields
- Zeros for numeric fields

MQPMO_DEFAULT_CONTEXT

The message is to have default context information associated with it, for both identity and origin. The queue manager sets the context fields in the message descriptor as follows:

Table 508. Default context information values for MQMD fields

Field in MQMD	Value used
UserIdentifier	Determined from the environment if possible; set to blanks otherwise.
AccountingToken	Determined from the environment if possible; set to MQACT_NONE otherwise.
ApplIdentityData	Set to blanks.

Table 508. Default context information values for MQMD fields (continued)

Field in MQMD	Value used
PutApplType	Determined from the environment.
PutApplName	Determined from the environment if possible; set to blanks otherwise.
PutDate	Set to the date when message is put.
PutTime	Set to the time when message is put.
ApplOriginData	Set to blanks.

For more information about message context, see Message context.

These are the default values and actions if no context options are specified.

MQPMO_PASS_IDENTITY_CONTEXT
The message is to have context information associated with it. Identity context is taken from the queue handle specified in the *Context* field. Origin context information is generated by the queue manager in the same way that it is for MQPMO_DEFAULT_CONTEXT (see the preceding table for values). For more information about message context, see Message context.

For the MQPUT call, the queue must have been opened with the MQOO_PASS_IDENTITY_CONTEXT option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the MQOO_PASS_IDENTITY_CONTEXT option.

MQPMO_PASS_ALL_CONTEXT
The message is to have context information associated with it. Context is taken from the queue handle specified in the *Context* field. For more information about message context, see Controlling context information.

For the MQPUT call, the queue must have been opened with the MQOO_PASS_ALL_CONTEXT option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the MQOO_PASS_ALL_CONTEXT option.

MQPMO_SET_IDENTITY_CONTEXT
The message is to have context information associated with it. The application specifies the identity context in the MQMD structure. Origin context information is generated by the queue manager in the same way that it is for MQPMO_DEFAULT_CONTEXT (see the preceding table for values). For more information about message context, see Message context.

For the MQPUT call, the queue must have been opened with the MQOO_SET_IDENTITY_CONTEXT option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the MQOO_SET_IDENTITY_CONTEXT option.

MQPMO_SET_ALL_CONTEXT
The message is to have context information associated with it. The application specifies the identity, origin, and user context in the MQMD structure. For more information about message context, see Message context.

For the MQPUT call, the queue must have been opened with the MQOO_SET_ALL_CONTEXT option. For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the MQOO_SET_ALL_CONTEXT option.

You can specify only one of the MQPMO_*_CONTEXT context options. If you specify none, MQPMO_DEFAULT_CONTEXT is assumed.

Property options. The following option relates to the properties of the message:

MQPMO_MD_FOR_OUTPUT_ONLY
The message descriptor parameter must only be used for output to return the message descriptor of the message that was put. The message descriptor fields associated with the *NewMsgHandle*, *OriginalMsgHandle*, or both fields, of the **MQPMO** structure must be used for input.

If a valid message handle is not provided then the call fails with reason code **MQRC_MD_ERROR**.

Put response options. The following options control the response returned to an MQPUT or MQPUT1 call. You can specify only one of these options. If MQPMO_ASYNC_RESPONSE and MQPMO_SYNC_RESPONSE are not specified, MQPMO_RESPONSE_AS_Q_DEF or MQPMO_RESPONSE_AS_TOPIC_DEF is assumed.

MQPMO_ASYNC_RESPONSE

The MQPMO_ASYNC_RESPONSE option requests that an MQPUT or MQPUT1 operation is completed without the application waiting for the queue manager to complete the call. Using this option can improve messaging performance, particularly for applications using client bindings. An application can periodically check, using the MQSTAT verb, whether an error has occurred during any previous asynchronous calls.

With this option, only the following fields are guaranteed to be completed in the MQMD;

- ApplIdentityData
- PutApplType
- PutApplName
- ApplOriginData

Additionally, if either or both of MQPMO_NEW_MSG_ID or MQPMO_NEW_CORREL_ID are specified as options, the MsgId and CorrelId returned are also completed. (MQPMO_NEW_MSG_ID can be implicitly specified by specifying a blank MsgId field).

Only the preceding specified fields are completed. Other information that would normally be returned in the MQMD or MQPMO structure is undefined.

When requesting asynchronous put response for MQPUT1, the ResolvedQName and ResolvedQMgrName returned in the MQOD structure are undefined.

When requesting asynchronous put response for MQPUT or MQPUT1, a CompCode and Reason of MQCC_OK and MQRC_NONE does not necessarily mean that the message was successfully put to a queue. When developing an MQI application that uses asynchronous put response and requires confirmation that messages have been put to a queue you must check both CompCode and Reason codes from the put operations and also use MQSTAT to query asynchronous error information.

Although the success or failure of each individual MQPUT or MQPUT1 call mightnot be returned immediately, the first error that occurred under an asynchronous call can be determined later through a call to MQSTAT.

If a persistent message under syncpoint fails to be delivered using asynchronous put response, and you attempt to commit the transaction, the commit fails and the transaction is backed out with a completion code of MQCC_FAILED and a reason of MQRC_BACKED_OUT. The application can make a call to MQSTAT to determine the cause of a previous MQPUT or MQPUT1 failure.

MQPMO_SYNC_RESPONSE

Specifying this put response type ensures that the MQPUT or MQPUT1 operation is always issued synchronously. If the put operation is successful, all fields in the MQMD and MQPMO are completed.

This option ensures a synchronous response irrespective of the default put response value defined on the queue or topic object.

MQPMO_RESPONSE_AS_Q_DEF

If this value is specified for an MQPUT call, the put response type used is taken from the DEFPRESP value specified on the queue when it was first opened by the application.

- If the queue is a cluster queue, and this value is specified for an MQPUT call, the put response type used is taken from the **DEFPRESP** attribute defined at the *destination* queue manager that owns the particular instance of the queue on which the message is placed.

  When there are multiple instances of the cluster queue, and they differ in this attribute, the value from one of them is picked and it cannot be predicted which one will be used. You should therefore set this attribute to the same value on all instances. If this is not the case, error message AMQ9407 is issued to the queue manager logs. See also How are destination object attributes resolved for aliases, remote and cluster queues?

- If the queue is not a cluster queue, and this value is specified for an MQPUT call, the put response type used is taken from the **DEFPRESP** attribute defined at the *local* queue manager, even if the destination queue manager is remote.

If a client application is connected to a queue manager at a level earlier than IBM WebSphere MQ 7.0, it behaves as if MQPMO_SYNC_RESPONSE was specified.

If this option is specified for an MQPUT1 call, the value of the DEFPRESP attribute is not known before the request is sent to the server. By default, if the MQPUT1 call is using MQPMO_SYNCPOINT it behaves as for MQPMO_ASYNC_RESPONSE, and if it is using MQPMO_NO_SYNCPOINT it behaves as for MQPMO_SYNC_RESPONSE. However, you can override this default behavior by setting the Put1DefaultAlwaysSync property in the client configuration file, see CHANNELS stanza of the client configuration file.

MQPMO_RESPONSE_AS_TOPIC_DEF
MQPMO_RESPONSE_AS_TOPIC_DEF is a synonym for MQPMO_RESPONSE_AS_Q_DEF for use with topic objects.

Other options. The following options control authorization checking, what happens when the queue manager is quiescing, and resolving queue and queue manager names:

MQPMO_ALTERNATE_USER_AUTHORITY
MQPMO_ALTERNATE_USER_AUTHORITY indicates that the *AlternateUserId* field in the **ObjDesc** parameter of the MQPUT1 call contains a user identifier that is to be used to validate authority to put messages on the queue. The call can succeed only if *AlternateUserId* is authorized to open the queue with the specified options, regardless of whether the user identifier under which the application is running is authorized to do so. (This does not apply to the context options specified, however, which are always checked against the user identifier under which the application is running.)

This option is valid only with the MQPUT1 call.

MQPMO_FAIL_IF_QUIESCING
This option forces the MQPUT or MQPUT1 call to fail if the queue manager is in the quiescing state.

On z/OS, this option also forces the MQPUT or MQPUT1 call to fail if the connection (for a CICS or IMS application) is in the quiescing state.

The call returns completion code MQCC_FAILED with reason code MQRC_Q_MGR_QUIESCING or MQRC_CONNECTION_QUIESCING.

MQPMO_RESOLVE_LOCAL_Q
Use this option to fill *ResolvedQName* in the MQPMO structure with the name of the local queue to which the message is put, and *ResolvedQMgrName* with the name of the local queue manager that hosts the local queue. For more information about MQPMO_RESOLVE_LOCAL_Q, see topic MQOO_RESOLVE_LOCAL_Q.

If you are authorized to put to a queue, you have the required authority to specify this flag on the MQPUT call; no special authority is needed.

Default option. If you need none of the options described, use the following option:

MQPMO_NONE
Use this value to indicate that no other options have been specified; all options assume their default values. MQPMO_NONE is defined to aid program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

MQPMO_NONE is an input field. The initial value of the *Options* field is MQPMO_NONE.

Timeout (MQLONG)

This is a reserved field; its value is not significant. The initial value of this field is `-1`.

Context (MQHOBJ)

If MQPMO_PASS_IDENTITY_CONTEXT or MQPMO_PASS_ALL_CONTEXT is specified, this field must contain the input queue handle from which context information to be associated with the message being put is taken.

If neither MQPMO_PASS_IDENTITY_CONTEXT nor MQPMO_PASS_ALL_CONTEXT is specified, this field is ignored.

This is an input field. The initial value of this field is `0`.

KnownDestCount (MQLONG)

This is the number of messages that the current MQPUT or MQPUT1 call has sent successfully to queues in the distribution list that are local queues. The count does not include messages sent to queues that resolve to remote queues (even though a local transmission queue is used initially to store the message). This field is also set when putting a message to a single queue that is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is not set if *Version* is less than MQPMO_VERSION_1.

This field is undefined on z/OS because distribution lists are not supported.

UnknownDestCount (MQLONG)

This is the number of messages that the current MQPUT or MQPUT1 call has sent successfully to queues in the distribution list that resolve to remote queues. Messages that the queue manager retains temporarily in distribution-list form count as the number of individual destinations that those distribution lists contain. This field is also set when putting a message to a single queue that is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is not set if *Version* is less than MQPMO_VERSION_1.

This field is undefined on z/OS because distribution lists are not supported.

InvalidDestCount (MQLONG)

This is the number of messages that could not be sent to queues in the distribution list. The count includes queues that failed to open, as well as queues that were opened successfully but for which the put operation failed. This field is also set when putting a message to a single queue that is not in a distribution list.

Note: This field is set if the **CompCode** parameter on the MQPUT or MQPUT1 call is MQCC_OK or MQCC_WARNING; it might be set if the **CompCode** parameter is MQCC_FAILED, but do not rely on this in application code.

This is an output field. The initial value of this field is 0. This field is not set if *Version* is less than MQPMO_VERSION_1.

This field is undefined on z/OS because distribution lists are not supported.

ResolvedQName (MQCHAR48)

This is the name of the destination queue after name resolution has been performed by the local queue manager. The name returned is the name of a queue that exists on the queue manager identified by *ResolvedQMgrName*.

A nonblank value is returned only if the object is a single queue; if the object is a distribution list or a topic, the value returned is undefined.

This is an output field. The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

ResolvedQMgrName (MQCHAR48)

This is the name of the destination queue manager after name resolution has been performed by the local queue manager. The name returned is the name of the queue manager that owns the queue identified by *ResolvedQName*, and can be the name of the local queue manager.

If *ResolvedQName* is a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *ResolvedQMgrName* is the name of the queue sharing group. If the queue is owned by some other queue sharing group, *ResolvedQName* can be the name of the queue sharing group or the name of a queue manager that is a member of the queue sharing group (the nature of the value returned is determined by the queue definitions that exist at the local queue manager).

A nonblank value is returned only if the object is a single queue; if the object is a distribution list or a topic, the value returned is undefined.

This is an output field. The length of this field is given by MQ_Q_MGR_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

RecsPresent (MQLONG)

This is the number of MQPMR put message records or MQRR response records that have been provided by the application. This number can be greater than zero only if the message is being put to a distribution list. Put message records and response records are optional; the application need not provide any records, or it can choose to provide records of only one type. However, if the application provides records of both types, it must provide *RecsPresent* records of each type.

The value of *RecsPresent* need not be the same as the number of destinations in the distribution list. If too many records are provided, the excess are not used; if too few records are provided, default values are used for the message properties for those destinations that do not have put message records (see *PutMsgRecOffset*).

If *RecsPresent* is less than zero, or is greater than zero but the message is not being put to a distribution list, the call fails with reason code MQRC_RECS_PRESENT_ERROR.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQPMO_VERSION_2.

PutMsgRecFields (MQLONG)

This field contains flags that indicate which MQPMR fields are present in the put message records provided by the application. Use *PutMsgRecFields* only when the message is being put to a distribution list. The field is ignored if *RecsPresent* is zero, or both *PutMsgRecOffset* and *PutMsgRecPtr* are zero.

For fields that are present, the queue manager uses for each destination the values from the fields in the corresponding put message record. For fields that are absent, the queue manager uses the values from the MQMD structure.

Use one or more of the following flags to indicate which fields are present in the put message records:

MQPMRF_MSG_ID
Message-identifier field is present.

MQPMRF_CORREL_ID
Correlation-identifier field is present.

MQPMRF_GROUP_ID
Group-identifier field is present.

MQPMRF_FEEDBACK
Feedback field is present.

MQPMRF_ACCOUNTING_TOKEN
Accounting-token field is present.

If you specify this flag, specify either MQPMO_SET_IDENTITY_CONTEXT or MQPMO_SET_ALL_CONTEXT in the *Options* field; if this condition is not satisfied, the call fails with reason code MQRC_PMO_RECORD_FLAGS_ERROR.

If no MQPMR fields are present, the following can be specified:

MQPMRF_NONE
No put-message record fields are present.

If this value is specified, either *RecsPresent* must be zero, or both *PutMsgRecOffset* and *PutMsgRecPtr* must be zero.

MQPMRF_NONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

If *PutMsgRecFields* contains flags that are not valid, or put message records are provided but *PutMsgRecFields* has the value MQPMRF_NONE, the call fails with reason code MQRC_PMO_RECORD_FLAGS_ERROR.

This is an input field. The initial value of this field is MQPMRF_NONE. This field is ignored if *Version* is less than MQPMO_VERSION_2.

PutMsgRecOffset (MQLONG)

This is the offset in bytes of the first MQPMR put message record from the start of the MQPMO structure. The offset can be positive or negative. *PutMsgRecOffset* is used only when the message is being put to a distribution list. The field is ignored if *RecsPresent* is zero.

When the message is being put to a distribution list, an array of one or more MQPMR put message records can be provided in order to specify certain properties of the message for each destination individually; these properties are:

- Message identifier
- Correlation identifier
- Group identifier
- Feedback value
- Accounting token

You do not need to specify all these properties, but whatever subset you choose, specify the fields in the correct order. See the description of the MQPMR structure for further details.

Usually, there must be as many put message records as there are object records specified by MQOD when the distribution list is opened; each put message record supplies the message properties for the queue identified by the corresponding object record. Queues in the distribution list that fail to open must still have put message records allocated for them at the appropriate positions in the array, although the message properties are ignored in this case.

The number of put message records can differ from the number of object records. If there are fewer put message records than object records, the message properties for the destinations that do not have put message records are taken from the corresponding fields in the message descriptor MQMD. If there are more put message records than object records, the excess are not used (although it must still be possible to access them). Put message records are optional, but if they are supplied there must be *RecsPresent* of them.

Provide the put message records in a similar way to the object records in MQOD, either by specifying an offset in *PutMsgRecOffset*, or by specifying an address in *PutMsgRecPtr* ; for details of how to do this, see the *ObjectRecOffset* field described in“MQOD - Object descriptor” on page 471.

No more than one of *PutMsgRecOffset* and *PutMsgRecPtr* can be used; the call fails with reason code MQRC_PUT_MSG_RECORDS_ERROR if both are nonzero.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQPMO_VERSION_2.

ResponseRecOffset (MQLONG)

This is the offset in bytes of the first MQRR response record from the start of the MQPMO structure. The offset can be positive or negative. *ResponseRecOffset* is used only when the message is being put to a distribution list. The field is ignored if *RecsPresent* is zero.

When putting the message to a distribution list, you can provide an array of one or more MQRR response records to identify the queues to which the message was not sent successfully (*CompCode* field in MQRR), and the reason for each failure (*Reason* field in MQRR). The message might not have been sent either because the queue failed to open, or because the put operation failed. The queue manager sets the response records only when the outcome of the call is mixed (that is, some messages were sent successfully while others failed, or all failed but for differing reasons); reason code MQRC_MULTIPLE_REASONS from the call indicates this case. If the same reason code applies to all queues, that reason is returned in the **Reason** parameter of the MQPUT or MQPUT1 call, and the response records are not set.

Usually, there are as many response records as there are object records specified by MQOD when the distribution list is opened; when necessary, each response record is set to the completion code and reason code for the put to the queue identified by the corresponding object record. Queues in the distribution list that fail to open must still have response records allocated for them at the appropriate positions in the array, although they are set to the completion code and reason code resulting from the open operation, rather than the put operation.

The number of response records can differ from the number of object records. If there are fewer response records than object records, the application might not be able to identify all the destinations for which the put operation failed, or the reasons for the failures. If there are more response records than object records, the excess are not used (although it must still be possible to access them). Response records are optional, but if they are supplied there must be *RecsPresent* of them.

Provide the response records in a similar way to the object records in MQOD, either by specifying an offset in *ResponseRecOffset*, or by specifying an address in *ResponseRecPtr* ; for details of how to do this, see the *ObjectRecOffset* field described in "MQOD - Object descriptor" on page 471. However, use no more than one of *ResponseRecOffset* and *ResponseRecPtr* ; the call fails with reason code MQRC_RESPONSE_RECORDS_ERROR if both are nonzero.

For the MQPUT1 call, this field must be zero. This is because the response information (if requested) is returned in the response records specified by the object descriptor MQOD.

This is an input field. The initial value of this field is 0. This field is ignored if *Version* is less than MQPMO_VERSION_2.

PutMsgRecPtr (MQPTR)

This is the address of the first MQPMR put message record. Use *PutMsgRecPtr* only when the message is being put to a distribution list. The field is ignored if *RecsPresent* is zero.

You can use either *PutMsgRecPtr* or *PutMsgRecOffset* can be used to specify the put message records, but not both; for details, see "PutMsgRecOffset (MQLONG)" on page 505. If you do not use *PutMsgRecPtr*, set it to the null pointer or null bytes.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if *Version* is less than MQPMO_VERSION_2.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length, with the initial value being the all-null byte string.

ResponseRecPtr (MQPTR)

This is the address of the first MQRR response record. *ResponseRecPtr* is used only when the message is being put to a distribution list. The field is ignored if *RecsPresent* is zero.

Use either *ResponseRecPtr* or *ResponseRecOffset* to specify the response records, but not both; for details, see "ResponseRecOffset (MQLONG)" on page 506. If you do not use *ResponseRecPtr* set it to the null pointer or null bytes.

For the MQPUT1 call, this field must be the null pointer or null bytes. This is because the response information (if requested) is returned in the response records specified by the object descriptor MQOD.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise. This field is ignored if *Version* is less than MQPMO_VERSION_2.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length, with the initial value being the all-null byte string.

OriginalMsgHandle (MQHMSG)

This is an optional handle to a message. It might have been previously retrieved from a queue. The use of this handle is subject to the value of the *Action* field; see also NewMsgHandle.

The contents of the original message handle will not be altered by the **MQPUT** or **MQPUT1** call.

This is an input field. The initial value of this field is **MQHM_NONE**. This field is ignored if Version is less than **MQPMO_VERSION_3**.

NewMsgHandle (MQHMSG)

This is an optional handle to the message being put subject to the value of the Action field. It defines the properties of the message and overrides the values of the *OriginalMsgHandle*, if specified.

On return from the **MQPUT** or **MQPUT1** call, the contents of the handle reflect the message that was actually put.

This is an input field. The initial value of this field is **MQHM_NONE**. This field is ignored if Version is less than **MQPMO_VERSION_3**.

Action (MQLONG)

This specifies the type of put being performed and the relationship between the original message specified by the OriginalMsgHandle field and the new message specified by the NewMsgHandle field. The properties of the message are chosen by the queue manager according to the value of the Action specified.

You can choose to supply the contents of the message descriptor using the MsgDesc parameter on the MQPUT or MQPUT1 calls. Alternatively it is possible not to supply the MsgDesc parameter, or to specify that it is output-only by including MQPMO_MD_FOR_OUTPUT_ONLY in the Options field of the MQPMO structure.

If the MsgDesc parameter is not supplied, or if it is specified to be output-only, then the message descriptor for the new message is populated from the message handle fields of the MQPMO, according to the rules described in this topic.

The context setting and passing activities described in Controlling context information take effect after the message descriptor has been composed.

If an incorrect action value is specified, the call fails with the reason code MQRC_ACTION_ERROR.

Any one of the following actions can be specified:

MQACTP_NEW

A new message is being put, and no relationship to a previous message is being specified by the program. The message descriptor is composed as follows:

- If a MsgDesc is supplied on the MQPUT or MQPUT1 call, and MQPMO_MD_FOR_OUTPUT_ONLY is not in the MQPMO.Options, this is used as the message descriptor unmodified.
- If a MsgDesc is not supplied, or MQPMO_MD_FOR_OUTPUT_ONLY is in the MQPMO.Options then the queue manager generates the message descriptor using a combination of properties from OriginalMsgHandle and NewMsgHandle. Any message descriptor fields explicitly set on the new message handle take precedence over those in the original message handle.

Message data is taken from the MQPUT or MQPUT1 Buffer parameter.

MQACTP_FORWARD

A previously retrieved message is being forwarded. The original message handle specifies the message that was previously retrieved.

The new message handle specifies any modifications to the properties (including any in the message descriptor) in the original message handle.

The message descriptor is composed as follows:

- If a MsgDesc is supplied on the MQPUT or MQPUT1 call, and MQPMO_MD_FOR_OUTPUT_ONLY is not in the MQPMO.Options, this is used as the message descriptor unmodified.
- If a MsgDesc is not supplied, or MQPMO_MD_FOR_OUTPUT_ONLY is in the MQPMO.Options then the queue manager generates the message descriptor using a combination of properties from OriginalMsgHandle and NewMsgHandle. Any message descriptor fields explicitly set on the new message handle take precedence over those in the original message handle.
- If MQPMO_NEW_MSG_ID or MQPMO_NEW_CORREL_ID are specified in the MQPMO.Options, then these are honoured.

The message properties are composed as follows:

- All properties from the original message handle which have MQCOPY_FORWARD in the MQPD.CopyOptions
- All properties from the new message handle. For each property in the new message handle that has the same name as a property in the original message handle, the value is taken from the new message handle. The only exception to this rule is the special case when the property in the new message handle has the same name as a property in the original message handle, but the value of the property is null. In this case the property is removed from the message.

The message data to be forwarded is taken from the MQPUT or MQPUT1 Buffer parameter.

MQACTP_REPLY

A reply is being made to a previously retrieved message. The original message handle specifies the message that was previously retrieved.

The new message handle specifies any modifications to the properties (including any in the message descriptor) in the original message handle.

The message descriptor is composed as follows:

- If a MsgDesc is supplied on the MQPUT or MQPUT1 call, and MQPMO_MD_FOR_OUTPUT_ONLY is not in the MQPMO.Options, this is used as the message descriptor unmodified.
- If a MsgDesc is not supplied, or MQPMO_MD_FOR_OUTPUT_ONLY is in the MQPMO.Options, then initial message descriptor fields are chosen as follows:

Table 509. Reply message handle transformation

Field in MQMD	Value used
Report	If MQRO_PASS_DISCARD_AND_EXPIRY and MQRO_DISCARD_MSG are set: MQRO_DISCARD_MSG otherwise MQRO_NONE

Field in MQMD	Value used
MsgType	MQMT_REPLY
Expiry	If MQRO_PASS_DISCARD_AND_EXPIRY is set: Copied from the input message otherwise MQEI_UNLIMITED
Feedback	MQFB_NONE
MsgId	If MQPMO_NEW_MSG_ID is set: A new message identifier is generated else if MQRO_PASS_MSG_ID is set: Copied from the input message otherwise MQMI_NONE

CorrelId	If MQPMO_NEW_CORREL_ID is set:
	A new correlation identifier is generated
	else if MQRO_COPY_MSG_ID_TO_CORREL_ID is set:
	Copied from the MsgId field of the input message
	else if MQRO_PASS_CORREL_ID is set:
	Copied from the CorrelId field of the input message
	otherwise
	MQCI_NONE

BackoutCount	0
ReplyToQ	Blanks
ReplyToQMgr	Blanks
GroupId	MQGI_NONE
MsgSeqNumber	1
Offset	0
MsgFlags	MQMF_NONE
OriginalLength	MQOL_UNDEFINED

Table 509. Reply message handle transformation (continued)

- The message descriptor is then modified by the new message handle - any message descriptor fields explicitly set as properties in the new message handle take precedence over the message descriptor fields as described previously.

The message properties are composed as follows:

- All properties from the original message handle which have MQCOPY_REPLY in the MQPD.CopyOptions
- All properties from the new message handle. For each property in the new message handle that has the same name as a property in the original message handle, the value is taken from the new message handle. The only exception to this rule is the special case when the property in the new message handle has the same name as a property in the original message handle, but the value of the property is null. In this case the property is removed from the message.

The message data to be forwarded is taken from the MQPUT/MQPUT1 Buffer parameter.

MQACTP_REPORT

A report is being generated as a result of a previously retrieved message. The original message handle specifies the message causing the report to be generated.

The new message handle specifies any modifications to the properties (including any in the message descriptor) in the original message handle.

The message descriptor is composed as follows:

- If a MsgDesc is supplied on the MQPUT or MQPUT1 call, and MQPMO_MD_FOR_OUTPUT_ONLY is not in the MQPMO.Options, this is used as the message descriptor unmodified.
- If a MsgDesc is not supplied, or MQPMO_MD_FOR_OUTPUT_ONLY is in the MQPMO.Options then initial message descriptor fields are chosen as follows:

Table 510. Report message handle transformation

Field in MQMD	Value used
Report	If MQRO_PASS_DISCARD_AND_EXPIRY and MQRO_DISCARD_MSG are set: MQRO_DISCARD_MSG otherwise MQRO_NONE
MsgType	MQMT_REPORT
Expiry	If MQRO_PASS_DISCARD_AND_EXPIRY is set: Copied from the input message otherwise MQEI_UNLIMITED
MsgId	If MQPMO_NEW_MSG_ID is set: A new message identifier is generated else if MQRO_PASS_MSG_ID is set: Copied from the input message otherwise MQMI_NONE

CorrelId	If MQPMO_NEW_CORREL_ID is set:
	A new correlation identifier is generated
	else if MQRO_COPY_MSG_ID_TO_CORREL_ID is set:
	Copied from the MsgId field of the input message
	else if MQRO_PASS_CORREL_ID is set:
	Copied from the CorrelId field of the input message
	otherwise
	MQCI_NONE

BackoutCount	0
ReplyToQ	Blanks
ReplyToQMgr	Blanks
OriginalLength	Set to the *BufferLength*

- The message descriptor is then modified by the new message handle - any message descriptor fields explicitly set as properties in the new message handle take precedence over the message descriptor fields as described previously.

The message properties are composed as follows:

- All properties from the original message handle which have MQCOPY_REPORT in the MQPD.CopyOptions
- All properties from the new message handle. For each property in the new message handle that has the same name as a property in the original message handle, the value is taken from the new message handle. The only exception to this rule is the special case when the property in the new message handle has the same name as a property in the original message handle, but the value of the property is null. In this case the property is removed from the message.

The Feedback field in the resultant MQMD represents the report that is to be generated. A Feedback value of MQFB_NONE causes the MQPUT or MQPUT1 call to fail with reason code MQRC_FEEDBACK_ERROR.

To choose the user data of the report message, IBM MQ consults the Report and Feedback fields in the resultant MQMD, and the Buffer and BufferLength parameters of the MQPUT or MQPUT1 call.

- If Feedback is MQFB_COA, MQFB_COD or MQFB_EXPIRATION then the value of Report is inspected.
- If any of the following cases is true, the full message data from Buffer for a length of BufferLength is used.
  - Feedback is MQFB_EXPIRATION and Report contains MQRO_EXPIRATION_WITH_FULL_DATA
  - Feedback is MQFB_COD and Report contains MQRO_COD_WITH_FULL_DATA
  - Feedback is MQFB_COA and Report contains MQRO_COA_WITH_FULL_DATA
- If any of the following cases is true, the first 100 bytes of the message (or BufferLength if this is less than 100) from Buffer are used
  - Feedback is MQFB_EXPIRATION and Report contains MQRO_EXPIRATION_WITH_DATA
  - Feedback is MQFB_COD and Report contains MQRO_COD_WITH_DATA
  - Feedback is MQFB_COA and Report contains MQRO_COA_WITH_DATA
- If Feedback is MQFB_EXPIRATION, MQFB_COD or MQFB_COA, and Report does not contain the *_WITH_FULL_DATA or *_WITH_DATA options relevant to that Feeback value, then no user data is included with the message.
- If Feedback takes a different value from those listed above, then Buffer and BufferLength are used as normal.

The derivation of the user data described in the previous list is also shown in the following table:

Table 511. Source of user data

	MQFB_COA	**MQFB_COD**	**MQFB_EXPIRATION**
MQRO_EXPIRATION _WITH_FULL_DATA	None	None	Buffer(Bufferlength)
MQRO_COD_WITH _FULL_DATA	None	Buffer(Bufferlength)	None
MQRO_COA_WITH _FULL_DATA	Buffer(Bufferlength)	None	None
MQRO_EXPIRATION _WITH_DATA	None	None	Buffer(First 100 bytes)
MQRO_COD_WITH_DA TA	None	Buffer(First 100 bytes)	None

Table 511. Source of user data (continued)			
	MQFB_COA	**MQFB_COD**	**MQFB_EXPIRATION**
MQRO_COA_WITH_DATA	Buffer(First 100 bytes)	None	None

PubLevel (MQLONG)

The initial value of this field is 9. The level of subscription targeted by this publication. Only those subscriptions with the highest SubLevel less than or equal to this value receive this publication. This value must be in the range zero to 9; zero is the lowest level. However, if a publication has been retained, it is no longer available to subscribers at higher levels because it is republished at PubLevel 1.

For information, see Intercepting publications.

MQPMR - Put-message record

Use the MQPMR structure to specify various message properties for a single destination when putting a message to a distribution list. MQPMR is an input/output structure for the MQPUT and MQPUT1 calls.

Availability

The MQPMR structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ clients connected to these systems.

Character set and encoding

Data in MQPMR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ client, the structure must be in the character set and encoding of the client.

Usage

By providing an array of these structures on the MQPUT or MQPUT1 call, you can specify different values for each destination queue in a distribution list. Some of the fields are input only, others are input/output.

Note: This structure is unusual in that it does not have a fixed layout. The fields in this structure are optional, and the presence or absence of each field is indicated by the flags in the *PutMsgRecFields* field in MQPMO. Fields that are present ***must occur in the following order*** :

- *MsgId*
- *CorrelId*
- *GroupId*
- *Feedback*
- *AccountingToken*

Fields that are absent occupy no space in the record.

Because MQPMR does not have a fixed layout, no definition of it is provided in the header, COPY, and INCLUDE files for the supported programming languages. The application programmer must

create a declaration containing the fields that are required by the application, and set the flags in *PutMsgRecFields* to indicate the fields that are present.

Fields

There are no initial values defined for this structure, as no structure declarations are provided in the header, COPY, and INCLUDE files for the supported programming languages. The sample declarations show how to declare the structure if all the fields are required.

Table 512. Fields in MQPMR

Field name	Field description
MsgId	Message identifier
CorrelId	Correlation identifier
GroupId	Group identifier
Feedback	Feedback or reason code
AccountingToken	Accounting token

Language declarations

C declaration for MQPMR

```
typedef struct tagMQPMR MQPMR;
struct tagMQPMR {
  MQBYTE24  MsgId;            /* Message identifier */
  MQBYTE24  CorrelId;         /* Correlation identifier */
  MQBYTE24  GroupId;          /* Group identifier */
  MQLONG    Feedback;         /* Feedback or reason code */
  MQBYTE32  AccountingToken;  /* Accounting token */
};
```

COBOL declaration for MQPMR

```
**   MQPMR structure
  10 MQPMR.
**    Message identifier
   15 MQPMR-MSGID           PIC X(24).
**    Correlation identifier
   15 MQPMR-CORRELID        PIC X(24).
**    Group identifier
   15 MQPMR-GROUPID         PIC X(24).
**    Feedback or reason code
   15 MQPMR-FEEDBACK        PIC S9(9) BINARY.
**    Accounting token
   15 MQPMR-ACCOUNTINGTOKEN PIC X(32).
```

PL/I declaration for MQPMR

```
dcl
 1 MQPMR based,
  3 MsgId           char(24),      /* Message identifier */
  3 CorrelId        char(24),      /* Correlation identifier */
  3 GroupId         char(24),      /* Group identifier */
  3 Feedback        fixed bin(31), /* Feedback or reason code */
  3 AccountingToken char(32);      /* Accounting token */
```

Visual Basic declaration for MQPMR

```
Type MQPMR
  MsgId           As MQBYTE24 'Message identifier'
  CorrelId        As MQBYTE24 'Correlation identifier'
```

```
   GroupId         As MQBYTE24 'Group identifier'
   Feedback        As Long     'Feedback or reason code'
   AccountingToken As MQBYTE32 'Accounting token'
 End Type
```

MsgId (MQBYTE24)

This is the message identifier to be used for the message sent to the queue with a name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MsgId* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *MsgId* field. If that value is MQMI_NONE, a new message identifier is generated for *each* of those destinations (that is, no two of those destinations have the same message identifier).

If MQPMO_NEW_MSG_ID is specified, new message identifiers are generated for all the destinations in the distribution list, regardless of whether they have MQPMR records. This is different from the way that MQPMO_NEW_CORREL_ID is processed (see *CorrelId* field).

This is an input/output field.

CorrelId (MQBYTE24)

This is the correlation identifier to be used for the message sent to the queue with a name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *CorrelId* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *CorrelId* field.

If MQPMO_NEW_CORREL_ID is specified, a *single* new correlation identifier is generated and used for all the destinations in the distribution list, regardless of whether they have MQPMR records. This is different from the way that MQPMO_NEW_MSG_ID is processed (see *MsgId* field).

This is an input/output field.

GroupId (MQBYTE24)

GroupId is the group identifier to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *GroupId* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *GroupId* field. The value is processed as documented in Physical order on a queue, but with the following differences:

- GroupId is created from the QMName and a timestamp. Therefore to keep a GroupId unique keep queue manager names unique too. Also do not set the clocks back on the queue managers machine.
- In those cases where a new group identifier would be used, the queue manager generates a different group identifier for each destination (that is, no two destinations have the same group identifier).
- In those cases where the value in the field would be used, the call fails with reason code MQRC_GROUP_ID_ERROR

This is an input/output field.

Feedback (MQLONG)

This is the feedback code to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *Feedback* field in MQMD for a put to a single queue.

If this field is not present, the value in MQMD is used.

This is an input field.

AccountingToken (MQBYTE32)

This is the accounting token to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *AccountingToken* field in MQMD for a put to a single queue. See the description of *AccountingToken* in "MQMD - Message descriptor" on page 413 for information about the content of this field.

If this field is not present, the value in MQMD is used.

This is an input field.

MQRFH - Rules and formatting header

The MQRFH structure defines the layout of the rules and formatting header. Use this header to send string data in the form of name-value pairs.

Availability

All IBM MQ systems, plus IBM MQ MQI clients connected to these systems.

Format name

MQFMT_RF_HEADER

Character set and encoding

The fields in the MQRFH structure (including *NameValueString*) are in the character set and encoding given by the *CodedCharSetId* and *Encoding* fields in the header structure that precedes the MQRFH, or by those fields in the MQMD structure if the MQRFH is at the start of the application message data.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 513. Fields in MQRFH for MQRFH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQRFH_STRUC_ID	'RFH¬'
Version (structure version number)	MQRFH_VERSION_1	1
StrucLength (length in bytes of the MQRFH structure)	MQRFH_STRUC_LENGTH_FIXED	32
Encoding (numeric encoding of the data that follows *NameValueString*)	MQENC_NATIVE	Depends on environment
CodedCharSetId (specifies the character set identifier of the data that follows *NameValueString*)	MQCCSI_UNDEFINED	0

Table 513. Fields in MQRFH for MQRFH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Format (format name of the data that follows *NameValueString*)	MQFMT_NONE	Blanks
Flags (flags)	MQRFH_NONE	0
NameValueString (variable-length character string containing name-value pairs)	none	none

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQRFH_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQRFH MyRFH = {MQRFH_DEFAULT};
```

Language declarations

C declaration for MQRFH

```
typedef struct tagMQRFH MQRFH;
struct tagMQRFH {
  MQCHAR4  StrucId;         /* Structure identifier */
  MQLONG   Version;         /* Structure version number */
  MQLONG   StrucLength;     /* Total length of MQRFH including
                               NameValueString */
  MQLONG   Encoding;        /* Numeric encoding of data that follows
                               NameValueString */
  MQLONG   CodedCharSetId;  /* Character set identifier of data that
                               follows NameValueString */
  MQCHAR8  Format;          /* Format name of data that follows
                               NameValueString */
  MQLONG   Flags;           /* Flags */
};
```

COBOL declaration for MQRFH

```
**   MQRFH structure
  10 MQRFH.
**    Structure identifier
   15 MQRFH-STRUCID        PIC X(4).
**    Structure version number
   15 MQRFH-VERSION        PIC S9(9) BINARY.
**    Total length of MQRFH including NAMEVALUESTRING
   15 MQRFH-STRUCLENGTH    PIC S9(9) BINARY.
**    Numeric encoding of data that follows NAMEVALUESTRING
   15 MQRFH-ENCODING       PIC S9(9) BINARY.
**    Character set identifier of data that follows NAMEVALUESTRING
   15 MQRFH-CODEDCHARSETID PIC S9(9) BINARY.
**    Format name of data that follows NAMEVALUESTRING
   15 MQRFH-FORMAT         PIC X(8).
**    Flags
   15 MQRFH-FLAGS          PIC S9(9) BINARY.
```

PL/I declaration for MQRFH

```
dcl
 1 MQRFH based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
```

```
  3 StrucLength    fixed bin(31), /* Total length of MQRFH including
                                     NameValueString */
  3 Encoding       fixed bin(31), /* Numeric encoding of data that
                                     follows NameValueString */
  3 CodedCharSetId fixed bin(31), /* Character set identifier of data
                                     that follows NameValueString */
  3 Format         char(8),       /* Format name of data that follows
                                     NameValueString */
  3 Flags          fixed bin(31); /* Flags */
```

High Level Assembler declaration for MQRFH

```
MQRFH                  DSECT
MQRFH_STRUCID          DS   CL4  Structure identifier
MQRFH_VERSION          DS   F    Structure version number
MQRFH_STRUCLENGTH      DS   F    Total length of MQRFH including
*                                NAMEVALUESTRING
MQRFH_ENCODING         DS   F    Numeric encoding of data that follows
*                                NAMEVALUESTRING
MQRFH_CODEDCHARSETID   DS   F    Character set identifier of data that
*                                follows NAMEVALUESTRING
MQRFH_FORMAT           DS   CL8  Format name of data that follows
*                                NAMEVALUESTRING
MQRFH_FLAGS            DS   F    Flags
*
MQRFH_LENGTH           EQU  *-MQRFH
                       ORG  MQRFH
MQRFH_AREA             DS   CL(MQRFH_LENGTH)
```

Visual Basic declaration for MQRFH

```
Type MQRFH
  StrucId        As String*4 'Structure identifier'
  Version        As Long     'Structure version number'
  StrucLength    As Long     'Total length of MQRFH including'
                             'NameValueString'
  Encoding       As Long     'Numeric encoding of data that follows'
                             'NameValueString'
  CodedCharSetId As Long     'Character set identifier of data that'
                             'follows NameValueString'
  Format         As String*8 'Format name of data that follows'
                             'NameValueString'
  Flags          As Long     'Flags'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQRFH_STRUC_ID
Identifier for rules and formatting header structure.

For the C programming language, the constant MQRFH_STRUC_ID_ARRAY is also defined; this has the same value as MQRFH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQRFH_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQRFH_VERSION_1
Version-1 rules and formatting header structure.

The initial value of this field is MQRFH_VERSION_1.

StrucLength (MQLONG)

This is the length in bytes of the MQRFH structure, including the *NameValueString* field at the end of the structure. The length does not include any user data that follows the *NameValueString* field.

To avoid problems converting the user data in some environments, *StrucLength* must be a multiple of four.

The following constant gives the length of the *fixed* part of the structure, that is, the length excluding the *NameValueString* field:

MQRFH_STRUC_LENGTH_FIXED
Length of fixed part of MQRFH structure.

The initial value of this field is MQRFH_STRUC_LENGTH_FIXED.

Encoding (MQLONG)

This specifies the numeric encoding of the data that follows *NameValueString* ; it does not apply to numeric data in the MQRFH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is MQENC_NATIVE.

CodedCharSetId (MQLONG)

This specifies the character set identifier of the data that follows *NameValueString* ; it does not apply to character data in the MQRFH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

MQCCSI_INHERIT
Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

MQCCSI_INHERIT cannot be used if the value of the *PutApplType* field in MQMD is MQAT_BROKER.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This specifies the format name of the data that follows *NameValueString*.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *Format* field in MQMD.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The following can be specified:

MQRFH_NONE
No flags.

The initial value of this field is MQRFH_NONE.

NameValueString (MQCHARn)

This is a variable-length character string containing name-value pairs in the form:

```
name1 value1 name2 value2 name3 value3 ...
```

Each name or value must be separated from the adjacent name or value by one or more blank characters; these blanks are not significant. A name or value can contain significant blanks by prefixing and suffixing the name or value with double quotation marks; all characters between the open double quotation mark

and the matching closing double quotation mark are treated as significant. In the following example, the name is FAMOUS_WORDS, and the value is Hello World:

```
FAMOUS_WORDS "Hello World"
```

A name or value can contain any characters other than the null character (which acts as a delimiter for *NameValueString*). However, to assist interoperability an application can restrict names to the following characters:

- First character: upper or lowercase alphabetic (A through Z, or a through z), or underscore.
- Subsequent characters: upper or lowercase alphabetic, decimal digit (0 through 9), underscore, hyphen, or dot.

If a name or value contains one or more double quotation marks, the name or value must be enclosed in double quotation marks, and each double quotation mark within the string must be doubled:

```
Famous_Words "The program displayed ""Hello World"""
```

Names and values are case sensitive, that is, lowercase letters are not considered to be the same as uppercase letters. For example, FAMOUS_WORDS and Famous_Words are two different names.

The length in bytes of *NameValueString* is equal to *StrucLength* minus MQRFH_STRUC_LENGTH_FIXED. To avoid problems converting the user data in some environments, make this length a multiple of four. Pad *NameValueString* with blanks to this length, or terminate it earlier by placing a null character following the last significant character in the string. The null character and the bytes following it, up to the specified length of *NameValueString*, are ignored.

Note: Because the length of this field is not fixed, the field is omitted from the declarations of the structure that are provided for the supported programming languages.

MQRFH2 - Rules and formatting header 2

The MQRFH2 header is based on the MQRFH header, but it allows Unicode strings to be transported without translation, and it can carry numeric data types. The MQRFH2 structure defines the format of the version-2 rules and formatting header. You use this header to send data that has been encoded using an XML-like syntax. A message can contain two or more MQRFH2 structures in series, with user data optionally following the last MQRFH2 structure in the series.

Availability

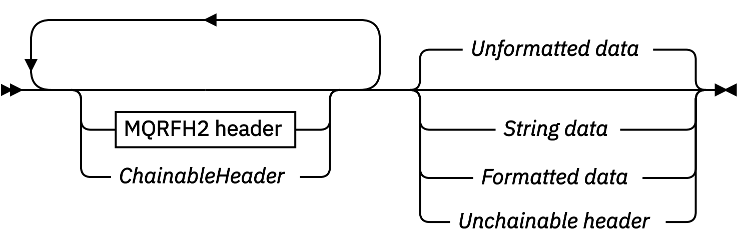
All IBM MQ systems, plus IBM MQ MQI clients connected to these systems.

Format name

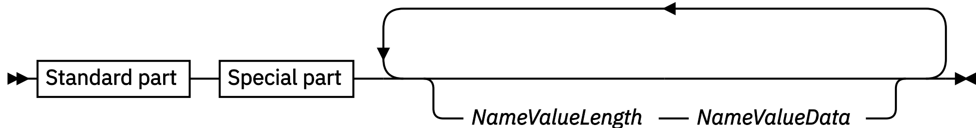
MQFMT_RF_HEADER_2

Syntax

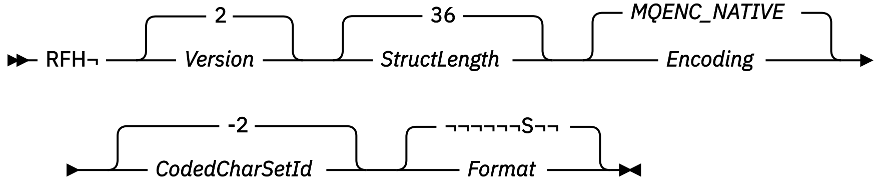
IBM MQ Message



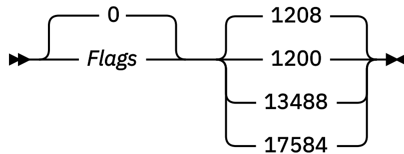
MQRFH2 header



Standard part



Special part



Character set and encoding

Special rules apply to the character set and encoding used for the MQRFH2 structure:

- Fields other than *NameValueData* are in the character set and encoding given by the *CodedCharSetId* and *Encoding* fields in the header structure that precedes MQRFH2, or by those fields in the MQMD structure if the MQRFH2 is at the start of the application message data.

  The character set must be one that has single-byte characters for the characters that are valid in queue names.

  When MQGMO_CONVERT is specified on the MQGET call, the queue manager converts the MQRFH2 fields, other than *NameValueData*, to the requested character set and encoding.
- *NameValueData* is in the character set given by the *NameValueCCSID* field. Only the listed Unicode character sets are valid for *NameValueCCSID* ; see the description of *NameValueCCSID* for details.

  Some character sets have a representation that depends on the encoding. If *NameValueCCSID* is one of these character sets, *NameValueData* must be in the same encoding as the other fields in the MQRFH2.

  When MQGMO_CONVERT is specified on the MQGET call, the queue manager converts *NameValueData* to the requested encoding, but does not change its character set.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 514. Fields in MQRFH2 for MQRFH2

Field name	Name of constant	Value of constant
StrucId (structure identifier)	MQRFH_STRUC_ID	'RFH¬'
Version (structure version number)	MQRFH_VERSION_2	2

Table 514. Fields in MQRFH2 for MQRFH2 (continued)		
Field name	**Name of constant**	**Value of constant**
StrucLength (length in bytes of the MQRFH2 structure)	MQRFH_STRUC_LENGTH_FIXED_2	36
Encoding (numeric encoding of the data that follows the last *NameValueData* field)	MQENC_NATIVE	Depends on environment
CodedCharSetId (character set identifier of the data that follows the last *NameValueData* field)	MQCCSI_INHERIT	-2
Format (format name of the data that follows the last *NameValueData* field)	MQFMT_NONE	Blanks
Flags (flags)	MQRFH_NONE	0
NameValueCCSID (coded character set identifier of the data in the *NameValueData* field)	None	1208
NameValueLength (length in bytes of the data in the *NameValueData* field)	None	None
NameValueData (name-value pairs of message properties)	None	None

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQRFH2_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQRFH2 MyRFH2 = {MQRFH2_DEFAULT};
```

Language declarations

C declaration for MQRFH2

```
typedef struct tagMQRFH2 MQRFH2;
struct tagMQRFH2 {
  MQCHAR4  StrucId;         /* Structure identifier */
  MQLONG   Version;         /* Structure version number */
  MQLONG   StrucLength;     /* Total length of MQRFH2 including all
                               NameValueLength and NameValueData
                               fields */
  MQLONG   Encoding;        /* Numeric encoding of data that follows
                               last NameValueData field */
```

```
  MQLONG   CodedCharSetId;  /* Character set identifier of data that
                               follows last NameValueData field */
  MQCHAR8  Format;          /* Format name of data that follows last
                               NameValueData field */
  MQLONG   Flags;           /* Flags */
  MQLONG   NameValueCCSID;  /* Character set identifier of
                               NameValueData */
};
```

COBOL declaration for MQRFH2

```
**   MQRFH2 structure
  10 MQRFH2.
**    Structure identifier
   15 MQRFH2-STRUCID        PIC X(4).
**    Structure version number
   15 MQRFH2-VERSION        PIC S9(9) BINARY.
**    Total length of MQRFH2 including all NAMEVALUELENGTH and
**    NAMEVALUEDATA fields
   15 MQRFH2-STRUCLENGTH    PIC S9(9) BINARY.
**    Numeric encoding of data that follows last NAMEVALUEDATA field
   15 MQRFH2-ENCODING       PIC S9(9) BINARY.
**    Character set identifier of data that follows last NAMEVALUEDATA
**    field
   15 MQRFH2-CODEDCHARSETID PIC S9(9) BINARY.
**    Format name of data that follows last NAMEVALUEDATA field
   15 MQRFH2-FORMAT         PIC X(8).
**    Flags
   15 MQRFH2-FLAGS          PIC S9(9) BINARY.
**    Character set identifier of NAMEVALUEDATA
   15 MQRFH2-NAMEVALUECCSID PIC S9(9) BINARY.
```

PL/I declaration for MQRFH2

```
dcl
 1 MQRFH2 based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 StrucLength    fixed bin(31), /* Total length of MQRFH2 including
                                     all NameValueLength and
                                     NameValueData fields */
  3 Encoding       fixed bin(31), /* Numeric encoding of data that
                                     follows last NameValueData field */
  3 CodedCharSetId fixed bin(31), /* Character set identifier of data
                                     that follows last NameValueData
                                     field */
  3 Format         char(8),       /* Format name of data that follows
                                     last NameValueData field */
  3 Flags          fixed bin(31), /* Flags */
  3 NameValueCCSID fixed bin(31); /* Character set identifier of
                                     NameValueData */
```

High Level Assembler declaration for MQRFH2

```
MQRFH                 DSECT
MQRFH_STRUCID         DS   CL4  Structure identifier
MQRFH_VERSION         DS   F    Structure version number
MQRFH_STRUCLENGTH     DS   F    Total length of MQRFH2 including all
*                               NAMEVALUELENGTH and NAMEVALUEDATA fields
MQRFH_ENCODING        DS   F    Numeric encoding of data that follows
*                               last NAMEVALUEDATA field
MQRFH_CODEDCHARSETID  DS   F    Character set identifier of data that
*                               follows last NAMEVALUEDATA field
MQRFH_FORMAT          DS   CL8  Format name of data that follows last
*                               NAMEVALUEDATA field
MQRFH_FLAGS           DS   F    Flags
MQRFH_NAMEVALUECCSID  DS   F    Character set identifier of
*                               NAMEVALUEDATA
*
MQRFH_LENGTH          EQU  *-MQRFH
                      ORG  MQRFH
MQRFH_AREA            DS   CL(MQRFH_LENGTH)
```

Visual Basic declaration for MQRFH2

```
Type MQRFH2
  StrucId        As String*4 'Structure identifier'
  Version        As Long     'Structure version number'
  StrucLength    As Long     'Total length of MQRFH2 including all'
                             'NameValueLength and NameValueData fields'
  Encoding       As Long     'Numeric encoding of data that follows'
                             'last NameValueData field'
  CodedCharSetId As Long     'Character set identifier of data that'
                             'follows last NameValueData field'
  Format         As String*8 'Format name of data that follows last'
                             'NameValueData field'
  Flags          As Long     'Flags'
  NameValueCCSID As Long     'Character set identifier of NameValueData'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQRFH_STRUC_ID
: Identifier for rules and formatting header structure.

  For the C programming language, the constant MQRFH_STRUC_ID_ARRAY is also defined; this has the same value as MQRFH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQRFH_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQRFH_VERSION_2
: Version-2 rules and formatting header structure.

The initial value of this field is MQRFH_VERSION_2.

StrucLength (MQLONG)

This is the length in bytes of the MQRFH2 structure, including the *NameValueLength* and *NameValueData* fields at the end of the structure. It is valid for there to be multiple pairs of *NameValueLength* and *NameValueData* fields at the end of the structure, in the sequence:

```
length1, data1, length2, data2, ...
```

StrucLength does not include any user data that might follow the last *NameValueData* field at the end of the structure.

To avoid problems with converting the user data in some environments, *StrucLength* must be a multiple of four.

The following constant gives the length of the *fixed* part of the structure, that is, the length excluding the *NameValueLength* and *NameValueData* fields:

MQRFH_STRUC_LENGTH_FIXED_2
: Length of fixed part of MQRFH2 structure.

The initial value of this field is MQRFH_STRUC_LENGTH_FIXED_2.

Encoding (MQLONG)

This specifies the numeric encoding of the data that follows the last *NameValueData* field; it does not apply to numeric data in the MQRFH2 structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is MQENC_NATIVE.

CodedCharSetId (MQLONG)

This specifies the character set identifier of the data that follows the last *NameValueData* field; it does not apply to character data in the MQRFH2 structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

MQCCSI_INHERIT
Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

MQCCSI_INHERIT cannot be used if the value of the *PutApplType* field in MQMD is MQAT_BROKER.

The initial value of this field is MQCCSI_INHERIT.

Format (MQCHAR8)

This specifies the format name of the data that follows the last *NameValueData* field.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *Format* field in MQMD.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The initial value of this field is MQRFH_NONE. MQRFH_NONE must be specified.

MQRFH_NONE
No flags.

MQRFH_INTERNAL
The MQRFH2 header contains internally set properties.

MQRFH_INTERNAL is for queue manager use.

The top 16 bits, MQRFH_FLAGS_RESTRICTED_MASK, are reserved for flags the queue manager sets. Flags that a user might set are defined in the bottom 16 bits.

NameValueCCSID (MQLONG)

This specifies the coded character set identifier of the data in the *NameValueData* field. This is different from the character set of the other strings in the MQRFH2 structure, and can be different from the character set of the data (if any) that follows the last *NameValueData* field at the end of the structure.

NameValueCCSID must have one of the following values:

CCSID	Meaning
1200	UTF-16, most recent Unicode version supported
13488	UTF-16, Unicode version 2.0 subset
17584	UTF-16, Unicode version 3.0 subset (includes the Euro symbol)
1208	UTF-8, most recent Unicode version supported

For the UTF-16 character sets, the encoding (byte order) of the *NameValueData* must be the same as the encoding of the other fields in the MQRFH2 structure.

Characters beyond the Unicode Basic Multilingual Plane (those above U+FFFF), represented in UTF-16 by surrogate code points (X'D800' through X'DFFF'), or four bytes in UTF-8, are not supported.

Note: If *NameValueCCSID* does not have one of the values listed above, and the MQRFH2 structure requires conversion on the MQGET call, the call completes with reason code MQRC_SOURCE_CCSID_ERROR and the message is returned unconverted.

The initial value of this field is 1208.

NameValueLength (MQLONG)

The length of the corresponding NameValueData field

This specifies the length in bytes of the data in the *NameValueData* field. *NameValueLength* must be a multiple of four.

Note: The *NameValueLength* and *NameValueData* fields are optional, but if present they must occur as a pair and be adjacent. The pair of fields can be repeated as many times as required, for example:

```
length1 data1 length2 data2 length3 data3
```

Because these fields are optional, they are omitted from the declarations of the structure that are provided for the various programming languages supported.

NameValueData (MQCHARn)

NameValueData is a variable length field that contains a folder containing name-value pairs of message properties. A folder is a variable-length character string containing data encoded using an XML-like syntax. The length in bytes of the character string is given by the *NameValueLength* field that precedes the *NameValueData* field. The length must be a multiple of four.

The *NameValueLength* and *NameValueData* fields are optional, but if present they must occur as a pair and be adjacent. The pair of fields can be repeated as many times as required, for example:

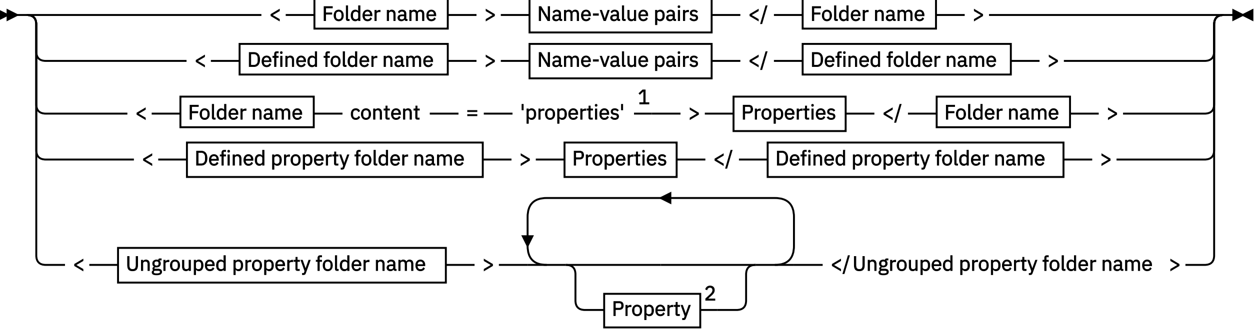
```
length1 data1 length2 data2 length3 data3
```

NameValueData is not converted to the character set specified on the MQGET call. Even if the message is retrieved with the MQGMO_CONVERT option in effect *NameValueData* remains in its original character set. However, *NameValueData* is converted to the encoding specified on the MQGET call.

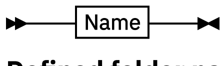
Notes:

- Because these fields are optional, they are omitted from the declarations of the structure that are provided for the various programming languages supported.
- The terms "defined" and "reserved" are used in the syntax diagram. "Defined" means that the name is used by IBM MQ. "Reserved" means that the name is reserved for future use by IBM MQ.

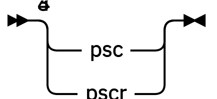
NameValueData syntax



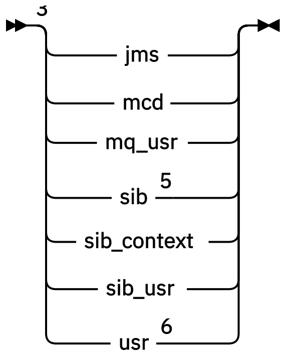
Folder name



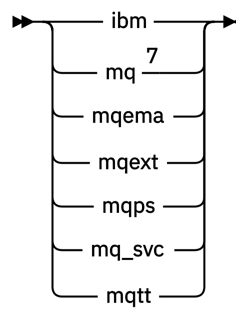
Defined folder name



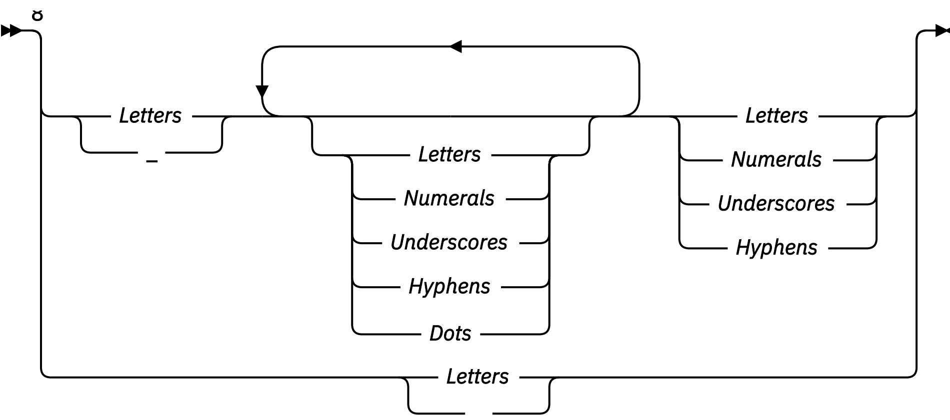
Defined property folder name



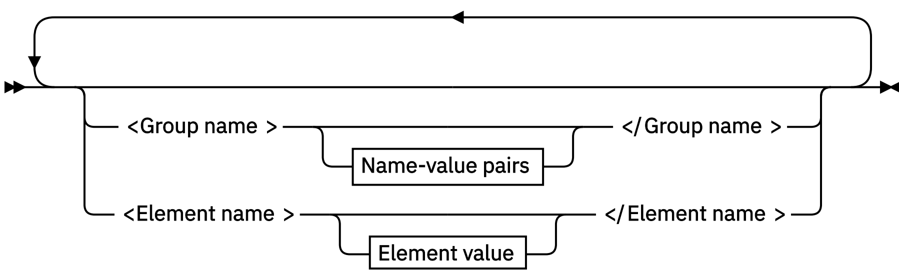
Ungrouped property folder name



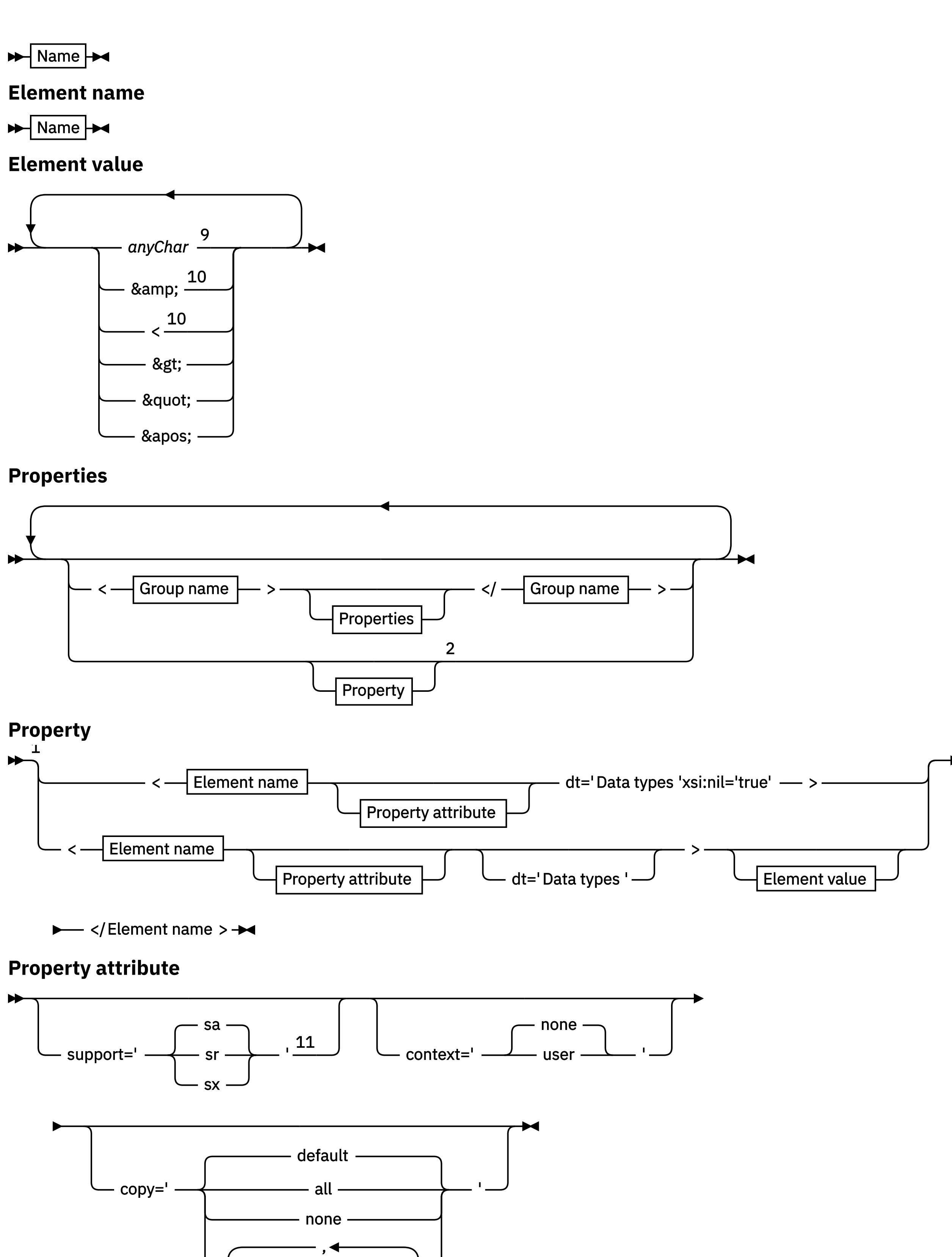
Name



Name-value pairs



Group name



Element name

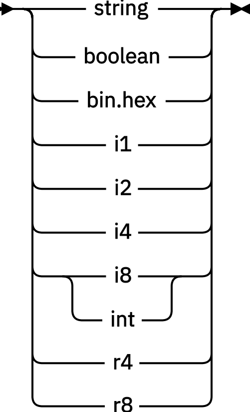
Element value

Properties

Property

Property attribute

Data types



Notes:

[1] Double quotation marks or single quotation marks are valid.
[2] Do not use an invalid property name; see "Invalid property name" on page 539. Use a reserved property name only for its defined purpose; see "Defined property names" on page 539.
[3] The name must be in lowercase.
[4] Only one `psc` and `pscr` folder is supported.
[5] WebSphere Application Server Service Integration Bus ignores sib, sib_context, and sib_usr folders in subsequent MQRFH2 headers, and only properties in the first MQRFH2 header are significant.
[6] Not more than one `usr` folder must be present in an MQRFH2. Properties in the `usr` folder must occur no more than once.
[7] Only properties in the first mq folder are significant. If the folder is UTF-8, only single byte UTF-8 characters are supported. The only white space character is Unicode U+0020.
[8] Valid characters are defined in the W3C XML specification, and consist essentially of Unicode categories `Ll, Lu, Lo, Lt, Nl, Mc, Mn, Lm,` and Nd ; see Unicode character categories.
[9] All characters are significant. Leading and trailing blanks are part of the element value.
[10] Do not use an invalid character; see "Invalid characters" on page 538. Use an escape sequence, rather than these invalid characters.
[11] The support property attribute is only valid on the mq folder

Folder name

NameValueData contains a single folder. To create multiple folders, create multiple *NameValueData* fields. You can create multiple *NameValueData* fields in a single MQRFH2 header within a message. Alternatively you can create multiple chained MQRFH2 headers, each containing multiple *NameValueData* fields.

The order of MQRFH2 headers, and the order of *NameValueData* fields makes no difference to the logical contents of a folder. If the same folder is present more than once in a message the folder is parsed as a whole. If the same property occurs in muliple instances of the same folder, it is parsed as a list.

A correct parse of an MQRFH2 is not affected by the alternative ways a folder can be physically stored in a message.

Four folders do not follow this rule. Only the first instance of the mq, `sib`, `sib_context`, and `sib_usr` folder are parsed.

If the same property occurs more than once in the combined contents of the chained MQRFH2 headers, only the first instance of the property is parsed. If a property is set using an API call, such as MQSETMP, and added to an MQRFH2 directly by an application, the API call takes precedence.

A folder name is the name of a folder containing name-value pairs or groups. Groups and name-value pairs can be mixed at the same level in the folder tree; see Figure 1 on page 529. Do not combine a group name and an element name; see Figure 2 on page 529

```
<group1><nvp1>value</nvp1></group1><group2><nvp2>value</nvp2></group2>
<group3><nvp1>value</nvp1></group3><nvp3>value</nvp3>
```

Figure 1. Correct uses of groups and name-value pairs

```
<group1><nvp1> value </nvp1> value </group1>
```

Figure 2. Incorrect use of groups and name-value pairs

Do not use an invalid or reserved folder name; see "Invalid path name" on page 538 and "Reserved folder or property folder name" on page 538. Use a defined folder name only for its defined purpose; see "Defined folder name" on page 530.

If you add the attribute `'content=properties'` to the folder name tag, the folder becomes a property folder; see Figure 3 on page 529.

```
<myFolder></myfolder>
<myPropertyFolder contents='properties'></myPropertyFolder>
```

Figure 3. Example of a folder and a property folder

Folder names are case-sensitive. Folder names and property folder names share the same namespace. They must have different names. `Folder1` in Figure 4 on page 529 must be a different name to `Folder2` in Figure 5 on page 529.

```
< Folder1 ><NVP1> value </NVP1></ Folder1 >
```

Figure 4. `Folder1` namespace

```
< Folder2 content='properties'>< Property1 > value </ Property1 ></ Folder2 >
```

Figure 5. `Folder2` namespace

Groups, properties, and name-value pairs in different folders have different namespaces. `Property1` in Figure 5 on page 529 is a different property to `Property1` in Figure 6 on page 529.

```
<Folder3 content='properties'>< Property1 > value </ Property1 ></Folder3>
```

Figure 6. `Folder3` namespace

Property folders are different to non-property folders in two important respects:

1. Property folders contain properties, and non-property folders contain name-value pairs. The folders differ slightly, syntactically.

2. Use the defined interfaces, such as the properties MQI, or JMS message properties, to access message properties. The interfaces ensure the property folders in the MQRFH2 are well-formed. A well-formed property folder is interoperable between queue managers on different platforms and different releases.

The message property MQI is a robust way to read and write an MQRFH2, and avoids the difficulties of parsing an MQRFH2 correctly.

Defined folder name

A defined folder name is the name of a folder that is reserved for use by IBM MQ, or another product. Do not create a folder of the same name, and do not add your own name-value pairs to the folders. The defined folders are psc and pscr.

psc and pscr are used by queued publish/subscribe.

A segmented message put with either MQMF_SEGMENT or MQMF_SEGMENTATION_ALLOWED cannot contain an MQRFH2 with a defined folder name. The MQPUT fails with reason code 2443, MQRC_SEGMENTATION_NOT_ALLOWED.

Defined property folder name

A defined property folder name is the name of a property folder that is used by IBM MQ, or another product. For the names of the folders and their contents, see Property folders. Defined property folder names are a subset of all the folder names reserved by IBM MQ; see "Reserved folder or property folder name" on page 538.

Any element stored in a defined property folder is a property. An element stored in a defined property folder must not have a content='properties' attribute.

You can add properties only to the defined property folders usr, mq_usr, and sib_usr. In other property folders, such as mq and sib, IBM MQ ignores or throws away properties it does not recognize.

The description of each defined property folder lists the properties that IBM MQ has defined that can be used by application programs. Some of the properties are accessed indirectly by setting or getting a JMS property, and some are accessed directly using the MQSETMP and MQINQMP MQI calls.

The defined property folders also contain other properties that IBM MQ has reserved, but which applications do not have access to. The names of the reserved properties are not listed. No reserved properties are present in the usr, mq_usr, and sib_usr property folders. But do not create properties with invalid property names; see "Invalid property name" on page 539.

Property folders

jms

jms contains JMS header fields, and JMSX properties that cannot be fully expressed in the MQMD. The jms folder is always present in a JMS MQRFH2.

Table 515. jms property name, synonym, data type, and folder

Property synonym	Property name	Data type	Folder
JMSDestination	jms.Dst	string	<jms><Dst> *destination* </Dst></jms>
JMSExpiration	jms.Exp	i8	<jms><Exp> *expiration* </Exp></jms>
JMSCorrelation	jms.Cid	string	<jms><Cid> *correlationId* </Cid></jms>

Table 515. jms property name, synonym, data type, and folder (continued)			
Property synonym	**Property name**	**Data type**	**Folder**
JMSDelivery	jms.Dlv	i4	<jms><Dlv> *delivery* </Dlv></jms>
JMSPriority	jms.Pri	i4	<jms><Pri> *priority* </Pri></jms>
JMSReplyTo	jms.Rto	string	<jms><Rto> *replyToURI* </Rto></jms>
JMSTimeStamp	jms.Tms	i8	<jms><Tms> *timestamp* </Tms></jms>
JMSXGroupID	jms.Gid	string	<jms><Gid> *groupId* </Gid></jms>
JMSXGroupSeq	jms.Seq	i4	<jms><Seq> *messageSequenceNo* </Seq></jms>

Do not add your own properties in the `jms` folder.

mcd

`mcd` contains properties that describe the format of the message. For example, the message service domain `Msd` property identifies a JMS message as being `JMSTextMessage`, `JMSBytesMessage`, `JMSStreamMessage`, `JMSMapMessage`, `JMSObjectMessage`, or null.

The `mcd` folder is always present in a JMS message containing an `MQRFH2`.

It is always present in a message containing an `MQRFH2` sent from IBM Integration Bus. It describes the domain, format, type, and message set of a message.

Table 516. mcd property name, synonym, data type, and folder			
Property synonym	**Property name**	**Data type**	**Folder**
	mcd.Msd	string	<mcd><Msd>*messageDomain*</Msd></mcd>
	mcd.Set	string	<mcd><Set>*messageDomain*</Set></mcd>
	mcd.Type	string	<mcd><Type>*messageDomain*</Type></mcd>
	mcd.Fmt	string	<mcd><Fmt>*messageDomain*</Fmt></mcd>

Do not add your own properties in the `mcd` folder.

mq_usr

`mq_usr` contains application-defined properties that are not exposed as JMS user-defined properties. Properties that do not meet JMS requirements can be placed in this folder.

You can create properties in the `mq_usr` folder. Properties you create in the `mq_usr` are like properties you create in new folders with the `content='properties'` attribute.

sib

`sib` contains WebSphere Application Server service integration bus (WAS/SIB) system message properties. `sib` properties are not exposed as JMS properties to IBM MQ JMS applications because

they are not of the supported types. For example, some sib properties cannot be exposed as JMS properties because they are byte arrays. Some sib properties are exposed to WAS/SIB applications as JMS_IBM_* properties; these include forward and reverse routing paths properties.

Do not add your own properties in the sib folder.

sib_context

sib_context contains WAS/SIB system message properties that are not exposed to WAS/SIB user applications or as JMS properties. sib_context contains security and transactional properties that are used for web services.

Do not add your own properties in the sib_context folder.

sib_usr

sib_usr contains WAS/SIB user message properties that are not exposed as JMS user properties because they are not of supported types. sib_usr is exposed to WAS/SIB applications in the SIMessage interface; see Developing Service Integration.

The type of a sib_usr property must be bin.hex, and the value must be in the correct format. If an IBM MQ application writes a bin.hex typed element to the folder in the wrong format, the application receives an IOException. If the data type of the property is not bin.hex the application receives a ClassCastException.

Do not attempt to make JMS user properties available to WAS/SIB by using this folder; instead use the usr folder.

You can create properties in the sib_usr folder.

usr

usr contains application-defined JMS properties associated with the message. The usr folder is present only if an application has set an application-defined property.

usr is the default property folder. If a property is set without a folder name, it is placed in the usr folder.

Table 517. usr property name, synonym, data type, and folder

Property synonym	Property name	Data type	Folder
	usr.contentType	string	<usr><contentType>text/xml; charset=utf-8</contentType></usr>
	usr.endPointURL	string	<usr><endPointURL> *URI* </endPointURL></usr>
	usr.targetService	string	<usr><targetService> *serviceName* </targetService></usr>
	usr.soapAction	string	<usr><soapAction> *name* </soapAction></usr>
	usr.transportVersion	string	<usr><transportVersion> *version* </transportVersion></usr>

You can create properties in the usr folder.

A segmented message put with either MQMF_SEGMENT or MQMF_SEGMENTATION_ALLOWED cannot contain an MQRFH2 with a defined property folder name. The MQPUT fails with reason code 2443, MQRC_SEGMENTATION_NOT_ALLOWED.

Ungrouped property folder name

ibm

ibm contains properties that are used only by IBM MQ.

Table 518. ibm property name, synonym, data type, and folder			
Property synonym	**Property name**	**Data type**	**Folder**
	ibm.rfp	string	<ibm><rfp>fingerprint</rfp></ibm>

Do not add your own properties in the ibm folder.

mq

mq contains properties that are used only by IBM MQ.

The following restrictions apply to properties in the mq folder:

- Only properties in the first significant mq folder in the message are acted upon by MQ; properties in any other mq folder in the message are ignored.
- Only single-byte UTF-8 characters are allowed in the folder. A multi-byte character in the folder, can cause parsing to fail, and the message to be rejected.
- Do not use escape strings in the folder. An escape string is treated as the actual value of the element.
- Only Unicode character U+0020 is treated as white space within the folder. All other characters are treated as significant and can cause parsing of the folder to fail, and the message to be rejected.

If parsing of the mq folder fails, or if the folder does not observe these restrictions, the message is rejected with reason code 2527, MQRC_RFH_RESTRICTED_FORMAT_ERR.

Do not add your own properties in the mq folder.

mqema

mqema contains properties that are used only by WebSphere Application Server. The folder has been replaced by mqext.

Do not add your own properties in the mqema folder.

mqext

mqext contains the following types of property:

- Properties that are used only by WebSphere Application Server.
- Properties relating to delayed delivery of messages.

The folder is present if the application has either set at least one of the IBM defined properties or used delivery delay.

Table 519. mqext property name, synonym, data type, and folder			
Property synonym	**Property name**	**Data type**	**Folder**
JMSArmCorrelator	mqext.Arm	string	<mqext><Arm>*armCorrelator*</Arm></mqext>
JMSRMCorrelator	mqext.Wrm	string	<mqext><Wrm>*wrmCorrelator*</Wrm></mqext>
JMSDeliveryTime	mqext.Dlt	i8	<mqext><Dlt>*DeliveryTime*</Dlt></mqext>

Property synonym	Property name	Data type	Folder
JMSDeliveryDelay	mqext.Dly	i8	<mqext><Dly>*DeliveryTime*</Dly></mqext>

Table 519. mqext property name, synonym, data type, and folder (continued)

Do not add your own properties in the mqext folder.

mqps

mqps contains properties that are used only by IBM MQ publish/subscribe. The folder is present only if the application has set at least one of the integrated publish/subscribe properties.

Table 520. mqps property name, synonym, data type, and folder

Property synonym	Property name	Data type	Folder
MQTopicString	mqps.Top	string	<mqps><Top>*topicString*</Top></mqps>
MQSubUserData	mqps.Sud	string	<mqps><Sud>*subscriberUserData*...</Sud></mqps>
MQIsRetained	mqps.Ret	boolean	<mqps><Ret>*isRetained*</Ret></mqps>
MQPubOptions	mqps.Pub	i8	<mqps><Pub>*publicationOptions*</Pub></mqps>
MQPubLevel	mqps.Pbl	i8	<mqps><Pbl>*publicationLevel*</Pbl></mqps>
MQPubTime	mqpse.Pts	string	<mqps><Pts>*publicationTime*</Pts></mqps>
MQPubSeqNum	mqpse.Seq	i8	<mqps><Seq>*publicationSequenceNumber*</Seq></mqps>
MQPubStrIntData	mqpse.Sid	string	<mqps><Sid>*publicationData*</Sid></mqps>
MQPubFormat	mqpse.Pfmt	i8	<mqps><Pfmt>*messageFormat*</Pfmt></mqps>

Do not add your own properties in the mqps folder.

mq_svc

mq_svc contains properties used by SupportPac MA93.

Do not add your own properties in the mq_svc folder.

mqtt

mqtt contains properties use by MQ Telemetry

Table 521. mqtt property name, synonym, data type, and folder

Property synonym	Property name	Data type	Folder
	mqtt.clientId	string	<mqtt><clientId> *topicString* </clientId></mqtt>
	mqtt.qos	i4	<mqtt><qos> *qualityOfService* </qos></mqtt>

Table 521. mqtt property name, synonym, data type, and folder (continued)			
Property synonym	**Property name**	**Data type**	**Folder**
	mqtt.msgid	string	<mqtt><msgid> *messageIdentifier* </msgid></mqtt>

Do not add your own properties in the mqtt folder.

A segmented message put with either MQMF_SEGMENT or MQMF_SEGMENTATION_ALLOWED cannot contain an MQRFH2 with an ungrouped property folder name. The MQPUT fails with reason code 2443, MQRC_SEGMENTATION_NOT_ALLOWED.

Name-value pairs

In the syntax diagram, "Name-value pairs" describes the content of an ordinary folder. An ordinary folder contains groups, and elements. An element is a name-value pair. A group contains elements and other groups.

In terms of trees, elements are leaf nodes, and groups are internal nodes. An internal node, and the folder, which is the root node, can contain a mixture of internal nodes and leaf nodes. A node cannot be both an internal node and a leaf node at the same time; see Figure 2 on page 529.

Properties

In the syntax diagram, "Properties" describes the content of a property folder. A property folder contains groups, and properties. A property is a name-value pair with an optional data type attribute. A group contains properties and other groups.

In terms of trees, properties are leaf nodes, and groups are internal nodes. An internal node, and the property folder, which is the root node, can contain a mixture of internal nodes and leaf nodes. A node cannot be both an internal node and a leaf node at the same time; see Figure 2 on page 529.

Property

A message property is a name-value pair in a property folder. It can optionally include a data type attribute and a property attribute; for an example, see the following code. If the data type attribute is omitted, the property type is string.

```
<pf><p1 dt='i8' > value </p1></pf>
```

The name of a message property is its full path name, with the XML-like, <> syntax, replaced by dots. For example, myPropertyFolder1.myGroup1.myGroup2.myProperty1 is mapped to a *NameValueData* string as follows. The string is formatted for easier reading.

```
<myPropertyFolder1>
    <myGroup1>
        <myGroup2>
            <myProperty1>value</myProperty1>
        </myGroup2>
    </myGroup1>
</myPropertyFolder1>
```

A property folder can contain multiple properties. For example the properties in Figure 7 on page 536 are mapped to the property folder in Figure 8 on page 536

```
 myPropertyFolder1.myProperty4
myPropertyFolder1.myGroup1.myGroup2.myProperty1
myPropertyFolder1.myGroup1.myGroup2.myProperty2
myPropertyFolder1.myGroup1.myProperty3
```

Figure 7. Multiple properties with the same root name

```
<myPropertyFolder1>
    <myProperty4>value</myProperty4>
    <myGroup1>
        <myGroup2>
            <myProperty1>value</myProperty1>
            <myProperty2>value</myProperty2>
        </myGroup2>
        <myProperty3>value</myProperty3>
    </myGroup1>
</myPropertyFolder1>
```

Figure 8. Multiple property name mapping

Name

A name must begin with a *Letter* or an *Underscore*. It must not contain a *Colon*, not end in a *Period* and contain only *Letters*, *Numerals*, *Underscores*, *Hyphens*, and *Dots*. Valid characters are defined in the W3C XML specification, and consist essentially of Unicode categories `Ll, Lu, Lo, Lt, Nl, Mc, Mn, Lm,` and Nd ; see Unicode character categories.

The complete path of a property or name-value pair must not break the rule described in "Invalid path name" on page 538. Paths are restricted to 4095 bytes, must not contain Unicode compatibility characters, and must not start with the string XML.

Group name

A group name has the same syntax as a name. Group names are optional. Properties and name-value pairs can be placed in the root of a folder. Use groups if it helps to organize properties and name-value pairs.

Element name

An element name has the same syntax as a name.

Element value

An element value includes all the white space between the < *`Element name`* > tag and the < */ `Element name`* >. Do not use the two characters < and & in a value. Replace then with < and `&`.

Property attributes

The property attributes map property descriptor fields: The mappings are as follows:

Support

sa (default)
`MQPD_SUPPORT_OPTIONAL`

sr
`MQPD_SUPPORT_REQUIRED`

sx
MQPD_SUPPORT_REQUIRED_IF_LOCAL

Context

none (default)
MQPD_NO_CONTEXT

user
MQPD_USER _CONTEXT

CopyOptions

forward
MQPD_COPY_FORWARD

reply
MQPD_COPY_REPLY

report
MQPD_COPY_REPORT

publish
MQPD_COPY_PUBLISH

all
MQPD_COPY_ALL

Do not use `all` in combination with other options.

default
MQPD_COPY_DEFAULT

Do not use `default` in combination with other options. `default` is the same as `forward` + `report` + `publish`.

none
MQPD_COPY_NONE

Do not use none in combination with other options.

The Support property attributes are only applicable to properties in the `mq` folder.

The Context and CopyOptions property attributes are applicable to all property folders.

Data types

MQRFH2 data types map to message property types as follows:

Table 522. Data type mappings

MQRFH2 data type	**Message property type**
bin.hex	MQBYTE[]
boolean	MQBOOL
i1	MQINT8
i2	MQINT16
i4	MQINT32
i8	MQINT64
r4	MQFLOAT32
r8	MQFLOAT64
string	MQCHAR[]

Any element without a data type is assumed to be of type `string`.

A null value is indicated by the element attribute `xsi:nil='true'`. Do not use the attribute `xsi:nil='false'` for non-null values. For example, the following property has a null value:

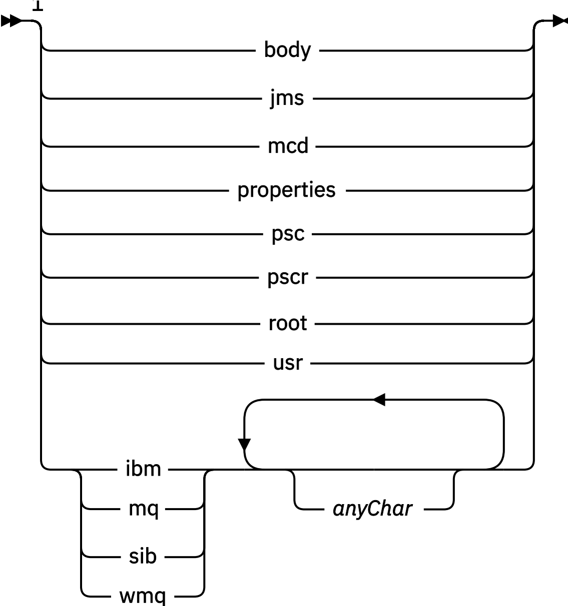
```
<NullProperty
xsi:nil='true'></NullProperty>
```

A byte or character string property can have an empty value. An empty value is represented by an `MQRFH2` element with a zero length element value. For example, the following property has an empty value:

```
<EmptyProperty></EmptyProperty>
```

Reserved folder or property folder name

Restrict the name of a folder or property folder not to start with any of the following strings. The prefixes are reserved for folder or property names created by IBM.

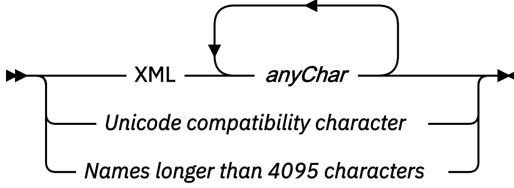


Notes:

[1] A reserved folder or property name contains any mixture of lower and uppercase letters.

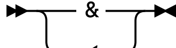
Invalid path name

Restrict the complete path of a name-value pair or a property not to include any of the following strings.



Invalid characters

Always use the escape sequences `&` and < instead of the literals "&" and "<".

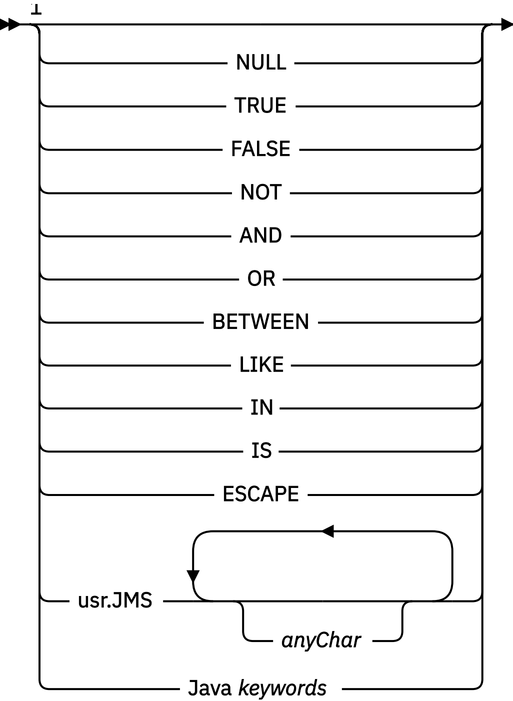


Defined property names

Defined property names are the names of properties that are defined by IBM MQ, or other products, and used by IBM MQ and user applications. Defined properties exist only in defined property folders. Defined property names are described in the description of property folders; see Property folders.

Invalid property name

Do not construct property names that match the following rule. The rule applies to the full property path that names a property, and not only to the property element name.



Notes:

[1] An invalid property name can contain any combination of upper and lowercase.

Invalid attributes

Property folders and properties can include only supported “Property attributes” on page 536 and “Data types” on page 537.

Any non-supported XML-like attributes, for example, names with quoted string values, that are included in property folders or properties might be removed.

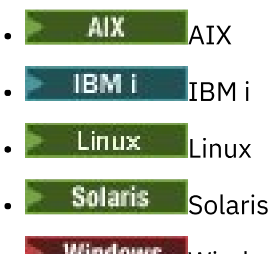
XML-like attributes included in non-property folders or non-property elements that remain in MQRFH2 headers.

MQRMH - Reference message header

The MQRMH structure defines the format of a reference message header. This header is used with user-written message channel exits to send extremely large amounts of data (called *bulk data*) from one queue manager to another. The difference compared to normal messaging is that the bulk data is not stored on a queue; instead, only a *reference* to the bulk data is stored on the queue. This reduces the possibility of IBM MQ resources being exhausted by a small number of extremely large messages.

Availability

The MQRMH structure is available on the following platforms:



- AIX
- IBM i
- Linux
- Solaris
- Windows

and for IBM MQ clients connected to these systems.

Format name

MQFMT_REF_MSG_HEADER

Character set and encoding

Character data in MQRMH, and the strings addressed by the offset fields, must be in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute. Numeric data in MQRMH must be in the native machine encoding; this is given by the value of MQENC_NATIVE for the C programming language.

Set the character set and encoding of the MQRMH into the *CodedCharSetId* and *Encoding* fields in:

- The MQMD (if the MQRMH structure is at the start of the message data), or
- The header structure that precedes the MQRMH structure (all other cases).

Usage

An application puts a message consisting of an MQRMH, but omitting the bulk data. When a message channel agent (MCA) reads the message from the transmission queue, a user-supplied message exit is invoked to process the reference message header. The exit can append to the reference message the bulk data identified by the MQRMH structure, before the MCA sends the message through the channel to the next queue manager.

At the receiving end, a message exit that waits for reference messages must exist. When a reference message is received, the exit must create the object from the bulk data that follows the MQRMH in the message, and then pass on the reference message without the bulk data. The reference message can later be retrieved by an application reading the reference message (without the bulk data) from a queue.

Normally, the MQRMH structure is all that is in the message. However, if the message is on a transmission queue, one or more additional headers precede the MQRMH structure.

A reference message can also be sent to a distribution list. In this case, the MQDH structure and its related records precede the MQRMH structure when the message is on a transmission queue.

Note: Do not send a reference message as a segmented message, because the message exit cannot process it correctly.

Data conversion

For data conversion purposes, converting the MQRMH structure includes conversion of the source environment data, source object name, destination environment data, and destination object name. Any other bytes within *StrucLength* bytes of the start of the structure are either discarded or have undefined values after data conversion. The bulk data is converted provided that all the following statements are true:

- The bulk data is present in the message when the data conversion is performed.

- The *Format* field in MQRMH has a value other than MQFMT_NONE.
- A user-written data-conversion exit exists with the format name specified.

Be aware, however, that usually the bulk data is not present in the message when the message is on a queue, and that as a result the bulk data is converted by the MQGMO_CONVERT option.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 523. Fields in MQRMH for MQRMH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQRMH_STRUC_ID	'RMH¬'
Version (structure version number)	MQRMH_VERSION_1	1
StrucLength (total length of MQRMH, including strings at end of fixed fields, but not the bulk data)	None	0
Encoding (numeric encoding of bulk data)	MQENC_NATIVE	Depends on environment
CodedCharSetId (character set identifier of bulk data)	MQCCSI_UNDEFINED	0
Format (format name of bulk data)	MQFMT_NONE	Blanks
Flags (reference message flags)	MQRMHF_NOT_LAST	0
ObjectType (object type)	None	Blanks
ObjectInstanceId (object instance identifier)	MQOII_NONE	Nulls
SrcEnvLength (length of source environment data)	None	0
SrcEnvOffset (offset of source environment data)	None	0
SrcNameLength (length of source object name)	None	0
SrcNameOffset (offset of source object name)	None	0
DestEnvLength (length of destination environment data)	None	0
DestEnvOffset (offset of destination environment data)	None	0
DestNameLength (length of destination object name)	None	0
DestNameOffset (offset of destination object name)	None	0
DataLogicalLength (length of bulk data)	None	0
DataLogicalOffset (low offset of bulk data)	None	0
DataLogicalOffset2 (high offset of bulk data)	None	0

Table 523. Fields in MQRMH for MQRMH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. The symbol ¬ represents a single blank character. 2. In the C programming language, the macro variable MQRMH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure: `MQRMH MyRMH = {MQRMH_DEFAULT};`		

Language declarations

C declaration for MQRMH

```
typedef struct tagMQRMH MQRMH;
struct tagMQRMH {
  MQCHAR4   StrucId;             /* Structure identifier */
  MQLONG    Version;             /* Structure version number */
  MQLONG    StrucLength;         /* Total length of MQRMH, including
                                    strings at end of fixed fields, but
                                    not the bulk data */
  MQLONG    Encoding;            /* Numeric encoding of bulk data */
  MQLONG    CodedCharSetId;      /* Character set identifier of bulk
                                    data */
  MQCHAR8   Format;              /* Format name of bulk data */
  MQLONG    Flags;               /* Reference message flags */
  MQCHAR8   ObjectType;          /* Object type */
  MQBYTE24  ObjectInstanceId;    /* Object instance identifier */
  MQLONG    SrcEnvLength;        /* Length of source environment data */
  MQLONG    SrcEnvOffset;        /* Offset of source environment data */
  MQLONG    SrcNameLength;       /* Length of source object name */
  MQLONG    SrcNameOffset;       /* Offset of source object name */
  MQLONG    DestEnvLength;       /* Length of destination environment
                                    data */
  MQLONG    DestEnvOffset;       /* Offset of destination environment
                                    data */
  MQLONG    DestNameLength;      /* Length of destination object name */
  MQLONG    DestNameOffset;      /* Offset of destination object name */
  MQLONG    DataLogicalLength;   /* Length of bulk data */
  MQLONG    DataLogicalOffset;   /* Low offset of bulk data */
  MQLONG    DataLogicalOffset2;  /* High offset of bulk data */
};
```

COBOL declaration for MQRMH

```
**   MQRMH structure
  10 MQRMH.
**    Structure identifier
   15 MQRMH-STRUCID            PIC X(4).
**    Structure version number
   15 MQRMH-VERSION            PIC S9(9) BINARY.
**    Total length of MQRMH, including strings at end of fixed fields,
**    but not the bulk data
   15 MQRMH-STRUCLENGTH        PIC S9(9) BINARY.
**    Numeric encoding of bulk data
   15 MQRMH-ENCODING           PIC S9(9) BINARY.
**    Character set identifier of bulk data
   15 MQRMH-CODEDCHARSETID     PIC S9(9) BINARY.
**    Format name of bulk data
   15 MQRMH-FORMAT             PIC X(8).
**    Reference message flags
   15 MQRMH-FLAGS              PIC S9(9) BINARY.
**    Object type
   15 MQRMH-OBJECTTYPE         PIC X(8).
**    Object instance identifier
   15 MQRMH-OBJECTINSTANCEID   PIC X(24).
**    Length of source environment data
```

```
   15 MQRMH-SRCENVLENGTH       PIC S9(9) BINARY.
**    Offset of source environment data
   15 MQRMH-SRCENVOFFSET       PIC S9(9) BINARY.
**    Length of source object name
   15 MQRMH-SRCNAMELENGTH      PIC S9(9) BINARY.
**    Offset of source object name
   15 MQRMH-SRCNAMEOFFSET      PIC S9(9) BINARY.
**    Length of destination environment data
   15 MQRMH-DESTENVLENGTH      PIC S9(9) BINARY.
**    Offset of destination environment data
   15 MQRMH-DESTENVOFFSET      PIC S9(9) BINARY.
**    Length of destination object name
   15 MQRMH-DESTNAMELENGTH     PIC S9(9) BINARY.
**    Offset of destination object name
   15 MQRMH-DESTNAMEOFFSET     PIC S9(9) BINARY.
**    Length of bulk data
   15 MQRMH-DATALOGICALLENGTH  PIC S9(9) BINARY.
**    Low offset of bulk data
   15 MQRMH-DATALOGICALOFFSET  PIC S9(9) BINARY.
**    High offset of bulk data
   15 MQRMH-DATALOGICALOFFSET2 PIC S9(9) BINARY.
```

PL/I declaration for MQRMH

```
dcl
 1 MQRMH based,
  3 StrucId            char(4),       /* Structure identifier */
  3 Version            fixed bin(31), /* Structure version number */
  3 StrucLength        fixed bin(31), /* Total length of MQRMH,
                                         including strings at end of
                                         fixed fields, but not the bulk
                                         data */
  3 Encoding           fixed bin(31), /* Numeric encoding of bulk
                                         data */
  3 CodedCharSetId     fixed bin(31), /* Character set identifier of
                                         bulk data */
  3 Format             char(8),       /* Format name of bulk data */
  3 Flags              fixed bin(31), /* Reference message flags */
  3 ObjectType         char(8),       /* Object type */
  3 ObjectInstanceId   char(24),      /* Object instance identifier */
  3 SrcEnvLength       fixed bin(31), /* Length of source environment
                                         data */
  3 SrcEnvOffset       fixed bin(31), /* Offset of source environment
                                         data */
  3 SrcNameLength      fixed bin(31), /* Length of source object name */
  3 SrcNameOffset      fixed bin(31), /* Offset of source object name */
  3 DestEnvLength      fixed bin(31), /* Length of destination
                                         environment data */
  3 DestEnvOffset      fixed bin(31), /* Offset of destination
                                         environment data */
  3 DestNameLength     fixed bin(31), /* Length of destination object
                                         name */
  3 DestNameOffset     fixed bin(31), /* Offset of destination object
                                         name */
  3 DataLogicalLength  fixed bin(31), /* Length of bulk data */
  3 DataLogicalOffset  fixed bin(31), /* Low offset of bulk data */
  3 DataLogicalOffset2 fixed bin(31); /* High offset of bulk data */
```

High Level Assembler declaration for MQRMH

```
MQRMH                     DSECT
MQRMH_STRUCID             DS   CL4   Structure identifier
MQRMH_VERSION             DS   F     Structure version number
MQRMH_STRUCLENGTH         DS   F     Total length of MQRMH, including
*                                    strings at end of fixed fields, but
*                                    not the bulk data
MQRMH_ENCODING            DS   F     Numeric encoding of bulk data
MQRMH_CODEDCHARSETID      DS   F     Character set identifier of bulk
*                                    data
MQRMH_FORMAT              DS   CL8   Format name of bulk data
MQRMH_FLAGS               DS   F     Reference message flags
MQRMH_OBJECTTYPE          DS   CL8   Object type
MQRMH_OBJECTINSTANCEID    DS   XL24  Object instance identifier
MQRMH_SRCENVLENGTH        DS   F     Length of source environment data
MQRMH_SRCENVOFFSET        DS   F     Offset of source environment data
MQRMH_SRCNAMELENGTH       DS   F     Length of source object name
MQRMH_SRCNAMEOFFSET       DS   F     Offset of source object name
```

```
MQRMH_DESTENVLENGTH       DS   F     Length of destination environment
*                                    data
MQRMH_DESTENVOFFSET       DS   F     Offset of destination environment
*                                    data
MQRMH_DESTNAMELENGTH      DS   F     Length of destination object name
MQRMH_DESTNAMEOFFSET      DS   F     Offset of destination object name
MQRMH_DATALOGICALLENGTH   DS   F     Length of bulk data
MQRMH_DATALOGICALOFFSET   DS   F     Low offset of bulk data
MQRMH_DATALOGICALOFFSET2  DS   F     High offset of bulk data
*
MQRMH_LENGTH              EQU  *-MQRMH
                          ORG  MQRMH
MQRMH_AREA                DS   CL(MQRMH_LENGTH)
```

Visual Basic declaration for MQRMH

```
Type MQRMH
  StrucId            As String*4 'Structure identifier'
  Version            As Long     'Structure version number'
  StrucLength        As Long     'Total length of MQRMH, including'
                                 'strings at end of fixed fields, but'
                                 'not the bulk data'
  Encoding           As Long     'Numeric encoding of bulk data'
  CodedCharSetId     As Long     'Character set identifier of bulk data'
  Format             As String*8 'Format name of bulk data'
  Flags              As Long     'Reference message flags'
  ObjectType         As String*8 'Object type'
  ObjectInstanceId   As MQBYTE24 'Object instance identifier'
  SrcEnvLength       As Long     'Length of source environment data'
  SrcEnvOffset       As Long     'Offset of source environment data'
  SrcNameLength      As Long     'Length of source object name'
  SrcNameOffset      As Long     'Offset of source object name'
  DestEnvLength      As Long     'Length of destination environment'
                                 'data'
  DestEnvOffset      As Long     'Offset of destination environment'
                                 'data'
  DestNameLength     As Long     'Length of destination object name'
  DestNameOffset     As Long     'Offset of destination object name'
  DataLogicalLength  As Long     'Length of bulk data'
  DataLogicalOffset  As Long     'Low offset of bulk data'
  DataLogicalOffset2 As Long     'High offset of bulk data'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQRMH_STRUC_ID
Identifier for reference message header structure.

For the C programming language, the constant MQRMH_STRUC_ID_ARRAY is also defined; this has the same value as MQRMH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQRMH_STRUC_ID.

Version (MQLONG)

The structure version number. The value must be:

MQRMH_VERSION_1
Version-1 reference message header structure.

The following constant specifies the version number of the current version:

MQRMH_CURRENT_VERSION
Current version of reference message header structure.

The initial value of this field is MQRMH_VERSION_1.

StrucLength (MQLONG)

The total length of MQRMH, including strings at the end of fixed fields, but not the bulk data.

The initial value of this field is zero.

Encoding (MQLONG)

This specifies the numeric encoding of the bulk data; it does not apply to numeric data in the MQRMH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is MQENC_NATIVE.

CodedCharSetId (MQLONG)

This specifies the character set identifier of the bulk data; it does not apply to character data in the MQRMH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

MQCCSI_INHERIT

Character data in the data following this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

Do not use MQCCSI_INHERIT if the value of the `PutApplType` field in MQMD is MQAT_BROKER.

This value is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

and for IBM MQ clients connected to these systems.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This specifies the format name of the bulk data.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *`Format`* field in MQMD.

The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

These are reference message flags. The following flags are defined:

MQRMHF_LAST

This flag indicates that the reference message represents or contains the last part of the referenced object.

MQRMHF_NOT_LAST

Reference message does not contain or represent last part of object. MQRMHF_NOT_LAST aids program documentation. It is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is MQRMHF_NOT_LAST.

ObjectType (MQCHAR8)

This is a name that the message exit can use to recognize types of reference message that it supports. The name must conform to the same rules as the *Format* field, see "Format (MQCHAR8)" on page 545.

The initial value of this field is 8 blanks.

ObjectInstanceId (MQBYTE24)

Use this field to identify a specific instance of an object. If it is not needed, set it to the following value:

MQOII_NONE
No object instance identifier specified. The value is binary zero for the length of the field.

For the C programming language, the constant MQOII_NONE_ARRAY is also defined; this has the same value as MQOII_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_OBJECT_INSTANCE_ID_LENGTH. The initial value of this field is MQOII_NONE.

SrcEnvLength (MQLONG)

The length of the source environment data. If this field is zero, there is no source environment data, and *SrcEnvOffset* is ignored.

The initial value of this field is 0.

SrcEnvOffset (MQLONG)

This field specifies the offset of the source environment data from the start of the MQRMH structure. Source environment data can be specified by the creator of the reference message, if that data is known to the creator. For example, on Windows the source environment data might be the directory path of the object containing the bulk data. However, if the creator does not know the source environment data, the user-supplied message exit must determine any environment information needed.

The length of the source environment data is given by *SrcEnvLength* ; if this length is zero, there is no source environment data, and *SrcEnvOffset* is ignored. If present, the source environment data must reside completely within *StrucLength* bytes from the start of the structure.

Applications must not assume that the environment data starts immediately after the last fixed field in the structure or that it is contiguous with any of the data addressed by the *SrcNameOffset*, *DestEnvOffset*, and *DestNameOffset* fields.

The initial value of this field is 0.

SrcNameLength (MQLONG)

The length of the source object name. If this field is zero, there is no source object name, and *SrcNameOffset* is ignored.

The initial value of this field is 0.

SrcNameOffset (MQLONG)

This field specifies the offset of the source object name from the start of the MQRMH structure. The source object name can be specified by the creator of the reference message, if that data is known to the creator. However, if the creator does not know the source object name, the user-supplied message exit must identify the object to be accessed.

The length of the source object name is given by *SrcNameLength* ; if this length is zero, there is no source object name, and *SrcNameOffset* is ignored. If present, the source object name must reside completely within *StrucLength* bytes from the start of the structure.

Applications must not assume that the source object name is contiguous with any of the data addressed by the *SrcEnvOffset*, *DestEnvOffset*, and *DestNameOffset* fields.

The initial value of this field is 0.

DestEnvLength (MQLONG)

This is the length of the destination environment data. If this field is zero, there is no destination environment data, and *DestEnvOffset* is ignored.

DestEnvOffset (MQLONG)

This field specifies the offset of the destination environment data from the start of the MQRMH structure. Destination environment data can be specified by the creator of the reference message, if that data is known to the creator. For example, on Windows the destination environment data might be the directory path of the object where the bulk data is to be stored. However, if the creator does not know the destination environment data, it is the responsibility of the user-supplied message exit to determine any environment information needed.

The length of the destination environment data is given by *DestEnvLength* ; if this length is zero, there is no destination environment data, and *DestEnvOffset* is ignored. If present, the destination environment data must reside completely within *StrucLength* bytes from the start of the structure.

Applications must not assume that the destination environment data is contiguous with any of the data addressed by the *SrcEnvOffset*, *SrcNameOffset*, and *DestNameOffset* fields.

The initial value of this field is 0.

DestNameLength (MQLONG)

The length of the destination object name. If this field is zero, there is no destination object name, and *DestNameOffset* is ignored.

DestNameOffset (MQLONG)

This field specifies the offset of the destination object name from the start of the MQRMH structure. The destination object name can be specified by the creator of the reference message, if that data is known to the creator. However, if the creator does not know the destination object name, it is the responsibility of the user-supplied message exit to identify the object to be created or modified.

The length of the destination object name is given by *DestNameLength* ; if this length is zero, there is no destination object name, and *DestNameOffset* is ignored. If present, the destination object name must reside completely within *StrucLength* bytes from the start of the structure.

Applications must not assume that the destination object name is contiguous with any of the data addressed by the *SrcEnvOffset*, *SrcNameOffset*, and *DestEnvOffset* fields.

The initial value of this field is 0.

DataLogicalLength (MQLONG)

The *DataLogicalLength* field specifies the length of the bulk data referenced by the MQRMH structure.

If the bulk data is actually present in the message, the data begins at an offset of *StrucLength* bytes from the start of the MQRMH structure. The length of the entire message minus *StrucLength* gives the length of the bulk data present.

If data is present in the message, *DataLogicalLength* specifies the amount of that data that is relevant. The normal case is for *DataLogicalLength* to have the same value as the length of data present in the message.

If the MQRMH structure represents the remaining data in the object (starting from the specified logical offset), you can use the value zero for *DataLogicalLength*, provided that the bulk data is not actually present in the message.

If no data is present, the end of MQRMH coincides with the end of the message.

The initial value of this field is 0.

DataLogicalOffset (MQLONG)

This field specifies the low offset of the bulk data from the start of the object of which the bulk data forms part. The offset of the bulk data from the start of the object is called the *logical offset*. This is not the physical offset of the bulk data from the start of the MQRMH structure; that offset is given by *StrucLength*.

To allow large objects to be sent using reference messages, the logical offset is divided into two fields, and the actual logical offset is given by the sum of these two fields:

- *DataLogicalOffset* represents the remainder obtained when the logical offset is divided by 1 000 000 000. It is thus a value in the range 0 through 999 999 999.
- *DataLogicalOffset2* represents the result obtained when the logical offset is divided by 1 000 000 000. It is thus the number of complete multiples of 1 000 000 000 that exist in the logical offset. The number of multiples is in the range 0 through 999 999 999.

The initial value of this field is 0.

DataLogicalOffset2 (MQLONG)

This field specifies the high offset of the bulk data from the start of the object of which the bulk data forms part. It is a value in the range 0 through 999 999 999. See *DataLogicalOffset* for details.

The initial value of this field is 0.

MQRR - Response record

Use the MQRR structure to receive the completion code and reason code resulting from the open or put operation for a single destination queue, when the destination is a distribution list. MQRR is an output structure for the MQOPEN, MQPUT, and MQPUT1 calls.

Availability

The MQRR structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ clients connected to these systems.

Character set and encoding

Data in MQRR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Usage

By providing an array of these structures on the MQOPEN and MQPUT calls, or on the MQPUT1 call, you can determine the completion codes and reason codes for all the queues in a distribution list when the outcome of the call is mixed, that is, when the call succeeds for some queues in the list but fails for others. Reason code MQRC_MULTIPLE_REASONS from the call indicates that the response records (if provided by the application) have been set by the queue manager.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 524. Fields in MQRR

Field name and description	Name of constant	Initial value (if any) of constant
CompCode (completion code for queue)	MQCC_OK	0
Reason (reason code for queue)	MQRC_NONE	0

Notes:

1. In the C programming language, the macro variable MQRR_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQRR MyRR = {MQRR_DEFAULT};
```

Language declarations

C declaration for MQRR

```
typedef struct tagMQRR MQRR;
struct tagMQRR {
  MQLONG  CompCode;  /* Completion code for queue */
  MQLONG  Reason;    /* Reason code for queue */
};
```

COBOL declaration for MQRR

```
**   MQRR structure
  10 MQRR.
**    Completion code for queue
   15 MQRR-COMPCODE PIC S9(9) BINARY.
**    Reason code for queue
   15 MQRR-REASON   PIC S9(9) BINARY.
```

PL/I declaration for MQRR

```
dcl
 1 MQRR based,
  3 CompCode fixed bin(31), /* Completion code for queue */
  3 Reason   fixed bin(31); /* Reason code for queue */
```

Visual Basic declaration for MQRR

```
Type MQRR
  CompCode As Long 'Completion code for queue'
  Reason   As Long 'Reason code for queue'
End Type
```

CompCode (MQLONG)

This is the completion code resulting from the open or put operation for the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call.

This is always an output field. The initial value of this field is MQCC_OK.

Reason (MQLONG)

This is the reason code resulting from the open or put operation for the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call.

This is always an output field. The initial value of this field is MQRC_NONE.

MQSCO - SSL/TLS configuration options

The MQSCO structure, in conjunction with the TLS fields in the MQCD structure, allows an application running as an IBM MQ MQI client to specify configuration options that control the use of TLS for the client connection when the channel protocol is TCP/IP. The structure is an input parameter on the MQCONNX call.

Availability

The MQSCO structure is available on the following clients:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

If the channel protocol for the client channel is not TCP/IP, the MQSCO structure is ignored.

Character set and encoding

Data in MQSCO must be in the character set given by the **CodedCharSetId** queue manager attribute, and encoding of the local queue manager given by MQENC_NATIVE.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 525. Fields in MQSCO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQSCO_STRUC_ID	'SCO¬'
Version (structure version number)	MQSCO_CURRENT_VERSION	1
KeyRepository (location of key repository)	None	Null string or blanks
CryptoHardware (details of cryptographic hardware)	None	Null string or blanks
AuthInfoRecCount (number of MQAIR records present)	None	0
AuthInfoRecOffset (offset of first MQAIR record from start of MQSCO)	None	0
AuthInfoRecPtr (address of first MQAIR record)	None	Null pointer or null bytes

Table 525. Fields in MQSCO (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Note: The following two fields are ignored if *Version* is less than MQSCO_VERSION_2.		
KeyResetCount (TLS secret key reset count)	MQSCO_RESET_COUNT_ DEFAULT	0
"FipsRequired (MQLONG)" on page 555 (use FIPS-certified cryptographic algorithms in IBM MQ)	MQSSL_FIPS_NO	0
Note: The following two fields are ignored if *Version* is less than MQSCO_VERSION_3.		
EncryptionPolicySuiteB (use only Suite B cryptographic algorithms)	MQ_SUITE_B_NONE, MQ_SUITE_B_NOT_AVA ILABLE, MQ_SUITE_B_NOT_AVA ILABLE, MQ_SUITE_B_NOT_AVA ILABLE	1, 0, 0, 0
Note: The following two fields are ignored if *Version* is less than MQSCO_VERSION_4.		
CertificateValPolicy (certificate validation policy)	MQ_CERT_VAL_POLICY _DEFAULT	0
Note: The following two fields are ignored if *Version* is less than MQSCO_VERSION_5.		
CertificateLabel (details the certificate label that is being used)	None	Null string or blanks

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQSCO_DEFAULT contains the values listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQSCO MySCO = {MQSCO_DEFAULT};
```

Language declarations

C declaration for MQSCO

```
typedef struct tagMQSCO MQSCO;
struct tagMQSCO {
   MQCHAR4    StrucId;                  /* Structure identifier */
   MQLONG     Version;                  /* Structure version number */
   MQCHAR256  KeyRepository;            /* Location of TLS key */
                                        /* repository */
   MQCHAR256  CryptoHardware;           /* Cryptographic hardware */
                                        /* configuration string */
   MQLONG     AuthInfoRecCount;         /* Number of MQAIR records */
                                        /* present */
   MQLONG     AuthInfoRecOffset;        /* Offset of first MQAIR */
                                        /* record from start of */
                                        /* MQSCO structure */
   PMQAIR     AuthInfoRecPtr;           /* Address of first MQAIR */
                                        /* record */
/* Ver:1 */
   MQLONG     KeyResetCount;            /* Number of unencrypted */
```

```
                                            /* bytes sent/received */
                                            /* before secret key is */
                                            /* reset */
   MQLONG     FipsRequired;                 /* Using FIPS-certified */
/* Ver:2 */
                                            /* algorithms */
   MQLONG     EncryptionPolicySuiteB[4];    /* Use only Suite B */
/* Ver:3 */
                                            /* cryptographic algorithms */
   MQLONG     CertificateValPolicy;         /* Certificate validation */
                                            /* policy */
/* Ver:4 */
   MQCHAR64   CertificateLabel;             /* Certificate label */
/* Ver:5 */

  };
```

COBOL declaration for MQSCO

```
**   MQSCO structure
  10 MQSCO.
**    Structure identifier
   15 MQSCO-STRUCID                  PIC X(4).
**    Structure version number
   15 MQSCO-VERSION                  PIC S9(9) BINARY.
**    Location of TLS key repository
   15 MQSCO-KEYREPOSITORY            PIC X(256).
**    Cryptographic hardware configuration string
   15 MQSCO-CRYPTOHARDWARE           PIC X(256).
**    Number of MQAIR records present
   15 MQSCO-AUTHINFORECCOUNT         PIC S9(9) BINARY.
**    Offset of first MQAIR record from start of MQSCO structure
   15 MQSCO-AUTHINFORECOFFSET        PIC S9(9) BINARY.
**    Address of first MQAIR record
   15 MQSCO-AUTHINFORECPTR           POINTER.
** Version 1 **
**    Number of unencrypted bytes sent/received before secret key is
**    reset
   15 MQSCO-KEYRESETCOUNT            PIC S9(9) BINARY.
**    Using FIPS-certified algorithms
   15 MQSCO-FIPSREQUIRED             PIC S9(9) BINARY.
** Version 2 **
**    Use only Suite B cryptographic algorithms
   15 MQSCO-ENCRYPTIONPOLICYSUITEB   PIC S9(9) BINARY OCCURS 4.
** Version 3 **
**    Certificate validation policy setting
   15 MQSCO-CERTIFICATEVALPOLICY     PIC S9(9) BINARY.
** Version 4 **
**    SSL/TLS certificate label
   15 MQSCO-CERTIFICATELABEL         PIC X(64).
** Version 5 **
```

PL/I declaration for MQSCO

```
dcl
 1 MQSCO based,
  3 StrucId                   char(4),       /* Structure identifier */
  3 Version                   fixed bin(31), /* Structure version number */
  3 KeyRepository             char(256),     /* Location of TLS key
                                                repository */
  3 CryptoHardware            char(256),     /* Cryptographic hardware
                                                configuration string */
  3 AuthInfoRecCount          fixed bin(31), /* Number of MQAIR records
                                                present */
  3 AuthInfoRecOffset         fixed bin(31), /* Offset of first MQAIR record
                                                from start of MQSCO structure */
  3 AuthInfoRecPtr            pointer,       /* Address of first MQAIR record */
  3 KeyResetCount             fixed bin(31), /* Key reset count */
/* Version 1 */
  3 FipsRequired              fixed bin(31), /* FIPS required */
/* Version 2 */
  3 EncryptionPolicySuiteB (4) fixed bin(31), /* Suite B encryption policy */
/* Version 3 */
  3 CertificateValPolicy      fixed bin(31), /* Certificate validation policy */
/* Version 4 */
```

```
  3 CertificateLabel           char(64),      /* SSL/TLS certificate label */
/* Version 5 */
```

Visual Basic declaration for MQSCO

```
Type MQSCO
  StrucId           As String*4   'Structure identifier'
  Version           As Long       'Structure version number'
  KeyRepository     As String*256 'Location of TLS key repository'
  CryptoHardware    As String*256 'Cryptographic hardware configuration'
                                  'string'
  AuthInfoRecCount  As Long       'Number of MQAIR records present'
  AuthInfoRecOffset As Long       'Offset of first MQAIR record from'
                                  'start of MQSCO structure'
  AuthInfoRecPtr    As MQPTR      'Address of first MQAIR record'
  KeyResetCount     As Long       'Number of unencrypted bytes sent/received before secret key
is reset'
'Version 1'
  FipsRequired      As Long       'Mandatory FIPS CipherSpecs?'
'Version 2'
End Type
```

Related reference

"MQCNO - Connect options" on page 311
The MQCNO structure allows the application to specify options relating to the connection to the queue manager. The structure is an input/output parameter on the MQCONNX call.

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQSCO_STRUC_ID
: Identifier for TLS configuration options structure.

  For the C programming language, the constant MQSCO_STRUC_ID_ARRAY is also defined; this has the same value as MQSCO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQSCO_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQSCO_VERSION_1
: Version-1 TLS configuration options structure.

MQSCO_VERSION_2
: Version-2 TLS configuration options structure.

MQSCO_VERSION_3
: Version-3 TLS configuration options structure.

MQSCO_VERSION_4
: Version-4 TLS configuration options structure.

MQSCO_VERSION_5
: Version-5 TLS configuration options structure.

The following constant specifies the version number of the current version:

MQSCO_CURRENT_VERSION
: Current version of TLS configuration options structure.

This is always an input field. The initial value of this field is MQSCO_VERSION_1.

ULW *KeyRepository (MQCHAR256)*

This field is relevant only for IBM MQ MQI clients running on UNIX, Linux, and Windows systems. It specifies the location of the key database file in which keys and certificates are stored. The key database

file must have a file name of the form `zzz.kdb`, where `zzz` is user-selectable. The *KeyRepository* field contains the path to this file, along with the file name stem (all characters in the file name up to but not including the final `.kdb`). The `.kdb` file suffix is added automatically.

Each key database file has an associated *password stash file*. This holds encoded passwords that are used to allow programmatic access to the key database. The password stash file must reside in the same directory and have the same file stem as the key database, and must end with the suffix `.sth`.

For example, if the *KeyRepository* field has the value `/xxx/yyy/key`, the key database file must be `/xxx/yyy/key.kdb`, and the password stash file must be `/xxx/yyy/key.sth`, where `xxx` and `yyy` represent directory names.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. The value is not checked; if there is an error in accessing the key repository, the call fails with reason code MQRC_KEY_REPOSITORY_ERROR.

To run a TLS connection from an IBM MQ MQI client, set *KeyRepository* to a valid key database file name.

This is an input field. The length of this field is given by MQ_SSL_KEY_REPOSITORY_LENGTH. The initial value of this field is the null string in C, and blank characters in other programming languages.

CryptoHardware (MQCHAR256)

This field gives configuration details for cryptographic hardware connected to the client system.

Set the field to a string of the following format, or leave it blank or null:

```
GSK_PKCS11=the PKCS #11 driver path and file name;the PKCS #11
token label;the PKCS #11 token password;symmetric cipher setting;
```

To use cryptographic hardware which conforms to the PKCS #11 interface, for example, the IBM 4960 or IBM 4764, the PKCS #11 driver path, PKCS #11 token label, and PKCS #11 token password strings must be specified, each terminated by a semi-colon.

The PKCS #11 driver path is an absolute path to the shared library providing support for the PKCS #11 card. The PKCS #11 driver file name is the name of the shared library. An example of the value required for the PKCS #11 path and file name is:

```
/usr/lib/pkcs11/PKCS11_API.so
```

The PKCS #11 token label must match the label you configured your hardware with.

If no cryptographic hardware configuration is required, set the field to blank or null.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. If the value is not valid, or leads to a failure when used to configure the cryptographic hardware, the call fails with reason code MQRC_CRYPTO_HARDWARE_ERROR.

This is an input field. The length of this field is given by MQ_SSL_CRYPTO_HARDWARE_LENGTH. The initial value of this field is the null string in C, and blank characters in other programming languages.

AuthInfoRecCount (MQLONG)

This is the number of authentication information (MQAIR) records addressed by the *AuthInfoRecPtr* or *AuthInfoRecOffset* fields. For more information, see"MQAIR - Authentication information record" on page 267. The value must be zero or greater. If the value is not valid, the call fails with reason code MQRC_AUTH_INFO_REC_COUNT_ERROR.

This is an input field. The initial value of this field is 0.

AuthInfoRecOffset (MQLONG)

This is the offset in bytes of the first authentication information record from the start of the MQSCO structure. The offset can be positive or negative. The field is ignored if *AuthInfoRecCount* is zero.

You can use either *AuthInfoRecOffset* or *AuthInfoRecPtr* to specify the MQAIR records, but not both; see the description of the *AuthInfoRecPtr* field for details.

This is an input field. The initial value of this field is 0.

AuthInfoRecPtr (PMQAIR)

This is the address of the first authentication information record. The field is ignored if *AuthInfoRecCount* is zero.

You can provide the array of MQAIR records in one of two ways:

- By using the pointer field *AuthInfoRecPtr*

  In this case, the application can declare an array of MQAIR records that is separate from the MQSCO structure, and set *AuthInfoRecPtr* to the address of the array.

  Consider using *AuthInfoRecPtr* for programming languages that support the pointer data type in a fashion that is portable to different environments (for example, the C programming language).
- By using the offset field *AuthInfoRecOffset*

  In this case, the application must declare a compound structure containing an MQSCO followed by the array of MQAIR records, and set *AuthInfoRecOffset* to the offset of the first record in the array from the start of the MQSCO structure. Ensure that this value is correct, and has a value that can be accommodated within an MQLONG (the most restrictive programming language is COBOL, for which the valid range is -999 999 999 through +999 999 999).

  Consider using *AuthInfoRecOffset* for programming languages that do not support the pointer data type, or that implement the pointer data type in a fashion that is not portable to different environments (for example, the COBOL programming language).

Whatever technique you choose, only one of *AuthInfoRecPtr* and *AuthInfoRecOffset* can be used; the call fails with reason code MQRC_AUTH_INFO_REC_ERROR if both are nonzero.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

KeyResetCount (MQLONG)

This represents the total number of unencrypted bytes sent and received within a TLS conversation before the secret key is renegotiated.

The number of bytes includes control information sent by the MCA.

If you specify a TLS secret key reset count in the range 1 byte through 32 KB, TLS channels will use a secret key reset count of 32 KB. This is to avoid the processing cost of excessive key resets which would occur for small TLS secret key reset values.

This is an input field. The value is a number in the range 0 through 999 999 999, with a default value of 0. Use a value of 0 to indicate that secret keys are never renegotiated.

FipsRequired (MQLONG)

IBM MQ can be configured with cryptographic hardware so that the cryptography modules used are those provided by the hardware product; these can be FIPS-certified to a particular level depending on the cryptographic hardware product in use. Use this field to specify that only FIPS-certified algorithms are used if the cryptography is provided in IBM MQ-provided software.

Note: On UNIX, Linux, and Windows, IBM MQ provides FIPS 140-2 compliance through the "IBM Crypto for C" cryptographic module. The certificate for this module has been moved to the Historical status. Customers should view the IBM Crypto for C certificate and be aware of any advice provided by NIST. A

replacement FIPS 140-3 module is currently in progress and its status can be viewed by searching for it in the NIST CMVP modules in process list.

When IBM MQ is installed an implementation of TLS cryptography is also installed which provides some FIPS-certified modules.

The values can be:

MQSSL_FIPS_NO
This is the default value. When set to this value:

- Any CipherSpec supported on a particular platform can be used.
- If run without use of cryptographic hardware, the CipherSpecs run using FIPS 140-2 certified cryptography on the IBM MQ platforms.

  For a list of FIPS certified CipherSpecs, see the table described in Enabling CipherSpecs.

MQSSL_FIPS_YES
When set to this value, unless you are using cryptographic hardware to perform the cryptography, you can be sure that

- Only FIPS-certified cryptographic algorithms can be used in the CipherSpec applying to this client connection.
- Inbound and outbound TLS channel connections only succeed, if certain Cipher Specs are used.

  See Enabling CipherSpecs for more information.

Note: Where possible, if FIPS-only CipherSpecs are configured then the MQI client rejects connections which specify a non-FIPS CipherSpec with MQRC_SSL_INITIALIZATION_ERROR. IBM MQ does not guarantee to reject all such connections and it is your responsibility to determine whether your IBM MQ configuration is FIPS-compliant.

EncryptionPolicySuiteB(MQLONG)

This field Specifies whether Suite B compliant cryptography is used and what level of strength is employed. The value can be one or more of:

- MQ_SUITE_B_NONE

  Suite B compliant cryptography is not used.
- MQ_SUITE_B_128_BIT

  Suite B 128-bit strength security is used.
- MQ_SUITE_B_192_BIT

  Suite B 192-bit strength security is used.

Note: Using the MQ_SUITE_B_NONE with any other value in this field is invalid.

CertificateValPolicy (MQLONG)

This field specifies what type of certificate validation policy is used. The field can be set to one of the following values:

MQ_CERT_VAL_POLICY_ANY
Apply each of the certificate validation policies supported by the secure sockets library. Accept the certificate chain if any of the policies considers the certificate chain valid.

MQ_CERT_VAL_POLICY_RFC5280
Apply only the RFC5280 compliant certificate validation policy. This setting provides stricter validation than the ANY setting, but rejects some older digital certificates.

The initial value of this field is MQ_CERT_VAL_POLICY_ANY

CertificateLabel (MQCHAR64)

This field gives details of the certificate label being used.

IBM MQ initializes the default value for the *CertificateLabel* field as blanks.

This is interpreted at runtime as the default value, and is backwards compatible.

For example, specifying a MQSCO version less than 5.0, or using the default value of blanks for the *CertificateLabel* field, uses the preexisting default value of `ibmwebspheremq`*`user_id`*.

MQSD - Subscription descriptor

The MQSD structure is used to specify details about the subscription being made. The structure is an input/output parameter on the MQSUB call. For more information, see MQSUB usage notes.

Availability

The MQSD structure is available on the following platforms:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

and for IBM MQ MQI clients connected to these systems.

Version

The current version of MQSD is MQSD_VERSION_1.

Character set and encoding

Data in MQSD must be in the character set given by the **`CodedCharSetId`** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Managed subscriptions

If an application has no specific need to use a particular queue as the destination for those publications that match its subscription, it can use the managed subscription feature. If an application elects to use a managed subscription, the queue manager informs the subscriber about the destination where published messages are sent, by providing an object handle as an output from the MQSUB call. For more information, see Hobj (MQHOBJ) - input/output.

When the subscription is removed, the queue manager also undertakes to clean up messages that have not been retrieved from the managed destination, in the following situations:

- When the subscription is removed - by use of MQCLOSE with MQCO_REMOVE_SUB - and the managed Hobj is closed.
- By implicit means when the connection is lost to an application using a non-durable subscription (MQSO_NON_DURABLE)
- By expiration when a subscription is removed because it has expired and the managed Hobj is closed.

You must use managed subscriptions with non-durable subscriptions, so that this clean up can occur, and so that messages for closed non-durable subscriptions do not take up space in your queue manager. Durable subscriptions can also use managed destinations.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQSD_STRUC_ID	'SD¬¬'
Version (structure version number)	MQSD_VERSION_1	1
Options (options)	MQSO_NON_DURABLE	0
ObjectName (object name)	None	Null string or blanks
AlternateUserId (alternate user ID)	None	Null string or blanks
AlternateSecurityId (alternate security ID)	MQSID_NONE	Nulls
SubExpiry (subscription expiry)	MQEI_UNLIMITED	-1
ObjectString (object string)	None	Names and values as defined for MQCHARV
SubName (subscription name)	None	Names and values as defined for MQCHARV
SubUserData (subscription user data)	None	Names and values as defined for MQCHARV
SubCorrelId (subscription correlation ID)	MQCI_NONE	Nulls
PubPriority (publication priority)	MQPRI_PRIORITY_AS_Q_DEF	-3
PubAccountingToken (publication accounting token)	MQACT_NONE	Nulls
PubAppIdentityData (publication application identity data)	None	Null string or blanks
SelectionString (string providing selection criteria)	None	Names and values as defined for MQCHARV
SubLevel (subscription level)	None	1
ResObjectString (long object name)	None	Names and values as defined for MQCHARV

Field name and description	Name of constant	Initial value (if any) of constant

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQSD_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQSD MySD = {MQSD_DEFAULT};
```

Language declarations

C declaration for MQSD

```
typedef struct tagMQSD MQSD;
struct tagMQSD {
  MQCHAR4   StrucId;               /* Structure identifier */
  MQLONG    Version;               /* Structure version number */
  MQLONG    Options;               /* Options associated with subscribing */
  MQCHAR48  ObjectName;            /* Object name */
  MQCHAR12  AlternateUserId;       /* Alternate user identifier */
  MQBYTE40  AlternateSecurityId;   /* Alternate security identifier */
  MQLONG    SubExpiry;             /* Expiry of Subscription */
  MQCHARV   ObjectString;          /* Object Long name */
  MQCHARV   SubName;               /* Subscription name */
  MQCHARV   SubUserData;           /* Subscription User data */
  MQBYTE24  SubCorrelId;           /* Correlation Id related to this subscription */
  MQLONG    PubPriority;           /* Priority set in publications */
  MQBYTE32  PubAccountingToken;    /* Accounting Token set in publications */
  MQCHAR32  PubApplIdentityData;   /* Appl Identity Data set in publications */
  MQCHARV   SelectionString;       /* Message selector structure */
  MQLONG    SubLevel;              /* Subscription level */
  MQCHARV   ResObjectString;       /* Resolved Long object name*/
  /* Ver:1 */
};
```

COBOL declaration for MQSD

```
** Address of variable length string
   20  MQSD-OBJECTSTRING-VSPTR         POINTER.
** Offset of variable length string
   20  MQSD-OBJECTSTRING-VSOFFSET      PIC S9(9) BINARY.
** size of buffer
   20  MQSD-OBJECTSTRING-VSBUFSIZE     PIC S9(9) BINARY.
** Length of variable length string
   20  MQSD-OBJECTSTRING-VSLENGTH      PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQSD-OBJECTSTRING-VSCCSID       PIC S9(9) BINARY.
** Subscription name
 15  MQSD-SUBNAME.
** Address of variable length string
   20  MQSD-SUBNAME-VSPTR              POINTER.
** Offset of variable length string
   20  MQSD-SUBNAME-VSOFFSET           PIC S9(9) BINARY.
** size of buffer
   20  MQSD-SUBNAME-VSBUFSIZE          PIC S9(9) BINARY.
** Length of variable length string
   20  MQSD-SUBNAME-VSLENGTH           PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQSD-SUBNAME-VSCCSID            PIC S9(9) BINARY.
** Subscription User data
 15  MQSD-SUBUSERDATA.
** Address of variable length string
   20  MQSD-SUBUSERDATA-VSPTR          POINTER.
** Offset of variable length string
```

```
   20  MQSD-SUBUSERDATA-VSOFFSET       PIC S9(9) BINARY.
** size of buffer
   20  MQSD-SUBUSERDATA-VSBUFSIZE      PIC S9(9) BINARY.
** Length of variable length string
   20  MQSD-SUBUSERDATA-VSLENGTH       PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQSD-SUBUSERDATA-VSCCSID        PIC S9(9) BINARY.
** Correlation Id related to this subscription
 15  MQSD-SUBCORRELID                  PIC X(24).
** Priority set in publications
 15  MQSD-PUBPRIORITY                  PIC S9(9) BINARY.
** Accounting Token set in publications
 15  MQSD-PUBACCOUNTINGTOKEN           PIC X(32).
** Appl Identity Data set in publications
 15  MQSD-PUBAPPLIDENTITYDATA          PIC X(32).
** Message Selector
 15 MQSD-SELECTIONSTRING.
** Address of variable length string
   20  MQSD-SELECTIONSTRING-VSPTR     POINTER.
** Offset of variable length string
   20  MQSD-SELECTIONSTRING-VSOFFSET       PIC S9(9) BINARY.
** size of buffer
   20  MQSD-SELECTIONSTRING-VSBUFSIZE      PIC S9(9) BINARY.
** Length of variable length string
   20  MQSD-SELECTIONSTRING-VSLENGTH       PIC S9(9) BINARY.
** CCSID of variable length string
   20  MQSD-SELECTIONSTRING-VSCCSID        PIC S9(9) BINARY.
** Selection criteria
   20  MQSD-SELECTIONSTRING-SUBLEVEL       PIC S9(9) BINARY.
** Long object name
   20  MQSD-SELECTIONSTRING-RESOBJSTRING   PIC S9(9) BINARY.
```

PL/I declaration for MQSD

```
dcl
1 MQSD based,
3 StrucId       char(4),    /* Structure identifier */
3 Version       fixed bin(31), /* Structure version number */
3 Options       fixed bin(31), /* Options associated with subscribing */
3 ObjectName     char(48),   /* Object name */
3 AlternateUserId   char(12),   /* Alternate user identifier */
3 AlternateSecurityId char(40),   /* Alternate security identifier */
3 SubExpiry      fixed bin(31), /* Expiry of Subscription */
3 ObjectString,           /* Object Long name */
5 VSPtr       pointer,    /* Address of variable length string */
5 VSOffset      fixed bin(31), /* Offset of variable length string */
5 VSBufSize     fixed bin(31), /* size of buffer */
5 VSLength      fixed bin(31), /* Length of variable length string */
5 VSCCSID      fixed bin(31); /* CCSID of variable length string */
3 SubName,              /* Subscription name */
5 VSPtr       pointer,    /* Address of variable length string */
5 VSOffset      fixed bin(31), /* Offset of variable length string */
5 VSBufSize     fixed bin(31), /* size of buffer */
5 VSLength      fixed bin(31), /* Length of variable length string */
5 VSCCSID      fixed bin(31); /* CCSID of variable length string */
3 SubUserData,            /* Subscription User data */
5 VSPtr       pointer,    /* Address of variable length string */
5 VSOffset      fixed bin(31), /* Offset of variable length string */
5 VSBufSize     fixed bin(31), /* size of buffer */
5 VSLength      fixed bin(31), /* Length of variable length string */
5 VSCCSID      fixed bin(31), /* CCSID of variable length string */
3 SubCorrelId     char(24),   /* Correlation Id related to this subscription */
3 PubPriority     fixed bin(31), /* Priority set in publications */
3 PubAccountingToken char(32),   /* Accounting Token set in publications */
3 PubApplIdentityData char(32),   /* Appl Identity Data set in publications */
3 SelectionString,         /* Message Selection */
5 VSPtr       pointer,    /* Address of variable length string */
5 VSOffset      fixed bin(31), /* Offset of variable length string */
5 VSBufSize     fixed bin(31), /* size of buffer */
5 VSLength      fixed bin(31), /* Length of variable length string */
5 VSCCSID      fixed bin(31), /* CCSID of variable length string */
3 SubLevel      fixed bin(31), /* Subscription level */
3 ResObjectString,         /* Resolved Long object name */
5 VSPtr       pointer,    /* Address of variable length string */
5 VSOffset      fixed bin(31), /* Offset of variable length string */
5 VSBufSize     fixed bin(31), /* size of buffer */
5 VSLength      fixed bin(31), /* Length of variable length string */
5 VSCCSID      fixed bin(31); /* CCSID of variable length string */
```

High Level Assembler declaration for MQSD

```
MQSD                DSECT
MQSD_STRUCID          DS  CL4  Structure identifier
MQSD_VERSION          DS  F   Structure version number
MQSD-OPTIONS          DS  F   Options associated with subscribing
MQSD_OBJECTNAME        DS  CL48 Object name
MQSD_ALTERNATEUSERID      DS  CL12 Alternate user identifier
MQSD_ALTERNATESECURITYID    DS  CL40 Alternate security identifier
MQSD_SUBEXPIRY         DS  F   Expiry of Subscription
MQSD_OBJECTSTRING       DS  0F  Object Long name
MQSD_OBJECTSTRING_VSPTR    DS  F   Address of variable length string
MQSD_OBJECTSTRING_VSOFFSET   DS  F   Offset of variable length string
MQSD_OBJECTSTRING_VSBUFSIZE  DS  F   size of buffer
MQSD_OBJECTSTRING_VSLENGTH   DS  F   Length of variable length string
MQSD_OBJECTSTRING_VSCCSID   DS  F   CCSID of variable length string
MQSD_OBJECTSTRING_LENGTH    EQU  *-MQSD_OBJECTSTRING
ORG  MQSD_OBJECTSTRING
MQSD_OBJECTSTRING_AREA     DS  CL(MQSD_OBJECTSTRING_LENGTH)
*
MQSD_SUBNAME          DS  0F  Subscription name
MQSD_SUBNAME_VSPTR       DS  F   Address of variable length string
MQSD_SUBNAME_VSOFFSET     DS  F   Offset of variable length string
MQSD_SUBNAME_VSBUFSIZE     DS  F   size of buffer
MQSD_SUBNAME_VSLENGTH     DS  F   Length of variable length string
MQSD_SUBNAME_VSCCSID      DS  F   CCSID of variable length string
MQSD_SUBNAME_LENGTH      EQU  *-MQSD_SUBNAME
ORG  MQSD_SUBNAME
MQSD_SUBNAME_AREA       DS  CL(MQSD_SUBNAME_LENGTH)
*
MQSD_SUBUSERDATA        DS  0F  Subscription User data
MQSD_SUBUSERDATA_VSPTR     DS  F   Address of variable length string
MQSD_SUBUSERDATA_VSOFFSET   DS  F   Offset of variable length string
MQSD_SUBUSERDATA_VSBUFSIZE   DS  F   size of buffer
MQSD_SUBUSERDATA_VSLENGTH   DS  F   Length of variable length string
MQSD_SUBUSERDATA_VSCCSID    DS  F   CCSID of variable length string
MQSD_SUBUSERDATA_LENGTH    EQU  *-MQSD_SUBUSERDATA
ORG  MQSD_SUBUSERDATA
MQSD_SUBUSERDATA_AREA     DS  CL(MQSD_SUBUSERDATA_LENGTH)
*
MQSD_SUBCORRELID        DS  CL24 Correlation Id related to this subscription
MQSD_PUBPRIORITY        DS  F   Priority set in publications
MQSD_PUBACCOUNTINGTOKEN    DS  CL32 Accounting Token set in publications
MQSD_PUBAPPLIDENTITYDATA    DS  CL32 Appl Identity Data set in publications
*
MQSD_SELECTIONSTRING      DS  F   Message Selector
MQSD_SELECTIONSTRING_VSPTR   DS  F   Address of variable length string
MQSD_SELECTIONSTRING_VSOFFSET DS  F   Offset of variable length string
MQSD_SELECTIONSTRING_VSBUFSIZE DS  F   size of buffer
MQSD_SELECTIONSTRING_VSLENGTH DS  F   Length of variable length string
MQSD_SELECTIONSTRING_VSCCSID  DS  F   CCSID of variable length string
MQSD_SELECTIONSTRING_LENGTH  EQU *- MQSD_SELECTIONSTRING
ORG MQSD_SELECTIONSTRING
MQSD_SELECTIONSTRING_AREA   DS  CL(MQSD_SELECTIONSTRING_LENGTH)
*
MQSD-SUBLEVEL         DS  F   Subscription level
*
MQSD_RESOBJECTSTRING      DS  F   Resolved Long object name
MQSD_RESOBJECTSTRING_VSPTR   DS  F   Address of variable length string
MQSD_RESOBJECTSTRING_VSOFFSET DS  F   Offset of variable length string
MQSD_RESOBJECTSTRING_VSBUFSIZE DS  F   size of buffer
MQSD_RESOBJECTSTRING_VSLENGTH DS  F   Length of variable length string
MQSD_RESOBJECTSTRING_VSCCSID  DS  F   CCSID of variable length string
MQSD_RESOBJECTSTRING_LENGTH  EQU *- MQSD_RESOBJECTSTRING
ORG MQSD_RESOBJECTSTRING
MQSD_RESOBJECTSTRING_AREA   DS  CL(MQSD_RESOBJECTSTRING_LENGTH)
*
MQSD_LENGTH          EQU  *-MQSD
ORG  MQSD
MQSD_AREA           DS  CL(MQSD_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQSD_STRUC_ID
: Identifier for Subscription Descriptor structure.

For the C programming language, the constant MQSD_STRUC_ID_ARRAY is also defined; this has the same value as MQSD_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQSD_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQSD_VERSION_1
Version-1 Subscription Descriptor structure.

The following constant specifies the version number of the current version:

MQSD_CURRENT_VERSION
Current version of Subscription Descriptor structure.

This is always an input field. The initial value of this field is MQSD_VERSION_1.

Options (MQLONG)

This provides options to control the action of the MQSUB call.

You must specify at least one of the following options:

- MQSO_ALTER
- MQSO_RESUME
- MQSO_CREATE

To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

Combinations that are not valid are noted in this topic; any other combinations are valid.

Access or creation options: Access and creation options control whether a subscription is created, or whether an existing subscription is returned or altered. You must specify at least one of these options.

Table 526. Valid combinations of access and creation options

Combination of options	Notes
MQSO_CREATE	Creates a subscription if one does not exist. This combination fails if the subscription exists.
MQSO_RESUME	Resumes an existing subscription. This combination fails if no subscription exists.
MQSO_CREATE + MQSO_RESUME	Creates a subscription if one does not exist and resumes a matching one, if it does exist. This combination is useful when it is used in an application that is run a number of times.
MQSO_ALTER (see note)	Resumes an existing subscription, altering any fields to match that specified in the MQSD. This combination fails if no subscription exists.
MQSO_CREATE + MQSO_ALTER (see note)	Creates a subscription if one does not exist and resumes a matching one, if it does exist, altering any fields to match that specified in the MQSD. This combination is useful combination when used in an application that wants to ensure that its subscription is in a certain state before proceeding.

Note:

Options specifying MQSO_ALTER can also specify MQSO_RESUME, but this combination has no additional effect to specifying MQSO_ALTER alone. MQSO_ALTER implies MQSO_RESUME, because calling MQSUB to alter a subscription implies that the subscription will also be resumed. The opposite is not true, however: resuming a subscription does not imply it is to be altered.

MQSO_CREATE

Create a new subscription for the topic specified. If a subscription using the same *SubName* exists, the call fails with MQRC_SUB_ALREADY_EXISTS. This failure can be avoided by combining the MQSO_CREATE option with MQSO_RESUME. The *SubName* is not always necessary. For more details, see the description of that field.

Combining MQSO_CREATE with MQSO_RESUME returns a handle to a pre-existing subscription for the specified *SubName* if one is found; if there is no existing subscription, a new one is created using all the fields provided in the MQSD.

MQSO_CREATE can also be combined with MQSO_ALTER to similar effect.

MQSO_RESUME

Return a handle to a pre-existing subscription which matches that specified by *SubName*. No changes are made to the matching subscriptions attributes and they are returned on output in the MQSD structure. Only the following MQSD fields are used: StrucId, Version, Options, AlternateUserId and AlternateSecurityId, and SubName.

The call fails with reason code MQRC_NO_SUBSCRIPTION if a subscription does not exist matching the full subscription name. This failure can be avoided by combining the MQSO_CREATE option with MQSO_RESUME.

The user ID of the subscription is the user ID that created the subscription, or if it has been later altered by a different user ID, it is the user ID of the most recent successful alteration. If an AlternateUserId is used, and use of alternate user IDs is allowed for that user, the alternate user ID is recorded as the user ID that created the subscription instead of the user ID under which the subscription was made.

If a matching subscription exists that was created without the MQSO_ANY_USERID option, and the user ID of the subscription is different from that of the application requesting a handle to the subscription, the call fails with reason code MQRC_IDENTITY_MISMATCH.

If a matching subscription exists and is currently in use, the call fails with MQRC_SUBSCRIPTION_IN_USE.

If the subscription named in SubName is not a valid subscription to resume or alter from an application, the call fails with MQRC_INVALID_SUBSCRIPTION.

MQSO_RESUME is implied by MQSO_ALTER so you do not need to combine it with that option. However, combining the two options does not cause an error.

MQSO_ALTER

Return a handle to a pre-existing subscription with the full subscription name matching that specified by the name in *SubName*. Any attributes of the subscription that are different from that specified in the MQSD are altered in the subscription unless alteration is disallowed for that attribute. Details are noted in the description of each attribute and are summarized in the following table. If you try to alter an attribute that cannot be changed, or to alter a subscription that has set the MQSO_IMMUTABLE option, the call fails with the reason code shown in the following table.

The call fails with reason code MQRC_NO_SUBSCRIPTION if a subscription matching the full subscription name does not exist. You can avoid this failure by combining the MQSO_CREATE option with MQSO_ALTER.

Combining MQSO_CREATE with MQSO_ALTER returns a handle to a pre-existing subscription for the specified *SubName* if one is found; if there is no existing subscription, a new one is created using all the fields provided in the MQSD.

The user ID of the subscription is the user ID that created the subscription, or if it is later altered by a different user ID, it is the user ID of the most recent, successful alteration. If an AlternateUserId is used, and use of alternate user IDs is allowed for that user, then the alternate user ID is recorded as the user ID that created the subscription instead of the user ID under which the subscription was made.

If a matching subscription exists that was created without the option MQSO_ANY_USERID and the user ID of the subscription is different from that of the application requesting a handle to the subscription, the call fails with reason code MQRC_IDENTITY_MISMATCH.

If a matching subscription exists and is currently in use, the call fails with MQRC_SUBSCRIPTION_IN_USE.

If the subscription named in SubName is not a valid subscription to resume or alter from an application, the call fails with MQRC_INVALID_SUBSCRIPTION.

The following table shows the ability of MQSO_ALTER to alter attribute values in MQSD and MQSUB.

Table 527. Attributes in MQSD and MQSUB that can be altered

Data type descriptor or function call	Field name	Can this attribute be altered using MQSO_ALTER	Reason code
MQSD	Durability options	No	MQRC_DURABILITY_NOT_ALTERABLE
MQSD	Destination Options	Yes	None
MQSD	Registration options	Yes (see note "1" on page 564)	MQRC_GROUPING_NOT_ALTERABLE if you try to alter MQSO_GROUP_SUB
MQSD	Publication options	Yes (see note "2" on page 564)	None
MQSD	Wildcard options	No	MQRC_TOPIC_NOT_ALTERABLE
MQSD	Other options	No (see note "3" on page 564)	None
MQSD	ObjectName	No	MQRC_TOPIC_NOT_ALTERABLE
MQSD	AlternateUserId	No (see note "4" on page 564)	None
MQSD	AlternateSecurityId	No (see note "4" on page 564)	None
MQSD	SubExpiry	Yes	None
MQSD	ObjectString	No	MQRC_TOPIC_NOT_ALTERABLE
MQSD	SubName	No (see note "5" on page 565)	None
MQSD	SubUserData	Yes	None
MQSD	SubCorrelId	Yes (see note "6" on page 565)	MQRC_GROUPING_NOT_ALTERABLE when in a grouped subscription
MQSD	PubPriority	Yes	None
MQSD	PubAccountingToken	Yes	None
MQSD	PubApplIdentityData	Yes	None
MQSD	SubLevel	No	MQRC_SUBLEVEL_NOT_ALTERABLE
MQSUB	Hobj	Yes (see note "6" on page 565)	MQRC_GROUPING_NOT_ALTERABLE when in a grouped subscription

Notes:

1. MQSO_GROUP_SUB cannot be altered.
2. MQSO_NEW_PUBLICATIONS_ONLY cannot be altered because it is not part of the subscription
3. These options are not part of the subscription
4. This attribute is not part of the subscription

5. This attribute is the identity of the subscription being altered
6. Alterable except when part of a grouped sub (MQSO_GROUP_SUB)

Durability options: The following options control how durable the subscription is. You can specify only one of these options. If you are altering an existing subscription using the MQSO_ALTER option, you cannot change the durability of the subscription. On return from an MQSUB call using MQSO_RESUME, the appropriate durability option is set.

MQSO_DURABLE

Request that the subscription to this topic remains until it is explicitly removed using MQCLOSE with the MQCO_REMOVE_SUB option. If this subscription is not explicitly removed it will remain even after this applications connection to the queue manager is closed.

If a durable subscription is requested to a topic that is defined as not allowing durable subscriptions, the call fails with MQRC_DURABILITY_NOT_ALLOWED.

MQSO_NON_DURABLE

Request that the subscription to this topic is removed when the applications connection to the queue manager is closed, if it is not already explicitly removed. MQSO_NON_DURABLE is the opposite of the MQSO_DURABLE option, and is defined to aid program documentation. It is the default if neither is specified.

Destination options: The following option controls the destination that publications for a topic that has been subscribed to are sent to. If altering an existing subscription using the MQSO_ALTER option, the destination used for publications for the subscription can be changed. On return from an MQSUB call using MQSO_RESUME, this option is set if appropriate.

MQSO_MANAGED

Request that the destination that the publications are sent to is managed by the queue manager.

The object handle returned in *Hobj* represents a queue manager managed queue and is for use with subsequent MQGET, MQCB, MQINQ, or MQCLOSE calls.

An object handle returned from a previous MQSUB call cannot be provided in the **Hobj** parameter when MQSO_MANAGED is not specified.

MQSO_NO_MULTICAST

Request that the destination that the publications are sent to is not a multicast group address. This option is only valid when combined with the MQSO_MANAGED option. When a handle to a queue is provided in the **Hobj** parameter, multicast cannot be used for this subscription, and the option is not valid.

If the topic is defined to only allow multicast subscriptions, using the `MCAST(ONLY)` setting, then the call fails with reason code MQRC_MULTICAST_REQUIRED.

Scope Option: The following option controls the scope of the subscription being made. If altering an existing subscription using the MQSO_ALTER option, this subscription scope option cannot be changed. On returning from an MQSUB call using MQSO-RESUME, the appropriate scope option is set.

MQSO_SCOPE_QMGR

This subscription is made only on the local queue manager. No proxy subscription is distributed to other queue managers in the network. Only publications that are published at this queue manager are sent to this subscriber. This overrides any behavior set using the SUBSCOPE topic attribute.

Note: If not set, the subscription scope is determined by the SUBSCOPE topic attribute.

Registration options: The following options control the details of the registration that is made to the queue manager for this subscription. If altering an existing subscription using the MQSO_ALTER option, these registration options can be changed. On return from an MQSUB call using MQSO_RESUME the appropriate registration options is set.

MQSO_GROUP_SUB

This subscription is to be grouped with other subscriptions of the same SubLevel using the same queue and specifying the same correlation ID so that any publications to topics that would cause

more than one publication message to be provided to the group of subscriptions, due to an overlapping set of topic strings being used, only causes one message to be delivered to the queue. If this option is not used, then each unique subscription (identified by SubName) that matches is provided with a copy of the publication which could mean more than one copy of the publication may be placed on the queue shared by a number of subscriptions.

Only the most significant subscription in the group is provided with a copy of the publication. The most significant subscription is based on the Full topic name up to the point where a wildcard is found. If a mixture of wildcard schemes is used within the group, only the position of the wildcard is important. You are advised not to combine different wildcard schemes within a group of subscriptions that share the same queue.

When creating a new grouped subscription it must still have a unique SubName, but if it matches the full topic name of an existing subscription in the group, the call fails with MQRC_DUPLICATE_GROUP_SUB.

If the most significant subscription in group also specifies MQSO_NOT_OWN_PUBS and this is a publication from the same application, then no publication is delivered to the queue.

When altering a subscription made with this option, the fields which imply the grouping, Hobj on the MQSUB call (representing the queue and queue manager name), and the SubCorrelId cannot be changed. Attempting to alter them causes the call to fail with MQRC_GROUPING_NOT_ALTERABLE.

This option must be combined with MQSO_SET_CORREL_ID with a SubCorrelId that is not set to MQCI_NONE, and cannot be combined with MQSO_MANAGED.

MQSO_ANY_USERID

When MQSO_ANY_USERID is specified, the identity of the subscriber is not restricted to a single user ID. This allows any user to alter or resume the subscription when they have suitable authority. Only a single user may have the subscription at any one time. An attempt to resume use of a subscription currently in use by another application causes the call to fail with MQRC_SUBSCRIPTION_IN_USE.

To add this option to an existing subscription the MQSUB call (using MQSO_ALTER) must come from the same user ID as the original subscription itself.

If an MQSUB call refers to an existing subscription with MQSO_ANY_USERID set, and the user ID differs from the original subscription, the call succeeds only if the new user ID has authority to subscribe to the topic. On successful completion, future publications to this subscriber are put to the subscribers queue with the new user ID set in the publication message.

Do not specify both MQSO_ANY_USERID and MQSO_FIXED_USERID. If neither is specified, the default is MQSO_FIXED_USERID.

MQSO_FIXED_USERID

When MQSO_FIXED_USERID is specified, the subscription can be altered or resumed by only the last user ID to alter the subscription. If the subscription has not been altered, it is the user ID that created the subscription.

If an MQSUB verb refers to an existing subscription with MQSO_ANY_USERID set and alters the subscription using MQSO_ALTER to use option MQSO_FIXED_USERID, the user ID of the subscription is now fixed at this new user ID. The call succeeds only if the new user ID has authority to subscribe to the topic.

If a user ID other than the one recorded as owning a subscription tries to resume or alter an MQSO_FIXED_USERID subscription, the call fails with MQRC_IDENTITY_MISMATCH. The owning user ID of a subscription can be viewed using the DISPLAY SBSTATUS command.

Do not specify both MQSO_ANY_USERID and MQSO_FIXED_USERID. If neither is specified, the default is MQSO_FIXED_USERID.

Publication options: The following options control the way publications are sent to this subscriber. If altering an existing subscription using the MQSO_ALTER option, these publication options can be changed.

MQSO_NOT_OWN_PUBS

Tells the broker that the application does not want to see any of its own publications. Publications are considered to originate from the same application if the connection handles are the same. On return from an MQSUB call using MQSO_RESUME, this option is set if appropriate.

MQSO_NEW_PUBLICATIONS_ONLY

No currently retained publications are to be sent, when this subscription is created, only new publications. This option only applies when MQSO_CREATE is specified. Any subsequent changes to a subscription do not alter the flow of publications and so any publications retained on a topic, will have already been sent to the subscriber as new publications.

If this option is specified without MQSO_CREATE the call fails with MQRC_OPTIONS_ERROR. On return from an MQSUB call using MQSO_RESUME, this option is not set even if the subscription was created using this option.

If this option is not used, previously retained messages are sent to the destination queue provided. If this action fails due to an error, either MQRC_RETAINED_MSG_Q_ERROR or MQRC_RETAINED_NOT_DELIVERED, the creation of the subscription fails.

MQSO_PUBLICATIONS_ON_REQUEST

Setting this option indicates that the subscriber will request information specifically when required. The queue manager does not send unsolicited messages to the subscriber. The retained publication (or possibly multiple publications if a wildcard is specified in the topic) is sent to the subscriber each time an MQSUBRQ call is made using the Hsub handle from a previous MQSUB call. No publications are sent as a result of the MQSUB call using this option. On return from an MQSUB call using MQSO_RESUME, this option is set if appropriate.

This option is not valid in combination with a SubLevel greater than 1.

Read ahead options: The following options control whether non-persistent messages are sent to an application ahead of the application requesting them.

MQSO_READ_AHEAD_AS_Q_DEF

If the MQSUB call uses a managed handle, the default read ahead attribute of the model queue associated with the topic subscribed to determines whether messages are sent to the application before the application requests them.

This is the default value.

MQSO_NO_READ_AHEAD

If the MQSUB call uses a managed handle, messages are not sent to the application before the application requests them.

MQSO_READ_AHEAD

If the MQSUB call uses a managed handle, messages might be sent to the application before the application requests them.

Note:

The following notes apply to the read ahead options:

1. Only one of these options can be specified. If both MQOO_READ_AHEAD and MQOO_NO_READ_AHEAD are specified, reason code MQRC_OPTIONS_ERROR is returned. These options are only applicable if MQSO_MANAGED is specified.
2. They are not applicable for MQSUB when a queue is passed which has been opened previously. Read ahead might not be enabled when requested. The MQGET options used on the first MQGET call might prevent read ahead from being enabled. Also, read ahead is disabled when the client is connecting to a queue manager where read ahead is not supported. If the application is not running as an IBM MQ client, these options are ignored.

Wildcard options: The following options control how wildcards are interpreted in the string provided in the ObjectString field of the MQSD. You can specify only one of these options. If altering an existing

subscription using the MQSO_ALTER option, these wildcard options cannot be changed. On return from an MQSUB call using MQSO_RESUME, the appropriate wildcard option is set.

MQSO_WILDCARD_CHAR

Wildcards only operate on characters within the topic string.

The behavior defined by MQSO_WILDCARD_CHAR is shown in the following table.

Table 528. How wildcards are interpreted

Special Character	Behavior
Forward slash (/)	No significance, just another character
Asterisk (*)	Wildcard, zero or more characters
Question mark (?)	Wildcard, 1 character
Percent sign (%)	Escape character to allow the characters (*), (?) or (%) to be used in a string and not be interpreted as a special character, for example, (%*), (%?) or (%%).

For example, publishing on the following topic:

```
/level0/level1/level2/level3/level4
```

matches subscribers using the following topics:

```
*
/*
/ level0/level1/level2/level3/*
/ level0/level1/*/level3/level4
/ level0/level1/le?el2/level3/level4
```

Note: This use of wildcards supplies exactly the meaning provided in IBM MQ V6 and WebSphere MB V6 when using MQRFH1 formatted messages for publish/subscribe. It is recommended that this is not used for newly written applications and is only used for applications that were previously running against that version and have not been changed to use the default wildcard behavior as described in MQSO_WILDCARD_TOPIC.

MQSO_WILDCARD_TOPIC

Wildcards only operate on topic elements within the topic string. This is the default behavior if none is chosen.

The behavior required by MQSO_WILDCARD_TOPIC is shown in the following table:

Table 529. How wildcards are interpreted

Special Character	Behavior
(/)	Topic level separator
Number sign (#)	Wildcard: multiple topic level
Plus sign (+)	Wildcard: single topic level

Notes:

The (+) and (#) are not treated as wildcards if they are mixed in with other characters (including themselves) within a topic level. In the following string, the (#) and (+) characters are treated as ordinary characters.

```
level0/level1/#+/level3/level#
```

For example, publishing on the following topic:

```
/level0/level1/level2/level3/level4
```

matches subscribers using the following topics:

```
#
/#
/ level0/level1/level2/level3/#
/ level0/level1/+/level3/level4
```

Other options: The following options control the way the API call is issued rather than the subscription. On return from an MQSUB call using MQSO_RESUME, these options are unchanged. See "AlternateUserId (MQCHAR12)" on page 570 for more details.

MQSO_ALTERNATE_USER_AUTHORITY

The AlternateUserId field contains a user identifier to use to validate this MQSUB call. The call can succeed only if this AlternateUserId is authorized to open the object with the specified access options, regardless of whether the user identifier under which the application is running is authorized to do so.

MQSO_SET_CORREL_ID

The subscription is to use the correlation identifier supplied in the *SubCorrelId* field. If this option is not specified, a correlation identifier is automatically created by the queue manager at subscription time and is returned to the application in the *SubCorrelId* field. For more information, see "SubCorrelId (MQBYTE24)" on page 573 for more information.

This option cannot be combined with MQSO_MANAGED.

MQSO_SET_IDENTITY_CONTEXT

The subscription is to use the accounting token and application identity data supplied in the *PubAccountingToken* and *PubApplIdentityData* fields.

If this option is specified, the same authorization check is carried out as if the destination queue was accessed using an MQOPEN call with MQOO_SET_IDENTITY_CONTEXT, except in the case where the MQSO_MANAGED option is also used in which case there is no authorization check on the destination queue.

If this option is not specified, the publications sent to this subscriber have default context information associated with them as follows:

Table 530. Default context information for publications sent to this subscriber

Field in MQMD	Value used
UserIdentifier	The user ID associated with the subscription at the time the subscription was made.
AccountingToken	Determined from the environment if possible; Set to MQACT_NONE if not.
ApplIdentityData	Set to blanks

This option is only valid with MQSO_CREATE and MQSO_ALTER. If used with MQSO_RESUME, the *PubAccountingToken* and *PubApplIdentityData* fields are ignored, so this option has no effect.

If a subscription is altered without using this option where previously the subscription supplied identity context information, default context information is generated for the altered subscription.

If a subscription allowing different user IDs to use it with option MQSO_ANY_USERID, is resumed by a different user ID, default identity context is generated for the new user ID now owning the subscription and any subsequent publications are delivered containing the new identity context.

MQSO_FAIL_IF_QUIESCING

The MQSUB call fails if the queue manager is in quiescing state. On z/OS, for a CICS or IMS application, this option also forces the MQSUB call to fail if the connection is in quiescing state.

ObjectName (MQCHAR48)

This is the name of the topic object as defined on the local queue manager.

The name can contain the following characters:

- Uppercase alphabetic characters (A through Z)
- Lowercase alphabetic characters (a through z)
- Numeric digits (0 through 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but can contain trailing blanks. Use a null character to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply in the environments indicated:

- On systems that use EBCDIC Katakana, lowercase characters cannot be used.
- On z/OS:
  - Avoid names that begin or end with an underscore; they cannot be processed by the operations and control panels.
  - The percent character has a special meaning to RACF. If RACF is used as the external security manager, names must not contain the percent. If they do, those names are not included in any security checks when RACF generic profiles are used.
- On IBM i, names containing lowercase characters, forward slash, or percent, must be enclosed in quotation marks when specified on commands. These quotation marks must not be specified for names that occur as fields in structures or as parameters on calls.

The *ObjectName* is used to form the full topic name.

The full topic name can be built from two different fields: *ObjectName* and *ObjectString*. For details of how these two fields are used, see Combining topic strings.

If the object identified by the *ObjectName* field cannot be found, the call fails with reason code MQRC_UNKNOWN_OBJECT_NAME even if there is a string specified in *ObjectString*.

On return from an MQSUB call using the MQSO_RESUME option this field is unchanged.

The length of this field is given by MQ_TOPIC_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

If altering an existing subscription using the MQSO_ALTER option, the name of the topic object subscribed to cannot be changed. This field and the *ObjectString* field can be omitted. If they are provided, they must resolve to the same full topic name. If they do not, the call fails with MQRC_TOPIC_NOT_ALTERABLE.

AlternateUserId (MQCHAR12)

If you specify MQSO_ALTERNATE_USER_AUTHORITY, this field contains an alternative user identifier that is used to check the authorization for the subscription and for output to the destination queue (specified in the **Hobj** parameter of the MQSUB call), in place of the user identifier that the application is currently running under.

If successful, the user identifier specified in this field is recorded as the subscription owning user identifier in place of the user identifier that the application is currently running under.

If MQSO_ALTERNATE_USER_AUTHORITY is specified and this field is entirely blank up to the first null character or the end of the field, the subscription can succeed only if no user authorization is needed to subscribe to this topic with the options specified or the destination queue for output.

If MQSO_ALTERNATE_USER_AUTHORITY is not specified, this field is ignored.

The following differences exist in the environments indicated:

- On z/OS, only the first 8 characters of AlternateUserId are used to check the authorization for the subscription. However, the current user identifier must be authorized to specify this particular alternative user identifier; all 12 characters of the alternative user identifier are used for this check. The user identifier must contain only characters allowed by the external security manager.

On return from an MQSUB call using MQSO_RESUME, this field is unchanged.

This is an input field. The length of this field is given by MQ_USER_ID_LENGTH. The initial value of this field is the null string in C, and 12 blank characters in other programming languages.

AlternateSecurityId (MQBYTE40)

This is a security identifier that is passed with the AlternateUserId to the authorization service to allow appropriate authorization checks to be performed.

AlternateSecurityId is used only if MQSO_ALTERNATE_USER_AUTHORITY is specified, and the AlternateUserId field is not entirely blank up to the first null character or the end of the field.

On return from an MQSUB call using MQSO_RESUME, this field is unchanged.

See the description of "AlternateSecurityId (MQBYTE40)" on page 482 in the MQOD data type for more information.

SubExpiry (MQLONG)

This is the time expressed in tenths of a second after which the subscription expires. No more publications will match this subscription after this interval has passed. As soon as a subscription expires, publications are no longer sent to the queue. However, the publications that are already there are not affected in any way. *SubExpiry* has no effect on publication expiry.

The following special value is recognized:

MQEI_UNLIMITED
The subscription has an unlimited expiration time.

If altering an existing subscription using the MQSO_ALTER option, the expiry of the subscription can be changed.

On return from an MQSUB call using the MQSO_RESUME option this field is set to the original expiry of the subscription and not the remaining expiry time.

ObjectString (MQCHARV)

This is the long object name to be used.

The *ObjectString* is used to form the Full topic name.

The full topic name can be built from two different fields: *ObjectName* and *ObjectString*. For details of how these two fields are used, see Combining topic strings.

The maximum length of *ObjectString* is 10240.

If *ObjectString* is not specified correctly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code MQRC_OBJECT_STRING_ERROR.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

If there are wildcards in the *ObjectString* the interpretation of those wildcards can be controlled using the Wildcard options specified in the Options field of the MQSD.

On return from an MQSUB call using the MQSO_RESUME option this field is unchanged. The full topic name used is returned in the *ResObjectString* field if a buffer is provided.

If altering an existing subscription using the MQSO_ALTER option, the long name of the topic object subscribed to cannot be changed. This field and the *ObjectName* field can be omitted. If they are provided they must resolve to the same full topic name or the call fails with MQRC_TOPIC_NOT_ALTERABLE.

SubName (MQCHARV)

This specifies the subscription name. This field is only required if *Options* specifies the option MQSO_DURABLE, but if provided will be used by the queue manager for MQSO_NON_DURABLE as well.

If specified, *SubName* must be unique within the queue manager, because it is the method used to identify the subscription.

The maximum length of *SubName* is 10240.

This field serves two purposes. For an MQSO_DURABLE subscription, you use this field to identify a subscription so you can resume it after it has been created if you have either closed the handle to the subscription (using the MQCO_KEEP_SUB option) or have been disconnected from the queue manager. This is done using the MQSUB call with the MQSO_RESUME option. It is also displayed in the administrative view of subscriptions in the SUBID field in DISPLAY SBSTATUS.

If *SubName* is specified incorrectly, according to the description of how to use the MQCHARV structure, is left out when it is required (that is *SubName*. *VSLength* is zero), or if it exceeds the maximum length, the call fails with reason code MQRC_SUB_NAME_ERROR.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

If altering an existing subscription using the MQSO_ALTER option, the subscription name cannot be changed, because it is the identifying field used to find the referenced subscription. It is not changed on output from an MQSUB call with the MQSO_RESUME option.

SubUserData (MQCHARV)

This specifies the subscription user data. The data provided on the subscription in this field will be included as the MQSubUserData message property of every publication sent to this subscription.

The maximum length of *SubUserData* is 10240.

If *SubUserData* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code MQRC_SUB_USER_DATA_ERROR.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

If altering an existing subscription using the MQSO_ALTER option, the subscription user data can be changed.

This variable length field is returned on output from an MQSUB call using the MQSO_RESUME option, if a buffer is provided and there is a positive buffer length in *VSBufLen*. If no buffer is provided on the call, only the length of the subscription user date is returned in the *VSLength* field of the MQCHARV. If the buffer provided is smaller than the space required to return the field, only *VSBufLen* bytes are returned in the provided buffer.

SubCorrelId (MQBYTE24)

This field contains a correlation identifier common to all publications matching this subscription.

Attention: a correlation identifier can only be passed between queue managers in a publish/subscribe cluster, not a hierarchy.

All publications sent to match this subscription contain this correlation identifier in the message descriptor. If multiple subscriptions get their publications from the same queue, using MQGET by correlation identifier allows only publications for a specific subscription to be obtained. This correlation identifier can either be generated by the queue manager or by the user.

If the option MQSO_SET_CORREL_ID is not specified, the correlation identifier is generated by the queue manager and this field is an output field containing the correlation identifier that will be set in each message published for this subscription. The generated correlation identifier consists of a 4-byte product identifier (AMQX or CSQM in either ASCII or EBCDIC) followed by a product specific implementation of a unique string.

If the option MQSO_SET_CORREL_ID is specified, the correlation identifier is generated by the user and this field is an input field containing the correlation identifier to be set in each publication for this subscription. In this case, if the field contains MQCI_NONE, the correlation identifier that is set in each message published for this subscription is the correlation identifier created by the original put of the message.

If the option MQSO_GROUP_SUB is specified and the correlation identifier specified is the same as an existing grouped subscription using the same queue and an overlapping topic string, only the most significant subscription in the group is provided with a copy of the publication.

The length of this field is given by MQ_CORREL_ID_LENGTH. The initial value of this field is MQCI_NONE.

If you are altering an existing subscription using the MQSO_ALTER option, and this field is an input field, then the subscription correlation identifier can be changed, unless the subscription is a grouped subscription, that is, it has been created using the option MQSO_GROUP_SUB, in which case the subscription correlation identifier cannot be changed.

On return from an MQSUB call using MQSO_RESUME, this field is set to the current correlation identifier for the subscription.

PubPriority (MQLONG)

This is the value that will be in the *Priority* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. For more information about the *Priority* field in the MQMD, see "Priority (MQLONG)" on page 443.

The value must be greater than or equal to zero; zero is the lowest priority. The following special values can also be used:

MQPRI_PRIORITY_AS_Q_DEF

When a subscription queue is provided in the *Hobj* field in the MQSUB call, and is not a managed handle, then the priority for the message is taken from the **DefPriority** attribute of this queue. If the queue is a cluster queue or there is more than one definition in the queue-name resolution path then the priority is determined when the publication message is put to the queue as described for "Priority (MQLONG)" on page 443.

If the MQSUB call uses a managed handle, the priority for the message is taken from the **DefPriority** attribute of the model queue associated with the topic subscribed to.

MQPRI_PRIORITY_AS_PUBLISHED

The priority for the message is the priority of the original publication. This is the initial value of the field.

If altering an existing subscription using the MQSO_ALTER option, the *Priority* of any future publication messages can be changed.

On return from an MQSUB call using MQSO_RESUME, this field is set to the current priority being used for the subscription.

PubAccountingToken (MQBYTE32)

This is the value that will be in the *AccountingToken* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. *AccountingToken* is part of the identity context of the message. For more information about message context, see Message context. For more information about the *AccountingToken* field in the MQMD, see "AccountingToken (MQBYTE32)" on page 450

You can use the following special value for the *PubAccountingToken* field:

MQACT_NONE

No accounting token is specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQACT_NONE_ARRAY is also defined; this has the same value as MQACT_NONE, but is an array of characters instead of a string.

If the option MQSO_SET_IDENTITY_CONTEXT is not specified, the accounting token is generated by the queue manager as default context information and this field is an output field which contains the *AccountingToken* which will be set in each message published for this subscription.

If the option MQSO_SET_IDENTITY_CONTEXT is specified, the accounting token is being generated by the user and this field is an input field which contains the *AccountingToken* to be set in each publication for this subscription.

The length of this field is given by MQ_ACCOUNTING_TOKEN_LENGTH. The initial value of this field is MQACT_NONE.

If altering an existing subscription using the MQSO_ALTER option, the value of *AccountingToken* in any future publication messages can be changed.

On return from an MQSUB call using MQSO_RESUME, this field is set to the current *AccountingToken* being used for the subscription.

PubApplIdentityData (MQCHAR32)

This is the value that is in the *ApplIdentityData* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. *ApplIdentityData* is part of the identity context of the message. For more information about message context, see Message context. For more information about the *ApplIdentityData* field in the MQMD, see "ApplIdentityData (MQCHAR32)" on page 452

If the option MQSO_SET_IDENTITY_CONTEXT is not specified, the *ApplIdentityData* which is set in each message published for this subscription is blanks, as default context information.

If the option MQSO_SET_IDENTITY_CONTEXT is specified, the *PubApplIdentityData* is being generated by the user and this field is an input field which contains the *ApplIdentityData* to be set in each publication for this subscription.

The length of this field is given by MQ_APPL_IDENTITY_DATA_LENGTH. The initial value of this field is the null string in C, and 32 blank characters in other programming languages.

If altering an existing subscription using the MQSO_ALTER option, the *ApplIdentityData* of any future publication messages can be changed.

On return from an MQSUB call using MQSO_RESUME, this field is set to the current *ApplIdentityData* being used for the subscription.

SelectionString (MQCHARV)

This is the string used to provide the selection criteria used when subscribing for messages from a topic.

This variable length field will be returned on output from an MQSUB call using the MQSO_RESUME option, if a buffer is provided, and also there is a positive buffer length in VSBufSize. If no buffer is provided on the call, only the length of the selection string will be returned in the VSLength field of the MQCHARV. If the buffer provided is smaller than the space required to return the field, only VSBufSize bytes are returned in the provided buffer.

If *SelectionString* is specified incorrectly, according to the description of how to use the "MQCHARV - Variable Length String" on page 289 structure, or if it exceeds the maximum length, the call fails with reason code MQRC_SELECTION_STRING_ERROR.

SelectionString usage is described in Selectors.

SubLevel (MQLONG)

This is the level associated with the subscription. Publications are only delivered to this subscription if it is in the set of subscriptions with the highest SubLevel value less than or equal to the PubLevel used at publication time. However, if a publication has been retained, it is no longer available to subscribers at higher levels because it is republished at PubLevel 1.

The value must be in the range zero to 9. Zero is the lowest level.

The initial value of this field is 1.

For more information see Intercepting publications.

If altering an existing subscription using the MQSO_ALTER option, then the SubLevel cannot be changed.

Combining a SubLevel with a value greater than 1 with the option MQSO_PUBLICATIONS_ON_REQUEST is not allowed.

On return from an MQSUB call using MQSO_RESUME, this field is set to the current level being used for the subscription.

ResObjectString (MQCHARV)

This is the long object name after the queue manager resolves the name provided in *ObjectName*.

If the long object name is provided in *ObjectString* and nothing is provided in *ObjectName*, then the value returned in this field is the same as provided in *ObjectString*.

If this field is omitted (that is ResObjectString.VSBufSize is zero) then the *ResObjectString* is not returned, but the length is returned in ResObjectString.VSLength. If the length is shorter than the full ResObjectString then it is truncated and returns as many of the rightmost characters as can fit in the provided length.

If *ResObjectString* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code MQRC_RES_OBJECT_STRING_ERROR.

MQSMPO - Set message property options

The **MQSMPO** structure allows applications to specify options that control how properties of messages are set. The structure is an input parameter on the **MQSETMP** call.

Availability

All IBM MQ systems and IBM MQ clients.

Character set and encoding

Data in **MQSMPO** must be in the character set of the application and encoding of the application (**MQENC_NATIVE**).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 531. Fields in MQSMPO

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQSMPO_STRUC_ID	'SMPO'
Version (structure version number)	MQSMPO_VERSION_1	1
Options (options)	MQSMPO_NONE	0
ValueEncoding (property value encoding)	MQENC_NATIVE	Depends on environment
ValueCCSID (property value character set)	MQCCSI_APPL	-3

Notes:

1. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
2. In the C programming language, the macro variable MQSMPO_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQSMPO MySMPO = {MQSMPO_DEFAULT};
```

Language declarations

C declaration for MQSMPO

```
typedef struct tagMQSMPO MQSMPO;
struct tagMQSMPO {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    Options;         /* Options that control the action of MQSETMP */
  MQLONG    ValueEncoding;   /* Encoding of Value */
  MQLONG    ValueCCSID;      /* Character set identifier of Value */
};
```

COBOL declaration for MQSMPO

```
**   MQSMPO structure
  10 MQSMPO.
**    Structure identifier
   15 MQSMPO-STRUCID       PIC X(4).
**    Structure version number
   15 MQSMPO-VERSION       PIC S9(9) BINARY.
**    Options that control the action of MQSETMP
   15 MQSMPO-OPTIONS       PIC S9(9) BINARY.
**    Encoding of VALUE
   15 MQSMPO-VALUEENCODING PIC S9(9) BINARY.
**    Character set identifier of VALUE
   15 MQSMPO-VALUECCSID    PIC S9(9) BINARY.
```

PL/I declaration for MQSMPO

```
dcl
 1 MQSMPO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action of MQSETMP */
  3 ValueEncoding  fixed bin(31), /* Encoding of Value */
  3 ValueCCSID     fixed bin(31), /* Character set identifier of Value */
```

High Level Assembler declaration for MQSMPO

```
MQSMPO                 DSECT
MQSMPO_STRUCID         DS   CL4   Structure identifier
MQSMPO_VERSION         DS   F     Structure version number
MQSMPO_OPTIONS         DS   F     Options that control the action of
*                                 MQSETMP
MQSMPO_VALUEENCODING   DS   F     Encoding of VALUE
MQSMPO_VALUECCSID      DS   F     Character set identifier of VALUE
MQSMPO_LENGTH          EQU  *-MQSMPO
MQSMPO_AREA            DS   CL(MQSMPO_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQSMPO_STRUC_ID

Identifier for set message property options structure.

For the C programming language, the constant **MQSMPO_STRUC_ID_ARRAY** is also defined; this has the same value as **MQSMPO_STRUC_ID**, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is **MQSMPO_STRUC_ID**.

Version (MQLONG)

This is the structure version number; the value must be:

MQSMPO_VERSION_1
Version-1 set message property options structure.

The following constant specifies the version number of the current version:

MQSMPO_CURRENT_VERSION
Current version of set message property options structure.

This is always an input field. The initial value of this field is **MQSMPO_VERSION_1**.

Options (MQLONG)

Location options

The following options relate to the relative location of the property compared to the property cursor:

MQSMPO_SET_FIRST
Sets the value of the first property that matches the specified name, or if it does not exist, adds a new property after all other properties with a matching hierarchy.

MQSMPO_SET_PROP_UNDER_CURSOR
Sets the value of the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired using either the MQIMPO_INQ_FIRST or the MQIMPO_INQ_NEXT option.

The property cursor is reset when the message handle is reused on an MQGET call, or when the message handle is specified in the *MsgHandle* field of the MQGMO or MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established or if the property pointer to by the property cursor has been deleted, the call fails with completion code MQCC_FAILED and reason code MQRC_PROPERTY_NOT_AVAILABLE.

MQSMPO_SET_PROP_BEFORE_CURSOR
Sets a new property before the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired using either the MQIMPO_INQ_FIRST or the MQIMPO_INQ_NEXT option.

The property cursor is reset when the message handle is reused on an MQGET call, or when the message handle is specified in the *MsgHandle* field of the MQGMO or MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established or if the property pointer to by the property cursor has been deleted, the call fails with completion code MQCC_FAILED and reason code MQRC_PROPERTY_NOT_AVAILABLE.

MQSMPO_SET_PROP_AFTER_CURSOR
Sets a new property after the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired using either the MQIMPO_INQ_FIRST or the MQIMPO_INQ_NEXT option.

The property cursor is reset when the message handle is reused on an MQGET call, or when the message handle is specified in the *MsgHandle* field of the MQGMO or MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established or if the property pointer to by the property cursor has been deleted, the call fails with completion code MQCC_FAILED and reason code MQRC_PROPERTY_NOT_AVAILABLE.

MQSMPO_APPEND_PROPERTY
Causes a new property to be added after all other properties with a matching hierarchy. If at least one property exists which matches the specified name, then a new property is added at the end after the end of that list of properties.

This option allows a list of properties with the same name to be created.

If you need none of the options described, use the following option:

MQSMPO_NONE
No options specified.

This is always an input field. The initial value of this field is MQSMPO_SET_FIRST.

ValueEncoding (MQLONG)

The encoding of the property value to be set if the value is numeric.

This is always an input field. The initial value of this field is **MQENC_NATIVE**.

ValueCCSID (MQLONG)

The character set of the property value to be set if the value is a character string.

This is always an input field. The initial value of this field is **MQCCSI_APPL**.

MQSRO - Subscription request options

The MQSRO structure allows the application to specify options that control how a subscription request is made. The structure is an input/output parameter on the MQSUBRQ call.

Availability

The MQSRO structure is available on the following platforms:

- AIX
- IBM i
- Linux
- Solaris
- Windows
- z/OS

and for IBM MQ MQI clients connected to these systems.

Version

The current version of MQSRO is MQSRO_VERSION_1.

Character set and encoding

Data in MQSRO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE. However, if the application is running as an MQ MQI client, the structure must be in the character set and encoding of the client.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQSRO_STRUC_ID	'SRO¬'
Version (structure version number)	MQSRO_VERSION_1	1
Options (options)	MQSRO_NONE	0
NumPubs (number of publications)	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQSRO_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQSRO MySRO = {MQSRO_DEFAULT};
```

Language declarations

C declaration for MQSRO

```
typedef struct tagMQSRO MQSRO;
struct tagMQSRO {
  MQCHAR4   StrucId;              /* Structure identifier */
  MQLONG    Version;              /* Structure version number */
  MQLONG    Options;              /* Options that control the action of MQSUBRQ */
  MQLONG    NumPubs;              /* Number of publications sent */
  /* Ver:1 */
};
```

COBOL declaration for MQSRO

```
** MQSRO structure
 10  MQSRO.
** Structure identifier
 15  MQSRO-STRUCID             PIC X(4).
** Structure version number
 15  MQSRO-VERSION             PIC S9(9) BINARY.
** Options that control the action of MQSUBRQ
 15  MQSRO-OPTIONS             PIC S9(9) BINARY.
** Number of publications sent
 15  MQSRO-NUMPUBS             PIC S9(9) BINARY.
```

PL/I declaration for MQSRO

```
dcl
 1 MQSRO based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 Options        fixed bin(31), /* Options that control the action of MQSUBRQ */
  3 NumPubs        fixed bin(31); /* Number of publications sent */
```

High Level Assembler declaration for MQSRO

```
MQSRO                    DSECT
MQSRO_STRUCID            DS    CL4   Structure identifier
MQSRO_VERSION            DS    F     Structure version number
MQSRO_OPTIONS            DS    F     Options that control the action of MQSUBRQ
MQSRO_NUMPUBS            DS    F     Number of publications sent
*
MQSRO_LENGTH             EQU   *-MQSRO
                         ORG   MQSRO
MQSRO_AREA               DS    CL(MQSRO_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier; the value must be:

MQSRO_STRUC_ID
Identifier for Subscription Request Options structure.

For the C programming language, the constant MQSRO_STRUC_ID_ARRAY is also defined; this has the same value as MQSRO_STRUC_ID, but is an array of characters instead of a string.

This is always an input field. The initial value of this field is MQSRO_STRUC_ID.

Version (MQLONG)

This is the structure version number; the value must be:

MQSRO_VERSION_1
Version-1 Subscription Request Options structure.

The following constant specifies the version number of the current version:

MQSRO_CURRENT_VERSION
Current version of Subscription Request Options structure.

This is always an input field. The initial value of this field is MQSRO_VERSION_1.

Options (MQLONG)

One of the following options must be specified. Only one option can be specified.

MQSRO_FAIL_IF_QUIESCING

The MQSUBRQ call fails if the queue manager is in the quiescing state. On z/OS, for a CICS or IMS application, this option also forces the MQSUBRQ call to fail if the connection is in a quiescing state.

Default option: If the option described previously is not required, the following option must be used:

MQSRO_NONE

Use this value to indicate that no other options have been specified; all options assume their default values.

MQSRO_NONE helps program documentation. Although it is not intended that this option be used with any other, because its value is zero, this use cannot be detected.

NumPubs (MQLONG)

This is an output field, returned to the application to indicate the number of publications sent to the subscription queue as a result of this call. Although this number of publications have been sent as a result of this call, there is no guarantee that this many messages will be available for the application to get, especially if they are non-persistent messages.

There might be more than one publication if the topic subscribed to contained a wildcard. If no wildcards were present in the topic string when the subscription represented by *Hsub* was created, then at most one publication is sent as a result of this call.

MQSTS - Status reporting structure

The MQSTS structure is an output parameter from the MQSTAT command. The MQSTAT command is used to retrieve status information. This information is returned in an MQSTS structure.

Character set and encoding

Character data in MQSTS is in the character set of the local queue manager; this is given by the *CodedCharSetId* queue manager attribute. Numeric data in MQSTS is in the native machine encoding; this is given by *Encoding*.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 532. Fields in MQSTS

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQSTS_STRUC_ID	'STAT¬'
Version (structure version number)	MQSTS_VERSION_1	1
CompCode (completion code of first error)	MQCC_OK	0
Reason (reason code of first error)	MQRC_NONE	0

Table 532. Fields in MQSTS (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
PutSuccessCount (number of successful asynchronous put calls)	None	0
PutWarningCount (number of asynchronous put calls that had warnings)	None	0
PutFailureCount (number of failed asynchronous put calls)	None	0
ObjectType (type of failing object)	MQOT_Q	1
ObjectName (name of failing object)	None	Null string or blanks
ObjectQMgrName (name of queue manager that owns the failing object	None	Null string or blanks
ResolvedObjectName (resolved name of destination queue)	None	Null string or blanks
ResolvedQMgrName (resolved name of destination queue manager)	None	Null string or blanks
Note: The remaining fields are ignored if Version is less than MQSTS_VERSION_2.		
ObjectString (long object name of failing object)	MQCHARV_DEFAULT	{NULL,0,0,0,-3}
SubName (subscription name of failing subscription)	MQCHARV_DEFAULT	{NULL,0,0,0,-3}
OpenOptions (open options associated with the failure)	None	0
SubOptions(subscription options associated with the failure)	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQSTS_DEFAULT contains the values that are listed in the table. It can be used in the following way to provide initial values for the fields in the structure:

```
MQSTS MySTS = {MQSTS_DEFAULT};
```

Language declarations

C declaration for MQSTS

```
typedef struct tagMQSTS MQSTS;
struct tagMQSTS {
 MQCHAR4   StrucId;            /* Structure identifier */
 MQLONG    Version;            /* Structure version number */
 MQLONG    CompCode;           /* Completion Code of first error */
 MQLONG    Reason;             /* Reason Code of first error */
 MQLONG    PutSuccessCount;    /* Number of Async calls succeeded */
 MQLONG    PutWarningCount;    /* Number of Async calls had warnings */
```

```
 MQLONG    PutFailureCount;    /* Number of Async calls had failures */
 MQLONG    ObjectType;         /* Failing object type */
 MQCHAR48  ObjectName;         /* Failing object name */
 MQCHAR48  ObjectQMgrName;     /* Failing object queue manager name */
 MQCHAR48  ResolvedObjectName; /* Resolved name of destination queue */
 MQCHAR48  ResolvedQMgrName;   /* Resolved name of destination qmgr */
/* Ver:1 */
 MQCHARV   ObjectString;       /* Failing object long name */
 MQCHARV   SubName;            /* Failing subscription name */
 MQLONG    OpenOptions;        /* Failing open options */
 MQLONG    SubOptions;         /* Failing subscription options */
/* Ver:2 */
};
```

COBOL declaration for MQSTS

```
      ** MQSTS structure
       10  MQSTS.
      ** Structure identifier
       15  MQSTS-STRUCID PIC X(4).
      ** Structure version number
       15  MQSTS-VERSION PIC S9(9) BINARY.
      ** Completion Code of first error
       15  MQSTS-COMPCODE PIC S9(9) BINARY.
      ** Reason Code of first error
       15  MQSTS-REASON PIC S9(9) BINARY.
      ** Number of Async put calls succeeded
       15  MQSTS-PUTSUCCESSCOUNT PIC S9(9) BINARY.
      ** Number of Async put calls had warnings
       15  MQSTS-PUTWARNINGCOUNT PIC S9(9) BINARY.
      ** Number of Async put calls had failures
       15  MQSTS-PUTFAILURECOUNT PIC S9(9) BINARY.
      ** Failing object type
       15  MQSTS-OBJECTTYPE PIC S9(9) BINARY.
      ** Failing object name
       15  MQSTS-OBJECTNAME PIC X(48).
      ** Failing object queue manager
       15  MQSTS-OBJECTQMGRNAME PIC X(48).
      ** Resolved name of destination queue
       15  MQSTS-RESOLVEDOBJECTNAME PIC X(48).
      ** Resolved name of destination qmgr
       15  MQSTS-RESOLVEDQMGRNAME PIC X(48).
      ** Ver:1 **
      ** Failing object long name
       15  MQSTS-OBJECTSTRING.
      ** Address of variable length string
       20  MQSTS-OBJECTSTRING-VSPTR POINTER.
      ** Offset of variable length string
       20  MQSTS-OBJECTSTRING-VSOFFSET PIC S9(9) BINARY.
      ** Size of buffer
       20  MQSTS-OBJECTSTRING-VSBUFSIZE PIC S9(9) BINARY.
      ** Length of variable length string
       20  MQSTS-OBJECTSTRING-VSLENGTH PIC S9(9) BINARY.
      ** CCSID of variable length string
       20  MQSTS-OBJECTSTRING-VSCCSID PIC S9(9) BINARY.
      ** Failing subscription name
       15  MQSTS-SUBNAME.
      ** Address of variable length string
       20  MQSTS-SUBNAME-VSPTR POINTER.
      ** Offset of variable length string
       20  MQSTS-SUBNAME-VSOFFSET PIC S9(9) BINARY.
      ** Size of buffer
       20  MQSTS-SUBNAME-VSBUFSIZE PIC S9(9) BINARY.
      ** Length of variable length string
       20  MQSTS-SUBNAME-VSLENGTH PIC S9(9) BINARY.
      ** CCSID of variable length string
       20  MQSTS-SUBNAME-VSCCSID PIC S9(9) BINARY.
      ** Failing open options
       15  MQSTS-OPENOPTIONS PIC S9(9) BINARY.
      ** Failing subscription options
       15  MQSTS-SUBOPTIONS PIC S9(9) BINARY.
      ** Ver:2 **
```

PL/I declaration for MQSTS

```
dcl
   1 MQSTS based,
```

```
    3 StrucId             char(4),       /* Structure identifier */
     3 Version            fixed bin(31), /* Structure version number */
     3 CompCode           fixed bin(31), /* Completion code */
     3 Reason             fixed bin(31), /* Reason code */
     3 PutSuccessCount    fixed bin(31), /* Put success count */
     3 PutWarningCount    fixed bin(31), /* Put warning count */
     3 PutFailureCount    fixed bin(31), /* Put failure count */
     3 ObjectType         fixed bin(31), /* Object type */
     3 ObjectName         char(48), /* Object name */
     3 ObjectQmgrName     char(48), /* Object queue manager */
     3 ResolvedObjectName char(48), /* Resolved Object name */
     3 ResolvedQmgrName   char(48); /* Resolved Object queue manager */
 /* Ver:1 */
     3 ObjectString,                /* Failing object long name */
        5 VSPtr pointer,            /* Address of variable length string */
        5 VSOffset fixed bin(31),   /* Offset of variable length string */
        5 VSBufSize fixed bin(31),  /* Size of buffer */
        5 VSLength fixed bin(31),   /* Length of variable length string */
        5 VSCCSID fixed bin(31);    /* CCSID of variable length string */
     3 SubName,                     /* Failing subscription name */
        5 VSPtr pointer,            /* Address of variable length string */
        5 VSOffset fixed bin(31),   /* Offset of variable length string */
        5 VSBufSize fixed bin(31),  /* Size of buffer */
        5 VSLength fixed bin(31),   /* Length of variable length string */
        5 VSCCSID fixed bin(31);    /* CCSID of variable length string */
    3 OpenOptions fixed bin(31),    /* Failing open options */
    3 SubOptions fixed bin(31);     /* Failing subscription options */
 /* Ver:2 */
```

High Level Assembler declaration for MQSTS

```
  MQSTS                        DSECT
  MQSTS_STRUCID                DS    CL4   Structure identifier
  MQSTS_VERSION                DS    F     Structure version number
  MQSTS_COMPCODE               DS    F     Completion code
  MQSTS_REASON                 DS    F     Reason code
  MQSTS_PUTSUCCESSCOUNT        DS    F     Success count
  MQSTS_PUTWARNINGCOUNT        DS    F     Warning count
  MQSTS_PUTFAILURECOUNT        DS    F     Failure count
  MQSTS_OBJTYPE                DS    F     Object type
  MQSTS_OBJNAME                DS    CL48  Object name
  MQSTS_OBJQMGR                DS    CL48  Object queue manager
  MQSTS_ROBJNAME               DS    CL48  Resolved object name
  MQSTS_ROBJQMGR               DS    CL48  Resolved object queue manager
  MQSTS_OBJECTSTRING           DS    0F   Force fullword alignment
  MQSTS_OBJECTSTRING_VSPTR     DS    A  Address of variable length string
  MQSTS_OBJECTSTRING_VSOFFSET  DS    F  Offset of variable length string
  MQSTS_OBJECTSTRING_VSBUFSIZE DS    F  Size of buffer
  MQSTS_OBJECTSTRING_VSLENGTH  DS    F  Length of variable length string
  MQSTS_OBJECTSTRING_VSCCSID   DS    F  CCSID of variable length string
  MQSTS_OBJECTSTRING_LENGTH    EQU   *-MQSTS_OBJECTSTRING
                                     ORG   MQSTS_OBJECTSTRING
  MQSTS_OBJECTSTRING_AREA      DS    CL(MQSTS_OBJECTSTRING_LENGTH)
  *
  MQSTS_SUBNAME                DS    0F Force fullword alignment
  MQSTS_SUBNAME_VSPTR          DS    A  Address of variable length string
  MQSTS_SUBNAME_VSOFFSET       DS    F  Offset of variable length string
  MQSTS_SUBNAME_VSBUFSIZE      DS    F  Size of buffer
  MQSTS_SUBNAME_VSLENGTH       DS    F  Length of variable length string
  MQSTS_SUBNAME_VSCCSID        DS    F  CCSID of variable length string
  MQSTS_SUBNAME_LENGTH         EQ    *-MQSTS_SUBNAME
                                     ORG   MQSTS_SUBNAME
  MQSTS_SUBNAME_AREA           DS    CL(MQSTS_SUBNAME_LENGTH)
  *
  MQSTS_OPENOPTIONS            DS    F  Failing open options
  MQSTS_SUBOPTIONS             DS    F  Failing subscription option
  MQSTS_LENGTH                 EQU   *-MQSTS
                               ORG   MQSTS
  MQSTS_AREA                   DS    CL(MQSTS_LENGTH)
```

Related reference

"MQSTAT - Retrieve status information" on page 772

Use the MQSTAT call to retrieve status information. The type of status information returned is determined by the Type value specified on the call.

StrucId (MQCHAR4)

The identifier for the status reporting structure, MQSTS.

StrucId is the structure identifier. The value must be:

MQSTS_STRUC_ID
Identifier for status reporting structure.

For the C programming language, the constant MQSTS_STRUC_ID_ARRAY is also defined; this has the same value as MQSTS_STRUC_ID, but is an array of characters instead of a string.

StrucId is always an input field. Its initial value is MQSTS_STRUC_ID.

Version (MQLONG)

The structure version number.

The value must be either:

MQSTS_VERSION_1
Version 1 status reporting structure.

MQSTS_VERSION_2
Version 2 status reporting structure.

The following constant specifies the version number of the current version:

MQSTS_CURRENT_VERSION
Current version of status reporting structure. The current version is MQSTS_VERSION_2.

Version is always an input field. Its initial value is MQSTS_VERSION_1.

CompCode (MQLONG)

The completion code of the operation being reported on.

The interpretation of CompCode depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

This is the completion code resulting from a previous asynchronous put operation on the object specified in ObjectName.

MQSTAT_TYPE_RECONNECTION

If the connection is reconnecting or failed to reconnect this is the completion code that caused the connection to begin reconnecting.

If the connection is currently connected the value is MQCC_OK.

MQSTAT_TYPE_RECONNECTION_ERROR

If the connection failed to reconnect this is the completion code that caused the reconnection to fail.

If the connection is currently connected, or reconnecting, the value is MQCC_OK.

CompCode is always an output field. Its initial value is MQCC_OK.

Reason (MQLONG)

The reason code of the operation being reported on.

The interpretation of Reason depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

This is the reason code resulting from a previous asynchronous put operation on the object specified in `ObjectName`.

MQSTAT_TYPE_RECONNECTION

If the connection is reconnecting or failed to reconnect this is the reason code that caused the reconnection to begin reconnecting.

If the connection is currently connected the value is `MQRC_NONE`.

MQSTAT_TYPE_RECONNECTION_ERROR

If the connection failed to reconnect this is the reason code that caused the reconnection to fail.

If the connection is currently connected, or reconnecting, the value is `MQRC_NONE`.

`Reason` is an output field. Its initial value is `MQRC_NONE`.

PutSuccessCount (MQLONG)

The number of asynchronous put operations that succeeded.

The value of `PutSuccessCount` depends on the value of the `MQSTAT` **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

The number of asynchronous put operations to the object named in the `MQSTS` structure that completed with `MQCC_OK`.

MQSTAT_TYPE_RECONNECTION

Zero.

MQSTAT_TYPE_RECONNECTION_ERROR

Zero.

`PutSuccessCount` is an output field. Its initial value is zero.

PutWarningCount (MQLONG)

The number of asynchronous put operations that ended with a warning.

The value of `PutWarningCount` depends on the value of the `MQSTAT` **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

The number of asynchronous put operations to the object named in the `MQSTS` structure that completed with `MQCC_WARNING`.

MQSTAT_TYPE_RECONNECTION

Zero.

MQSTAT_TYPE_RECONNECTION_ERROR

Zero.

`PutWarningCount` is an output field. Its initial value is zero.

PutFailureCount (MQLONG)

The number of asynchronous put operations that failed.

The value of `PutFailureCount` depends on the value of the `MQSTAT` **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

The number of asynchronous put operations to the object named in the `MQSTS` structure that completed with `MQCC_FAILED`.

MQSTAT_TYPE_RECONNECTION

Zero.

MQSTAT_TYPE_RECONNECTION_ERROR

Zero.

`PutFailureCount` is an output field. Its initial value is zero.

ObjectType (MQLONG)

The type of the object named in *ObjectName* being reported on.

Possible values of `ObjectType` are listed in "MQOT_* (Object Types and Extended Object Types)" on page 162.

`ObjectType` is an output field. Its initial value is `MQOT_Q`.

ObjectName (MQCHAR48)

The name of the object being reported on.

The interpretation of `ObjectName` depends on the value of the `MQSTAT` **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

This is the name of the queue or topic used in the put operation, the failure of which is reported in the *CompCode* and *Reason* fields in the `MQSTS` structure.

MQSTAT_TYPE_RECONNECTION

If the connection is reconnecting, this is the name of the queue manager associated with the connection.

MQSTAT_TYPE_RECONNECTION_ERROR

If the connection failed to reconnect, this is the name of the object which caused reconnection to fail. The reason for the failure is reported in the *CompCode* and *Reason* fields in the `MQSTS` structure.

`ObjectName` is an output field. Its initial value is the null string in C, and 48 blank characters in other programming languages.

ObjectQMgrName (MQCHAR48)

The name of the queue manager being reported on.

The interpretation of `ObjectQMgrName` depends on the value of the `MQSTAT` **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

This is the name of the queue manager on which the *ObjectName* object is defined. A name that is entirely blank up to the first null character or the end of the field denotes the queue manager to which the application is connected (the local queue manager).

MQSTAT_TYPE_RECONNECTION

The **`ObjectQMgrName`** field contains the name of a queue manager to which reconnection is being requested, or blank if no queue manager is specified. If possible, the client attempts to reconnect to a queue manager of that name.

Blank.

MQSTAT_TYPE_RECONNECTION_ERROR

If the connection failed to reconnect, this is the name of the object which caused reconnection to fail. The reason for the failure is reported in the *CompCode* and *Reason* fields in the `MQSTS` structure.

ObjectQMgrName is an output field. Its value is the null string in C, and 48 blank characters in other programming languages.

ResolvedObjectName (MQCHAR48)

The name of the object named in *ObjectName* after the local queue manager resolves the name.

The interpretation of ResolvedObjectName depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

ResolvedObjectName is the name of the object named in *ObjectName* after the local queue manager resolves the name. The name returned is the name of an object that exists on the queue manager identified by *ResolvedQMgrName*.

MQSTAT_TYPE_RECONNECTION

Blank.

MQSTAT_TYPE_RECONNECTION_ERROR

Blank.

ResolvedObjectName is an output field. Its initial value is the null string in C, and 48 blank characters in other programming languages.

ResolvedQMgrName (MQCHAR48)

The name of the destination queue manager after the local queue manager resolves the name.

The interpretation of ResolvedQMgrName depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

ResolvedQMgrName is the name of the destination queue manager after the local queue manager resolves the name. The name returned is the name of the queue manager that owns the object identified by *ResolvedObjectName*. *ResolvedQMgrName* might be the name of the local queue manager.

MQSTAT_TYPE_RECONNECTION

Blank.

MQSTAT_TYPE_RECONNECTION_ERROR

Blank.

ResolvedQMgrName is always an output field. Its initial value is the null string in C, and 48 blank characters in other programming languages.

ObjectString (MQCHARV)

Long object name of failing object being reported on. Present only in Version 2 of MQSTS or higher.

The interpretation of ObjectString depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

This is the long object name of the queue or topic used in the MQPUT operation, which failed.

MQSTAT_TYPE_RECONNECTION

Zero length string

MQSTAT_TYPE_RECONNECTION_ERROR

This is the long object name of the object that caused the reconnection to fail.

ObjectString is an output field. Its initial value is a zero length string.

SubName (MQCHARV)

The name of the failing subscription. Present only in Version 2 of MQSTS or higher.

The interpretation of SubName depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

Zero length string.

MQSTAT_TYPE_RECONNECTION

Zero length string.

MQSTAT_TYPE_RECONNECTION_ERROR

The name of the subscription that caused reconnection to fail. If no subscription name is available, or the failure is not related to a subscription, this is a zero-length string.

SubName is an output field. Its initial value is a zero length string.

OpenOptions (MQLONG)

The OpenOptions used to open the object being reported upon. Present only in Version 2 of MQSTS or higher.

The value of OpenOptions depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

Zero.

MQSTAT_TYPE_RECONNECTION

Zero.

MQSTAT_TYPE_RECONNECTION_ERROR

The OpenOptions used when the failure occurred. The reason for the failure is reported in the *CompCode* and *Reason* fields in the MQSTS structure.

OpenOptions is an output field. Its initial value is zero.

SubOptions (MQLONG)

The SubOptions used to open the failing subscription. Present only in Version 2 of MQSTS or higher.

The interpretation of SubOptions depends on the value of the MQSTAT **Type** parameter.

MQSTAT_TYPE_ASYNC_ERROR

Zero.

MQSTAT_TYPE_RECONNECTION

Zero.

MQSTAT_TYPE_RECONNECTION_ERROR

The SubOptions used when the failure occurred. If the failure is not related to subscribing to a topic, the value returned is zero.

SubOptions is an output field. Its initial value is zero.

MQTM - Trigger message

The MQTM structure describes the data in the trigger message that is sent by the queue manager to a trigger-monitor application when a trigger event occurs for a queue. This structure is part of the IBM MQ Trigger Monitor Interface (TMI), which is one of the IBM MQ framework interfaces.

Format name

MQFMT_TRIGGER.

Character set and encoding

Character data in MQTM is in the character set of the queue manager that generates the MQTM. Numeric data in MQTM is in the machine encoding of the queue manager that generates the MQTM.

The character set and encoding of the MQTM are given by the *CodedCharSetId* and *Encoding* fields in:

- The MQMD (if the MQTM structure is at the start of the message data), or
- The header structure that precedes the MQTM structure (all other cases).

Usage

A trigger-monitor application might need to pass some or all of the information in the trigger message to the application that the trigger-monitor application starts. Information that might be needed by the started application includes *QName*, *TriggerData*, and *UserData*. The trigger-monitor application can pass the MQTM structure directly to the started application, or pass an MQTMC2 structure instead, depending on what is permitted by the environment and convenient for the started application. For information about MQTMC2, see "MQTMC2 - Trigger message 2 (character format)" on page 596.

- z/OS On z/OS, for an MQAT_CICS application that is started using the CKTI transaction, the entire trigger message structure MQTM is made available to the started transaction; the information can be retrieved by using the EXEC CICS RETRIEVE command.
- IBM i On IBM i, the trigger-monitor application provided with IBM MQ passes an MQTMC2 structure to the started application.

For information about using triggers, see Starting IBM MQ applications using triggers.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 533. Fields in MQTM for MQTM

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQTM_STRUC_ID	'TM¬¬'
Version (structure version number)	MQTM_VERSION_1	1
QName (name of triggered queue)	None	Null string or blanks
ProcessName (name of process object)	None	Null string or blanks
TriggerData (trigger data)	None	Null string or blanks
ApplType (application type	None	0
ApplId (application identifier)	None	Null string or blanks
EnvData (environment data)	None	Null string or blanks
UserData (user data)	None	Null string or blanks

Table 533. Fields in MQTM for MQTM (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
Notes: 1. The symbol ¬ represents a single blank character. 2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages. 3. In the C programming language, the macro variable MQTM_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure: `MQTM MyTM = {MQTM_DEFAULT};`		

Language declarations

C declaration for MQTM

```
typedef struct tagMQTM MQTM;
struct tagMQTM {
  MQCHAR4    StrucId;      /* Structure identifier */
  MQLONG     Version;      /* Structure version number */
  MQCHAR48   QName;        /* Name of triggered queue */
  MQCHAR48   ProcessName;  /* Name of process object */
  MQCHAR64   TriggerData;  /* Trigger data */
  MQLONG     ApplType;     /* Application type */
  MQCHAR256  ApplId;       /* Application identifier */
  MQCHAR128  EnvData;      /* Environment data */
  MQCHAR128  UserData;     /* User data */
};
```

COBOL declaration for MQTM

```
**   MQTM structure
  10 MQTM.
**    Structure identifier
   15 MQTM-STRUCID     PIC X(4).
**    Structure version number
   15 MQTM-VERSION     PIC S9(9) BINARY.
**    Name of triggered queue
   15 MQTM-QNAME       PIC X(48).
**    Name of process object
   15 MQTM-PROCESSNAME PIC X(48).
**    Trigger data
   15 MQTM-TRIGGERDATA PIC X(64).
**    Application type
   15 MQTM-APPLTYPE    PIC S9(9) BINARY.
**    Application identifier
   15 MQTM-APPLID      PIC X(256).
**    Environment data
   15 MQTM-ENVDATA     PIC X(128).
**    User data
   15 MQTM-USERDATA    PIC X(128).
```

PL/I declaration for MQTM

```
dcl
 1 MQTM based,
  3 StrucId     char(4),       /* Structure identifier */
  3 Version     fixed bin(31), /* Structure version number */
  3 QName       char(48),      /* Name of triggered queue */
  3 ProcessName char(48),      /* Name of process object */
  3 TriggerData char(64),      /* Trigger data */
  3 ApplType    fixed bin(31), /* Application type */
  3 ApplId      char(256),     /* Application identifier */
```

```
   3 EnvData     char(128),     /* Environment data */
   3 UserData    char(128);     /* User data */
```

High Level Assembler declaration for MQTM

```
MQTM               DSECT
MQTM_STRUCID       DS   CL4    Structure identifier
MQTM_VERSION       DS   F      Structure version number
MQTM_QNAME         DS   CL48   Name of triggered queue
MQTM_PROCESSNAME   DS   CL48   Name of process object
MQTM_TRIGGERDATA   DS   CL64   Trigger data
MQTM_APPLTYPE      DS   F      Application type
MQTM_APPLID        DS   CL256  Application identifier
MQTM_ENVDATA       DS   CL128  Environment data
MQTM_USERDATA      DS   CL128  User data
*
MQTM_LENGTH        EQU  *-MQTM
                   ORG  MQTM
MQTM_AREA          DS   CL(MQTM_LENGTH)
```

Visual Basic declaration for MQTM

```
Type MQTM
  StrucId     As String*4   'Structure identifier'
  Version     As Long       'Structure version number'
  QName       As String*48  'Name of triggered queue'
  ProcessName As String*48  'Name of process object'
  TriggerData As String*64  'Trigger data'
  ApplType    As Long       'Application type'
  ApplId      As String*256 'Application identifier'
  EnvData     As String*128 'Environment data'
  UserData    As String*128 'User data'
End Type
```

MQMD for a trigger message

Table 534. Settings for the fields in the MQMD of a trigger message generated by the queue manager

Field in MQMD	Value used
StrucId	MQMD_STRUC_ID
Version	MQMD_VERSION_1
Report	MQRO_NONE
MsgType	MQMT_DATAGRAM
Expiry	MQEI_UNLIMITED
Feedback	MQFB_NONE
Encoding	MQENC_NATIVE
CodedCharSetId	Queue manager's **CodedCharSetId** attribute
Format	MQFMT_TRIGGER
Priority	Initiation queue's **DefPriority** attribute
Persistence	MQPER_NOT_PERSISTENT
MsgId	A unique value
CorrelId	MQCI_NONE
BackoutCount	0
ReplyToQ	Blanks
ReplyToQMgr	Name of queue manager

Table 534. Settings for the fields in the MQMD of a trigger message generated by the queue manager (continued)

Field in MQMD	Value used
UserIdentifier	Blanks
AccountingToken	MQACT_NONE
ApplIdentityData	Blanks
PutApplType	MQAT_QMGR, or as appropriate for the message channel agent
PutApplName	First 28 bytes of the queue manager name
PutDate	Date when trigger message is sent
PutTime	Time when trigger message is sent
ApplOriginData	Blanks

An application that generates a trigger message is recommended to set similar values, except for the following:

- The *Priority* field can be set to MQPRI_PRIORITY_AS_Q_DEF (the queue manager will change this to the default priority for the initiation queue when the message is put).
- The *ReplyToQMgr* field can be set to blanks (the queue manager will change this to the name of the local queue manager when the message it put).
- Set the context fields as appropriate for the application.

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQTM_STRUC_ID
Identifier for trigger message structure.

For the C programming language, the constant MQTM_STRUC_ID_ARRAY is also defined; this has the same value as MQTM_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQTM_STRUC_ID.

Version (MQLONG)

This is the structure version number. The value must be:

MQTM_VERSION_1
Version number for trigger message structure.

The following constant specifies the version number of the current version:

MQTM_CURRENT_VERSION
Current version of trigger message structure.

The initial value of this field is MQTM_VERSION_1.

QName (MQCHAR48)

This is the name of the queue for which a trigger event occurred, and is used by the application started by the trigger-monitor application. The queue manager initializes this field with the value of the **QName** attribute of the triggered queue; see“Attributes for queues” on page 823for details of this attribute.

Names that are shorter than the defined length of the field are padded to the right with blanks; they are not ended prematurely by a null character.

The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

ProcessName (MQCHAR48)

This is the name of the queue manager process object specified for the triggered queue, and can be used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ProcessName** attribute of the queue identified by the *QName* field; see"Attributes for queues" on page 823for details of this attribute.

Names that are shorter than the defined length of the field are always padded to the right with blanks; they are not ended prematurely by a null character.

The length of this field is given by MQ_PROCESS_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

TriggerData (MQCHAR64)

This is free-format data for use by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **TriggerData** attribute of the queue identified by the *QName* field; see "Attributes for queues" on page 823 for details of this attribute. The content of this data is of no significance to the queue manager.

On z/OS, for a CICS application started using the CKTI transaction, this information is not used.

The length of this field is given by MQ_TRIGGER_DATA_LENGTH. The initial value of this field is the null string in C, and 64 blank characters in other programming languages.

ApplType (MQLONG)

This identifies the nature of the program to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ApplType** attribute of the process object identified by the *ProcessName* field; see "Attributes for process definitions" on page 858 for details of this attribute. The content of this data is of no significance to the queue manager.

ApplType can have one of the following standard values. User-defined types can also be used, but should be restricted to values in the range MQAT_USER_FIRST through MQAT_USER_LAST:

MQAT_AIX
AIX application (same value as MQAT_UNIX).

MQAT_BATCH
Batch application

MQAT_BROKER
Broker application

MQAT_CICS
CICS transaction.

MQAT_CICS_BRIDGE
CICS bridge application.

MQAT_CICS_VSE
CICS/VSE transaction.

MQAT_DOS
IBM MQ MQI client application on PC DOS.

MQAT_IMS
IMS application.

MQAT_IMS_BRIDGE
IMS bridge application.

MQAT_JAVA
Java application.

MQAT_MVS
MVS or TSO application (same value as MQAT_ZOS).

MQAT_NOTES_AGENT
Lotus Notes Agent application.

MQAT_OS390
OS/390 application (same value as MQAT_ZOS).

MQAT_OS400
IBM i application.

MQAT_RRS_BATCH
RRS batch application.

MQAT_UNIX
UNIX application.

MQAT_UNKNOWN
Application of unknown type.

MQAT_USER
User-defined application type.

MQAT_VOS
Stratus VOS application.

MQAT_WINDOWS
16-bit Windows application.

MQAT_WINDOWS_NT
32-bit Windows application.

MQAT_WLM
z/OS workload manager application.

MQAT_XCF
XCF.

MQAT_ZOS
z/OS application.

MQAT_USER_FIRST
Lowest value for user-defined application type.

MQAT_USER_LAST
Highest value for user-defined application type.

The initial value of this field is `0`.

ApplId (MQCHAR256)

This is a character string that identifies the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ApplId** attribute of the process object identified by the *ProcessName* field; see "Attributes for process definitions" on page 858 for details of this attribute. The content of this data is of no significance to the queue manager.

The meaning of *ApplId* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ requires *ApplId* to be the name of an executable program. The following notes apply to the environments indicated:

- On z/OS, *ApplId* is:
  - A CICS transaction identifier, for applications started using the CICS trigger-monitor transaction CKTI
  - An IMS transaction identifier, for applications started using the IMS trigger monitor CSQQTRMN
- On Windows systems, the program name can be prefixed with a drive and directory path.
- On IBM i, the program name can be prefixed with a library name and / character.
- On UNIX, the program name can be prefixed with a directory path.

The length of this field is given by MQ_PROCESS_APPL_ID_LENGTH. The initial value of this field is the null string in C, and 256 blank characters in other programming languages.

EnvData (MQCHAR128)

This is a character string that contains environment-related information pertaining to the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **EnvData** attribute of the process object identified by the *ProcessName* field; see "Attributes for process definitions" on page 858 for details of this attribute. The content of this data is of no significance to the queue manager.

On z/OS, for a CICS application started using the CKTI transaction, or an IMS application to be started using the CSQQTRMN transaction, this information is not used.

The length of this field is given by MQ_PROCESS_ENV_DATA_LENGTH. The initial value of this field is the null string in C, and 128 blank characters in other programming languages.

UserData (MQCHAR128)

This is a character string that contains user information relevant to the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **UserData** attribute of the process object identified by the *ProcessName* field; see "Attributes for process definitions" on page 858 for details of this attribute. The content of this data is of no significance to the queue manager.

For Microsoft Windows, the character string must not contain double quotation marks if the process definition is going to be passed to **runmqtrm**.

The length of this field is given by MQ_PROCESS_USER_DATA_LENGTH. The initial value of this field is the null string in C, and 128 blank characters in other programming languages.

MQTMC2 - Trigger message 2 (character format)

When a trigger-monitor application retrieves a trigger message (MQTM) from an initiation queue, the trigger monitor might need to pass some or all of the information in the trigger message to the application that the trigger monitor starts.

Information that the started application might need includes *QName*, *TriggerData*, and *UserData*. The trigger monitor application can pass the MQTM structure directly to the started application, or pass an MQTMC2 structure instead, depending on what is permitted by the environment and convenient for the started application.

This structure is part of the IBM MQ Trigger Monitor Interface (TMI), which is one of the IBM MQ framework interfaces.

Character set and encoding

Character data in MQTMC2 is in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute.

Usage

The MQTMC2 structure is very similar to the format of the MQTM structure. The difference is that the non-character fields in MQTM are changed in MQTMC2 to character fields of the same length, and the queue manager name is added at the end of the structure.

- z/OS On z/OS, for an MQAT_IMS application that is started using the CSQQTRMN application, an MQTMC2 structure is made available to the started application.
- IBM i On IBM i, the trigger monitor application provided with IBM MQ passes an MQTMC2 structure to the started application.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 535. Fields in MQTMC2

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQTMC_STRUC_ID	'TMC¬'
Version (structure version number)	MQTMC_VERSION_2	'¬¬¬2'
QName (name of triggered queue)	None	Null string or blanks
ProcessName (name of process object)	None	Null string or blanks
TriggerData (trigger data)	None	Null string or blanks
ApplType (application type)	None	Blanks
ApplId (application identifier)	None	Null string or blanks
EnvData (environment data)	None	Null string or blanks
UserData (user data)	None	Null string or blanks
QMgrName (queue manager name)	None	Null string or blanks

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQTMC2_DEFAULT contains the values listed above. Use it in the following way to provide initial values for the fields in the structure:

```
MQTMC2 MyTMC = {MQTMC2_DEFAULT};
```

Language declarations

C declaration for MQTMC2

```
typedef struct tagMQTMC2 MQTMC2;
struct tagMQTMC2 {
  MQCHAR4    StrucId;      /* Structure identifier */
  MQCHAR4    Version;      /* Structure version number */
  MQCHAR48   QName;        /* Name of triggered queue */
  MQCHAR48   ProcessName;  /* Name of process object */
  MQCHAR64   TriggerData;  /* Trigger data */
  MQCHAR4    ApplType;     /* Application type */
  MQCHAR256  ApplId;       /* Application identifier */
  MQCHAR128  EnvData;      /* Environment data */
  MQCHAR128  UserData;     /* User data */
  MQCHAR48   QMgrName;     /* Queue manager name */
};
```

COBOL declaration for MQTMC2

```
**   MQTMC2 structure
  10 MQTMC2.
**    Structure identifier
   15 MQTMC2-STRUCID     PIC X(4).
**    Structure version number
```

```
   15 MQTMC2-VERSION     PIC X(4).
**    Name of triggered queue
   15 MQTMC2-QNAME       PIC X(48).
**    Name of process object
   15 MQTMC2-PROCESSNAME PIC X(48).
**    Trigger data
   15 MQTMC2-TRIGGERDATA PIC X(64).
**    Application type
   15 MQTMC2-APPLTYPE    PIC X(4).
**    Application identifier
   15 MQTMC2-APPLID      PIC X(256).
**    Environment data
   15 MQTMC2-ENVDATA     PIC X(128).
**    User data
   15 MQTMC2-USERDATA    PIC X(128).
**    Queue manager name
   15 MQTMC2-QMGRNAME    PIC X(48).
```

PL/I declaration for MQTMC2

```
dcl
 1 MQTMC2 based,
  3 StrucId     char(4),   /* Structure identifier */
  3 Version     char(4),   /* Structure version number */
  3 QName       char(48),  /* Name of triggered queue */
  3 ProcessName char(48),  /* Name of process object */
  3 TriggerData char(64),  /* Trigger data */
  3 ApplType    char(4),   /* Application type */
  3 ApplId      char(256), /* Application identifier */
  3 EnvData     char(128), /* Environment data */
  3 UserData    char(128), /* User data */
  3 QMgrName    char(48);  /* Queue manager name */
```

High Level Assembler declaration for MQTMC2

```
MQTMC2              DSECT
MQTMC2_STRUCID      DS   CL4    Structure identifier
MQTMC2_VERSION      DS   CL4    Structure version number
MQTMC2_QNAME        DS   CL48   Name of triggered queue
MQTMC2_PROCESSNAME  DS   CL48   Name of process object
MQTMC2_TRIGGERDATA  DS   CL64   Trigger data
MQTMC2_APPLTYPE     DS   CL4    Application type
MQTMC2_APPLID       DS   CL256  Application identifier
MQTMC2_ENVDATA      DS   CL128  Environment data
MQTMC2_USERDATA     DS   CL128  User data
MQTMC2_QMGRNAME     DS   CL48   Queue manager name
*
MQTMC2_LENGTH       EQU  *-MQTMC2
                    ORG  MQTMC2
MQTMC2_AREA         DS   CL(MQTMC2_LENGTH)
```

Visual Basic declaration for MQTMC2

```
Type MQTMC2
  StrucId     As String*4   'Structure identifier'
  Version     As String*4   'Structure version number'
  QName       As String*48  'Name of triggered queue'
  ProcessName As String*48  'Name of process object'
  TriggerData As String*64  'Trigger data'
  ApplType    As String*4   'Application type'
  ApplId      As String*256 'Application identifier'
  EnvData     As String*128 'Environment data'
  UserData    As String*128 'User data'
  QMgrName    As String*48  'Queue manager name'
End Type
```

StrucId (MQCHAR4)

Structure identifier.

The value must be:

MQTMC_STRUC_ID
Identifier for trigger message (character format) structure.

For the C programming language, the constant MQTMC_STRUC_ID_ARRAY is also defined; this has the same value as MQTMC_STRUC_ID, but is an array of characters instead of a string.

Version (MQCHAR4)

Structure version number.

The value must be:

MQTMC_VERSION_2
Version 2 trigger message (character format) structure.

For the C programming language, the constant MQTMC_VERSION_2_ARRAY is also defined; this has the same value as MQTMC_VERSION_2, but is an array of characters instead of a string.

The following constant specifies the version number of the current version:

MQTMC_CURRENT_VERSION
Current version of trigger message (character format) structure.

QName (MQCHAR48)

Name of triggered queue.

See the *QName* field in the MQTM structure.

ProcessName (MQCHAR48)

Name of process object.

See the *ProcessName* field in the MQTM structure.

TriggerData (MQCHAR64)

Trigger data.

See the *TriggerData* field in the MQTM structure.

ApplType (MQCHAR4)

Application type.

This field always contains blanks, whatever the value in the *ApplType* field in the MQTM structure of the original trigger message.

ApplId (MQCHAR256)

Application identifier.

See the *ApplId* field in the MQTM structure.

EnvData (MQCHAR128)

Environment data.

See the *EnvData* field in the MQTM structure.

UserData (MQCHAR128)

User data.

See the *UserData* field in the MQTM structure.

QMgrName (MQCHAR48)

Queue manager name.

This is the name of the queue manager at which the trigger event occurred.

MQWIH - Work information header

If a message is to be processed by the z/OS workload manager (WLM), the message must begin with an MQWIH structure. This structure describes the information that must be present at the start of a message that is to be handled by WLM.

Availability

All IBM MQ systems, plus IBM MQ clients connected to these systems.

Format name

MQFMT_WORK_INFO_HEADER.

Character set and encoding

The fields in the MQWIH structure are in the character set and encoding given by the *CodedCharSetId* and *Encoding* fields in the header structure that precedes MQWIH, or by those fields in the MQMD structure if the MQWIH is at the start of the application message data.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

Usage

For any IBM MQ supported platform you can create and transmit a message that includes the MQWIH structure, but only an IBM MQ for z/OS queue manager can interact with WLM. Therefore, for the message to get to WLM from a non-z/OS queue manager, your queue manager network must include at least one z/OS queue manager through which the message can be routed.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 536. Fields in MQWIH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQWIH_STRUC_ID	'WIH¬'
Version (structure version number)	MQWIH_VERSION_1	1
StrucLength (length of MQWIH structure)	MQWIH_LENGTH_1	120
Encoding (numeric encoding of data that follows MQWIH)	None	0
CodedCharSetId (character-set identifier of data that follows MQWIH)	MQCCSI_UNDEFINED	0
Format (format name of data that follows MQWIH)	MQFMT_NONE	Blanks
Flags (flags)	MQWIH_NONE	0
ServiceName (service name)	None	Blanks

Table 536. Fields in MQWIH (continued)		
Field name and description	**Name of constant**	**Initial value (if any) of constant**
ServiceStep (service step name)	None	Blanks
MsgToken (message token)	MQMTOK_NONE	Nulls
Reserved (reserved)	None	Blanks

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQWIH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQWIH MyWIH = {MQWIH_DEFAULT};
```

Language declarations

C declaration for MQWIH

```
typedef struct tagMQWIH MQWIH;
struct tagMQWIH {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQLONG    StrucLength;     /* Length of MQWIH structure */
  MQLONG    Encoding;        /* Numeric encoding of data that follows
                                MQWIH */
  MQLONG    CodedCharSetId;  /* Character-set identifier of data that
                                follows MQWIH */
  MQCHAR8   Format;          /* Format name of data that follows
                                MQWIH */
  MQLONG    Flags;           /* Flags */
  MQCHAR32  ServiceName;     /* Service name */
  MQCHAR8   ServiceStep;     /* Service step name */
  MQBYTE16  MsgToken;        /* Message token */
  MQCHAR32  Reserved;        /* Reserved */
};
```

COBOL declaration for MQWIH

```
**   MQWIH structure
  10 MQWIH.
**    Structure identifier
   15 MQWIH-STRUCID        PIC X(4).
**    Structure version number
   15 MQWIH-VERSION        PIC S9(9) BINARY.
**    Length of MQWIH structure
   15 MQWIH-STRUCLENGTH    PIC S9(9) BINARY.
**    Numeric encoding of data that follows MQWIH
   15 MQWIH-ENCODING       PIC S9(9) BINARY.
**    Character-set identifier of data that follows MQWIH
   15 MQWIH-CODEDCHARSETID PIC S9(9) BINARY.
**    Format name of data that follows MQWIH
   15 MQWIH-FORMAT         PIC X(8).
**    Flags
   15 MQWIH-FLAGS          PIC S9(9) BINARY.
**    Service name
   15 MQWIH-SERVICENAME    PIC X(32).
**    Service step name
   15 MQWIH-SERVICESTEP    PIC X(8).
**    Message token
   15 MQWIH-MSGTOKEN       PIC X(16).
**    Reserved
   15 MQWIH-RESERVED       PIC X(32).
```

PL/I declaration for MQWIH

```
dcl
 1 MQWIH based,
  3 StrucId        char(4),       /* Structure identifier */
  3 Version        fixed bin(31), /* Structure version number */
  3 StrucLength    fixed bin(31), /* Length of MQWIH structure */
  3 Encoding       fixed bin(31), /* Numeric encoding of data that
                                     follows MQWIH */
  3 CodedCharSetId fixed bin(31), /* Character-set identifier of data
                                     that follows MQWIH */
  3 Format         char(8),       /* Format name of data that follows
                                     MQWIH */
  3 Flags          fixed bin(31), /* Flags */
  3 ServiceName    char(32),      /* Service name */
  3 ServiceStep    char(8),       /* Service step name */
  3 MsgToken       char(16),      /* Message token */
  3 Reserved       char(32);      /* Reserved */
```

High Level Assembler declaration for MQWIH

```
MQWIH                DSECT
MQWIH_STRUCID        DS   CL4   Structure identifier
MQWIH_VERSION        DS   F     Structure version number
MQWIH_STRUCLENGTH    DS   F     Length of MQWIH structure
MQWIH_ENCODING       DS   F     Numeric encoding of data that follows
*                               MQWIH
MQWIH_CODEDCHARSETID DS   F     Character-set identifier of data that
*                               follows MQWIH
MQWIH_FORMAT         DS   CL8   Format name of data that follows MQWIH
MQWIH_FLAGS          DS   F     Flags
MQWIH_SERVICENAME    DS   CL32  Service name
MQWIH_SERVICESTEP    DS   CL8   Service step name
MQWIH_MSGTOKEN       DS   XL16  Message token
MQWIH_RESERVED       DS   CL32  Reserved
*
MQWIH_LENGTH         EQU  *-MQWIH
                     ORG  MQWIH
MQWIH_AREA           DS   CL(MQWIH_LENGTH)
```

Visual Basic declaration for MQWIH

```
Type MQWIH
  StrucId        As String*4  'Structure identifier'
  Version        As Long      'Structure version number'
  StrucLength    As Long      'Length of MQWIH structure'
  Encoding       As Long      'Numeric encoding of data that follows'
                              'MQWIH'
  CodedCharSetId As Long      'Character-set identifier of data that'
                              'follows MQWIH'
  Format         As String*8  'Format name of data that follows MQWIH'
  Flags          As Long      'Flags'
  ServiceName    As String*32 'Service name'
  ServiceStep    As String*8  'Service step name'
  MsgToken       As MQBYTE16  'Message token'
  Reserved       As String*32 'Reserved'
End Type
```

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQWIH_STRUC_ID
Identifier for work information header structure.

For the C programming language, the constant MQWIH_STRUC_ID_ARRAY is also defined; this has the same value as MQWIH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQWIH_STRUC_ID.

Version (MQLONG)

This is the structure version number. The value must be:

MQWIH_VERSION_1
Version-1 work information header structure.

The following constant specifies the version number of the current version:

MQWIH_CURRENT_VERSION
Current version of work information header structure.

The initial value of this field is MQWIH_VERSION_1.

StrucLength (MQLONG)

This is the length of the MQWIH structure. The value must be:

MQWIH_LENGTH_1
Length of version-1 work information header structure.

The following constant specifies the length of the current version:

MQWIH_CURRENT_LENGTH
Length of current version of work information header structure.

The initial value of this field is MQWIH_LENGTH_1.

Encoding (MQLONG)

This specifies the numeric encoding of the data that follows the MQWIH structure; it does not apply to numeric data in the MQWIH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is 0.

CodedCharSetId (MQLONG)

This specifies the character set identifier of the data that follows the MQWIH structure; it does not apply to character data in the MQWIH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. You can use the following special value:

MQCCSI_INHERIT
Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value MQCCSI_INHERIT is not returned by the MQGET call.

MQCCSI_INHERIT cannot be used if the value of the `PutApplType` field in MQMD is MQAT_BROKER.

The initial value of this field is MQCCSI_UNDEFINED.

Format (MQCHAR8)

This specifies the format name of the data that follows the MQWIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the `Format` field in MQMD.

The length of this field is given by MQ_FORMAT_LENGTH. The initial value of this field is MQFMT_NONE.

Flags (MQLONG)

The value must be:

MQWIH_NONE
No flags.

The initial value of this field is MQWIH_NONE.

ServiceName (MQCHAR32)

This is the name of the service that is to process the message.

The length of this field is given by MQ_SERVICE_NAME_LENGTH. The initial value of this field is 32 blank characters.

ServiceStep (MQCHAR8)

This is the name of the step of *ServiceName* to which the message relates.

The length of this field is given by MQ_SERVICE_STEP_LENGTH. The initial value of this field is 8 blank characters.

MsgToken (MQBYTE16)

This is a message token that uniquely identifies the message.

For the MQPUT and MQPUT1 calls, this field is ignored. The length of this field is given by MQ_MSG_TOKEN_LENGTH. The initial value of this field is MQMTOK_NONE.

Reserved (MQCHAR32)

This is a reserved field; it must be blank.

MQXP - Exit parameter block

The MQXP structure is used as an input/output parameter to the API-crossing exit. For more information about this exit, see The API-crossing exit.

Character set and encoding

Character data in MQXP is in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute. Numeric data in MQXP is in the native machine encoding; this is given by MQENC_NATIVE.

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 537. Fields in MQXP

Field name and description	Name of constant
StrucId (structure identifier)	MQXP_STRUC_ID
Version (structure version number)	MQXP_VERSION_1
ExitId (exit identifier)	MQXT_API_CROSSING_EXIT
ExitReason (reason for invocation of exit)	None
ExitResponse (response from exit)	None
ExitCommand (API call code)	None
ExitParmCount (parameter count)	None

Table 537. Fields in MQXP (continued)	
Field name and description	**Name of constant**
Reserved (reserved)	None
ExitUserArea (user area)	None

Language declarations

C declaration for MQXP

```
typedef struct tagMQXP MQXP;
struct tagMQXP {
  MQCHAR4   StrucId;        /* Structure identifier */
  MQLONG    Version;        /* Structure version number */
  MQLONG    ExitId;         /* Exit identifier */
  MQLONG    ExitReason;     /* Reason for invocation of exit */
  MQLONG    ExitResponse;   /* Response from exit */
  MQLONG    ExitCommand;    /* API call code */
  MQLONG    ExitParmCount;  /* Parameter count */
  MQLONG    Reserved;       /* Reserved */
  MQBYTE16  ExitUserArea;   /* User area */
};
```

COBOL declaration for MQXP

```
**   MQXP structure
  10 MQXP.
**    Structure identifier
   15 MQXP-STRUCID       PIC X(4).
**    Structure version number
   15 MQXP-VERSION       PIC S9(9) BINARY.
**    Exit identifier
   15 MQXP-EXITID        PIC S9(9) BINARY.
**    Reason for invocation of exit
   15 MQXP-EXITREASON    PIC S9(9) BINARY.
**    Response from exit
   15 MQXP-EXITRESPONSE  PIC S9(9) BINARY.
**    API call code
   15 MQXP-EXITCOMMAND   PIC S9(9) BINARY.
**    Parameter count
   15 MQXP-EXITPARMCOUNT PIC S9(9) BINARY.
**    Reserved
   15 MQXP-RESERVED      PIC S9(9) BINARY.
**    User area
   15 MQXP-EXITUSERAREA  PIC X(16).
```

PL/I declaration for MQXP

```
dcl
 1 MQXP based,
  3 StrucId       char(4),       /* Structure identifier */
  3 Version       fixed bin(31), /* Structure version number */
  3 ExitId        fixed bin(31), /* Exit identifier */
  3 ExitReason    fixed bin(31), /* Reason for invocation of exit */
  3 ExitResponse  fixed bin(31), /* Response from exit */
  3 ExitCommand   fixed bin(31), /* API call code */
  3 ExitParmCount fixed bin(31), /* Parameter count */
  3 Reserved      fixed bin(31), /* Reserved */
  3 ExitUserArea  char(16);      /* User area */
```

High Level Assembler declaration for MQXP

```
MQXP                DSECT
MQXP_STRUCID        DS    CL4   Structure identifier
MQXP_VERSION        DS    F     Structure version number
MQXP_EXITID         DS    F     Exit identifier
MQXP_EXITREASON     DS    F     Reason for invocation of exit
MQXP_EXITRESPONSE   DS    F     Response from exit
```

```
MQXP_EXITCOMMAND    DS   F      API call code
MQXP_EXITPARMCOUNT  DS   F      Parameter count
MQXP_RESERVED       DS   F      Reserved
MQXP_EXITUSERAREA   DS   XL16   User area
*
MQXP_LENGTH         EQU  *-MQXP
                    ORG  MQXP
MQXP_AREA           DS   CL(MQXP_LENGTH)
```

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQXP_STRUC_ID
Identifier for exit parameter structure.

For the C programming language, the constant MQXP_STRUC_ID_ARRAY is also defined; this has the same value as MQXP_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the exit.

Version (MQLONG)

This is the structure version number. The value must be:

MQXP_VERSION_1
Version number for exit parameter-block structure.

Note: When a new version of this structure is introduced, the layout of the existing part is not changed. The exit must therefore check that the version number is equal to or greater than the lowest version that contains the fields that the exit needs to use.

This is an input field to the exit.

ExitId (MQLONG)

This is set on entry to the exit routine, and indicates the type of exit:

MQXT_API_CROSSING_EXIT
API-crossing exit for CICS.

This is an input field to the exit.

ExitReason (MQLONG)

This is set on entry to the exit routine. For the API-crossing exit it indicates whether the routine is called before or after execution of the API call:

MQXR_BEFORE
Before API execution.

MQXR_AFTER
After API execution.

This is an input field to the exit.

ExitResponse (MQLONG)

The value is set by the exit to communicate with the caller. The following values are defined:

MQXCC_OK
Exit completed successfully.

MQXCC_SUPPRESS_FUNCTION
Suppress function.

When this value is set by an API-crossing exit called *before* the API call, the API call is not performed. The *CompCode* for the call is set to MQCC_FAILED, the *Reason* is set to MQRC_SUPPRESSED_BY_EXIT, and all other parameters remain as the exit left them.

When this value is set by an API-crossing exit called *after* the API call, it is ignored by the queue manager.

MQXCC_SKIP_FUNCTION
Skip function.

When this value is set by an API-crossing exit called *before* the API call, the API call is not performed; the *CompCode* and *Reason* and all other parameters remain as the exit left them.

When this value is set by an API-crossing exit called *after* the API call, it is ignored by the queue manager.

This is an output field from the exit.

ExitCommand (MQLONG)

This field is set on entry to the exit routine. It identifies the API call that caused the exit to be invoked:

MQXC_CALLBACK
The CALLBACK call.

MQXC_MQBACK
The MQBACK call.

MQXC_MQCB
The MQCB call.

MQXC_MQCLOSE
The MQCLOSE call.

MQXC_MQCMIT
The MQCMIT call.

MQXC_MQCTL
The MQCTL call.

MQXC_MQGET
The MQGET call.

MQXC_MQINQ
The MQINQ call.

MQXC_MQOPEN
The MQOPEN call.

MQXC_MQPUT
The MQPUT call.

MQXC_MQPUT1
The MQPUT1 call.

MQXC_MQSET
The MQSET call.

MQXC_MQSTAT
The MQSTAT call.

MQXC_MQSUB
The MQSUB call.

MQXC_MQSUBRQ
The MQSUBRQ call.

This is an input field to the exit.

ExitParmCount (MQLONG)

This field is set on entry to the exit routine. It contains the number of parameters that the MQ call takes.

Table 538. Number of parameters for each MQ call

Call name	Number of parameters
MQBACK	3
MQCLOSE	5
MQCMIT	3
MQGET	9
MQINQ	10
MQOPEN	6
MQPUT	8
MQPUT1	8
MQSET	10

This is an input field to the exit.

Reserved (MQLONG)

This is a reserved field. Its value is not significant to the exit.

ExitUserArea (MQBYTE16)

This is a field that is available for the exit to use. It is initialized to binary zero for the length of the field before the first invocation of the exit for the task, and thereafter any changes made to this field by the exit are preserved across invocations of the exit. The following value is defined:

MQXUA_NONE
No user information.

The value is binary zero for the length of the field.

For the C programming language, the constant MQXUA_NONE_ARRAY is also defined; this has the same value as MQXUA_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_EXIT_USER_AREA_LENGTH. This is an input/output field to the exit.

MQXQH - Transmission-queue header

The MQXQH structure describes the information that is prefixed to the application message data of messages when they are on transmission queues. A transmission queue is a special type of local queue that temporarily holds messages destined for remote queues (that is, destined for queues that do not belong to the local queue manager). A transmission queue is denoted by the **Usage** queue attribute having the value MQUS_TRANSMISSION.

Format name

MQFMT_XMIT_Q_HEADER

Character set and encoding

Data in MQXQH must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by MQENC_NATIVE.

Set the character set and encoding of the MQXQH into the *CodedCharSetId* and *Encoding* fields in:

- The separate MQMD (if the MQXQH structure is at the start of the message data), or
- The header structure that precedes the MQXQH structure (all other cases).

Fields

Note: In the following table, the fields are grouped by usage rather than alphabetically. The child topics follow the same sequence.

Table 539. Fields in MQXQH for MQXQH

Field name and description	Name of constant	Initial value (if any) of constant
StrucId (structure identifier)	MQXQH_STRUC_ID	'XQH¬'
Version (structure version number)	MQXQH_VERSION_1	1
RemoteQName (name of destination queue)	None	Null string or blanks
RemoteQMgrName (name of destination queue manager)	None	Null string or blanks
MsgDesc (original message descriptor)	Same names and values as MQMD; see Table 500 on page 415	-

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.
3. In the C programming language, the macro variable MQXQH_DEFAULT contains the values that are listed in the table. Use it in the following way to provide initial values for the fields in the structure:

```
MQXQH MyXQH = {MQXQH_DEFAULT};
```

Language declarations

C declaration for MQXQH

```
typedef struct tagMQXQH MQXQH;
struct tagMQXQH {
  MQCHAR4   StrucId;         /* Structure identifier */
  MQLONG    Version;         /* Structure version number */
  MQCHAR48  RemoteQName;     /* Name of destination queue */
  MQCHAR48  RemoteQMgrName;  /* Name of destination queue manager */
  MQMD1     MsgDesc;         /* Original message descriptor */
};
```

COBOL declaration for MQXQH

```
**   MQXQH structure
  10 MQXQH.
**    Structure identifier
   15 MQXQH-STRUCID                  PIC X(4).
**    Structure version number
   15 MQXQH-VERSION                  PIC S9(9) BINARY.
**    Name of destination queue
   15 MQXQH-REMOTEQNAME              PIC X(48).
**    Name of destination queue manager
   15 MQXQH-REMOTEQMGRNAME           PIC X(48).
**    Original message descriptor
   15 MQXQH-MSGDESC.
**     Structure identifier
    20 MQXQH-MSGDESC-STRUCID          PIC X(4).
**     Structure version number
    20 MQXQH-MSGDESC-VERSION          PIC S9(9) BINARY.
**     Report options
```

```
     20 MQXQH-MSGDESC-REPORT           PIC S9(9) BINARY.
**      Message type
     20 MQXQH-MSGDESC-MSGTYPE          PIC S9(9) BINARY.
**      Expiry time
     20 MQXQH-MSGDESC-EXPIRY           PIC S9(9) BINARY.
**      Feedback or reason code
     20 MQXQH-MSGDESC-FEEDBACK         PIC S9(9) BINARY.
**      Numeric encoding of message data
     20 MQXQH-MSGDESC-ENCODING         PIC S9(9) BINARY.
**      Character set identifier of message data
     20 MQXQH-MSGDESC-CODEDCHARSETID   PIC S9(9) BINARY.
**      Format name of message data
     20 MQXQH-MSGDESC-FORMAT           PIC X(8).
**      Message priority
     20 MQXQH-MSGDESC-PRIORITY         PIC S9(9) BINARY.
**      Message persistence
     20 MQXQH-MSGDESC-PERSISTENCE      PIC S9(9) BINARY.
**      Message identifier
     20 MQXQH-MSGDESC-MSGID            PIC X(24).
**      Correlation identifier
     20 MQXQH-MSGDESC-CORRELID         PIC X(24).
**      Backout counter
     20 MQXQH-MSGDESC-BACKOUTCOUNT     PIC S9(9) BINARY.
**      Name of reply-to queue
     20 MQXQH-MSGDESC-REPLYTOQ         PIC X(48).
**      Name of reply queue manager
     20 MQXQH-MSGDESC-REPLYTOQMGR      PIC X(48).
**      User identifier
     20 MQXQH-MSGDESC-USERIDENTIFIER   PIC X(12).
**      Accounting token
     20 MQXQH-MSGDESC-ACCOUNTINGTOKEN  PIC X(32).
**      Application data relating to identity
     20 MQXQH-MSGDESC-APPLIDENTITYDATA PIC X(32).
**      Type of application that put the message
     20 MQXQH-MSGDESC-PUTAPPLTYPE      PIC S9(9) BINARY.
**      Name of application that put the message
     20 MQXQH-MSGDESC-PUTAPPLNAME      PIC X(28).
**      Date when message was put
     20 MQXQH-MSGDESC-PUTDATE          PIC X(8).
**      Time when message was put
     20 MQXQH-MSGDESC-PUTTIME          PIC X(8).
**      Application data relating to origin
     20 MQXQH-MSGDESC-APPLORIGINDATA   PIC X(4).
```

PL/I declaration for MQXQH

```
dcl
 1 MQXQH based,
  3 StrucId           char(4),       /* Structure identifier */
  3 Version           fixed bin(31), /* Structure version number */
  3 RemoteQName       char(48),      /* Name of destination queue */
  3 RemoteQMgrName    char(48),      /* Name of destination queue
                                        manager */
  3 MsgDesc,                         /* Original message descriptor */
   5 StrucId          char(4),       /* Structure identifier */
   5 Version          fixed bin(31), /* Structure version number */
   5 Report           fixed bin(31), /* Report options */
   5 MsgType          fixed bin(31), /* Message type */
   5 Expiry           fixed bin(31), /* Expiry time */
   5 Feedback         fixed bin(31), /* Feedback or reason code */
   5 Encoding         fixed bin(31), /* Numeric encoding of message
                                        data */
   5 CodedCharSetId   fixed bin(31), /* Character set identifier of
                                        message data */
   5 Format           char(8),       /* Format name of message data */
   5 Priority         fixed bin(31), /* Message priority */
   5 Persistence      fixed bin(31), /* Message persistence */
   5 MsgId            char(24),      /* Message identifier */
   5 CorrelId         char(24),      /* Correlation identifier */
   5 BackoutCount     fixed bin(31), /* Backout counter */
   5 ReplyToQ         char(48),      /* Name of reply-to queue */
   5 ReplyToQMgr      char(48),      /* Name of reply queue manager */
   5 UserIdentifier   char(12),      /* User identifier */
   5 AccountingToken  char(32),      /* Accounting token */
   5 ApplIdentityData char(32),      /* Application data relating to
                                        identity */
   5 PutApplType      fixed bin(31), /* Type of application that put the
                                        message */
   5 PutApplName      char(28),      /* Name of application that put the
```

```
                                    message */
   5 PutDate          char(8),       /* Date when message was put */
   5 PutTime          char(8),       /* Time when message was put */
   5 ApplOriginData   char(4);       /* Application data relating to
                                        origin */
```

High Level Assembler declaration for MQXQH

```
MQXQH                           DSECT
MQXQH_STRUCID                   DS   CL4   Structure identifier
MQXQH_VERSION                   DS   F     Structure version number
MQXQH_REMOTEQNAME               DS   CL48  Name of destination queue
MQXQH_REMOTEQMGRNAME            DS   CL48  Name of destination queue
*                                          manager
MQXQH_MSGDESC                   DS   0F    Force fullword alignment
MQXQH_MSGDESC_STRUCID           DS   CL4   Structure identifier
MQXQH_MSGDESC_VERSION           DS   F     Structure version number
MQXQH_MSGDESC_REPORT            DS   F     Report options
MQXQH_MSGDESC_MSGTYPE           DS   F     Message type
MQXQH_MSGDESC_EXPIRY            DS   F     Expiry time
MQXQH_MSGDESC_FEEDBACK          DS   F     Feedback or reason code
MQXQH_MSGDESC_ENCODING          DS   F     Numeric encoding of message
*                                          data
MQXQH_MSGDESC_CODEDCHARSETID    DS   F     Character set identifier of
*                                          message data
MQXQH_MSGDESC_FORMAT            DS   CL8   Format name of message data
MQXQH_MSGDESC_PRIORITY          DS   F     Message priority
MQXQH_MSGDESC_PERSISTENCE       DS   F     Message persistence
MQXQH_MSGDESC_MSGID             DS   XL24  Message identifier
MQXQH_MSGDESC_CORRELID          DS   XL24  Correlation identifier
MQXQH_MSGDESC_BACKOUTCOUNT      DS   F     Backout counter
MQXQH_MSGDESC_REPLYTOQ          DS   CL48  Name of reply-to queue
MQXQH_MSGDESC_REPLYTOQMGR       DS   CL48  Name of reply queue manager
MQXQH_MSGDESC_USERIDENTIFIER    DS   CL12  User identifier
MQXQH_MSGDESC_ACCOUNTINGTOKEN   DS   XL32  Accounting token
MQXQH_MSGDESC_APPLIDENTITYDATA  DS   CL32  Application data relating to
*                                          identity
MQXQH_MSGDESC_PUTAPPLTYPE       DS   F     Type of application that put
*                                          the message
MQXQH_MSGDESC_PUTAPPLNAME       DS   CL28  Name of application that put
*                                          the message
MQXQH_MSGDESC_PUTDATE           DS   CL8   Date when message was put
MQXQH_MSGDESC_PUTTIME           DS   CL8   Time when message was put
MQXQH_MSGDESC_APPLORIGINDATA    DS   CL4   Application data relating to
*                                          origin
MQXQH_MSGDESC_LENGTH            EQU  *-MQXQH_MSGDESC
                                ORG  MQXQH_MSGDESC
MQXQH_MSGDESC_AREA              DS   CL(MQXQH_MSGDESC_LENGTH)
*
MQXQH_LENGTH                    EQU  *-MQXQH
                                ORG  MQXQH
MQXQH_AREA                      DS   CL(MQXQH_LENGTH)
```

Visual Basic declaration for MQXQH

```
Type MQXQH
  StrucId        As String*4  'Structure identifier'
  Version        As Long      'Structure version number'
  RemoteQName    As String*48 'Name of destination queue'
  RemoteQMgrName As String*48 'Name of destination queue manager'
  MsgDesc        As MQMD1     'Original message descriptor'
End Type
```

Fields in the separate message descriptor

A message that is on a transmission queue has *two* message descriptors:

- One message descriptor is stored separately from the message data; this is called the *separate message descriptor*, and is generated by the queue manager when the message is placed on the transmission queue. Some of the fields in the separate message descriptor are copied from the message descriptor provided by the application on the MQPUT or MQPUT1 call.

The separate message descriptor is the one that is returned to the application in the **MsgDesc** parameter of the MQGET call when the message is removed from the transmission queue.

- A second message descriptor is stored within the MQXQH structure as part of the message data; this is called the *embedded message descriptor*, and is a copy of the message descriptor that was provided by the application on the MQPUT or MQPUT1 call (with minor variations).

  The embedded message descriptor is always a version-1 MQMD. If the message put by the application has nondefault values for one or more of the version-2 fields in the MQMD, an MQMDE structure follows the MQXQH, and is in turn followed by the application message data (if any). The MQMDE is either:

  – Generated by the queue manager (if the application uses a version-2 MQMD to put the message), or
  – Already present at the start of the application message data (if the application uses a version-1 MQMD to put the message).

  The embedded message descriptor is the one that is returned to the application in the **MsgDesc** parameter of the MQGET call when the message is removed from the final destination queue.

The fields in the separate message descriptor are set by the queue manager as shown. If the queue manager does not support the version-2 MQMD, a version-1 MQMD is used without loss of function.

Table 540. Values used for fields in the separate MQMD

Field in separate MQMD	Value used
StrucId	MQMD_STRUC_ID
Version	MQMD_VERSION_2
Report	Copied from the embedded message descriptor, but with the bits identified by MQRO_ACCEPT_UNSUP_IF_XMIT_MASK set to zero. (This prevents a COA or COD report message being generated when a message is placed on or removed from a transmission queue.)
MsgType	Copied from the embedded message descriptor.
Expiry	Copied from the embedded message descriptor.
Feedback	Copied from the embedded message descriptor.
Encoding	MQENC_NATIVE (see note)
CodedCharSetId	Queue manager's **CodedCharSetId** attribute.
Format	MQFMT_XMIT_Q_HEADER
Priority	Copied from the embedded message descriptor.
Persistence	Copied from the embedded message descriptor.
MsgId	A new value is generated by the queue manager. This message identifier is different from the *MsgId* that the queue manager may have generated for the embedded message descriptor described previously.
CorrelId	The *MsgId* from the embedded message descriptor. For messages being put to the SYSTEM.CLUSTER.TRANSMIT.QUEUE, *CorrelId* is reserved for internal use.
BackoutCount	0
ReplyToQ	Copied from the embedded message descriptor.
ReplyToQMgr	Copied from the embedded message descriptor.
UserIdentifier	Copied from the embedded message descriptor.
AccountingToken	Copied from the embedded message descriptor. For messages being put to the SYSTEM.CLUSTER.TRANSMIT.QUEUE, *AccountingToken* is reserved for internal use.

Table 540. Values used for fields in the separate MQMD (continued)

Field in separate MQMD	Value used
ApplIdentityData	Copied from the embedded message descriptor.
PutApplType	MQAT_QMGR
PutApplName	First 28 bytes of the queue manager name.
PutDate	Date when message was put on transmission queue.
PutTime	Time when message was put on transmission queue.
ApplOriginData	Blanks
GroupId	MQGI_NONE
MsgSeqNumber	1
Offset	0
MsgFlags	MQMF_NONE
OriginalLength	MQOL_UNDEFINED

- On Windows, the value of MQENC_NATIVE for Micro Focus COBOL differs from the value for C. The value in the *Encoding* field in the separate message descriptor is always the value for C in these environments; this value is 546 in decimal. Also, the integer fields in the MQXQH structure are in the encoding that corresponds to this value (the native Intel encoding).

Fields in the embedded message descriptor

The fields in the embedded message descriptor have the same values as those in the **MsgDesc** parameter of the MQPUT or MQPUT1 call, except for the following:

- The *Version* field always has the value MQMD_VERSION_1.
- If the *Priority* field has the value MQPRI_PRIORITY_AS_Q_DEF, it is replaced by the value of the queue's **DefPriority** attribute.
- If the *Persistence* field has the value MQPER_PERSISTENCE_AS_Q_DEF, it is replaced by the value of the queue's **DefPersistence** attribute.
- If the *MsgId* field has the value MQMI_NONE, or the MQPMO_NEW_MSG_ID option was specified, or the message is a distribution-list message, *MsgId* is replaced by a new message identifier generated by the queue manager.

  When a distribution-list message is split into smaller distribution-list messages placed on different transmission queues, the *MsgId* field in each of the new embedded message descriptors is the same as that in the original distribution-list message.
- If the MQPMO_NEW_CORREL_ID option was specified, *CorrelId* is replaced by a new correlation identifier generated by the queue manager.
- The context fields are set as indicated by the MQPMO_*_CONTEXT options specified in the **PutMsgOpts** parameter; the context fields are:
  - *AccountingToken*
  - *ApplIdentityData*
  - *ApplOriginData*
  - *PutApplName*
  - *PutApplType*
  - *PutDate*
  - *PutTime*
  - *UserIdentifier*

- The version-2 fields (if they were present) are removed from the MQMD, and moved into an MQMDE structure, if one or more of the version-2 fields has a nondefault value.

Putting messages on remote queues

When an application puts a message on a remote queue (either by specifying the name of the remote queue directly, or by using a local definition of the remote queue), the local queue manager:

- Creates an MQXQH structure containing the embedded message descriptor
- Appends an MQMDE if one is needed and is not already present
- Appends the application message data
- Places the message on an appropriate transmission queue

Putting messages directly on transmission queues

An application can also put a message directly on a transmission queue. In this case the application must prefix the application message data with an MQXQH structure, and initialize the fields with appropriate values. In addition, the *Format* field in the **MsgDesc** parameter of the MQPUT or MQPUT1 call must have the value MQFMT_XMIT_Q_HEADER.

Character data in the MQXQH structure created by the application must be in the character set of the local queue manager (defined by the **CodedCharSetId** queue manager attribute), and integer data must be in the native machine encoding. In addition, character data in the MQXQH structure must be padded with blanks to the defined length of the field; the data must not be ended prematurely by using a null character, because the queue manager does not convert the null and subsequent characters to blanks in the MQXQH structure.

However, the queue manager does not check that an MQXQH structure is present, or that valid values have been specified for the fields.

Applications should not put their messages directly to the SYSTEM.CLUSTER.TRANSMIT.QUEUE.

Getting messages from transmission queues

Applications that get messages from a transmission queue must process the information in the MQXQH structure in an appropriate fashion. The presence of the MQXQH structure at the beginning of the application message data is indicated by the value MQFMT_XMIT_Q_HEADER being returned in the *Format* field in the **MsgDesc** parameter of the MQGET call. The values returned in the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter indicate the character set and encoding of the character and integer data in the MQXQH structure. The character set and encoding of the application message data are defined by the *CodedCharSetId* and *Encoding* fields in the embedded message descriptor.

StrucId (MQCHAR4)

This is the structure identifier. The value must be:

MQXQH_STRUC_ID
Identifier for transmission-queue header structure.

For the C programming language, the constant MQXQH_STRUC_ID_ARRAY is also defined; this has the same value as MQXQH_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQXQH_STRUC_ID.

Version (MQLONG)

This is the structure version number. The value must be:

MQXQH_VERSION_1
Version number for transmission-queue header structure.

The following constant specifies the version number of the current version:

MQXQH_CURRENT_VERSION
Current version of transmission-queue header structure.

The initial value of this field is MQXQH_VERSION_1.

RemoteQName (MQCHAR48)

This is the name of the message queue that is the apparent eventual destination for the message (this might prove not to be the eventual destination if, for example, this queue is defined at *RemoteQMgrName* to be a local definition of another remote queue).

If the message is a distribution-list message (that is, the *Format* field in the embedded message descriptor is MQFMT_DIST_HEADER), *RemoteQName* is blank.

The length of this field is given by MQ_Q_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

RemoteQMgrName (MQCHAR48)

This is the name of the queue manager or queue sharing group that owns the queue that is the apparent eventual destination for the message.

If the message is a distribution-list message, *RemoteQMgrName* is blank.

The length of this field is given by MQ_Q_MGR_NAME_LENGTH. The initial value of this field is the null string in C, and 48 blank characters in other programming languages.

MsgDesc (MQMD1)

This is the embedded message descriptor, and is a close copy of the message descriptor MQMD that was specified as the **MsgDesc** parameter on the MQPUT or MQPUT1 call when the message was originally put to the remote queue.

Note: This is a version-1 MQMD.

The initial values of the fields in this structure are the same as those in the MQMD structure.

Function calls

This section gives information on all of the MQI calls that are possible. Descriptions, syntax, parameter information, usage notes, and language invocations for each possible language are given for each of the different calls.

Related reference

z/OS Examples of CEDF output from MQI calls

Call descriptions

This section describes MQI calls.

- “MQBACK - Back out changes” on page 618
- “MQBEGIN - Begin unit of work” on page 621
- “MQBUFMH - Convert buffer into message handle” on page 625
- “MQCB - Manage callback” on page 628
- “MQCB_FUNCTION - Callback function” on page 638
- “MQCLOSE - Close object” on page 639
- “MQCMIT - Commit changes” on page 647
- “MQCONN - Connect queue manager” on page 651
- “MQCONNX - Connect queue manager (extended)” on page 658

- “MQCRTMH - Create message handle” on page 664
- “MQCTL - Control callbacks” on page 667
- “MQDISC - Disconnect queue manager” on page 673
- “MQDLTMH - Delete message handle” on page 677
- “MQDLTMP - Delete message property” on page 679
- “MQGET - Get message” on page 682
- “MQINQ - Inquire object attributes” on page 694
- “MQINQMP - Inquire message property” on page 711
- “MQMHBUF - Convert message handle into buffer” on page 716
- “MQOPEN - Open object” on page 720
- “MQPUT - Put message” on page 738
- “MQPUT1 - Put one message” on page 751
- “MQSET - Set object attributes” on page 762
- “MQSETMP - Set message property” on page 768
- “MQSTAT - Retrieve status information” on page 772
- “MQMHBUF - Convert message handle into buffer” on page 716
- “MQSUB - Register subscription” on page 776
- “MQSUBRQ - Subscription request” on page 783

Online help on the UNIX platform, in the form of *man* pages, is available for these calls.

Note: The calls associated with data conversion, MQXCNVC and MQ_DATA_CONV_EXIT, are in “Data-conversion exit” on page 894.

Conventions used in the call descriptions

For each call, this collection of topics gives a description of the parameters and usage of the call in a format that is independent of programming language. This is followed by typical invocations of the call, and typical declarations of its parameters, in each of the supported programming languages.

Important: When coding IBM MQ API calls you must ensure that all relevant parameters (as described in the following sections) are provided. Failure to do so can produce unpredictable results.

The description of each call contains the following sections:

Call name
: The call name, followed by a brief description of the purpose of the call.

Parameters
: For each parameter, the name is followed by its data type in parentheses ( ) and one of the following:

  input
  : You supply information in the parameter when you make the call.

  output
  : The queue manager returns information in the parameter when the call completes or fails.

  input/output
  : You supply information in the parameter when you make the call, and the queue manager changes the information when the call completes or fails.

  For example:

  `Compcode` (MQLONG) - output

  In some cases, the data type is a structure. In all cases, there is more information about the data type or structure in “Elementary data types” on page 234.

The last two parameters in each call are a completion code and a reason code. The completion code indicates whether the call completed successfully, partially, or not at all. Further information about the partial success or the failure of the call is given in the reason code. For more information about each completion and reason code, see "Return codes" on page 861.

Usage notes
Additional information about the call, describing how to use it and any restrictions on its use.

Assembler language invocation
Typical invocation of the call, and declaration of its parameters, in assembler language.

C invocation
Typical invocation of the call, and declaration of its parameters, in C.

COBOL invocation
Typical invocation of the call, and declaration of its parameters, in COBOL.

PL/I invocation
Typical invocation of the call, and declaration of its parameters, in PL/I.

All parameters are passed by reference.

Visual Basic invocation
Typical invocation of the call, and declaration of its parameters, in Visual Basic.

Other notation conventions are:

Constants
Names of constants are shown in uppercase; for example, MQOO_OUTPUT. A set of constants having the same prefix is shown as follows: MQIA_*. See "Constants" on page 61 for the value of a constant.

Arrays
In some calls, parameters are arrays of character strings that do not have fixed sizes. In the descriptions of these parameters, a lowercase n represents a numeric constant. When you code the declaration for that parameter, replace the n with the numeric value that you require.

Using the calls in the C language

Parameters that are *input only* and of type MQHCONN, MQHOBJ, MQHMSG, or MQLONG are passed by value. For all other parameters, the *address* of the parameter is passed by value.

You do not need to specify all parameters that are passed by address every time that you invoke a function. Where you do not need a particular parameter, specify a null pointer as the parameter on the function invocation, in place of the address of parameter data. Parameters for which this is possible are identified in the call descriptions.

No parameter is returned as the value of the call; in C terminology, this means that all calls return `void`.

Declaring the Buffer parameter

The **MQGET**, **MQPUT**, and **MQPUT1** calls each have one parameter that has an undefined data type: the *Buffer* parameter. Use this parameter to send and receive the application's message data.

Parameters of this sort are shown in the C examples as arrays of MQBYTE. You can declare the parameters in this way, but it is usually more convenient to declare them as the particular structure that describes the layout of the data in the message. The function prototype declares the parameter as a pointer-to-void, so that you can specify the address of any sort of data as the parameter on the call invocation.

Pointer-to-void is a pointer to data of undefined format. It is defined as:

```
typedef void *PMQVOID;
```

MQBACK - Back out changes

The MQBACK call indicates to the queue manager that all the message gets and puts that have occurred since the last sync point are to be backed out.

Messages put as part of a unit of work are deleted; messages retrieved as part of a unit of work are reinstated on the queue.

- On z/OS, this call is used only by batch programs (including IMS batch DL/I programs).

Syntax

`MQBACK` (*Hconn*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

Compcode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason

Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_OUTCOME_PENDING
(2124, X'84C') Result of back-out operation is pending.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_ENVIRONMENT_ERROR
(2012, X'7DC') Call not valid in environment.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OUTCOME_MIXED
(2123, X'84B') Result of commit or back-out operation is mixed.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes

Usage notes

1. You can use this call only when the queue manager itself coordinates the unit of work. This can be:
   - A local unit of work, where the changes affect only MQ resources.
   - A global unit of work, where the changes can affect resources belonging to other resource managers, as well as affecting MQ resources.

   For further details about local and global units of work, see "MQBEGIN - Begin unit of work" on page 621.
2. In environments where the queue manager does not coordinate the unit of work, use the appropriate back-out call instead of MQBACK. The environment might also support an implicit back out caused by the application terminating abnormally.
   - On z/OS, use the following calls:
     - Batch programs (including IMS batch DL/I programs) can use the MQBACK call if the unit of work affects only MQ resources. However, if the unit of work affects both MQ resources and resources belonging to other resource managers (for example, Db2), use the SRRBACK call provided by the z/OS Recoverable Resource Service (RRS). The SRRBACK call backs out changes to resources belonging to the resource managers that have been enabled for RRS coordination.
     - CICS applications must use the `EXEC CICS SYNCPOINT ROLLBACK` command to back out the unit of work. Do not use the MQBACK call for CICS applications.
     - IMS applications (other than batch DL/I programs) must use IMS calls such as `ROLB` to back out the unit of work. Do not use the MQBACK call for IMS applications (other than batch DL/I programs).
   - On IBM i, use this call for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the `STRCMTCTL` command with the **`CMTSCOPE(*JOB)`** parameter must not have been issued for the job.
3. If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in "MQDISC - Disconnect queue manager" on page 673 for further details.
4. When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful

MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:

- The values of the *GroupId*, *MsgSeqNumber*, *Offset*, and *MsgFlags* fields in MQMD.
- Whether the message is part of a unit of work.
- For the MQPUT call: whether the message is persistent or nonpersistent.

The queue manager keeps *three* sets of group and segment information, one set for each of the following:

- The last successful MQPUT call (this can be part of a unit of work).
- The last successful MQGET call that removed a message from the queue (this can be part of a unit of work).
- The last successful MQGET call that browsed a message on the queue (this cannot be part of a unit of work).

5. The information associated with the MQGET call is restored to the value that it had before the first successful MQGET call for that queue handle in the current unit of work.

   Queues that were updated by the application after the unit of work started, but outside the scope of the unit of work, do not have their group and segment information restored if the unit of work is backed out.

   Restoring the group and segment information to its previous value when a unit of work is backed out allows the application to spread a large message group or large logical message consisting of many segments across several units of work, and to restart at the correct point in the message group or logical message if one of the units of work fails.

   Using several units of work might be advantageous if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to be able to restart putting or getting messages at the correct point if a system failure occurs.

   For details of how to restart at the correct point after a system failure, see the MQPMO_LOGICAL_ORDER option described in "MQPMO - Put message options" on page 491, and the MQGMO_LOGICAL_ORDER option described in "MQGMO - Get-message options" on page 360.

   The remaining usage notes apply only when the queue manager coordinates the units of work.

6. A unit of work has the same scope as a connection handle. All MQ calls that affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See the **Hconn** parameter described in "MQCONN - Connect queue manager" on page 651 for information about the scope of connection handles.
7. Only messages that were put or retrieved as part of the current unit of work are affected by this call.
8. A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but that never issues a commit or backout call, can fill queues with messages that are not available to other applications. To guard against this possibility, the administrator must set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

C invocation

```
MQBACK (Hconn, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQBACK' USING HCONN, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQBACK (Hconn, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn     fixed bin(31);  /* Connection handle */
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQBACK,(HCONN,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS  F  Connection handle
COMPCODE  DS  F  Completion code
REASON    DS  F  Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQBACK Hconn, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn    As Long 'Connection handle'
Dim CompCode As Long 'Completion code'
Dim Reason   As Long 'Reason code qualifying CompCode'
```

MQBEGIN - Begin unit of work

The MQBEGIN call begins a unit of work that is coordinated by the queue manager, and that can involve external resource managers.

Syntax

`MQBEGIN` (*Hconn*, *BeginOptions*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

Hconn must be a nonshared connection handle. If a shared connection handle is specified, the call fails with reason code MQRC_HCONN_ERROR. See the description of the MQCNO_HANDLE_SHARE_* options in "MQCNO - Connect options" on page 311 for more information about shared and nonshared handles.

BeginOptions

Type: MQBO - input/output

These are options that control the action of MQBEGIN, as described in "MQBO - Begin options" on page 273.

If no options are required, programs written in C or S/390 assembler can specify a null parameter address, instead of specifying the address of an MQBO structure.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason

Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_NO_EXTERNAL_PARTICIPANTS
(2121, X'849') No participating resource managers registered.

MQRC_PARTICIPANT_NOT_AVAILABLE
(2122, X'84A') Participating resource manager not available.

If *CompCode* is MQCC_FAILED:

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_BO_ERROR
(2134, X'856') Begin-options structure not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_ENVIRONMENT_ERROR
(2012, X'7DC') Call not valid in environment.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UOW_IN_PROGRESS
(2128, X'850') Unit of work already started.

For more information about these reason codes, see Messages and reason codes.

Usage notes

1. Use the MQBEGIN call to start a unit of work that is coordinated by the queue manager and that might involve changes to resources owned by other resource managers. The queue manager supports three types of unit-of-work:
   - **Queue manager-coordinated local unit of work**: A unit of work in which the queue manager is the only resource manager participating, and so the queue manager acts as the unit-of-work coordinator.
     - To start this type of unit of work, specify the MQPMO_SYNCPOINT or MQGMO_SYNCPOINT option on the first MQPUT, MQPUT1, or MQGET call in the unit of work.
     - To commit or back out this type of unit of work, use the MQCMIT or MQBACK call.
   - **Queue manager-coordinated global unit of work**: A unit of work in which the queue manager acts as the unit-of-work coordinator, both for MQ resources *and* for resources belonging to other resource managers. Those resource managers cooperate with the queue manager to ensure that all changes to resources in the unit of work are committed or backed out together.
     - To start this type of unit of work, use the MQBEGIN call.
     - To commit or back out this type of unit of work, use the MQCMIT and MQBACK calls.
   - **Externally-coordinated global unit of work**: A unit of work in which the queue manager is a participant, but the queue manager does not act as the unit-of-work coordinator. Instead, there is an external unit-of-work coordinator with which the queue manager cooperates.
     - To start this type of unit of work, use the relevant call provided by the external unit-of-work coordinator.

       If the MQBEGIN call is used to try to start the unit of work, the call fails with reason code MQRC_ENVIRONMENT_ERROR.
     - To commit or back out this type of unit of work, use the commit and back-out calls provided by the external unit-of-work coordinator.

       If you use the MQCMIT or MQBACK call to commit or back out the unit of work, the call fails with reason code MQRC_ENVIRONMENT_ERROR.
2. If the application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in “MQDISC - Disconnect queue manager” on page 673 for further details.
3. An application can participate in only one unit of work at a time. The MQBEGIN call fails with reason code MQRC_UOW_IN_PROGRESS if there is already a unit of work in existence for the application, regardless of which type of unit of work it is.

4. The MQBEGIN call is not valid in an MQ MQI client environment. An attempt to use the call fails with reason code MQRC_ENVIRONMENT_ERROR.
5. When the queue manager is acting as the unit-of-work coordinator for global units of work, the resource managers that can participate in the unit of work are defined in the queue manager configuration file.
6. On IBM i, the three types of unit of work are supported as follows:
   - **Queue manager-coordinated local unit of work** can be used only when a commitment definition does not exist at the job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must not have been issued for the job.
   - **Queue manager-coordinated global unit of work** is not supported.
   - **Externally-coordinated global unit of work** can be used only when a commitment definition exists at job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must have been issued for the job. If this has been done, the IBM i COMMIT and ROLLBACK operations apply to MQ resources as well as to resources belonging to other participating resource managers.

C invocation

```
MQBEGIN (Hconn, &BeginOptions, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQBO     BeginOptions;  /* Options that control the action of MQBEGIN */
MQLONG   CompCode;      /* Completion code */
MQLONG   Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQBEGIN' USING HCONN, BEGINOPTIONS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Options that control the action of MQBEGIN
 01  BEGINOPTIONS.
     COPY CMQBOV.
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQBEGIN (Hconn, BeginOptions, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn         fixed bin(31);  /* Connection handle */
dcl BeginOptions  like MQBO;      /* Options that control the action of
                                     MQBEGIN */
dcl CompCode      fixed bin(31);  /* Completion code */
dcl Reason        fixed bin(31);  /* Reason code qualifying CompCode */
```

Visual Basic invocation

```
MQBEGIN Hconn, BeginOptions, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn        As Long 'Connection handle'
Dim BeginOptions As MQBO 'Options that control the action of MQBEGIN'
Dim CompCode     As Long 'Completion code'
Dim Reason       As Long 'Reason code qualifying CompCode'
```

MQBUFMH - Convert buffer into message handle

The MQBUFMH function call converts a buffer into a message handle and is the inverse of the MQMHBUF call.

This call takes a message descriptor and MQRFH2 properties in the buffer and makes them available through a message handle. The MQRFH2 properties in the message data are, optionally, removed. The *Encoding*, *CodedCharSetId*, and *Format* fields of the message descriptor are updated, if necessary, to correctly describe the contents of the buffer after the properties have been removed.

Syntax

MQBUFMH (*Hconn*, *Hmsg*, *BufMsgHOpts*, *MsgDesc*, *BufferLength*, *Buffer*, *DataLength*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of **Hconn** must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created using MQHC_UNASSOCIATED_HCONN, a valid connection must be established on the thread converting a buffer into a message handle. If a valid connection is not established, the call fails with MQRC_CONNECTION_BROKEN.

Hmsg

Type: MQHMQSG - input

This is the message handle for which a buffer is required. The value was returned by a previous MQCRTMH call.

BufMsgHOpts

Type: MQBMHO - input

The MQBMHO structure allows applications to specify options that control how message handles are produced from buffers.

See "MQBMHO - Buffer to message handle options" on page 271 for details.

MsgDesc

Type: MQMD - input/output

The *MsgDesc* structure contains the message descriptor properties and describes the contents of the buffer area.

On output from the call, the properties are optionally removed from the buffer area and, in this case, the message descriptor is updated to correctly describe the buffer area.

Data in this structure must be in the character set and encoding of the application.

BufferLength

Type: MQLONG - input

BufferLength is the length of the Buffer area, in bytes.

A *BufferLength* of zero bytes is valid, and indicates that the buffer area contains no data.

Buffer
Type: MQBYTExBufferLength - input/output

These are options that control the action of MQBEGIN, as described in "MQBEGIN - Begin unit of work" on page 621.

Buffer defines the area containing the message buffer. For most data, you should align the buffer on a 4-byte boundary.

If **Buffer** contains character or numeric data, set the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter to the values appropriate to the data; this enables the data to be converted, if necessary.

If properties are found in the message buffer they are optionally removed; they later become available from the message handle on return from the call.

In the C programming language, the parameter is declared as a pointer-to-void, which means the address of any type of data can be specified as the parameter.

If the **BufferLength** parameter is zero, **Buffer** is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler can be null.

DataLength
Type: MQLONG - output

The length, in bytes, of the buffer which might have the properties removed.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BMHO_ERROR
(2489, X'09B9') Buffer to message handle options structure not valid.

MQRC_BUFFER_ERROR
(2004, X'07D4') Buffer parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'07D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CONNECTION_BROKEN
(2009, X'07D9') Connection to queue manager lost.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle not valid.

MQRC_MD_ERROR
(2026, X'07EA') Message descriptor not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_RFH_ERROR
(2334, X'091E') MQRFH2 structure not valid.

MQRC_RFH_FORMAT_ERROR
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

MQBUFMH calls cannot be intercepted by API exits - a buffer is converted into a message handle in the application space; the call does not reach the queue manager.

C invocation

```
MQBUFMH (Hconn, Hmsg, &BufMsgHOpts, &MsgDesc, BufferLength, Buffer,
         &DataLength, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN Hconn;        /* Connection handle */
MQHMSG  Hmsg;         /* Message handle */
MQBMHO  BufMsgHOpts;  /* Options that control the action of MQBUFMH */
MQMD    MsgDesc;      /* Message descriptor */
MQLONG  BufferLength; /* Length in bytes of the Buffer area */
MQBYTE  Buffer[n];    /* Area to contain the message buffer */
MQLONG  DataLength;   /* Length of the output buffer */
MQLONG  CompCode;     /* Completion code */
MQLONG  Reason;       /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQBUFMH' USING HCONN, HMSG, BUFMSGHOPTS, MSGDESC, BUFFERLENGTH,
                          BUFFER, DATALENGTH, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Message handle
 01  HMSG          PIC S9(18) BINARY.
**   Options that control the action of MQBUFMH
 01  BUFMSGHOPTS.
     COPY CMQBMHOV.
**   Message descriptor
```

```
 01  MSGDESC.
     COPY CMQMD.
**   Length in bytes of the Buffer area
 01  BUFFERLENGTH  PIC S9(9) BINARY.
**   Area to contain the message buffer
 01  BUFFER        PIC X(n).
**   Length of the output buffer
 01  DATALENGTH    PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQBUFMH (Hconn, Hmsg, BufMsgHOpts, MsgDesc, BufferLength, Buffer,
DataLength, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn        fixed bin(31); /* Connection handle */
dcl Hmsg         fixed bin(63); /* Message handle */
dcl BufMsgHOpts  like MQBMHO;   /* Options that control the action of
                                   MQBUFMH */
dcl MsgDesc      like MQMD;     /* Message descriptor */
dcl BufferLength fixed bin(31); /* Length in bytes of the Buffer area */
dcl Buffer       char(n);       /* Area to contain the message buffer */
dcl DataLength   fixed bin(31); /* Length of the output buffer */
dcl CompCode     fixed bin(31); /* Completion code */
dcl Reason       fixed bin(31); /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQBUFMH,(HCONN,HMSG,BUFMSGHOPTS,MSGDESC,BUFFERLENGTH,BUFFER,
                DATALENGTH,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN        DS       F      Connection handle
HMSG         DS       D      Message handle
BUFMSGHOPTS  CMQBMHOA ,      Options that control the action of MQBUFMH
MSGDESC      CMQMDA   ,      Message descriptor
BUFFERLENGTH DS       F      Length in bytes of the BUFFER area
BUFFER       DS       CL(n)  Area to contain the properties
DATALENGTH   DS       F      Length of the output buffer
COMPCODE     DS       F      Completion code
REASON       DS       F      Reason code qualifying COMPCODE
```

MQCB - Manage callback

The MQCB call registers a callback for the specified object handle and controls activation and changes to the callback.

A callback is a piece of code (specified as either the name of a function that can be dynamically linked or as function pointer) that is called by IBM MQ when certain events occur.

To use MQCB and MQCTL on a client you must be connected to a server where the negotiated **SHARECNV** parameter of the channel has agreed a non-zero value.

The types of callback that can be defined are:

Message consumer
: A message consumer callback function is called when a message, meeting the selection criteria specified, is available on an object handle.

Only one callback function can be registered against each object handle. If a single queue is to be read with multiple selection criteria then the queue must be opened multiple times and a consumer function registered on each handle.

Event handler
The event handler is called for conditions that affect the whole callback environment.

The function is called when an event condition occurs, for example, a queue manager or connection stopping or quiescing.

The function is not called for conditions that are specific to a single message consumer, for example MQRC_GET_INHIBITED; it is called however if a callback function does not end normally.

Syntax

MQCB (*Hconn*, *Operation*, *CallbackDesc*, *Hobj*, *MsgDesc*, *GetMsgOpts*, *CompCode*, *Reason*)

Parameters

Hconn
Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications you can specify the following special value for *MQHC_DEF_HCONN* to use the connection handle associated with this execution unit.

Operation
Type: MQLONG - input

The operation being processed on the callback defined for the specified object handle. You must specify one of the following options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

MQOP_REGISTER
Define the callback function for the specified object handle. This operation defines the function to be called and the selection criteria to be used.

If a callback function is already defined for the object handle the definition is replaced. If an error is detected while replacing the callback, the function is deregistered.

If a callback is registered in the same callback function in which it was previously deregistered, this is treated as a replace operation; any initial or final calls are not invoked.

You can use MQOP_REGISTER with MQOP_SUSPEND or MQOP_RESUME.

MQOP_DEREGISTER
Stop the consuming of messages for the object handle and removes the handle from those eligible for a callback.

A callback is automatically deregistered if the associated handle is closed.

If MQOP_DEREGISTER is called from within a consumer, and the callback has a stop call defined, it is invoked upon return from the consumer.

If this operation is issued against an *Hobj* with no registered consumer, the call returns with MQRC_CALLBACK_NOT_REGISTERED.

MQOP_SUSPEND
Suspends the consuming of messages for the object handle.

If this operation is applied to an event handler, the event handler does not get events while suspended, and any events missed while in the suspended state are not provided to the operation when it is resumed.

While suspended, the consumer function continues to get the control type callbacks.

MQOP_RESUME
Resume the consuming of messages for the object handle.

If this operation is applied to an event handler, the event handler does not get events while suspended, and any events missed while in the suspended state are not provided to the operation when it is resumed.

CallbackDesc
Type: MQCBD - input

This is a structure that identifies the callback function that is being registered by the application and the options used when registering it.

See MQCBD for details of the structure.

Callback descriptor is required only for the MQOP_REGISTER option; if the descriptor is not required, the parameter address passed can be null.

Hobj
Type: MQHOBJ - input

This handle represents the access that has been established to the object from which a message is to be consumed. This is a handle that has been returned from a previous MQOPEN or MQSUB call (in the **Hobj** parameter).

Hobj is not required when defining an event handler routine (MQCBT_EVENT_HANDLER) and should be specified as MQHO_NONE.

If *Hobj* has been returned from an MQOPEN call, the queue must have been opened with one or more of the following options:

- MQOO_INPUT_SHARED
- MQOO_INPUT_EXCLUSIVE
- MQOO_INPUT_AS_Q_DEF
- MQOO_BROWSE

MsgDesc
Type: MQMD - input

This structure describes the attributes of the message required, and the attributes of the message retrieved.

The **MsgDesc** parameter defines the attributes of the messages required by the consumer, and the version of the MQMD to be passed to the message consumer.

The *MsgId*, *CorrelId*, *GroupId*, *MsgSeqNumber*, and *Offset* in the MQMD are used for message selection, depending on the options specified in the **GetMsgOpts** parameter.

The *Encoding* and *CodedCharSetId* are used for message conversion if you specify the MQGMO_CONVERT option.

See MQMD for details.

MsgDesc is used for MQOP_REGISTER and if you require values other than the default for any fields. *MsgDesc* is not used for an event handler.

If the descriptor is not required the parameter address passed can be null.

Note, that if multiple consumers are registered against the same queue with overlapping selectors, the chosen consumer for each message is undefined.

GetMsgOpts
Type: MQGMO - input

The **GetMsgOpts** parameter controls how the message consumer gets messages. All options of this parameter have meanings as described in "MQGMO - Get-message options" on page 360, when used on an MQGET call, except:

MQGMO_SET_SIGNAL
This option is not permitted.

MQGMO_BROWSE_FIRST, MQGMO_BROWSE_NEXT, MQGMO_MARK_*
The order of messages delivered to a browsing consumer is dictated by the combinations of these options. Significant combinations are:

MQGMO_BROWSE_FIRST
The first message on the queue is delivered repeatedly to the consumer. This is useful when the consumer destructively consumes the message in the callback. Use this option with care.

MQGMO_BROWSE_NEXT
The consumer is given each message on the queue, from the current cursor position until the end of the queue is reached.

MQGMO_BROWSE_FIRST + MQGMO_BROWSE_NEXT
The cursor is reset to the start of the queue. The consumer is then given each message until the cursor reaches the end of the queue.

MQGMO_BROWSE_FIRST + MQGMO_MARK_*
Starting at the beginning of the queue, the consumer is given the first nonmarked message on the queue, which is then marked for this consumer. This combination ensures that the consumer can receive new messages added behind the current cursor point.

MQGMO_BROWSE_NEXT + MQGMO_MARK_*
Starting at the cursor position, the consumer is given the next nonmarked message on the queue, which is then marked for this consumer. Use this combination with care because messages can be added to the queue behind the current cursor position.

MQGMO_BROWSE_FIRST + MQGMO_BROWSE_NEXT + MQGMO_MARK_*
This combination is not permitted. If used the call returns MQRC_OPTIONS_ERROR.

MQGMO_NO_WAIT, MQGMO_WAIT, and WaitInterval
These options control how the consumer is invoked.

MQGMO_NO_WAIT
The consumer is never called with MQRC_NO_MSG_AVAILABLE. The consumer is only called for messages and events.

MQGMO_WAIT with a zero WaitInterval
The MQRC_NO_MSG_AVAILABLE code is passed to the consumer when there are no messages available and either the consumer has been started or the consumer has been delivered at least one message since the last "no messages" reason code.

This prevents the consumer from polling in a busy loop when a zero wait interval is specified.

MQGMO_WAIT and a positive WaitInterval
The consumer is called after the specified wait interval with reason code MQRC_NO_MSG_AVAILABLE. This call is made regardless of whether any messages have been delivered to the consumer. This allows the user to perform heartbeat or batch type processing.

MQGMO_WAIT and WaitInterval of MQWI_UNLIMITED
This specifies an infinite wait before returning MQRC_NO_MSG_AVAILABLE. The consumer is never called with MQRC_NO_MSG_AVAILABLE.

GetMsgOpts is used only for MQOP_REGISTER and if you require values other than the default for any fields. *GetMsgOpts* is not used for an event handler.

If the *GetMsgOpts* are not required, the parameter address passed can be null. Using this parameter is the same as specifying MQGMO_DEFAULT together with MQGMO_FAIL_IF_QUIESCING.

If a message properties handle is provided in the MQGMO structure, a copy is provided in the MQGMO structure that is passed into the consumer callback. On return from the MQCB call, the application can delete the message properties handle.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason

Type: MQLONG - output

The reason codes in the following list are the ones that the queue manager can return for the **Reason** parameter.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_CONV_LOAD_ERROR
(2133, X'855') Unable to load data conversion services modules.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CALLBACK_LINK_ERROR
(2487, X'9B7') Incorrect callback type field.

MQRC_CALLBACK_NOT_REGISTERED
(2448, X'990') Unable to unregister, suspend, or resume because there is no registered callback.

MQRC_CALLBACK_ROUTINE_ERROR
(2486, X'9B6') Either *CallbackFunction* or *CallbackName* must be specified but not both.

MQRC_CALLBACK_TYPE_ERROR
(2483, X'9B3') Incorrect callback type field.

MQRC_CBD_OPTIONS_ERROR
(2484, X'9B4') Incorrect MQCBD options field.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CORREL_ID_ERROR
(2207, X'89F') Correlation-identifier error.

MQRC_DATA_LENGTH_ERROR
(2010, X'7DA') Data length parameter not valid.

MQRC_FUNCTION_NOT_SUPPORTED
(2298, X'8FA') The function requested is not available in the current environment.

MQRC_GET_INHIBITED
(2016, X'7E0') Gets inhibited for the queue.

MQRC_GLOBAL_UOW_CONFLICT
(2351, X'92F') Global units of work conflict.

MQRC_GMO_ERROR
(2186, X'88A') Get-message options structure not valid.

MQRC_HANDLE_IN_USE_FOR_UOW
(2353, X'931') Handle in use for global unit of work.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_INCONSISTENT_BROWSE
(2259, X'8D3') Inconsistent browse specification.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_INVALID_MSG_UNDER_CURSOR
(2246, X'8C6') Message under cursor not valid for retrieval.

MQRC_LOCAL_UOW_CONFLICT
(2352, X'930') Global unit of work conflicts with local unit of work.

MQRC_MATCH_OPTIONS_ERROR
(2247, X'8C7') Match options not valid.

MQRC_MAX_MSG_LENGTH_ERROR
(2485, X'9B4') Incorrect *MaxMsgLength* field.

MQRC_MD_ERROR
(2026, X'7EA') Message descriptor not valid.

MQRC_MODULE_ENTRY_NOT_FOUND
(2497, X'9C1') The specified function entry point could not be found in the module.

MQRC_MODULE_INVALID
(2496, X'9C0') Module found, however it is of the wrong type; not 32 bit, 64 bit, or a valid dynamic link library.

MQRC_MODULE_NOT_FOUND
(2495, X'9BF') Module not found in the search path or not authorized to load.

MQRC_MSG_SEQ_NUMBER_ERROR
(2250, X'8CA') Message sequence number not valid.

MQRC_MSG_TOKEN_ERROR
(2331, X'91B') Use of message token not valid.

MQRC_NO_MSG_AVAILABLE
(2033, X'7F1') No message available.

MQRC_NO_MSG_UNDER_CURSOR
(2034, X'7F2') Browse cursor not positioned on message.

MQRC_NOT_OPEN_FOR_BROWSE
(2036, X'7F4') Queue not open for browse.

MQRC_NOT_OPEN_FOR_INPUT
(2037, X'7F5') Queue not open for input.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OPERATION_ERROR
(2206, X'89E') Incorrect operation code on API Call.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_INDEX_TYPE_ERROR
(2394, X'95A') Queue has wrong index type.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SIGNAL_OUTSTANDING
(2069, X'815') Signal outstanding for this handle.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_SYNCPOINT_LIMIT_REACHED
(2024, X'7E8') No more messages can be handled within current unit of work.

MQRC_SYNCPOINT_NOT_AVAILABLE
(2072, X'818') Sync point support not available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UOW_ENLISTMENT_ERROR
(2354, X'932') Enlistment in global unit of work failed.

MQRC_UOW_MIX_NOT_SUPPORTED
(2355, X'933') Mixture of unit-of-work calls not supported.

MQRC_UOW_NOT_AVAILABLE
(2255, X'8CF') Unit of work not available for the queue manager to use.

MQRC_WAIT_INTERVAL_ERROR
(2090, X'82A') Wait interval in MQGMO not valid.

MQRC_WRONG_GMO_VERSION
(2256, X'8D0') Wrong version of MQGMO supplied.

MQRC_WRONG_MD_VERSION
(2257, X'8D1') Wrong version of MQMD supplied.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. MQCB is used to define the action to be invoked for each message, matching the specified criteria, available on the queue. When the action is processed, either the message is removed from the queue and passed to the defined message consumer, or a message token is provided, which is used to retrieve the message.
2. MQCB can be used to define callback routines before starting consumption with MQCTL or it can be used from within a callback routine.
3. To use MQCB from outside of a callback routine, you must first suspend message consumption by using MQCTL and resume consumption afterward.
4. MQCB is not supported within the IMS adapter.

Message consumer callback sequence

You can configure a consumer to invoke callback at key points during the lifecycle of the consumer. For example:

- when the consumer is first registered,
- when the connection is started,
- when the connection is stopped and
- when the consumer is deregistered, either explicitly, or implicitly by an MQCLOSE.

Table 541. MQCTL verb definitions

Verb	Meaning
MQCTL(START)	MQCTL call using the MQOP_START Operation
MQCTL(STOP)	MQCTL call using the MQOP_STOP Operation
MQCTL(WAIT)	MQCTL call using the MQOP_START_WAIT Operation

This allows the consumer to maintain state associated with the consumer. When a callback is requested by an application, the rules for consumer invocation are as follows:

REGISTER
Is always the first type of invocation of the callback.

Is always called on the same thread, as the MQCB(REGISTER) call.

START
Is always called synchronously with the MQCTL(START) verb.

- All START callbacks are completed before the MQCTL(START) verb returns.

Is on the same thread as the message delivery if THREAD_AFFINITY is requested.

The call with start is not guaranteed if, for example, a previous callback issues MQCTL(STOP) during the MQCTL(START).

STOP
No further messages or events are delivered after this call until the connection is restarted.

A STOP is guaranteed if the application was previously called for START, or a message, or an event.

DEREGISTER
Is always the last type of invocation of the callback.

Ensure that your application performs thread-based initialization and cleanup in the START and STOP callbacks. You can do non-thread based initialization and cleanup with REGISTER and DEREGISTER callbacks.

Do not make any assumptions about the life and availability of the thread other than what is stated. For example, do not rely on a thread staying alive beyond the last call to DEREGISTER. Similarly, when you have chosen not to use THREAD_AFFINITY, do not assume that the thread exists whenever the connection is started.

If your application has particular requirements for thread characteristics, it can always create a thread accordingly, then use MQCTL(WAIT). This has the effect of 'donating' the thread to IBM MQ for asynchronous message delivery.

Message consumer connection usage

You can configure a consumer to invoke callback at key points during the lifecycle of the consumer. For example:

- when the consumer is first registered,
- when the connection is started,
- when the connection is stopped and
- when the consumer is deregistered, either explicitly, or implicitly by an MQCLOSE.

Table 542. MQCTL verb definitions

Verb	Meaning
MQCTL(START)	MQCTL call using the MQOP_START Operation
MQCTL(STOP)	MQCTL call using the MQOP_STOP Operation
MQCTL(WAIT)	MQCTL call using the MQOP_START_WAIT Operation

This allows the consumer to maintain state associated with the consumer. When a callback is requested by an application, the rules for consumer invocation are as follows:

REGISTER
Is always the first type of invocation of the callback.

Is always called on the same thread, as the MQCB(REGISTER) call.

START
Is always called synchronously with the MQCTL(START) verb.

- All START callbacks are completed before the MQCTL(START) verb returns.

Is on the same thread as the message delivery if THREAD_AFFINITY is requested.

The call with start is not guaranteed if, for example, a previous callback issues MQCTL(STOP) during the MQCTL(START).

STOP
No further messages or events are delivered after this call until the connection is restarted.

A STOP is guaranteed if the application was previously called for START, or a message, or an event.

DEREGISTER
Is always the last type of invocation of the callback.

Ensure that your application performs thread-based initialization and cleanup in the START and STOP callbacks. You can do non-thread based initialization and cleanup with REGISTER and DEREGISTER callbacks.

Do not make any assumptions about the life and availability of the thread other than what is stated. For example, do not rely on a thread staying alive beyond the last call to DEREGISTER. Similarly, when you have chosen not to use THREAD_AFFINITY, do not assume that the thread exists whenever the connection is started.

If your application has particular requirements for thread characteristics, it can always create a thread accordingly, then use MQCTL(WAIT). This has the effect of 'donating' the thread to IBM MQ for asynchronous message delivery.

C invocation

```
MQCB (Hconn, Operation, CallbackDesc, Hobj, MsgDesc,
GetMsgOpts, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQLONG   Operation;     /* Operation being processed */
MQCBD    CallbackDesc;  /* Callback descriptor */
MQHOBJ   HObj           /* Object handle */
MQMD     MsgDesc        /* Message descriptor attributes */
MQGMO    GetMsgOpts     /* Message options */
MQLONG   CompCode;      /* Completion code */
MQLONG   Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQCB' USING HCONN, OPERATION, CBDESC, HOBJ, MSGDESC,
            GETMSGOPTS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN    PIC S9(9) BINARY.
**   Operation
 01  OPERATION PIC S9(9) BINARY.
**   Callback Descriptior
 01  CBDESC.
     COPY CMQCBDV.
01  HOBJ     PIC S9(9) BINARY.
**   Message Descriptior
 01  MSGDESC.
     COPY CMQMDV.
**   Get Message Options
 01  GETMSGOPTS.
     COPY CMQGMOV.
**   Completion code
 01  COMPCODE PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON   PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCB(Hconn, Operation, CallbackDesc, Hobj, MsgDesc, GetMsgOpts,
          CompCode, Reason)
```

Declare the parameters as follows:

```
dcl Hconn        fixed bin(31); /* Connection handle */
dcl Operation    fixed bin(31); /* Operation */
dcl CallbackDesc like MQCBD;    /* Callback Descriptor */
dcl Hobj         fixed bin(31); /* Object Handle */
dcl MsgDesc      like MQMD;     /* Message Descriptor */
dcl GetMsgOpts   like MQGMO;    /* Get Message Options */
dcl CompCode     fixed bin(31); /* Completion code */
dcl Reason       fixed bin(31); /* Reason code qualifying CompCode */
```

MQCB_FUNCTION - Callback function

The MQCB_FUNCTION function call is the callback function for event handling and asynchronous message consumption.

The MQCB_FUNCTION call definition is provided solely to describe the parameters that are passed to the callback function. No entry point called MQCB_FUNCTION is provided by the queue manager.

The specification of the actual function to be called is an input to the MQCB call and is passed in through the MQCBD structure.

Syntax

`MQCB_FUNCTION` (*Hconn*, *MsgDesc*, *GetMsgOpts*, *Buffer*, *Context*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call. On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for Hconn:

MQHC_DEF_CONN

Default connection handle.

MsgDesc

Type: MQMD - input

This structure describes the attributes of the message retrieved.

See "MQMD - Message descriptor" on page 413 for details.

The version of MQMD passed is the same version as passed on the MQCB call that defined the consumer function.

The address of the MQMD is passed as null characters if a version 4 MQGMO was used to request that a Message Handle be returned instead of an MQMD.

This is an input field to the message consumer function; it is not relevant to an event handler function.

GetMsgOpts

Type: MQGMO - input

Options used to control the actions of the message consumer. This parameter also contains additional information about the message returned.

See MQGMO for details.

The version of MQGMO passed is the latest version supported.

This is an input field to the message consumer function; it is not relevant to an event handler function.

Buffer

Type: MQBYTExBufferLength - input

This is the area containing the message data.

If no message is available for this call, or if the message contains no message data, the address of the *Buffer* is passed as nulls.

This is an input field to the message consumer function; it is not relevant to an event handler function.

Context
Type: MQCBC - input/output

This structure provides context information to the callback functions. See "MQCBC - Callback context" on page 275 for details.

Usage notes

1. Be aware that if your callback routines use services that could delay or block the thread, for example, MQGET with wait, could delay the dispatch of other callbacks.
2. A separate unit of work is not automatically established for each invocation of a callback routine, so routines can either issue a commit call, or defer committing, until a logical batch of work has been processed. When the batch of work is committed, it commits the messages for all callback functions that have been invoked since the last sync point.
3. Programs invoked by CICS LINK or CICS START retrieve parameters using CICS services through named objects known as channel containers. The container names are the same as the parameter names. For more information, see your CICS documentation.
4. Callback routines can issue an MQDISC call, but not for their own connection. For example, if a callback routine has created a connection, then it can also disconnect the connection.
5. A callback routine should not, in general, rely on being invoked from the same thread each time. If required, use the MQCTLO_THREAD_AFFINITY when the connection is started.
6. When a callback routine receives a nonzero reason code, it must take appropriate action.
7. MQCB_FUNCTION is not supported within the IMS adapter.

MQCLOSE - Close object

The MQCLOSE call relinquishes access to an object, and is the inverse of the MQOPEN and MQSUB calls.

Syntax

`MQCLOSE` (*Hconn*, *Hobj*, *Options*, *CompCode*, *Reason*)

Parameters

Hconn
Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications you can omit the MQCONN call, and specify the following value for *Hconn* :

MQHC_DEF_HCONN
Default connection handle.

Hobj
Type: MQHOBJ - input/output

This handle represents the object that is being closed. The object can be of any type. The value of *Hobj* was returned by a previous MQOPEN call.

On successful completion of the call, the queue manager sets this parameter to a value that is not a valid handle for the environment. This value is:

MQHO_UNUSABLE_HOBJ
Unusable object handle.

On z/OS, *Hobj* is set to a value that is undefined.

Options
Type: MQLONG - input

This parameter controls how the object is closed.

Only permanent dynamic queues and subscriptions can be closed in more than one way, because they must be either retained or deleted; these are queues with the **DefinitionType** attribute that has the value MQQDT_PERMANENT_DYNAMIC (see the **DefinitionType** attribute described in "Attributes for queues" on page 823). The close options are summarized in this topic.

Durable subscriptions can either be kept or removed; these are created using the MQSUB call with the MQSO_DURABLE option.

When closing the handle to a managed destination (that is the **Hobj** parameter returned on an MQSUB call which used the MQSO_MANAGED option) the queue manager cleans up any publications that have not been retrieved when the associated subscription has also been removed. The subscription is removed using the MQCO_REMOVE_SUB option on the **Hsub** parameter returned on an MQSUB call. Note MQCO_REMOVE_SUB is the default behavior on MQCLOSE for a non-durable subscription.

When closing a handle to a non-managed destination you are responsible for cleaning up the queue where publications are sent. Close the subscription using MQCO_REMOVE_SUB first and then process messages off the queue until none remain.

You must specify one option only from the following:

Dynamic queue options: These options control how permanent dynamic queues are closed.

MQCO_DELETE
The queue is deleted if either of the following is true:

- It is a permanent dynamic queue, created by a previous MQOPEN call, and there are no messages on the queue and no uncommitted get or put requests outstanding for the queue (either for the current task or any other task).
- It is the temporary dynamic queue that was created by the MQOPEN call that returned *Hobj*. In this case, all the messages on the queue are purged.

In all other cases, including the case where the *Hobj* was returned on an MQSUB call, the call fails with reason code MQRC_OPTION_NOT_VALID_FOR_TYPE, and the object is not deleted.

On z/OS, if the queue is a dynamic queue that has been logically deleted, and this is the last handle for it, the queue is physically deleted. See "Usage notes" on page 644 for further details.

MQCO_DELETE_PURGE
The queue is deleted, and any messages on it purged, if either of the following is true:

- It is a permanent dynamic queue, created by a previous MQOPEN call, and there are no uncommitted get or put requests outstanding for the queue (either for the current task or any other task).
- It is the temporary dynamic queue that was created by the MQOPEN call that returned *Hobj*.

In all other cases, including the case where the *Hobj* was returned on an MQSUB call, the call fails with reason code MQRC_OPTION_NOT_VALID_FOR_TYPE, and the object is not deleted.

Table 543. Close options for different object types

Type of object or queue	MQCO_NONE	MQCO_DELETE	MQCO_DELETE_PURGE
Object other than a queue	Retained	Not valid	Not valid
Predefined queue	Retained	Not valid	Not valid

Table 543. Close options for different object types (continued)			
Type of object or queue	**MQCO_NONE**	**MQCO_DELETE**	**MQCO_DELETE_PURGE**
Permanent dynamic queue	Retained	Deleted if empty and no pending updates	Messages deleted; queue deleted if no pending updates
Temporary dynamic queue (call issued by creator of queue)	Deleted	Deleted	Deleted
Temporary dynamic queue (call not issued by creator of queue)	Retained	Not valid	Not valid
Distribution list	Retained	Not valid	Not valid
Managed subscription destination	Retained	Not valid	Not valid
Distribution list (subscription has been removed)	Messages deleted; queue deleted	Not valid	Not valid

Subscription closure options: These options control whether durable subscriptions are removed when the handle is closed, and whether publications still waiting to be read by the application are cleaned up. These options are only valid for use with an object handle returned in the **Hsub** parameter of an MQSUB call.

MQCO_KEEP_SUB

The handle to the subscription is closed but the subscription made is kept. Publications continue to be sent to the destination specified in the subscription. This option is only valid if the subscription was made with the option MQSO_DURABLE.

MQCO_KEEP_SUB is the default if the subscription is durable

MQCO_REMOVE_SUB

The subscription is removed and the handle to the subscription is closed.

The **Hobj** parameter of the MQSUB call is not invalidated by closure of the **Hsub** parameter and might continue to be used for MQGET or MQCB to receive the remaining publications. When the **Hobj** parameter of the MQSUB call is also closed, if it was a managed destination any unretrieved publications are removed.

MQCO_REMOVE_SUB is the default if the subscription is non-durable.

Successful completion of MQCO_REMOVE_SUB does not mean that the action completed. To check that this call has completed, see the DELETE SUB step in Checking that async commands for distributed networks have finished.

These subscription closure options are summarized in the following tables.

Table 544. Options to close a durable subscription handle but retain the subscription	
Task	**Subscription closure option**
Keep publications on an MQOPENed handle	MQCO_KEEP_SUB
Remove publications on an MQOPENed handle	Action not allowed
Keep publications on an MQSO_MANAGED handle	MQCO_KEEP_SUB
Remove publications on an MQSO_MANAGED handle	Action not allowed

To unsubscribe, either by closing a durable subscription handle and unsubscribing it or closing a non-durable subscription handle, use the following subscription closure options:

Table 545. Options to unsubscribe	
Task	**Subscription closure option**
Keep publications on an MQOPENed handle	MQCO_REMOVE_SUB
Remove publications on an MQOPENed handle	Action not allowed
Keep publications on an MQSO_MANAGED handle	MQCO_REMOVE_SUB

Read ahead options: The following options control what happens to non-persistent messages which have been sent to the client before an application requested them and have not yet been consumed by the application. These messages are stored in the client read ahead buffer waiting to be requested by the application and can either be discarded or consumed from the queue before the MQCLOSE is completed.

MQCO_IMMEDIATE

The object is closed immediately and any messages which have been sent to the client before an application requested them are discarded and are not available to be consumed by any application. This is the default value.

MQCO_QUIESCE

A request to close the object is made, but if any messages which have been sent to the client before an application requested them, still reside in the client read ahead buffer, the MQCLOSE call returns with a warning of MQRC_READ_AHEAD_MSGS and the object handle remains valid.

The application can then continue to use the object handle to retrieve messages until no more are available, and then close the object again. No more messages are sent to the client ahead of an application requesting them, read ahead is now turned off.

Applications are advised to use MQCO_QUIESCE rather than trying to reach a point where there are no more messages in the client read ahead buffer, because a message could arrive between the last MQGET call and the following MQCLOSE which would be discarded if MQCO_IMMEDIATE was used.

If an MQCLOSE with MQCO_QUIESCE is issued from within an asynchronous callback function, the same behavior of reading ahead messages applies. If the warning MQRC_READ_AHEAD_MSGS is returned, then the callback function is called at least one more time. When the last remaining message that was read ahead has been passed to the callback function the MQCBC ConsumerFlags field is set to MQCBCF_READA_BUFFER_EMPTY.

Default option: If you require none of the options described previously, you can use the following option:

MQCO_NONE

No optional close processing required.

This must be specified for:

- Objects other than queues
- Predefined queues
- Temporary dynamic queues (but only in those cases where `Hobj` is not the handle returned by the MQOPEN call that created the queue).
- Distribution lists

In all the above cases, the object is retained and not deleted.

If this option is specified for a temporary dynamic queue:

- The queue is deleted, if it was created by the MQOPEN call that returned `Hobj` ; any messages that are on the queue are purged.
- In all other cases the queue (and any messages on it) are retained.

If this option is specified for a permanent dynamic queue, the queue is retained and not deleted.

On z/OS, if the queue is a dynamic queue that has been logically deleted, and this is the last handle for it, the queue is physically deleted. See “Usage notes” on page 644 for further details.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason codes listed are the ones that the queue manager can return for the **Reason** parameter.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_INCOMPLETE_GROUP
(2241, X'8C1') Message group not complete.

MQRC_INCOMPLETE_MSG
(2242, X'8C2') Logical message not complete.

MQRC_READ_AHEAD_MSGS
(nnnn, X'xxx') The client has read ahead messages that have not yet been consumed by the application.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_NOT_AVAILABLE
(2345, X'929') Coupling facility not available.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_DB2_NOT_AVAILABLE
(2342, X'926') Db2 subsystem not available.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OPTION_NOT_VALID_FOR_TYPE
(2045, X'7FD') On an MQOPEN or MQCLOSE call: option not valid for object type.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_Q_NOT_EMPTY
(2055, X'807') Queue contains one or more messages or uncommitted put or get requests.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SECURITY_ERROR
(2063, X'80F') Security error occurred.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. When an application issues the MQDISC call, or ends either normally or abnormally, any objects that were opened by the application and are still open are closed automatically with the MQCO_NONE option.
2. The following points apply if the object being closed is a *queue*:
   - If operations on the queue are performed as part of a unit of work, the queue can be closed before or after the sync point occurs without affecting the outcome of the sync point. If the queue is triggered,

performing a rollback before closing the queue can cause a trigger message to be issued. For more information about trigger messages, see Properties of trigger messages.

- If the queue was opened with the MQOO_BROWSE option, the browse cursor is destroyed. If the queue is then reopened with the MQOO_BROWSE option, a new browse cursor is created (see MQOO_BROWSE).
- If a message is currently locked for this handle at the time of the MQCLOSE call, the lock is released (see MQGMO_LOCK).
- On z/OS, if there is an MQGET request with the MQGMO_SET_SIGNAL option outstanding against the queue handle being closed, the request is canceled (see MQGMO_SET_SIGNAL). Signal requests for the same queue but lodged against different handles (*Hobj*) are not affected (unless a dynamic queue is being deleted, in which case they are also canceled).

3. The following points apply if the object being closed is a *dynamic queue* (either permanent or temporary):

   - For a dynamic queue, you can specify the MQCO_DELETE and MQCO_DELETE_PURGE options regardless of the options specified on the corresponding MQOPEN call.
   - When a dynamic queue is deleted, all MQGET calls with the MQGMO_WAIT option that are outstanding against the queue are canceled and reason code MQRC_Q_DELETED is returned. See MQGMO_WAIT.

     Although applications cannot access a deleted queue, the queue is not removed from the system, and associated resources are not freed, until all handles that reference the queue have been closed, and all units of work that affect the queue have been either committed or backed out.

     On z/OS, a queue that has been logically deleted but not yet removed from the system prevents the creation of a new queue with the same name as the deleted queue; the MQOPEN call fails with reason code MQRC_NAME_IN_USE in this case. Also, such a queue can still be displayed using MQSC commands, even though it cannot be accessed by applications.
   - When a permanent dynamic queue is deleted, if the *Hobj* handle specified on the MQCLOSE call is not the one that was returned by the MQOPEN call that created the queue, a check is made that the user identifier that was used to validate the MQOPEN call is authorized to delete the queue. If the MQOO_ALTERNATE_USER_AUTHORITY option was specified on the MQOPEN call, the user identifier checked is the *AlternateUserId*.

     This check is not performed if:

     – The handle specified is the one returned by the MQOPEN call that created the queue.

     – The queue being deleted is a temporary dynamic queue.
   - When a temporary dynamic queue is closed, if the *Hobj* handle specified on the MQCLOSE call is the one that was returned by the MQOPEN call that created the queue, the queue is deleted. This occurs regardless of the close options specified on the MQCLOSE call. If there are messages on the queue, they are discarded; no report messages are generated.

     If there are uncommitted units of work that affect the queue, the queue and its messages are still deleted, but the units of work do not fail. However, as described previously, the resources associated with the units of work are not freed until each of the units of work has been either committed or backed out.

4. The following points apply if the object being closed is a *distribution list*:

   - The only valid close option for a distribution list is MQCO_NONE; the call fails with reason code MQRC_OPTIONS_ERROR or MQRC_OPTION_NOT_VALID_FOR_TYPE if any other options are specified.
   - When a distribution list is closed, individual completion codes and reason codes are not returned for the queues in the list; only the **CompCode** and **Reason** parameters of the call are available for diagnostic purposes.

     If a failure occurs closing one of the queues, the queue manager continues processing and attempts to close the remaining queues in the distribution list. The **CompCode** and **Reason** parameters of

the call are set to return information describing the failure. It is possible for the completion code to be MQCC_FAILED, even though most of the queues were closed successfully. The queue that encountered the error is not identified.

If there is a failure on more than one queue, it is not defined which failure is reported in the **CompCode** and **Reason** parameters.

C invocation

```
MQCLOSE (Hconn, &Hobj, Options, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQHOBJ   Hobj;      /* Object handle */
MQLONG   Options;   /* Options that control the action of MQCLOSE */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
     CALL 'MQCLOSE' USING HCONN, HOBJ, OPTIONS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Object handle
 01  HOBJ      PIC S9(9) BINARY.
**   Options that control the action of MQCLOSE
 01  OPTIONS   PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCLOSE (Hconn, Hobj, Options, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn     fixed bin(31);  /* Connection handle */
dcl Hobj      fixed bin(31);  /* Object handle */
dcl Options   fixed bin(31);  /* Options that control the action of
                                 MQCLOSE */
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQCLOSE,(HCONN,HOBJ,OPTIONS,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS  F  Connection handle
HOBJ      DS  F  Object handle
OPTIONS   DS  F  Options that control the action of MQCLOSE
```

```
COMPCODE  DS  F  Completion code
REASON    DS  F  Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQCLOSE Hconn, Hobj, Options, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn    As Long 'Connection handle'
Dim Hobj     As Long 'Object handle'
Dim Options  As Long 'Options that control the action of MQCLOSE'
Dim CompCode As Long 'Completion code'
Dim Reason   As Long 'Reason code qualifying CompCode'
```

MQCMIT - Commit changes

The MQCMIT call indicates to the queue manager that the application has reached a sync point, and that all the message gets and puts that have occurred since the last sync point are to be made permanent.

Messages put as part of a unit of work are made available to other applications; messages retrieved as part of a unit of work are deleted.

- z/OS On z/OS, the call is used only by batch programs (including IMS batch DL/I programs).

Syntax

MQCMIT (*Hconn*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason

Type: MQLONG - output

The reason codes listed are the ones that the queue manager can return for the **Reason** parameter.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_BACKED_OUT
(2003, X'7D3') Unit of work backed out.

MQRC_OUTCOME_PENDING
(2124, X'84C') Result of commit operation is pending.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CALL_INTERRUPTED
(2549, X'9F5') MQPUT or MQCMIT was interrupted and reconnection processing cannot reestablish a definite outcome.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_ENVIRONMENT_ERROR
(2012, X'7DC') Call not valid in environment.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OUTCOME_MIXED
(2123, X'84B') Result of commit or back-out operation is mixed.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RECONNECT_FAILED
(2548, X'9F4') After reconnecting, an error occurred reinstating the handles for a reconnectable connection.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. Use this call only when the queue manager itself coordinates the unit of work. This can be:
   - A local unit of work, where the changes affect only IBM MQ resources.
   - A global unit of work, where the changes can affect resources belonging to other resource managers, as well as affecting IBM MQ resources.

For further details about local and global units of work, see "MQBEGIN - Begin unit of work" on page 621.

2. In environments where the queue manager does not coordinate the unit of work, the appropriate commit call must be used instead of MQCMIT. The environment might also support an implicit commit caused by the application terminating normally.
   - On z/OS, use the following calls:
     - Batch programs (including IMS batch DL/I programs) can use the MQCMIT call if the unit of work affects only IBM MQ resources. However, if the unit of work affects both IBM MQ resources and resources belonging to other resource managers (for example, Db2), use the SRRCMIT call provided by the z/OS Recoverable Resource Service (RRS). The SRRCMIT call commits changes to resources belonging to the resource managers that have been enabled for RRS coordination.
     - CICS applications must use the `EXEC CICS SYNCPOINT` command to commit the unit of work explicitly. Alternatively, ending the transaction results in an implicit commit of the unit of work. The MQCMIT call cannot be used for CICS applications.
     - IMS applications (other than batch DL/I programs) must use IMS calls such as GU and CHKP to commit the unit of work. The MQCMIT call cannot be used for IMS applications (other than batch DL/I programs).
   - On IBM i, use this call for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must not have been issued for the job.
3. If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See MQDISC usage notes for further details.
4. When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:
   - The values of the *GroupId*, *MsgSeqNumber*, *Offset*, and *MsgFlags* fields in MQMD.
   - Whether the message is part of a unit of work.
   - For the MQPUT call: whether the message is persistent or nonpersistent.

   When a unit of work is committed, the queue manager retains the group and segment information, and the application can continue putting or getting messages in the current message group or logical message.

   Retaining the group and segment information when a unit of work is committed allows the application to spread a large message group or large logical message consisting of many segments across several units of work. Using several units of work is advantageous if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to restart putting or getting messages at the correct point if a system failure occurs. For details of how to restart at the correct point after a system failure, see MQPMO_LOGICAL_ORDER and MQGMO_LOGICAL_ORDER.

   The remaining usage notes apply only when the queue manager coordinates the units of work:
5. A unit of work has the same scope as a connection handle; all IBM MQ calls that affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See the **Hconn** parameter described in MQCONN for information about the scope of connection handles.
6. Only messages that were put or retrieved as part of the current unit of work are affected by this call.
7. A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but that never issues a commit or back-out call, can fill queues with messages that are not available to other applications. To guard against this, the administrator must set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

8. Windows UNIX On UNIX and Windows systems, if the **Reason** parameter is MQRC_CONNECTION_BROKEN (with a *CompCode* of MQCC_FAILED), or MQRC_UNEXPECTED_ERROR it is possible that the unit of work was successfully committed.

C invocation

```
MQCMIT (Hconn, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQCMIT' USING HCONN, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCMIT (Hconn, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn     fixed bin(31);  /* Connection handle */
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQCMIT,(HCONN,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS  F  Connection handle
COMPCODE  DS  F  Completion code
REASON    DS  F  Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQCMIT Hconn, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn    As Long 'Connection handle'
Dim CompCode As Long 'Completion code'
Dim Reason   As Long 'Reason code qualifying CompCode'
```

MQCONN - Connect queue manager

The MQCONN call connects an application program to a queue manager.

It provides a queue manager connection handle, which the application uses on subsequent message queuing calls.

- On z/OS, CICS applications do not have to issue this call. These applications are connected automatically to the queue manager to which the CICS system is connected. However, the MQCONN and MQDISC calls are still accepted from CICS applications.
- On IBM i, applications must use the MQCONN or MQCONNX call to connect to the queue manager, and the MQDISC call to disconnect from the queue manager.

A client connection cannot be made on a server only installation, and a local connection cannot be made on a client only installation.

Syntax

MQCONN (*QMgrName*, *Hconn*, *CompCode*, *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

This is the name of the queue manager to which the application wants to connect. The name can contain the following characters:

- Uppercase alphabetic characters (A through Z)
- Lowercase alphabetic characters (a through z)
- Numeric digits (0 through 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but can contain trailing blanks. A null character can be used to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply in the environments indicated:

- On systems that use EBCDIC Katakana, lowercase characters cannot be used.
- On z/OS, names that begin or end with an underscore cannot be processed by the operations and control panels. For this reason, avoid such names.
- On IBM i, enclose names containing lowercase characters, forward slash, or percent in quotation marks when specified on commands. Do not specify these quotation marks in the **QMgrName** parameter.

If the name consists entirely of blanks, the name of the *default* queue manager is used. However, note the use of blank queue manager names described in the section on IBM MQ MQI client applications.

The name specified for *QMgrName* must be the name of a *connectable* queue manager or, if queue manager groups are being used, the name of the queue manager group..

On z/OS, the queue managers to which it is possible to connect are determined by the environment:

- For CICS, you can use only the queue manager to which the CICS system is connected. The **QMgrName** parameter must still be specified, but its value is ignored; blank characters are a suitable option.

- For IMS, only queue managers that are listed in the subsystem definition table (CSQQDEFV), *and* listed in the SSM table in IMS, are connectable (see usage note 6).
- For z/OS batch and TSO, only queue managers that reside on the same system as the application are connectable (see usage note 6).

Queue sharing groups: On systems where several queue managers exist and are configured to form a queue sharing group, the name of the queue sharing group can be specified for *QMgrName* in place of the name of a queue manager. This allows the application to connect to *any* queue manager that is available in the queue sharing group and that is on the same z/OS image as the application. The system can also be configured so that using a blank *QMgrName* connects to the queue sharing group instead of to the default queue manager.

If *QMgrName* specifies the name of the queue sharing group, but there is also a queue manager with that name on the system, connection is made to the latter in preference to the former. Only if that connection fails is connection to one of the queue managers in the queue sharing group attempted.

If the connection is successful, you can use the handle returned by the MQCONN or MQCONNX call to access *all* the resources (both shared and nonshared) that belong to the queue manager to which connection has been made. Access to these resources is subject to the typical authorization controls.

If the application issues two MQCONN or MQCONNX calls to establish concurrent connections, and one or both calls specifies the name of the queue sharing group, the second call returns completion code MQCC_WARNING and reason code MQRC_ALREADY_CONNECTED when it connects to the same queue manager as the first call.

Queue sharing groups are supported only on z/OS. Connection to a queue sharing group is supported only in the batch, RRS batch, CICS, and TSO environments. For CICS, you can use only the queue sharing group to which the CICS system is connected. You must still specify the **QMgrName** parameter, but its value is ignored; blank characters are a suitable option.

Attention: IMS is unable to connect to a queue sharing group.

IBM MQ MQI client applications: For IBM MQ MQI client applications, a connection is attempted for each client-connection channel definition with the specified queue manager name, until one is successful. The queue manager, however, must have the same name as the specified name. If an all-blank name is specified, each client-connection channel with an all-blank queue manager name is tried until one is successful; in this case there is no check against the actual name of the queue manager.

IBM MQ client applications are not supported in z/OS, but z/OS can act as an IBM MQ server, to which IBM MQ client applications can connect.

IBM MQ MQI client queue manager groups: If the specified name starts with an asterisk (*), the queue manager to which connection is made might have a different name from that specified by the application. The specified name (without the asterisk) defines a *group* of queue managers that are eligible for connection. The implementation selects one from the group by trying each one in turn until one is found to which a connection can be made. The order in which connections are attempted is influenced by the client channel weight and connection affinity values of the candidate channels. If none of the queue managers in the group is available for connection, the call fails. Each queue manager is tried once only. If an asterisk alone is specified for the name, an implementation-defined default queue manager group is used.

Queue manager groups are supported only for applications running in an MQ-client environment; the call fails if a non-client application specifies a queue manager name beginning with an asterisk. A group is defined by providing several client connection channel definitions with the same queue manager name (the specified name without the asterisk), to communicate with each of the queue managers in the group. The default group is defined by providing one or more client connection channel definitions, each with a blank queue manager name (specifying an all-blank name therefore has the same effect as specifying a single asterisk for the name for a client application).

After connecting to one queue manager of a group, an application can specify blanks in the typical way in the queue manager name fields in the message and object descriptors to mean the name of the

queue manager to which the application has connected (the *local queue manager*). If the application needs to know this name, use the MQINQ call to inquire the **QMgrName** queue manager attribute.

Prefixing an asterisk to the connection name implies that the application does not depend on connecting to a particular queue manager in the group. Suitable applications are:

- Applications that put messages but do not get messages.
- Applications that put request messages and then get the reply messages from a *temporary dynamic* queue.

Unsuitable applications are ones that need to get messages from a particular queue at a particular queue manager; such applications must not prefix the name with an asterisk.

If you specify an asterisk, the maximum length of the remainder of the name is 47 characters.

The length of this parameter is given by MQ_Q_MGR_NAME_LENGTH.

Hconn

Type: MQHCONN - output

This handle represents the connection to the queue manager. Specify it on all subsequent message queuing calls issued by the application. It ceases to be valid when the MQDISC call is issued, or when the unit of processing that defines the scope of the handle terminates.

IBM MQ now supplies the mqm library with client packages as well as server packages. This means that when an MQI call that is found in the mqm library is made, the connection type is checked to see if it is a client or server connection, and then the correct underlying call is made. Therefore an exit which is passed an *Hconn* can now be linked against the mqm library, but used on a client installation.

Handle scope: The scope of the handle returned depends on the call used to connect to the queue manager (MQCONN or MQCONNX). If the call used is MQCONNX, the scope of the handle also depends on the MQCNO_HANDLE_SHARE_* option specified in the *Options* field of the MQCNO structure.

- If the call is MQCONN, or the MQCNO_HANDLE_SHARE_NONE option is specified, the handle returned is a *nonshared* handle.

  The scope of a nonshared handle is the smallest unit of parallel processing supported by the platform on which the application is running (see Table 546 on page 653 for details); the handle is not valid outside the unit of parallel processing from which the call was issued.
- If you specify the MQCNO_HANDLE_SHARE_BLOCK or MQCNO_HANDLE_SHARE_NO_BLOCK option, the handle returned is a *shared* handle.

  The scope of a shared handle is the process that owns the thread from which the call was issued; the handle can be used from any thread that belongs to that process. Not all platforms support threads.
- If the MQCONN or MQCONNX call fails with completion code equal to MQCC_FAILED, then the Hconn value is undefined.

Table 546. Scope of nonshared handles on various platforms

Platform	Scope of nonshared handle
z/OS	• CICS: the CICS task • IMS: the task, up to the next sync point (excluding subtasks of the task) • z/OS batch and TSO: the task (excluding subtasks of the task)
IBM i	Job
UNIX	Thread

Table 546. Scope of nonshared handles on various platforms (continued)	
Platform	**Scope of nonshared handle**
32 bit Windows applications	Thread
64 bit Windows applications	Thread

On z/OS for CICS applications the value returned is:

MQHC_DEF_HCONN
Default connection handle.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_ALREADY_CONNECTED
(2002, X'7D2') Application already connected.

MQRC_CLUSTER_EXIT_LOAD_ERROR
(2267, X'8DB') Unable to load cluster workload exit.

MQRC_SSL_ALREADY_INITIALIZED
(2391, X'957') SSL already initialized.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_CONN_LOAD_ERROR
(2129, X'851') Unable to load adapter connection module.

MQRC_ADAPTER_DEFS_ERROR
(2131, X'853') Adapter subsystem definition module not valid.

MQRC_ADAPTER_DEFS_LOAD_ERROR
(2132, X'854') Unable to load adapter subsystem definition module.

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ADAPTER_STORAGE_SHORTAGE
(2127, X'84F') Insufficient storage for adapter.

MQRC_ANOTHER_Q_MGR_CONNECTED
(2103, X'837') Another queue manager already connected.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_INIT_ERROR
(2375, X'947') API exit initialization failed.

MQRC_API_EXIT_TERM_ERROR
(2376, X'948') API exit termination failed.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CONN_ID_IN_USE
(2160, X'870') Connection identifier already in use.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_ERROR
(2273, X'8E1') Error processing MQCONN call.

MQRC_CONNECTION_NOT_AVAILABLE
(2568, X'A08') Occurs on an MQCONN or MQCONNX call when the queue manager is unable to provide a connection of the requested connection type on the current installation. A client connection cannot be made on a server only installation. A local connection cannot be made on a client only installation.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CRYPTO_HARDWARE_ERROR
(2382, X'94E') Cryptographic hardware configuration error.

MQRC_DUPLICATE_RECOV_COORD
(2163, X'873') Recovery coordinator exists.

MQRC_ENVIRONMENT_ERROR
(2012, X'7DC') Call not valid in environment.

Additionally, on the MQCONNX call, passing the “MQCSP - Security parameters” on page 330 control block from a CICS or IMS application.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOST_NOT_AVAILABLE
(2538, X'9EA') An MQCONN call was issued from a client to connect to a queue manager but the attempt to allocate a conversation to the remote system failed.

MQRC_INSTALLATION_MISMATCH
(2583, X'A17') Mismatch between queue manager installation and selected library.

MQRC_KEY_REPOSITORY_ERROR
(2381, X'94D') Key repository not valid.

MQRC_MAX_CONNS_LIMIT_REACHED
(2025, X'7E9') Maximum number of connections reached.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_OPEN_FAILED
(2137, X'859') Object not opened successfully.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SECURITY_ERROR
(2063, X'80F') Security error occurred.

MQRC_SSL_INITIALIZATION_ERROR
(2393, X'959') SSL initialization error.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. The queue manager to which connection is made using the MQCONN call is called the *local queue manager*.
2. Queues that are owned by the local queue manager appear to the application as local queues. It is possible to put messages on and get messages from these queues.

   Shared queues that are owned by the queue sharing group to which the local queue manager belongs appear to the application as local queues. It is possible to put messages on and get messages from these queues.

   Queues that are owned by remote queue managers appear as remote queues. It is possible to put messages on these queues, but not to get messages from these queues.
3. If the queue manager fails while an application is running, the application must issue the MQCONN call again to obtain a new connection handle to use on subsequent IBM MQ calls. The application can issue the MQCONN call periodically until the call succeeds.

   If an application is not sure whether it is connected to the queue manager, the application can safely issue an MQCONN call to obtain a connection handle. If the application is already connected, the handle returned is the same as that returned by the previous MQCONN call, but with completion code MQCC_WARNING and reason code MQRC_ALREADY_CONNECTED.
4. When the application has finished using IBM MQ calls, the application must use the MQDISC call to disconnect from the queue manager.
5. If the MQCONN call fails with completion code equal to MQCC_FAILED, then the Hconn value is undefined.
6. On z/OS:

   - Batch, TSO, and IMS applications must issue the MQCONN call to use the other IBM MQ calls. These applications can connect to more than one queue manager concurrently.

     If the queue manager fails, the application must issue the call again after the queue manager has restarted to obtain a new connection handle.

     Although IMS applications can issue the MQCONN call repeatedly, even when already connected, this is not recommended for online message processing programs (MPPs).
   - CICS applications do not have to issue the MQCONN call to use the other IBM MQ calls, but can do so if they want; both the MQCONN call and the MQDISC call are accepted. However, it is not possible to connect to more than one queue manager concurrently.

If the queue manager fails, these applications are automatically reconnected when the queue manager restarts, and so do not need to issue the MQCONN call.

7. On z/OS, to define the available queue managers:

   - For batch applications, system programmers can use the CSQBDEF macro to create a module (CSQBDEFV) that defines the default queue manager name, or queue sharing group name.
   - For IMS applications, system programmers can use the CSQQDEFX macro to create a module (CSQQDEFV) that defines the names of the available queue managers and specifies the default queue manager.

     In addition, each queue manager must be defined to the IMS control region and to each dependent region accessing that queue manager. To do this, you must create a subsystem member in the IMS.PROCLIB library and identify the subsystem member to the applicable IMS regions. If an application attempts to connect to a queue manager that is not defined in the subsystem member for its IMS region, the application abends.

   z/OS For more information about using these macros, see Macros intended for customer use.

8. On IBM i, programs that end abnormally are not automatically disconnected from the queue manager. Write applications to allow for the possibility of the MQCONN or MQCONNX call returning completion code MQCC_WARNING and reason code MQRC_ALREADY_CONNECTED. Use the connection handle returned in this situation as normal.

C invocation

```
MQCONN (QMgrName, &Hconn, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQCHAR48  QMgrName;  /* Name of queue manager */
MQHCONN   Hconn;     /* Connection handle */
MQLONG    CompCode;  /* Completion code */
MQLONG    Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQCONN' USING QMGRNAME, HCONN, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Name of queue manager
 01  QMGRNAME  PIC X(48).
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCONN (QMgrName, Hconn, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl QMgrName  char(48);       /* Name of queue manager */
dcl Hconn     fixed bin(31);  /* Connection handle */
```

```
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQCONN,(QMGRNAME,HCONN,COMPCODE,REASON)
```

Declare the parameters as follows:

```
QMGRNAME  DS  CL48  Name of queue manager
HCONN     DS  F     Connection handle
COMPCODE  DS  F     Completion code
REASON    DS  F     Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQCONN QMgrName, Hconn, CompCode, Reason
```

Declare the parameters as follows:

```
Dim QMgrName As String*48 'Name of queue manager'
Dim Hconn    As Long      'Connection handle'
Dim CompCode As Long      'Completion code'
Dim Reason   As Long      'Reason code qualifying CompCode'
```

MQCONNX - Connect queue manager (extended)

The MQCONNX call connects an application program to a queue manager. It provides a queue manager connection handle, which is used by the application on subsequent IBM MQ calls.

The MQCONNX call is like the MQCONN call, except that MQCONNX allows options to be specified to control the way that the call works.

- This call is supported on all IBM MQ systems, and IBM MQ clients connected to these systems.

A client connection cannot be made on a server only installation, and a local connection cannot be made on a client only installation.

Syntax

MQCONNX (*QMgrName*, *ConnectOpts*, *Hconn*, *CompCode*, *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

See the **QMgrName** parameter described in "MQCONN - Connect queue manager" on page 651 for details.

ConnectOpts

Type: MQCNO - input/output

See "MQCNO - Connect options" on page 311 for details.

Hconn

Type: MQHCONN - output

This handle represents the connection to the queue manager. Specify it on all subsequent message queuing calls issued by the application. It ceases to be valid when the MQDISC call is issued, or when the unit of processing that defines the scope of the handle terminates.

IBM MQ now supplies the mqm library with client packages as well as server packages. This means that when an MQI call that is found in the mqm library is made, the connection type is checked to see if it is a client or server connection, and then the correct underlying call is made. Therefore an exit which is passed an *Hconn* can now be linked against the mqm library, but used on a client installation.

Handle scope: The scope of the handle returned depends on the call used to connect to the queue manager (MQCONN or MQCONNX). If the call used is MQCONNX, the scope of the handle also depends on the MQCNO_HANDLE_SHARE_* option specified in the `Options` field of the MQCNO structure.

- If the call is MQCONN, or the MQCNO_HANDLE_SHARE_NONE option is specified, the handle returned is a *nonshared* handle.

  The scope of a nonshared handle is the smallest unit of parallel processing supported by the platform on which the application is running (see Table 547 on page 659 for details); the handle is not valid outside the unit of parallel processing from which the call was issued.
- If you specify the MQCNO_HANDLE_SHARE_BLOCK or MQCNO_HANDLE_SHARE_NO_BLOCK option, the handle returned is a *shared* handle.

  The scope of a shared handle is the process that owns the thread from which the call was issued; the handle can be used from any thread that belongs to that process. Not all platforms support threads.
- If the MQCONN or MQCONNX call fails with completion code equal to MQCC_FAILED, then the Hconn value is undefined.

Table 547. Scope of nonshared handles on various platforms

Platform	**Scope of nonshared handle**
z/OS	• CICS: the CICS task • IMS: the task, up to the next sync point (excluding subtasks of the task) • z/OS batch and TSO: the task (excluding subtasks of the task)
IBM i	Job
UNIX	Thread
32 bit Windows applications	Thread
64 bit Windows applications	Thread

On z/OS for CICS applications the value returned is:

MQHC_DEF_HCONN
Default connection handle.

CompCode
Type: MQLONG - output

See the **CompCode** parameter described in “MQCONN - Connect queue manager” on page 651 for details.

Reason
Type: MQLONG - output

The following codes can be returned by the MQCONN and MQCONNX calls. For a list of additional codes that can be returned by the MQCONNX call, see the following codes.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_ALREADY_CONNECTED
(2002, X'7D2') Application already connected.

MQRC_CLUSTER_EXIT_LOAD_ERROR
(2267, X'8DB') Unable to load cluster workload exit.

MQRC_SSL_ALREADY_INITIALIZED
(2391, X'957') SSL already initialized.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_CONN_LOAD_ERROR
(2129, X'851') Unable to load adapter connection module.

MQRC_ADAPTER_DEFS_ERROR
(2131, X'853') Adapter subsystem definition module not valid.

MQRC_ADAPTER_DEFS_LOAD_ERROR
(2132, X'854') Unable to load adapter subsystem definition module.

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ADAPTER_STORAGE_SHORTAGE
(2127, X'84F') Insufficient storage for adapter.

MQRC_ANOTHER_Q_MGR_CONNECTED
(2103, X'837') Another queue manager already connected.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_INIT_ERROR
(2375, X'947') API exit initialization failed.

MQRC_API_EXIT_TERM_ERROR
(2376, X'948') API exit termination failed.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CONN_ID_IN_USE
(2160, X'870') Connection identifier already in use.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_ERROR
(2273, X'8E1') Error processing MQCONN call.

MQRC_CONNECTION_NOT_AVAILABLE
(2568, X'A08') Occurs on an MQCONN or MQCONNX call when the queue manager is unable to provide a connection of the requested connection type on the current installation. A client connection cannot be made on a server only installation. A local connection cannot be made on a client only installation.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CRYPTO_HARDWARE_ERROR
(2382, X'94E') Cryptographic hardware configuration error.

MQRC_DUPLICATE_RECOV_COORD
(2163, X'873') Recovery coordinator exists.

MQRC_ENVIRONMENT_ERROR
(2012, X'7DC') Call not valid in environment.

Additionally, on the MQCONNX call, passing the “MQCSP - Security parameters” on page 330 control block from a CICS or IMS application.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOST_NOT_AVAILABLE
(2538, X'9EA') An MQCONN call was issued from a client to connect to a queue manager but the attempt to allocate a conversation to the remote system failed.

MQRC_INSTALLATION_MISMATCH
(2583, X'A17') Mismatch between queue manager installation and selected library.

MQRC_KEY_REPOSITORY_ERROR
(2381, X'94D') Key repository not valid.

MQRC_MAX_CONNS_LIMIT_REACHED
(2025, X'7E9') Maximum number of connections reached.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_OPEN_FAILED
(2137, X'859') Object not opened successfully.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SECURITY_ERROR
(2063, X'80F') Security error occurred.

MQRC_SSL_INITIALIZATION_ERROR
(2393, X'959') SSL initialization error.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

The following additional reason codes can be returned by the MQCONNX call:

If *CompCode* is MQCC_FAILED:

MQRC_AIR_ERROR
(2385, X'951') Authentication information record not valid.

MQRC_AUTH_INFO_CONN_NAME_ERROR
(2387, X'953') Authentication information connection name not valid.

MQRC_AUTH_INFO_REC_COUNT_ERROR
(2383, X'94F') Authentication information record count not valid.

MQRC_AUTH_INFO_REC_ERROR
(2384, X'950') Authentication information record fields not valid.

MQRC_AUTH_INFO_TYPE_ERROR
(2386, X'952') Authentication information type not valid.

MQRC_CD_ERROR
(2277, X'8E5') Channel definition not valid.

MQRC_CLIENT_CONN_ERROR
(2278, X'8E6') Client connection fields not valid.

MQRC_CNO_ERROR
(2139, X'85B') Connect-options structure not valid.

MQRC_CONN_TAG_IN_USE
(2271, X'8DF') Connection tag in use.

MQRC_CONN_TAG_NOT_USABLE
(2350, X'92E') Connection tag not usable.

MQRC_LDAP_PASSWORD_ERROR
(2390, X'956') LDAP password not valid.

MQRC_LDAP_USER_NAME_ERROR
(2388, X'954') LDAP user name fields not valid.

MQRC_LDAP_USER_NAME_LENGTH_ERR
(2389, X'955') LDAP user name length not valid.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_SCO_ERROR
(2380, X'94C') SSL configuration options structure not valid.

MQRC_SSL_CONFIG_ERROR
(2392, X'958') SSL configuration error.

For detailed information about these codes, see Messages and reason codes.

Usage notes

For the Visual Basic programming language, the following point applies:

- The **ConnectOpts** parameter is declared as being of type MQCNO. If the application is running as an IBM MQ MQI client, and you want to specify the parameters of the client-connection channel, declare the **ConnectOpts** parameter as being of type Any, so that the application can specify an MQCNOCD structure on the call in place of an MQCNO structure. However, this means that the **ConnectOpts** parameter cannot be checked to ensure that it is the correct data type.

C invocation

```
MQCONNX (QMgrName, &ConnectOpts, &Hconn, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQCHAR48  QMgrName;     /* Name of queue manager */
MQCNO     ConnectOpts;  /* Options that control the action of MQCONNX */
MQHCONN   Hconn;        /* Connection handle */
```

```
MQLONG    CompCode;     /* Completion code */
MQLONG    Reason;       /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQCONNX' USING QMGRNAME, CONNECTOPTS, HCONN, COMPCODE,
REASON.
```

Declare the parameters as follows:

```
**   Name of queue manager
 01  QMGRNAME     PIC X(48).
**   Options that control the action of MQCONNX
 01  CONNECTOPTS.
     COPY CMQCNOV.
**   Connection handle
 01  HCONN        PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE     PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON       PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCONNX (QMgrName, ConnectOpts, Hconn, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl QMgrName     char(48);       /* Name of queue manager */
dcl ConnectOpts  like MQCNO;     /* Options that control the action of
                                    MQCONNX */
dcl Hconn        fixed bin(31);  /* Connection handle */
dcl CompCode     fixed bin(31);  /* Completion code */
dcl Reason       fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQCONNX,(QMGRNAME,CONNECTOPTS,HCONN,COMPCODE,REASON)
```

Declare the parameters as follows:

```
QMGRNAME     DS       CL48  Name of queue manager
CONNECTOPTS  CMQCNOA  ,     Options that control the action of MQCONNX
HCONN        DS       F     Connection handle
COMPCODE     DS       F     Completion code
REASON       DS       F     Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQCONNX QMgrName, ConnectOpts, Hconn, CompCode, Reason
```

Declare the parameters as follows:

```
Dim QMgrName    As String*48 'Name of queue manager'
Dim ConnectOpts As MQCNO     'Options that control the action of'
                             'MQCONNX'
Dim Hconn       As Long      'Connection handle'
```

```
Dim CompCode    As Long       'Completion code'
Dim Reason      As Long       'Reason code qualifying CompCode'
```

MQCRTMH - Create message handle

The MQCRTMH call returns a message handle.

An application can use the MQCRTMH call on subsequent message queuing calls:

- Use the MQSETMP call to set a property of the message handle.
- Use the MQINQMP call to inquire on the value of a property of the message handle.
- Use the MQDLTMP call to delete a property of the message handle.

The message handle can be used on the MQPUT and MQPUT1 calls to associate the properties of the message handle with those of the message being put. Similarly by specifying a message handle on the MQGET call, the properties of the message being retrieved can be accessed using the message handle when the MQGET call completes.

Use MQDLTMH to delete the message handle.

Syntax

MQCRTMH (*Hconn*, *CrtMsgHOpts*, *Hmsg*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call. If the connection to the queue manager ceases to be valid and no IBM MQ call is operating on the message handle, MQDLTMH is implicitly called to delete the message.

Alternatively, you can specify the following value:

MQHC_UNASSOCIATED_HCONN

The connection handle does not represent a connection to any particular queue manager.

When this value is used, the message handle must be deleted with an explicit call to MQDLTMH in order to release any storage allocated to it; IBM MQ never implicitly deletes the message handle.

There must be at least one valid connection to a queue manager established on the thread creating the message handle, otherwise the call fails with MQRC_HCONN_ERROR.

In an environment with multiple installations on a single system, the MQHC_UNASSOCIATED_HCONN value is limited to use with the first installation loaded into the process. The reason code MQRC_HMSG_NOT_AVAILABLE is returned if the message handle is supplied to a different installation.

On z/OS for CICS applications the MQCONN call can be omitted, and you can specify the following value for *Hconn* :

MQHC_DEF_CONN

Default connection handle

CrtMsgHOpts

Type: MQCMHO - input

The options that control the action of MQCRTMH. See MQCMHO for details.

Hmsg

Type: MQHMSG - output

On output a message handle is returned that can be used to set, inquire, and delete properties of the message handle. Initially the message handle contains no properties.

A message handle also has an associated message descriptor. Initially this contains the default values. The values of the associated message descriptor fields can be set and inquired using the MQSETMP and MQINQMP calls. The MQDLTMP call resets a field of the message descriptor back to its default value.

If the *Hconn* parameter is specified as the value MQHC_UNASSOCIATED_HCONN then the returned message handle can be used on MQGET, MQPUT, or MQPUT1 calls with any connection within the unit of processing, but can only be in use by one IBM MQ call at a time. If the handle is in use when a second IBM MQ call attempts to use the same message handle, the second IBM MQ call fails with reason code MQRC_MSG_HANDLE_IN_USE.

If the *Hconn* parameter is not MQHC_UNASSOCIATED_HCONN then the returned message handle can only be used on the specified connection.

The same *Hconn* parameter value must be used on the subsequent MQI calls where this message handle is used:

- MQDLTMH
- MQSETMP
- MQINQMP
- MQDLTMP
- MQMHBUF
- MQBUFMH

The returned message handle ceases to be valid when the MQDLTMH call is issued for the message handle, or when the unit of processing that defines the scope of the handle terminates. MQDLTMH is called implicitly if a specific connection is supplied when the message handle is created and the connection to the queue manager ceases to be valid, for example, if MQDBC is called.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE

(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR

(2130, X'852') Unable to load adapter service module.

MQRC_ASID_MISMATCH

(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS

(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CMHO_ERROR

(2461, X'099D') Create message handle options structure not valid.

MQRC_CONNECTION_BROKEN

(2273, X'7D9') Connection to queue manager lost.

MQRC_HANDLE_NOT_AVAILABLE
(2017, X'07E1') No more handles available.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle pointer not valid.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C

```
MQCRTMH (Hconn, &CrtMsgHOpts, &Hmsg, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;       /* Connection handle */
MQCMHO   CrtMsgHOpts; /* Options that control the action of MQCRTMH */
MQHMSG   Hmsg;        /* Message handle */
MQLONG   CompCode;    /* Completion code */
MQLONG   Reason;      /* Reason code qualifying CompCode */
```

COBOL

```
CALL 'MQCRTMH' USING HCONN, CRTMSGHOPTS, HMSG, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Options that control the action of MQCRTMH
 01  CRTMSGHOPTS.
     COPY CMQCMHOV.
**   Message handle
 01  HMSG    PIC S9(18) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I

```
call MQCRTMH (Hconn, CrtMsgHOpts, Hmsg, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn       fixed bin(31);  /* Connection handle */
dcl CrtMsgHOpts like MQCMHO;    /* Options that control the action of MQCRTMH */
dcl Hmsg        fixed bin(63);  /* Message handle */
dcl CompCode    fixed bin(31);  /* Completion code */
dcl Reason      fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler

```
CALL MQCRTMH,(HCONN,CRTMSGHOPTS,HMSG,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN          DS        F  Connection handle
CRTMSGHOPTS    CMQCMHOA  ,  Options that control the action of MQCRTMH
HMSG           DS        D  Message handle
COMPCODE       DS        F  Completion code
REASON         DS        F  Reason code qualifying COMPCODE
```

MQCTL - Control callbacks

The MQCTL call performs controlling actions on callbacks and the object handles opened for a connection.

Syntax

MQCTL (*Hconn*, *Operation*, *ControlOpts*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and you can specify the following special value for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Operation

Type: MQLONG - input

The operation being processed on the callback defined for the specified object handle. You must specify one, and one only, of the following options:

MQOP_START

Start the consuming of messages for all defined message consumer functions for the specified connection handle.

Callbacks run on a thread started by the system, which is different from any of the application threads.

This operation gives control of the provided connection handle to system. The only MQI calls which can be issued by a thread other than the consumer thread are:

- MQCTL with Operation MQOP_STOP
- MQCTL with Operation MQOP_SUSPEND
- MQDISC - Performs MQCTL with Operation MQOP_STOP before disconnection the HConn.

MQRC_HCONN_ASYNC_ACTIVE is returned if an IBM MQ API call is issued while the connection handle is started, and the call does not originate from a message consumer function.

If a message consumer stops the connection during the MQCBCT_START_CALL then the MQCTL call returns with a failure reason code of MQRC_CONNECTION_STOPPED.

This can be issued in a consumer function. For the same connection as the callback routine, its only purpose is to cancel a previously issued MQOP_STOP operation.

This option is not supported in the following environments: CICS on z/OS or if the application is bound with a nonthreaded IBM MQ library.

MQOP_START_WAIT
Start the consuming of messages for all defined message consumer functions for the specified connection handle.

Message consumers run on the same thread and control is not returned to the caller of MQCTL until:

- Released by the use of the MQCTL MQOP_STOP or MQOP_SUSPEND operations, or
- All consumer routines have been deregistered or suspended.

If all consumers are deregistered or suspended, an implicit MQOP_STOP operation is issued.

This option cannot be used from within a callback routine, either for the current connection handle or any other connection handle. If the call is attempted it returns with MQRC_ENVIRONMENT_ERROR.

If, at any time during an MQOP_START_WAIT operation there are no registered, non-suspended consumers the call fails with a reason code of MQRC_NO_CALLBACKS_ACTIVE.

If, during an MQOP_START_WAIT operation, the connection is suspended, the MQCTL call returns a warning reason code of MQRC_CONNECTION_SUSPENDED; the connection remains 'started'.

The application can choose to issue MQOP_STOP or MQOP_RESUME. In this instance, the MQOP_RESUME operation blocks.

This option is not supported in a single threaded client.

MQOP_STOP
Stop the consuming of messages, and wait for all consumers to complete their operations before this option completes. This operation releases the connection handle.

If issued from within a callback routine, this option does not take effect until the routine exits. No more message consumer routines are called after the consumer routines for messages already read have completed, and after stop calls (if requested) to callback routines have been made.

If issued outside a callback routine, control does not return to the caller until the consumer routines for messages already read have completed, and after stop calls (if requested) to callbacks have been made. The callbacks themselves, however, remain registered.

This function has no effect on read ahead messages. You must ensure that consumers run MQCLOSE(MQCO_QUIESCE), from within the callback function, to determine whether there are any further messages available to be delivered.

MQOP_SUSPEND
Pause the consuming of messages. This operation releases the connection handle.

This does not have any effect on the reading ahead of messages for the application. If you intend to stop consuming messages for a long time, consider closing the queue and reopening it when consumption continues.

If issued from within a callback routine, it does not take effect until the routine exits. No more message consumer routines will be called after the current routine exits.

If issued outside a callback, control does not return to the caller until the current consumer routine has completed and no more are called.

MQOP_RESUME
Resume the consuming of messages.

This option is normally issued from the main application thread, but it can also be used from within a callback routine to cancel an earlier suspension request issued in the same routine.

If the MQOP_RESUME is used to resume an MQOP_START_WAIT then the operation blocks.

ControlOpts
Type: MQCTLO - input

Options that control the action of MQCTL

See MQCTLO for details of the structure.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_CONV_LOAD_ERROR
(2133, X'855') Unable to load data conversion services modules.

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALLBACK_LINK_ERROR
(2487, X'9B7') Unable to call the callback routine

MQRC_CALLBACK_NOT_ REGISTERED
(2448, X'990') Unable to Deregister, Suspend, or Resume because there is no registered callback

MQRC_CALLBACK_ROUTINE_ERROR
(2486, X'9B6') Either, both CallbackFunction and CallbackName have been specified on an MQOP_REGISTER call.

Or either CallbackFunction or CallbackName have been specified but does not match the currently registered callback function.

MQRC_CALLBACK_TYPE_ERROR
(2483, X'9B3') Incorrect CallBackType field.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CBD_ERROR
(2444, X'98C') Option block is incorrect.

MQRC_CBD_OPTIONS_ERROR
(2484, X'9B4') Incorrect MQCBD options field.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CORREL_ID_ERROR
(2207, X'89F') Correlation-identifier error.

MQRC_FUNCTION_NOT_SUPPORTED
(2298, X'8FA') The function requested is not available in the current environment.

MQRC_GET_INHIBITED
(2016, X'7E0') Gets inhibited for the queue.

MQRC_GLOBAL_UOW_CONFLICT
(2351, X'92F') Global units of work conflict.

MQRC_GMO_ERROR
(2186, X'88A') Get-message options structure not valid.

MQRC_HANDLE_IN_USE_FOR_UOW
(2353, X'931') Handle in use for global unit of work.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_INCONSISTENT_BROWSE
(2259, X'8D3') Inconsistent browse specification.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_INVALID_MSG_UNDER_CURSOR
(2246, X'8C6') Message under cursor not valid for retrieval.

MQRC_LOCAL_UOW_CONFLICT
(2352, X'930') Global unit of work conflicts with local unit of work.

MQRC_MATCH_OPTIONS_ERROR
(2247, X'8C7') Match options not valid.

MQRC_MAX_MSG_LENGTH_ERROR
(2485, X'9B5') Incorrect MaxMsgLength field

MQRC_MD_ERROR
(2026, X'7EA') Message descriptor not valid.

MQRC_MODULE_ENTRY_NOT_FOUND
(2497, X'9C1')The specified function entry point could not be found in the module.

MQRC_MODULE_INVALID
(2496, X'9C0') Module is found but is of the wrong type (32 bit/64 bit) or is not a valid dll.

MQRC_MODULE_NOT_FOUND
(2495, X'9BF') Module not found in the search path or not authorized to load.

MQRC_MSG_ID_ERROR
(2206, X'89E') Message-identifier error.

MQRC_MSG_SEQ_NUMBER_ERROR
(2250, X'8CA') Message sequence number not valid.

MQRC_MSG_TOKEN_ERROR
(2331, X'91B') Use of message token not valid.

MQRC_NOT_OPEN_FOR_BROWSE
(2036, X'7F4') Queue not open for browse.

MQRC_NOT_OPEN_FOR_INPUT
(2037, X'7F5') Queue not open for input.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OPERATION_ERROR
(2488, X'9B8') Incorrect Operation code on API Call

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_INDEX_TYPE_ERROR
(2394, X'95A') Queue has wrong index type.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SIGNAL_OUTSTANDING
(2069, X'815') Signal outstanding for this handle.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_SYNCPOINT_NOT_AVAILABLE
(2072, X'818') Syncpoint support not available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UOW_ENLISTMENT_ERROR
(2354, X'932') Enlistment in global unit of work failed.

MQRC_UOW_MIX_NOT_SUPPORTED
(2355, X'933') Mixture of unit-of-work calls not supported.

MQRC_UOW_NOT_AVAILABLE
(2255, X'8CF') Unit of work not available for the queue manager to use.

MQRC_WAIT_INTERVAL_ERROR
(2090, X'82A') Wait interval in MQGMO not valid.

MQRC_WRONG_GMO_VERSION
(2256, X'8D0') Wrong version of MQGMO supplied.

MQRC_WRONG_MD_VERSION
(2257, X'8D1') Wrong version of MQMD supplied.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. Callback routines must check the responses from all services they invoke, and if the routine detects a condition that cannot be resolved, it must issue an MQCB MQOP_DEREGISTER command to prevent repeated calls to the callback routine.
2. If you are using asynchronous consume in an application where an XA Transaction Manager is managing global transactions, including updates to IBM MQ, you need to consider the following additional points:
   a. It is not valid to call MQCTL(MQOP_START) for an **HConn**, after it has been created, after calling **xa_open**.

      The reason is, that the **HConn** has become attached to an XA context, and so cannot then be accessed on the separate thread, or threads, in use by the asynchronous consume mechanism.
   b. If you call MQCTL(MQOP_START) in that scenario the call fails with reason code MQRC_ASYNC_XA_CONFLICT (2350).
   c. It is valid to call MQCTL(MQOP_START_WAIT) for an **HConn**, after it has been created, after calling **xa_open**.

      The reason is, that this method of starting the asynchronous consume mechanism causes all further callbacks for the **HConn** to run on the thread where the MQCTL call is made. Therefore, the link between the **HConn** and the thread is not lost.
3. z/OS On z/OS, when Operation is MQOP_START:
   - Programs which use asynchronous callback routines must be authorized to use z/OS UNIX System Services (USS).
   - Language Environment (LE) programs which use asynchronous callback routines must use the LE runtime option POSIX(ON).
   - Non-LE programs which use asynchronous callback routines must not use the USS pthread_create interface (callable service BPX1PTC).
4. z/OS MQCTL is not supported within the IMS adapter.

Note: In CICS, MQOP_START is not supported. Instead, use the MQOP_START_WAIT function call.

C invocation

```
MQCTL (Hconn, Operation, &ControlOpts, &CompCode, &Reason)
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQLONG   Operation;     /* Operation being processed */
MQCTLO   ControlOpts    /* Options that control the action of MQCTL */
MQLONG   CompCode;      /* Completion code */
MQLONG   Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQCTL' USING HCONN, OPERATION, CTLOPTS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN    PIC S9(9) BINARY.
**   Operation
 01  OPERATION PIC S9(9) BINARY.
**   Control Options
 01  CTLOPTS.
     COPY CMQCTLOV.
**   Completion code
 01  COMPCODE PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON   PIC S9(9) BINARY.
```

PL/I invocation

```
call MQCTL(Hconn, Operation, CtlOpts, CompCode, Reason)
```

Declare the parameters as follows:

```
dcl Hconn        fixed bin(31); /* Connection handle */
dcl Operation    fixed bin(31); /* Operation */
dcl CtlOpts like MQCTLO;        /* Options that control the action of MQCTL */
dcl CompCode     fixed bin(31); /* Completion code */
dcl Reason       fixed bin(31); /* Reason code qualifying CompCode */
```

MQDISC - Disconnect queue manager

The MQDISC call breaks the connection between the queue manager and the application program, and is the inverse of the MQCONN or MQCONNX call.

- On z/OS, all applications that use asynchronous message consumption, event handling or callback, the main control thread must issue an MQDISC call before ending. See Asynchronous consumption of IBM MQ messages for more details.
- On z/OS, CICS applications do not need to issue this call to disconnect from the queue manager.

  If a CICS application does make this call it has no effect unless an earlier MQCONNX call was made, specifying one of the:

  MQCNO_SERIALIZE_CONN_TAG_Q_MGR
  MQCNO_SERIALIZE_CONN_TAG_QSG
  MQCNO_RESTRICT_CONN_TAG_Q_MGR or
  MQCNO_RESTRICT_CONN_TAG_QSG

  options, in which case all currently open object handles are closed.

Syntax

MQDISC (*Hconn*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input/output

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications you can omit the MQCONN call, and specify the following value for *Hconn* :

MQHC_DEF_HCONN
Default connection handle.

On successful completion of the call, the queue manager sets *Hconn* to a value that is not a valid handle for the environment. This value is:

MQHC_UNUSABLE_HCONN
Unusable connection handle.

On z/OS, *Hconn* is set to a value that is undefined.

CompCode
Type: MQLONG - output

The completion code; it is one of the following codes:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_BACKED_OUT
(2003, X'7D3') Unit of work backed out.

MQRC_CONN_TAG_NOT_RELEASED
(2344, X'928') Connection tag not released.

MQRC_OUTCOME_PENDING
(2124, X'84C') Result of commit operation is pending.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_DISC_LOAD_ERROR
(2138, X'85A') Unable to load adapter disconnection module.

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_INIT_ERROR
(2375, X'947') API exit initialization failed.

MQRC_API_EXIT_TERM_ERROR
(2376, X'948') API exit termination failed.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_OUTCOME_MIXED
(2123, X'84B') Result of commit or back-out operation is mixed.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. If an MQDISC call is issued when the connection still has objects open under that connection, the queue manager closes those objects, with the close options set to MQCO_NONE.
2. If the application ends with uncommitted changes in a unit of work, the disposition of those changes depends on how the application ends:

   a. If the application issues the MQDISC call before ending:

      - For a queue manager-coordinated unit of work, the queue manager issues the MQCMIT call on behalf of the application. The unit of work is committed if possible, and backed out if not.
      - For an externally coordinated unit of work, there is no change in the status of the unit of work; however, the queue manager typically indicates that the unit of work must be committed when asked by the unit-of-work coordinator.

        On z/OS, CICS, IMS (other than batch DL/1 programs), and RRS applications are like this.

   b. If the application ends normally but without issuing the MQDISC call, the action taken depends on the environment:

      - On z/OS, except for MQ Java or MQ JMS applications, the actions described in note 2a occur.
      - In all other cases, the actions described in note 2c occur.

      Because of the differences between environments, ensure that applications that you want to port either commit or back out the unit of work before they end.

   c. If the application ends *abnormally* without issuing the MQDISC call, the unit of work is backed out.
3. On z/OS, the following points apply:

   - CICS applications do not have to issue the MQDISC call to disconnect from the queue manager, because the CICS system itself connects to the queue manager, and the MQDISC call has no effect on this connection.

- CICS, IMS (other than batch DL/1 programs), and RRS applications use units of work that are coordinated by an external unit-of-work coordinator. As a result, the MQDISC call does not affect the status of the unit of work (if any) that exists when the call is issued.

  However the MQDISC call *does* indicate the end of use of the connection tag *ConnTag* that was associated with the connection by an earlier MQCONNX call issued by the application. If there is an active unit of work that references the connection tag when the MQDISC call is issued, the call completes with completion code MQCC_WARNING and reason code MQRC_CONN_TAG_NOT_RELEASED. The connection tag does not become available for reuse until the external unit-of-work coordinator has resolved the unit of work.

Note: In CICS, MQOP_START is not supported. Instead, use the MQOP_START_WAIT function call.

C invocation

```
MQDISC (&Hconn, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQDISC' USING HCONN, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQDISC (Hconn, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn     fixed bin(31);  /* Connection handle */
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

System/390 assembler invocation

```
CALL MQDISC,(HCONN,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS  F  Connection handle
COMPCODE  DS  F  Completion code
REASON    DS  F  Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQDISC Hconn, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn    As Long 'Connection handle'
Dim CompCode As Long 'Completion code'
Dim Reason   As Long 'Reason code qualifying CompCode'
```

MQDLTMH - Delete message handle

The MQDLTMH call deletes a message handle and is the inverse of the MQCRTMH call.

Syntax

`MQDLTMH` (*Hconn*, *Hmsg*, *DltMsgHOpts*, *CompCode*, *Reason*)

Parameters

Hconn
Type: MQHCONN - input

This handle represents the connection to the queue manager.

The value must match the connection handle that was used to create the message handle specified in the **`Hmsg`** parameter.

If the message handle was created using MQHC_UNASSOCIATED_HCONN then a valid connection must be established on the thread deleting the message handle, otherwise the call fails with MQRC_CONNECTION_BROKEN.

Hmsg
Type: MQHMSG - input/output

This is the message handle to be deleted. The value was returned by a previous MQCRTMH call.

On successful completion of the call, the handle is set to an invalid value for the environment. This value is:

MQHM_UNUSABLE_HMSG
Unusable message handle.

The message handle cannot be deleted if another IBM MQ call is in progress that was passed the same message handle.

DltMsgHOpts
Type: MQDMHO - input

See MQDMHO for details.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CONNECTION_BROKEN
(2009, X'07D9') Connection to queue manager lost.

MQRC_DMHO_ERROR
(2462, X'099E') Delete message handle options structure not valid.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle pointer not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C invocation

```
MQDLTMH (Hconn, &Hmsg, &DltMsgHOpts, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;       /* Connection handle */
MQHMSG   Hmsg;        /* Message handle */
MQDMHO   DltMsgHOpts; /* Options that control the action of MQDLTMH */
MQLONG   CompCode;    /* Completion code */
MQLONG   Reason;      /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQDLTMH' USING HCONN, HMSG, DLTMSGHOPTS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**  Connection handle
01   HCONN   PIC S9(9) BINARY.

**  Options that control the action of MQDLTMH
01   DLTMSGHOPTS.
COPY CMQDMHOL.

**  Completion code
```

```
01  COMPCODE   PIC S9(9) BINARY.

** Reason code qualifying COMPCODE
01   REASON      PIC S9(9) BINARY.
```

PL/I invocation

```
call MQDLTMH (Hconn, Hmsg, DltMsgHOpts, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn          /* Connection handle */
dcl Hmsg           /* Message handle */
dcl DltMsgHOpts like MQDMHO;    /* Options that control the action of MQDLTMH */
dcl CompCode       /* Completion code */
dcl Reason         /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQDLTMH,(HCONN,HMSG,DLTMSGHOPTS,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN          DS        F  Connection handle
HMSG           DS        D  Message handle
DLTMSGHOPTS    CMQDMHOA  ,  Options that control the action of MQDLTMH
COMPCODE       DS        F  Completion code
REASON         DS        F  Reason code qualifying COMPCODE
```

MQDLTMP - Delete message property

The MQDLTMP call deletes a property from a message handle and is the inverse of the MQSETMP call.

Syntax

MQDLTMP (*Hconn*, *Hmsg*, *DltPropOpts*, *Name*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created using MQHC_UNASSOCIATED_HCONN then a valid connection must be established on the thread deleting the message handle otherwise the call fails with MQRC_CONNECTION_BROKEN.

Hmsg

Type: MQHMSG - input

This is the message handle containing the property to be deleted. The value was returned by a previous MQCRTMH call.

DltPropOpts

Type: MQDMPO - input

See the MQDMPO data type for details.

Name
Type: MQCHARV - input

The name of the property to delete. See Property names for further information about property names.

Wildcards are not allowed in the property name.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_PROPERTY_NOT_AVAILABLE
(2471, X'09A7') Property not available.

MQRC_RFH_FORMAT_ERROR
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'0852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'086D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CONNECTION_BROKEN
(2009, X'07D9') Connection to queue manager lost.

MQRC_DMPO_ERROR
(2481, X'09B1') Delete message property options structure not valid.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_PROPERTY_NAME_ERROR
(2442, X'098A') Invalid property name.

MQRC_SOURCE_CCSID_ERROR
(2111, X'083F') Property name coded character set identifier not valid.

MQRC_UNEXPECTED_ERROR
(2195, X'0893') Unexpected error occurred.

For detailed information about these codes, see:

- Messages and reason codes for IBM MQ for z/OS
- API completion and reason codes for other IBM MQ platforms

.

C invocation

```
MQDLTMP (Hconn, Hmsg, &DltPropOpts, &Name, &CompCode, &Reason)
```

Declare the parameters as follows:

```
MQHCONN Hconn;       /* Connection handle */
MQHMSG  Hmsg;        /* Message handle */
MQDMPO  DltPropOpts; /* Options that control the action of MQDLTMP */
MQCHARV Name;        /* Property name */
MQLONG  CompCode;    /* Completion code */
MQLONG  Reason;      /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQDLTMP' USING HCONN, HMSG, DLTPROPOPTS, NAME, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN    PIC S9(9) BINARY.
**   Message handle
 01  HMSG         PIC S9(18) BINARY.
**   Options that control the action of MQDLTMP
 01  DLTPROPOPTS.
     COPY CMQDMPOV.
**   Property name
 01  NAME.
     COPY CMQCHRVV.
**   Completion code
 01  COMPCODE PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON   PIC S9(9) BINARY.
```

PL/I invocation

```
call MQDLTMP (Hconn, Hmsg, DltPropOpts, Name, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn       fixed bin(31); /* Connection handle */
dcl Hmsg        fixed bin(63); /* Message handle */
dcl DltPropOpts like MQDMPO;   /* Options that control the action of MQDLTMP */
dcl Name        like MQCHARV;  /* Property name */
dcl CompCode    fixed bin(31); /* Completion code */
dcl Reason      fixed bin(31); /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQDLTMP,(HCONN,HMSG,DLTPROPOPTS,NAME,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN        DS         F     Connection handle
HMSG         DS         D     Message handle
DLTPROPOPTS  CMQDMPOA   ,     Options that control the action of MQDLTMP
NAME         CMQCHRVA   ,     Property name
COMPCODE     DS         F     Completion code
REASON       DS         F     Reason code qualifying COMPCODE
```

MQGET - Get message

The MQGET call retrieves a message from a local queue that has been opened using the MQOPEN call.

Syntax

MQGET (*Hconn*, *Hobj*, *MsgDesc*, *GetMsgOpts*, *BufferLength*, *Buffer*, *DataLength*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Hobj

Type: MQHOBJ - input

This handle represents the queue from which a message is to be retrieved. The value of *Hobj* was returned by a previous MQOPEN call. The queue must have been opened with one or more of the following options (see "MQOPEN - Open object" on page 720 for details):

- MQOO_INPUT_SHARED
- MQOO_INPUT_EXCLUSIVE
- MQOO_INPUT_AS_Q_DEF
- MQOO_BROWSE

MsgDesc

Type: MQMD - input/output

This structure describes the attributes of the message required, and the attributes of the message retrieved. See "MQMD - Message descriptor" on page 413 for details.

If *BufferLength* is less than the message length, *MsgDesc* is filled by the queue manager, whether MQGMO_ACCEPT_TRUNCATED_MSG is specified on the **GetMsgOpts** parameter (see MQGMO - Options field).

If the application provides a version-1 MQMD, the message returned has an MQMDE prefixed to the application message data, but only if one or more of the fields in the MQMDE has a nondefault value. If all the fields in the MQMDE have default values, the MQMDE is omitted. A format name of MQFMT_MD_EXTENSION in the *Format* field in MQMD indicates that an MQMDE is present.

The application does not need to provide an MQMD structure if a valid message handle is supplied in the *MsgHandle* field. If nothing is provided in this field, the descriptor of the message is taken from the descriptor associated with the message handles.

If the application provides a message handle rather than an MQMD structure, and specifies MQGMO_PROPERTIES_FORCE_MQRFH2, the call fails with reason code MQRC_MD_ERROR. The call also fails, with reason code MQRC_MD_ERROR, if the application does not provide an MQMD structure and specifies MQGMO_PROPERTIES_AS_Q_DEF, and the **PropertyControl** queue attribute is MQPROP_FORCE_MQRFH2.

If match options are specified and the message descriptor associated with the message handle is being used, the input fields used for matching come from the message handle.

GetMsgOpts

Type: MQGMO - input/output

See “MQGMO - Get-message options” on page 360 for details.

BufferLength

Type: MQLONG - input

This is the length in bytes of the *Buffer* area. Specify zero for messages that have no data, or if the message is to be removed from the queue and the data discarded (you must specify MQGMO_ACCEPT_TRUNCATED_MSG in this case).

Note: The length of the longest message that it is possible to read from the queue is given by the **MaxMsgLength** queue attribute; see “Attributes for queues” on page 823.

Buffer

Type: MQBYTExBufferLength - output

This is the area to contain the message data. Align the buffer on a boundary appropriate to the nature of the data in the message. 4 byte alignment is suitable for most messages (including messages containing IBM MQ header structures), but some messages might require more stringent alignment. For example, a message containing a 64 bit binary integer might require 8-byte alignment.

If *BufferLength* is less than the message length, as much of the message as possible is moved into **Buffer**. This happens whether MQGMO_ACCEPT_TRUNCATED_MSG is specified on the **GetMsgOpts** parameter (see MQGMO - Options field for more information).

The character set and encoding of the data in **Buffer** are given by the *CodedCharSetId* and *Encoding* fields returned in the **MsgDesc** parameter. If these values are different from the values required by the receiver, the receiver must convert the application message data to the character set and encoding required. The MQGMO_CONVERT option can be used (with a user-written exit if necessary) to convert the message data; see “MQGMO - Get-message options” on page 360 for details of this option.

Note: All the other parameters on the MQGET call are in the character set and encoding of the local queue manager (given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE).

If the call fails, the contents of the buffer might still have changed.

In the C programming language, the parameter is declared as a pointer-to-void: the address of any type of data can be specified as the parameter.

If the **BufferLength** parameter is zero, *Buffer* is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler can be null.

DataLength

Type: MQLONG - output

This is the length in bytes of the application data *in the message*. If this value is greater than *BufferLength*, only *BufferLength* bytes are returned in the **Buffer** parameter (that is, the message is truncated). If the value is zero, the message contains no application data.

If *BufferLength* is less than the message length, *DataLength* is still completed by the queue manager, whether MQGMO_ACCEPT_TRUNCATED_MSG is specified on the **GetMsgOpts** parameter

(see MQGMO - Options field for more information). This allows the application to determine the size of the buffer required to accommodate the message data, and then reissue the call with a buffer of the appropriate size.

However, if the MQGMO_CONVERT option is specified, and the converted message data is too long to fit in *Buffer*, the value returned for *DataLength* is:

- The length of the *unconverted* data, for queue manager defined formats.

  In this case, if the nature of the data causes it to expand during conversion, the application must allocate a buffer bigger than the value returned by the queue manager for *DataLength*.
- The value returned by the data-conversion exit, for application-defined formats.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason codes listed are the ones that the queue manager can return for the **Reason** parameter. If the application specifies the MQGMO_CONVERT option, and a user-written exit is invoked to convert some or all the message data, the exit decides what value is returned for the **Reason** parameter. As a result, values other than those values documented are possible.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_CONVERTED_MSG_TOO_BIG
(2120, X'848') Converted data too large for buffer.

MQRC_CONVERTED_STRING_TOO_BIG
(2190, X'88E') Converted string too large for field.

MQRC_DBCS_ERROR
(2150, X'866') DBCS string not valid.

MQRC_FORMAT_ERROR
(2110, X'83E') Message format not valid.

MQRC_INCOMPLETE_GROUP
(2241, X'8C1') Message group not complete.

MQRC_INCOMPLETE_MSG
(2242, X'8C2') Logical message not complete.

MQRC_INCONSISTENT_CCSIDS
(2243, X'8C3') Message segments have differing CCSIDs.

MQRC_INCONSISTENT_ENCODINGS
(2244, X'8C4') Message segments have differing encodings.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_MSG_TOKEN_ERROR
(2331, X'91B') Invalid use of message token.

MQRC_NO_MSG_LOCKED
(2209, X'8A1') No message locked.

MQRC_NOT_CONVERTED
(2119, X'847') Message data not converted.

MQRC_OPTIONS_CHANGED
(nnnn, X'xxx') Options that were required to be consistent have been changed.

MQRC_PARTIALLY_CONVERTED
(2272, X'8E0') Message data partially converted.

MQRC_SIGNAL_REQUEST_ACCEPTED
(2070, X'816') No message returned (but signal request accepted).

MQRC_SOURCE_BUFFER_ERROR
(2145, X'861') Source buffer parameter not valid.

MQRC_SOURCE_CCSID_ERROR
(2111, X'83F') Source coded character set identifier not valid.

MQRC_SOURCE_DECIMAL_ENC_ERROR
(2113, X'841') Packed-decimal encoding in message not recognized.

MQRC_SOURCE_FLOAT_ENC_ERROR
(2114, X'842') Floating-point encoding in message not recognized.

MQRC_SOURCE_INTEGER_ENC_ERROR
(2112, X'840') Source integer encoding not recognized.

MQRC_SOURCE_LENGTH_ERROR
(2143, X'85F') Source length parameter not valid.

MQRC_TARGET_BUFFER_ERROR
(2146, X'862') Target buffer parameter not valid.

MQRC_TARGET_CCSID_ERROR
(2115, X'843') Target coded character set identifier not valid.

MQRC_TARGET_DECIMAL_ENC_ERROR
(2117, X'845') Packed-decimal encoding specified by receiver not recognized.

MQRC_TARGET_FLOAT_ENC_ERROR
(2118, X'846') Floating-point encoding specified by receiver not recognized.

MQRC_TARGET_INTEGER_ENC_ERROR
(2116, X'844') Target integer encoding not recognized.

MQRC_TRUNCATED_MSG_ACCEPTED
(2079, X'81F') Truncated message returned (processing completed).

MQRC_TRUNCATED_MSG_FAILED
(2080, X'820') Truncated message returned (processing not completed).

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_CONV_LOAD_ERROR
(2133, X'855') Unable to load data conversion services modules.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BACKED_OUT
(2003, X'7D3') Unit of work backed out.

MQRC_BUFFER_ERROR
(2004, X'7D4') Buffer parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_NOT_AVAILABLE
(2345, X'929') Coupling facility not available.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CF_STRUC_LIST_HDR_IN_USE
(2347, X'92B') Coupling-facility structure list-header in use.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CORREL_ID_ERROR
(2207, X'89F') Correlation-identifier error.

MQRC_DATA_LENGTH_ERROR
(2010, X'7DA') Data length parameter not valid.

MQRC_DB2_NOT_AVAILABLE
(2342, X'926') Db2 subsystem not available.

MQRC_GET_INHIBITED
(2016, X'7E0') Gets inhibited for the queue.

MQRC_GLOBAL_UOW_CONFLICT
(2351, X'92F') Global units of work conflict.

MQRC_GMO_ERROR
(2186, X'88A') Get-message options structure not valid.

MQRC_HANDLE_IN_USE_FOR_UOW
(2353, X'931') Handle in use for global unit of work.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_INCONSISTENT_BROWSE
(2259, X'8D3') Inconsistent browse specification.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_INVALID_MSG_UNDER_CURSOR
(2246, X'8C6') Message under cursor not valid for retrieval.

MQRC_LOCAL_UOW_CONFLICT
(2352, X'930') Global unit of work conflicts with local unit of work.

MQRC_MATCH_OPTIONS_ERROR
(2247, X'8C7') Match options not valid.

MQRC_MD_ERROR
(2026, X'7EA') Message descriptor not valid.

MQRC_MSG_ID_ERROR
(2206, X'89E') Message-identifier error.

MQRC_MSG_SEQ_NUMBER_ERROR
(2250, X'8CA') Message sequence number not valid.

MQRC_MSG_TOKEN_ERROR
(2331, X'91B') Use of message token not valid.

MQRC_NO_MSG_AVAILABLE
(2033, X'7F1') No message available.

MQRC_NO_MSG_UNDER_CURSOR
(2034, X'7F2') Browse cursor not positioned on message.

MQRC_NOT_OPEN_FOR_BROWSE
(2036, X'7F4') Queue not open for browse.

MQRC_NOT_OPEN_FOR_INPUT
(2037, X'7F5') Queue not open for input.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_INDEX_TYPE_ERROR
(2394, X'95A') Queue has wrong index type.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SECOND_MARK_NOT_ALLOWED
(2062, X'80E') A message is already marked.

MQRC_SIGNAL_OUTSTANDING
(2069, X'815') Signal outstanding for this handle.

MQRC_SIGNAL1_ERROR
(2099, X'833') Signal field not valid.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_SYNCPOINT_LIMIT_REACHED
(2024, X'7E8') No more messages can be handled within current unit of work.

MQRC_SYNCPOINT_NOT_AVAILABLE
(2072, X'818') sync point support not available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UOW_ENLISTMENT_ERROR
(2354, X'932') Enlistment in global unit of work failed.

MQRC_UOW_MIX_NOT_SUPPORTED
(2355, X'933') Mixture of unit-of-work calls not supported.

MQRC_UOW_NOT_AVAILABLE
(2255, X'8CF') Unit of work not available for the queue manager to use.

MQRC_WAIT_INTERVAL_ERROR
(2090, X'82A') Wait interval in MQGMO not valid.

MQRC_WRONG_GMO_VERSION
(2256, X'8D0') Wrong version of MQGMO supplied.

MQRC_WRONG_MD_VERSION
(2257, X'8D1') Wrong version of MQMD supplied.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. The message retrieved is normally deleted from the queue. This deletion can occur as part of the MQGET call itself, or as part of a sync point.

   The browse options are: MQGMO_BROWSE_FIRST, MQGMO_BROWSE_NEXT, and MQGMO_BROWSE_MSG_UNDER_CURSOR.

2. If the MQGMO_LOCK option is specified with one of the browse options, the browsed message is locked so that it is visible only to this handle.

   If the MQGMO_UNLOCK option is specified, a previously locked message is unlocked. No message is retrieved in this case, and the **MsgDesc**, **BufferLength**, **Buffer**, and **DataLength** parameters are not checked or altered.

3. For applications issuing an MQGET call, the message retrieved can be lost if the application terminates abnormally or the connection is severed while processing the call. This issue arises because the surrogate running on the same platform as the queue manager that issues the MQGET call on behalf of the application cannot detect the loss of the application until the surrogate is about to return the message to the application, after the message has been removed from the queue. This issue can occur for both persistent messages and nonpersistent messages.

   To eliminate the risk of losing messages in this way, always retrieve messages within units of work. That is, by specifying the MQGMO_SYNCPOINT option on the MQGET call, and using the MQCMIT or MQBACK calls to commit or back out the unit of work when message processing is complete. If MQGMO_SYNCPOINT is specified, and the client terminates abnormally or the connection is severed, the surrogate backs out the unit of work on the queue manager and the message is reinstated on the queue. For more information about sync points, see Syncpoint considerations in IBM MQ applications.

   This situation can arise with IBM MQ clients as well as with applications that are running on the same platform as the queue manager.

4. If an application puts a sequence of messages on a particular queue within a single unit of work, and then commits that unit of work successfully, the messages become available for retrieval as follows:

   - If the queue is a *nonshared queue* (that is, a local queue), all messages within the unit of work become available at the same time.
   - If the queue is a *shared queue*, messages within the unit of work become available in the order in which they were put, but not all at the same time. When the system is heavily laden, it is possible for the first message in the unit of work to be retrieved successfully, but for the MQGET call for the second or subsequent message in the unit of work to fail with MQRC_NO_MSG_AVAILABLE. If this issue occurs, the application must wait a short while and then try the operation again.

5. If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if certain conditions are satisfied. See MQPUT usage notes for details. If the conditions are satisfied, the messages are presented to the receiving application in the order in which they were sent, if:

   - Only one receiver is getting messages from the queue.

     If there are two or more applications getting messages from the queue, they must agree with the sender the mechanism to be used to identify messages that belong to a sequence. For example, the sender might set all the `CorrelId` fields in the messages in a sequence to a value that was unique to that sequence of messages.
   - The receiver does not deliberately change the order of retrieval, for example by specifying a particular `MsgId` or `CorrelId`.

   If the sending application puts the messages as a message group, the messages are presented to the receiving application in the correct order if the receiving application specifies the MQGMO_LOGICAL_ORDER option on the MQGET call. For more information about message groups, see:

   - MQMD - MsgFlags field
   - MQPMO_LOGICAL_ORDER
   - MQGMO_LOGICAL_ORDER

   If the user is getting messages in a group under sync point, they must ensure that the complete group is processed before attempting to finish the transaction.

6. Applications must test for the feedback code MQFB_QUIT in the `Feedback` field of the **`MsgDesc`** parameter, and end if they find this value. See MQMD - Feedback field for more information.

7. If the queue identified by `Hobj` was opened with the MQOO_SAVE_ALL_CONTEXT option, and the completion code from the MQGET call is MQCC_OK or MQCC_WARNING, the context associated with the queue handle `Hobj` is set to the context of the message that has been retrieved (unless the MQGMO_BROWSE_FIRST, MQGMO_BROWSE_NEXT, or MQGMO_BROWSE_MSG_UNDER_CURSOR option is set, in which case the context is marked as not available).

   You can use the saved context on a subsequent MQPUT or MQPUT1 call by specifying the MQPMO_PASS_IDENTITY_CONTEXT or MQPMO_PASS_ALL_CONTEXT options. This enables the context of the message received to be transferred in whole or in part to another message (for example, when the message is forwarded to another queue). For more information about message context, see Message context.

8. If you include the MQGMO_CONVERT option in the **`GetMsgOpts`** parameter, the application message data is converted to the representation requested by the receiving application, before the data is placed in the **`Buffer`** parameter:

   - The `Format` field in the control information in the message identifies the structure of the application data, and the `CodedCharSetId` and `Encoding` fields in the control information in the message specify its character-set identifier and encoding.
   - The application issuing the MQGET call specifies in the `CodedCharSetId` and `Encoding` fields in the **`MsgDesc`** parameter the character-set identifier and encoding to which to convert the application message data.

When conversion of the message data is necessary, the conversion is performed either by the queue manager itself or by a user-written exit, depending on the value of the `Format` field in the control information in the message:

- The following format names are formats that are converted by the queue manager; these formats are called "built-in" formats:
  - MQFMT_ADMIN
  - MQFMT_CICS (z/OS only)
  - MQFMT_COMMAND_1
  - MQFMT_COMMAND_2
  - MQFMT_DEAD_LETTER_HEADER
  - MQFMT_DIST_HEADER
  - MQFMT_EVENT version 1
  - MQFMT_EVENT version 2 (z/OS only)
  - MQFMT_IMS
  - MQFMT_IMS_VAR_STRING
  - MQFMT_MD_EXTENSION
  - MQFMT_PCF
  - MQFMT_REF_MSG_HEADER
  - MQFMT_RF_HEADER
  - MQFMT_RF_HEADER_2
  - MQFMT_STRING
  - MQFMT_TRIGGER
  - MQFMT_WORK_INFO_HEADER (z/OS only)
  - MQFMT_XMIT_Q_HEADER
- The format name MQFMT_NONE is a special value that indicates that the nature of the data in the message is undefined. As a consequence, the queue manager does not attempt conversion when the message is retrieved from the queue.

  Note: If MQGMO_CONVERT is specified on the MQGET call for a message that has a format name of MQFMT_NONE, and the character set or encoding of the message differs from that specified in the **MsgDesc** parameter, the message is returned in the **Buffer** parameter (assuming no other errors), but the call completes with completion code MQCC_WARNING and reason code MQRC_FORMAT_ERROR.

  You can use MQFMT_NONE either when the nature of the message data means that it does not require conversion, or when the sending and receiving applications have agreed between themselves the form in which to send the message data.
- All other format names pass the message to a user-written exit for conversion. The exit has the same name as the format, apart from environment-specific additions. User-specified format names must not begin with the letters IBM MQ.

  See "Data-conversion exit" on page 894 for details of the data-conversion exit.

User data in the message can be converted between any supported character sets and encodings. However, be aware that, if the message contains one or more IBM MQ header structures, the message cannot be converted from or to a character set that has double-byte or multi-byte characters for any of the characters that are valid in queue names. Reason code MQRC_SOURCE_CCSID_ERROR or MQRC_TARGET_CCSID_ERROR results if this is attempted, and the message is returned unconverted. Unicode character set UTF-16 is an example of such a character set.

On return from MQGET, the following reason code indicates that the message was converted successfully:

- MQRC_NONE

The following reason code indicates that the message might have been converted successfully; the application must check the `CodedCharSetId` and `Encoding` fields in the **`MsgDesc`** parameter to find out:

- MQRC_TRUNCATED_MSG_ACCEPTED

All other reason codes indicate that the message was not converted.

Note: The interpretation of this reason code is true for conversions performed by a user-written exit only if the exit conforms to the processing guidelines described in "Data-conversion exit" on page 894.

9. When using the object-oriented interface to get messages, you can choose not to specify a buffer to hold the message data for an MQGET call. However, in versions of IBM MQ, prior to IBM WebSphere MQ 7.0, it was possible for MQGET to fail with reason code MQRC_CONVERTED_MSG_TO_BIG, even when a buffer was not specified. From IBM WebSphere MQ 7.0, when you get a message using an object-oriented application without restricting the size of the receive message buffer, the application does not fail with MQRC_CONVERTED_MSG_TOO_BIG, and receives the converted message. This is true of the following environments:

   - .NET, including fully managed applications
   - C++
   - Java (IBM MQ classes for Java)

   Note: For all clients, if the value of `sharingConversations` is zero, the channel operates as it did before IBM WebSphere MQ 7.0, and message handling reverts to IBM WebSphere MQ 6 behavior. In this situation, if the buffer is too small to receive the converted message, the unconverted message is returned, with reason code MQRC_CONVERTED_MSG_TOO_BIG. For more information about `sharingConversations`, see Using sharing conversations in a client application.

10. For the built-in formats, the queue manager can perform *default conversion* of character strings in the message when the MQGMO_CONVERT option is specified. Default conversion allows the queue manager to use an installation-specified default character set that approximates the actual character set, when converting string data. As a result, the MQGET call can succeed with completion code MQCC_OK, instead of completing with MQCC_WARNING and reason code MQRC_SOURCE_CCSID_ERROR or MQRC_TARGET_CCSID_ERROR.

    Note: The result of using an approximate character set to convert string data is that some characters might be converted incorrectly. To avoid this, use characters in the string that are common to both the actual character set and the default character set.

    Default conversion applies both to the application message data and to character fields in the MQMD and MQMDE structures:

    - Default conversion of the application message data occurs only when all the following statements are true:
      - The application specifies MQGMO_CONVERT.
      - The message contains data that must be converted either from or to a character set that is not supported.
      - Default conversion was enabled when the queue manager was installed or restarted.
    - Default conversion of the character fields in the MQMD and MQMDE structures occurs as necessary, if default conversion is enabled for the queue manager. The conversion is performed even if the MQGMO_CONVERT option is not specified by the application on the MQGET call.

11. For the Visual Basic programming language, the following points apply:

    - If the size of the **`Buffer`** parameter is less than the length specified by the **`BufferLength`** parameter, the call fails with reason code MQRC_STORAGE_NOT_AVAILABLE.

- The **Buffer** parameter is declared as being of type `String`. If the data to be retrieved from the queue is not of type `String`, use the MQGETAny call in place of MQGET.

  The MQGETAny call has the same parameters as the MQGET call, except that the **Buffer** parameter is declared as being of type `Any`, allowing any type of data to be retrieved. However, this means that `Buffer` cannot be checked to ensure that it is at least `BufferLength` bytes in size.

12. Not all MQGET options are supported when read ahead is enabled. The following table indicated which options are allowed and whether they can be altered between MQGET calls.

Table 548. MQGET options permitted when read ahead is enabled

	Permitted when read ahead is enabled and can be altered between MQGET calls	**Permitted when read ahead is enabled but cannot be altered between MQGET calls** [a]	**MQGET options that are not permitted when read ahead is enabled** [b]
MQGET MD values	MsgId [c] CorrelId [c]	Encoding CodedCharSetId	
MQGET MQGMO options	MQGMO_WAIT MQGMO_NO_WAIT MQGMO_FAIL_IF_QUIESCING MQGMO_BROWSE_FIRST [d] MQGMO_BROWSE_NEXT [d] MQGMO_BROWSE_MESSAGE _UNDER_CURSOR [d]	MQGMO_SYNCPOINT_IF_PERSISTENT MQGMO_NO_SYNCPOINT MQGMO_ACCEPT_TRUNCATED_MSG MQGMO_CONVERT MQGMO_LOGICAL_ORDER MQGMO_COMPLETE_MSG MQGMO_ALL_MSGS_AVAILABLE MQGMO_ALL_SEGMENTS_AVAILABLE MQGMO_MARK_BROWSE_HANDLE MQGMO_MARK_BROWSE_CO_OP MQGMO_UNMARK_BROWSE_CO_OP MQGMO_UNMARK_BROWSE_HANDLE MQGMO_UNMARKED_BROWSE_MSG MQGMO_PROPERTIES_FORCE_MQRFH2 MQGMO_NO_PROPERTIES MQGMO_PROPERTIES_IN_HANDLE MQGMO_PROPERTIES_COMPATIBILITY	MQGMO_SET_SIGNAL MQGMO_SYNCPOINT MQGMO_MARK_SKIP _BACKOUT MQGMO_MSG_UNDER _CURSOR [d] MQGMO_LOCK MQGMO_UNLOCK
MQGMO values		MsgHandle	

   a. If these options are altered between MQGET calls an MQRC_OPTIONS_CHANGED reason code is returned.
   b. If these options are specified on the first MQGET call then read ahead is disabled. If these options are specified on a subsequent MQGET call a reason code MQRC_OPTIONS_ERROR is returned.
   c. The client applications need to be aware that if the MsgId and CorrelId values are altered between MQGET calls messages with the previous values might have already been sent to the client and remain in the client read ahead buffer until consumed (or automatically purged).
   d. The first MQGET call determines whether messages are to be browsed or got from a queue when read ahead is enabled. If the application attempts to use a combination of browse and get an MQRC_OPTIONS_CHANGED reason code is returned.
   e. MQGMO_MSG_UNDER_CURSOR is not possible with read ahead. Messages can be browsed or got when read ahead is enabled but not a combination of both.

13. Applications can destructively get uncommitted messages only if those messages are put in the same local unit of work as the get. Applications cannot get uncommitted messages nondestructively.
14. Messages under a browse cursor can be retrieved in a unit of work. It is not possible to retrieve an uncommitted message in this way.

C invocation

```
MQGET (Hconn, Hobj, &MsgDesc, &GetMsgOpts, BufferLength, Buffer,
      &DataLength, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQHOBJ   Hobj;          /* Object handle */
MQMD     MsgDesc;       /* Message descriptor */
MQGMO    GetMsgOpts;    /* Options that control the action of MQGET */
MQLONG   BufferLength;  /* Length in bytes of the Buffer area */
MQBYTE   Buffer[n];     /* Area to contain the message data */
MQLONG   DataLength;    /* Length of the message */
```

```
MQLONG   CompCode;       /* Completion code */
MQLONG   Reason;         /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQGET' USING HCONN, HOBJ, MSGDESC, GETMSGOPTS, BUFFERLENGTH,
BUFFER, DATALENGTH, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Object handle
 01  HOBJ          PIC S9(9) BINARY.
**   Message descriptor
 01  MSGDESC.
     COPY CMQMDV.
**   Options that control the action of MQGET
 01  GETMSGOPTS.
     COPY CMQGMOV.
**   Length in bytes of the BUFFER area
 01  BUFFERLENGTH  PIC S9(9) BINARY.
**   Area to contain the message data
 01  BUFFER        PIC X(n).
**   Length of the message
 01  DATALENGTH    PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQGET (Hconn, Hobj, MsgDesc, GetMsgOpts, BufferLength, Buffer,
           DataLength, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn         fixed bin(31);  /* Connection handle */
dcl Hobj          fixed bin(31);  /* Object handle */
dcl MsgDesc       like MQMD;      /* Message descriptor */
dcl GetMsgOpts    like MQGMO;     /* Options that control the action of
                                     MQGET */
dcl BufferLength  fixed bin(31);  /* Length in bytes of the Buffer
                                     area */
dcl Buffer        char(n);        /* Area to contain the message data */
dcl DataLength    fixed bin(31);  /* Length of the message */
dcl CompCode      fixed bin(31);  /* Completion code */
dcl Reason        fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
         CALL MQGET,(HCONN,HOBJ,MSGDESC,GETMSGOPTS,BUFFERLENGTH,
               BUFFER,DATALENGTH,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN         DS       F      Connection handle
HOBJ          DS       F      Object handle
MSGDESC       CMQMDA   ,      Message descriptor
GETMSGOPTS    CMQGMOA  ,      Options that control the action of MQGET
BUFFERLENGTH  DS       F      Length in bytes of the BUFFER area
BUFFER        DS       CL(n)  Area to contain the message data
DATALENGTH    DS       F      Length of the message
```

```
COMPCODE      DS       F      Completion code
REASON        DS       F      Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQGET Hconn, Hobj, MsgDesc, GetMsgOpts, BufferLength, Buffer,
DataLength, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn        As Long   'Connection handle'
Dim Hobj         As Long   'Object handle'
Dim MsgDesc      As MQMD   'Message descriptor'
Dim GetMsgOpts   As MQGMO  'Options that control the action of MQGET'
Dim BufferLength As Long   'Length in bytes of the Buffer area'
Dim Buffer       As String 'Area to contain the message data'
Dim DataLength   As Long   'Length of the message'
Dim CompCode     As Long   'Completion code'
Dim Reason       As Long   'Reason code qualifying CompCode'
```

MQINQ - Inquire object attributes

The MQINQ call returns an array of integers and a set of character strings containing the attributes of an object.

The following types of object are valid:

- Queue manager
- Queue
- Namelist
- Process definition

Syntax

MQINQ (*Hconn*, *Hobj*, *SelectorCount*, *Selectors*, *IntAttrCount*, *IntAttrs*, *CharAttrLength*, *CharAttrs*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Hobj

Type: MQHOBJ - input

This handle represents the object (of any type) with attributes that are required. The handle must be returned by a previous MQOPEN call that specified the MQOO_INQUIRE option.

SelectorCount

Type: MQLONG - input

This is the count of selectors that are supplied in the *Selectors* array. It is the number of attributes that are to be returned. Zero is a valid value. The maximum number allowed is 256.

Selectors

Type: MQLONG x *SelectorCount* - input

This is an array of **SelectorCount** attribute selectors; each selector identifies an attribute (integer or character) with a value that is required.

Each selector must be valid for the type of object that *Hobj* represents, otherwise the call fails with completion code MQCC_FAILED and reason code MQRC_SELECTOR_ERROR.

In the special case of queues:

- If the selector is not valid for queues of any type, the call fails with completion code MQCC_FAILED and reason code MQRC_SELECTOR_ERROR.
- If the selector applies only to queues of types other than the type of the object, the call succeeds with completion code MQCC_WARNING and reason code MQRC_SELECTOR_NOT_FOR_TYPE.
- If the queue being inquired is a cluster queue, the selectors that are valid depend on how the queue was resolved; see "Usage notes" on page 707 for further details.

You can specify selectors in any order. Attribute values that correspond to integer attribute selectors (MQIA_* selectors) are returned in *IntAttrs* in the same order in which these selectors occur in *Selectors*. Attribute values that correspond to character attribute selectors (MQCA_* selectors) are returned in *CharAttrs* in the same order in which those selectors occur. MQIA_* selectors can be interleaved with the MQCA_* selectors; only the relative order within each type is important.

Note:

1. The integer and character attribute selectors are allocated within two different ranges; the MQIA_* selectors reside within the range MQIA_FIRST through MQIA_LAST, and the MQCA_* selectors within the range MQCA_FIRST through MQCA_LAST.

   For each range, the constants MQIA_LAST_USED and MQCA_LAST_USED define the highest value that the queue manager accepts.
2. If all the MQIA_* selectors occur first, the same element numbers can be used to address corresponding elements in the *Selectors* and *IntAttrs* arrays.
3. If the **SelectorCount** parameter is zero, *Selectors* is not referred to. In this case, the parameter address passed by programs written in C or S/390 assembler might be null.

The attributes that can be inquired are listed in the following tables. For the MQCA_* selectors, the constant that defines the length in bytes of the resulting string in *CharAttrs* is provided in parentheses.

The tables that follow list the selectors, by object, in alphabetical order, as follows:

- Table 549 on page 695 MQINQ attribute selectors for queues
- Table 550 on page 698 MQINQ attribute selectors for namelists
- Table 551 on page 698 MQINQ attribute selectors for process definitions
- Table 552 on page 699 MQINQ attribute selectors for the queue manager

All selectors are supported on all IBM MQ platforms, except where indicated in the **Note** column as follows:

Not z/OS

Supported on all platforms **except** z/OS

z/OS

Supported **only** on z/OS

Table 549. MQINQ attribute selectors for queues

Selector	Length of field	Description	Note
MQCA_ALTERATION_DATE	MQ_DATE_LENGTH	Date of most recent alteration	
MQCA_ALTERATION_TIME	MQ_TIME_LENGTH	Time of most recent alteration	

Selector	Length of field	Description	Note
MQCA_BACKOUT_REQ_Q_NAME	MQ_Q_NAME_LENGTH	Excessive backout requeue name	
MQCA_BASE_Q_NAME	MQ_Q_NAME_LENGTH	Name of queue that alias resolves to	
MQCA_CF_STRUC_NAME	MQ_CF_STRUC_NAME_LENGTH	Coupling facility structure name	z/OS
MQCA_CLUS_CHL_NAME	MQ_CHANNEL_NAME_LENGTH	Name of the cluster-sender channel that uses this queue as a transmission queue.	
MQCA_CLUSTER_NAME	MQ_CLUSTER_NAME_LENGTH	Cluster name	
MQCA_CLUSTER_NAMELIST	MQ_NAMELIST_NAME_LENGTH	Cluster namelist	
MQCA_CREATION_DATE	MQ_CREATION_DATE_LENGTH	Queue creation date	
MQCA_CREATION_TIME	MQ_CREATION_TIME_LENGTH	Queue creation time	
MQCA_CUSTOM	MQ_CUSTOM_LENGTH	The custom attribute for new features	
MQCA_INITIATION_Q_NAME	MQ_Q_NAME_LENGTH	Initiation queue name	
MQCA_PROCESS_NAME	MQ_PROCESS_NAME_LENGTH	Name of process definition	
MQCA_Q_DESC	MQ_Q_DESC_LENGTH	Queue description	
MQCA_Q_NAME	MQ_Q_NAME_LENGTH	Queue name	
MQCA_REMOTE_Q_MGR_NAME	MQ_Q_MGR_NAME_LENGTH	Name of remote queue manager	
MQCA_REMOTE_Q_NAME	MQ_Q_NAME_LENGTH	Name of remote queue as known on remote queue manager	
MQCA_STORAGE_CLASS	MQ_STORAGE_CLASS_LENGTH	Name of storage class	z/OS
MQCA_TRIGGER_DATA	MQ_TRIGGER_DATA_LENGTH	Trigger data	
MQCA_XMIT_Q_NAME	MQ_Q_NAME_LENGTH	Transmission queue name	
MQIA_ACCOUNTING_Q	MQLONG	Controls collection of accounting data for queue	Not z/OS
MQIA_BACKOUT_THRESHOLD	MQLONG	Backout threshold	
MQIA_CLWL_Q_PRIORITY	MQLONG	Priority of queue	
MQIA_CLWL_Q_RANK	MQLONG	Rank of queue	
MQIA_CLWL_USEQ	MQLONG	Use remote queues	
MQIA_CURRENT_Q_DEPTH	MQLONG	Number of messages on queue	
MQIA_DEF_BIND	MQLONG	Default binding	
MQIA_DEF_INPUT_OPEN_OPTION	MQLONG	Default open-for-input option	

Table 549. MQINQ attribute selectors for queues (continued)

Table 549. MQINQ attribute selectors for queues (continued)			
Selector	**Length of field**	**Description**	**Note**
MQIA_DEF_PERSISTENCE	MQLONG	Default message persistence	
MQIA_DEF_PRIORITY	MQLONG	Default message priority	
MQIA_DEFINITION_TYPE	MQLONG	Queue definition type	
MQIA_DIST_LISTS	MQLONG	Distribution list support	Not z/OS
MQIA_HARDEN_GET_BACKOUT	MQLONG	Whether to harden backout count	
MQIA_INDEX_TYPE	MQLONG	Type of index maintained for queue	z/OS
MQIA_INHIBIT_GET	MQLONG	Whether get operations are allowed	
MQIA_INHIBIT_PUT	MQLONG	Whether put operations are allowed	
MQIA_MAX_MSG_LENGTH	MQLONG	Maximum message length	
MQIA_MAX_Q_DEPTH	MQLONG	Maximum number of messages allowed on queue	
MQIA_MSG_DELIVERY_SEQUENCE	MQLONG	Whether message priority is relevant	
MQIA_NPM_CLASS	MQLONG	Level of reliability for nonpersistent messages	
MQIA_OPEN_INPUT_COUNT	MQLONG	Number of MQOPEN calls that have the queue open for input	
MQIA_OPEN_OUTPUT_COUNT	MQLONG	Number of MQOPEN calls that have the queue open for output	
MQIA_PROPERTY_CONTROL	MQLONG	Property control attribute	
MQIA_Q_DEPTH_HIGH_EVENT	MQLONG	Control attribute for queue depth high events	Not z/OS
MQIA_Q_DEPTH_HIGH_LIMIT	MQLONG	High limit for queue depth	Not z/OS
MQIA_Q_DEPTH_LOW_EVENT	MQLONG	Control attribute for queue depth low events	Not z/OS
MQIA_Q_DEPTH_LOW_LIMIT	MQLONG	Low limit for queue depth	Not z/OS
MQIA_Q_DEPTH_MAX_EVENT	MQLONG	Control attribute for queue depth max events	Not z/OS
MQIA_Q_SERVICE_INTERVAL	MQLONG	Limit for queue service interval	Not z/OS
MQIA_Q_SERVICE_INTERVAL_EVENT	MQLONG	Control attribute for queue service interval events	Not z/OS
MQIA_Q_TYPE	MQLONG	Queue type	
MQIA_QSG_DISP	MQLONG	Queue sharing group disposition	z/OS
MQIA_RETENTION_INTERVAL	MQLONG	Queue retention interval	

Table 549. MQINQ attribute selectors for queues (continued)			
Selector	**Length of field**	**Description**	**Note**
MQIA_SCOPE	MQLONG	Queue definition scope	Not z/OS
MQIA_SHAREABILITY	MQLONG	Whether queue can be shared for input	
MQIA_STATISTICS_Q	MQLONG	Controls collection of statistics data for queue	Not z/OS
MQIA_TRIGGER_CONTROL	MQLONG	Trigger control	
MQIA_TRIGGER_DEPTH	MQLONG	Trigger depth	
MQIA_TRIGGER_MSG_PRIORITY	MQLONG	Threshold message priority for triggers	
MQIA_TRIGGER_TYPE	MQLONG	Trigger type	
MQIA_USAGE	MQLONG	Usage	

Table 550. MQINQ attribute selectors for namelists			
Selector	**Length of field**	**Description**	**Note**
MQCA_ALTERATION_DATE	MQ_DATE_LENGTH	Date of most-recent alteration	
MQCA_ALTERATION_TIME	MQ_TIME_LENGTH	Time of most-recent alteration	
MQCA_NAMELIST_DESC	MQ_NAMELIST_DESC_LENGTH	Namelist description	
MQCA_NAMELIST_NAME	MQ_NAMELIST_NAME_LENGTH	Name of namelist object	
MQIA_NAMELIST_TYPE	MQLONG	Namelist type	z/OS
MQCA_NAMES	MQ_Q_NAME_LENGTH x *Number of names in the list*	Names in the namelist	
MQIA_NAME_COUNT	MQLONG	Number of names in the namelist	
MQIA_QSG_DISP	MQLONG	Queue sharing group disposition	z/OS

Table 551. MQINQ attribute selectors for process definitions			
Selector	**Length of field**	**Description**	**Note**
MQCA_ALTERATION_DATE	MQ_DATE_LENGTH	Date of most-recent alteration	
MQCA_ALTERATION_TIME	MQ_TIME_LENGTH	Time of most-recent alteration	
MQCA_APPL_ID	MQ_PROCESS_APPL_ID_LENGTH	Application identifier	
MQCA_ENV_DATA	MQ_PROCESS_ENV_DATA_LENGTH	Environment data	
MQCA_PROCESS_DESC	MQ_PROCESS_DESC_LENGTH	Description of process definition	
MQCA_PROCESS_NAME	MQ_PROCESS_NAME_LENGTH	Name of process definition	

Selector	Length of field	Description	Note
MQCA_USER_DATA	MQ_PROCESS_USER_DATA_LENGTH	User data	
MQIA_APPL_TYPE	MQLONG	Application type	
MQIA_QSG_DISP	MQLONG	Queue sharing group disposition	z/OS

Table 551. MQINQ attribute selectors for process definitions (continued)

Table 552. MQINQ attribute selectors for the queue manager

Selector	Length of field	Description	Note
MQCA_ALTERATION_DATE	MQ_DATE_LENGTH	Date of most-recent alteration	
MQCA_ALTERATION_TIME	MQ_TIME_LENGTH	Time of most-recent alteration	
MQCA_CHANNEL_AUTO_DEF_EXIT	MQ_EXIT_NAME_LENGTH	Automatic channel definition exit name	
MQCA_CHINIT_SERVICE_PARM		Reserved for use by IBM	
MQCA_CLUSTER_WORKLOAD_DATA	MQ_EXIT_DATA_LENGTH	Data passed to cluster workload exit	
MQCA_CLUSTER_WORKLOAD_EXIT	MQ_EXIT_NAME_LENGTH	Name of cluster workload exit	
MQCA_COMMAND_INPUT_Q_NAME	MQ_Q_NAME_LENGTH	System command input queue name	
MQCA_CUSTOM	MQ_CUSTOM_LENGTH	The custom attribute for new features	
MQCA_DEAD_LETTER_Q_NAME	MQ_Q_NAME_LENGTH	Name of dead-letter queue	
MQCA_DEF_XMIT_Q_NAME	MQ_Q_NAME_LENGTH	Default transmission queue name	
MQCA_DNS_GROUP	MQ_DNS_GROUP_NAME_LENGTH	Name of the group for the TCP listener that handles inbound transmissions for the queue sharing group to join. The name applies when using Workload Manager Dynamic Domain Name Services.	z/OS
MQCA_IGQ_USER_ID	MQ_USER_ID_LENGTH	Intra-group queuing user identifier	z/OS
MQCA_INSTALLATION_DESC	MQ_INSTALLATION_DESC_LENGTH	Description of the associated installation	Not z/OS. Not IBM i
MQCA_INSTALLATION_NAME	MQ_INSTALLATION_NAME_LENGTH	Name of the installation associated with the queue manager	Not z/OS. Not IBM i
MQCA_INSTALLATION_PATH	MQ_INSTALLATION_PATH_LENGTH	Path where the associated IBM MQ is installed	Not z/OS. Not IBM i

Table 552. MQINQ attribute selectors for the queue manager (continued)

Selector	Length of field	Description	Note
MQCA_LU_GROUP_NAME	MQ_LU_NAME_LENGTH	Generic LU name for the LU 6.2 listener that handles inbound transmissions for the queue sharing group to use	z/OS
MQCA_LU_NAME	MQ_LU_NAME_LENGTH	Name of the LU to use for outbound LU 6.2 transmissions. Set this name to the same LU that the listener uses for inbound transmissions	z/OS
MQCA_LU62_ARM_SUFFIX	MQ_ARM_SUFFIX_LENGTH	Suffix of the SYS1.PARMLIB member APPCPM *xx*, that nominates the LUADD for this channel initiator	z/OS
MQCA_PARENT	MQ_Q_MGR_NAME_LENGTH	Name of a hierarchically connected queue manager that is nominated as the parent of this queue manager	
MQCA_Q_MGR_DESC	MQ_Q_MGR_DESC_LENGTH	Queue manager description	
MQCA_Q_MGR_IDENTIFIER	MQ_Q_MGR_IDENTIFIER_L ENGT	Queue manager identifier (H)	
MQCA_Q_MGR_NAME	MQ_Q_MGR_NAME_LENGTH	Name of local queue manager	
MQCA_QSG_NAME	MQ_QSG_NAME_LENGTH	Queue sharing group name	z/OS
MQCA_REPOSITORY_NAME	MQ_CLUSTER_NAME_LENGT H	Name of cluster for which queue manager provides repository services	
MQCA_REPOSITORY_NAMELIST	MQ_NAMELIST_NAME_LENG TH	Name of namelist object containing names of clusters for which queue manager provides repository services	
MQCA_TCP_NAME	MQ_TCP_NAME_LENGTH	Name of the TCP/IP system that you are using	z/OS
MQIA_ACCOUNTING_CONN_OVE RRIDE	MQLONG	Override accounting settings	Not z/OS
MQIA_ACCOUNTING_INTERVAL	MQLONG	How often to write intermediate accounting records	Not z/OS
MQIA_ACCOUNTING_MQI	MQLONG	Controls collection of accounting information for MQI data	Not z/OS
MQIA_ACCOUNTING_Q	MQLONG	Controls collection of accounting information for queues	Not z/OS
MQIA_ACTIVE_CHANNELS	MQLONG	Maximum number of channels that can be active at any time	z/OS
MQIA_ADOPTNEWMCA_CHECK	MQLONG	Elements that are checked to determine whether to adopt an MCA. The check is performed when a new inbound channel is detected that has the same name as an MCA that is already active.	z/OS

Selector	Length of field	Description	Note
MQIA_ADOPTNEWMCA_INTERVAL	MQLONG	Amount of time, in seconds, that the new channel waits for the orphaned channel to end	Not z/OS
MQIA_ADOPTNEWMCA_TYPE	MQLONG	Whether to restart an orphaned instance of an MCA of a particular channel type automatically when a new inbound channel request matching the AdoptNewMCACheck parameters is detected	z/OS
MQIA_AUTHORITY_EVENT	MQLONG	Control attribute for authority events	Not z/OS
MQIA_BRIDGE_EVENT	MQLONG	Control attribute for IMS bridge events	z/OS
MQIA_CHANNEL_AUTO_DEF	MQLONG	Control attribute for automatic channel definition	Not z/OS
MQIA_CHANNEL_AUTO_DEF_EVENT	MQLONG	Control attribute for automatic channel definition events	Not z/OS
MQIA_CHANNEL_EVENT	MQLONG	Control attribute for channel events	
MQIA_CHINIT_ADAPTERS	MQLONG	Number of adapter subtasks to use for processing IBM MQ calls	z/OS
MQIA_CHINIT_DISPATCHERS	MQLONG	Number of dispatchers to use for the channel initiator	z/OS
MQIA_CHINIT_TRACE_AUTO_START	MQLONG	Whether to start channel initiator trace automatically	z/OS
MQIA_CHINIT_TRACE_TABLE_SIZE	MQLONG	Size of the trace data space (in MB) of the channel initiator	z/OS
MQIA_CLUSTER_WORKLOAD_LENGTH	MQLONG	Cluster workload length.	
MQIA_CLWL_MRU_CHANNELS	MQLONG	Number of most recently used channels for cluster workload balancing	
MQIA_CLWL_USEQ	MQLONG	Use remote queues	
MQIA_CODED_CHAR_SET_ID	MQLONG	Coded character set identifier	
MQIA_COMMAND_EVENT	MQLONG	Control attribute for command events	
MQIA_COMMAND_LEVEL	MQLONG	Command level supported by queue manager	
MQIA_CONFIGURATION_EVENT	MQLONG	Control attribute for configuration events	Not z/OS
MQIA_DEF_CLUSTER_XMIT_Q_TYPE	MQLONG	Default transmission queue type to be used for cluster-sender channels.	
MQIA_DIST_LISTS	MQLONG	Distribution list support	Not z/OS

Table 552. MQINQ attribute selectors for the queue manager (continued)

Selector	Length of field	Description	Note
MQIA_DNS_WLM	MQLONG	Whether the TCP listener that handles inbound transmissions for the queue sharing group registers with Workload Manager for Dynamic Domain Name Services	z/OS
MQIA_EXPIRY_INTERVAL	MQLONG	Interval between scans for expired messages	z/OS
MQIA_GROUP_UR	MQLONG	Control attribute for whether GROUP units of recovery are enabled for this queue manager. The GROUP unit of recovery disposition is only available if the queue manager is a member of a queue sharing group	z/OS
MQIA_IGQ_PUT_AUTHORITY	MQLONG	Intra-group queuing put authority	z/OS
MQIA_INHIBIT_EVENT	MQLONG	Control attribute for inhibit events	Not z/OS
MQIA_INTRA_GROUP_queuing	MQLONG	Intra-group queuing support	z/OS
MQIA_LISTENER_TIMER	MQLONG	Time interval (in seconds) between IBM MQ attempts to restart the listener if APPC or TCP/IP failed.	z/OS
MQIA_LOCAL_EVENT	MQLONG	Control attribute for local events	Not z/OS
MQIA_LOGGER_EVENT	MQLONG	Control attribute for inhibit events	Not z/OS
MQIA_LU62_CHANNELS	MQLONG	Maximum number of channels that can be current, or clients that can be connected, using the LU 6.2 transmission protocol	z/OS
MQIA_MSG_MARK_BROWSE_INTERVAL	MQLONG	Time interval (in milliseconds) after which the queue manager can automatically remove a mark from browse messages. **Attention:** You should not set this value below the default of 5000.	
MQIA_MAX_CHANNELS	MQLONG	Maximum number of channels that can be current (including server-connection channels with connected clients)	z/OS
MQIA_MAX_HANDLES	MQLONG	Maximum number of handles	
MQIA_MAX_MSG_LENGTH	MQLONG	Maximum message length	
MQIA_MAX_PRIORITY	MQLONG	Maximum priority	
MQIA_MAX_UNCOMMITTED_MSGS	MQLONG	Maximum number of uncommitted messages within a unit of work	

Table 552. MQINQ attribute selectors for the queue manager (continued)

Selector	Length of field	Description	Note
MQIA_OUTBOUND_PORT_MAX	MQLONG	With MQIA_OUTBOUND_PORT_MIN, defines range of port numbers to use when binding outgoing channels	z/OS
MQIA_OUTBOUND_PORT_MIN	MQLONG	With MQIA_OUTBOUND_PORT_MAX, defines range of port numbers to use when binding outgoing channels	z/OS
MQIA_PERFORMANCE_EVENT	MQLONG	Control attribute for performance events	Not z/OS
MQIA_PLATFORM	MQLONG	Platform on which the queue manager resides	
MQIA_PROT_POLICY_CAPABILITY	MQLONG	Indicates whether security capabilities of Advanced Message Security are available for a queue manager.	
MQIA_PUBSUB_MAXMSG_RETRY_COUNT	MQLONG	The number of attempts to reprocess a failed command message under sync point	
MQIA_PUBSUB_MODE	MQLONG	Whether the publish/subscribe engine and the queued publish/subscribe interface are running. Applications to publish or subscribe using the application programming interface require the publish/subscribe engine. Queues that are monitored by the queued publish/subscribe interface require the queued publish/subscribe interface to be running.	
MQIA_PUBSUB_NP_MSG	MQLONG	Whether to discard (or keep) an undelivered input message	
MQIA_PUBSUB_NP_RESP	MQLONG	Controls the behavior of undelivered response messages	
MQIA_PUBSUB_SYNC_PT	MQLONG	Whether only persistent (or all) messages are processed under sync point	
MQIA_QMGR_CFCONLOS	MQLONG	Specifies the action to be taken when the queue manager loses connectivity to the administration structure or any CF structures with CFCONLOS set to ASQMGR	z/OS
MQIA_RECEIVE_TIMEOUT	MQLONG	Approximately how long a TCP/IP channel waits to receive data, including heartbeats, from its partner, before returning to the inactive state. The value is numeric, qualified by MQIA_RECEIVE_TIMEOUT_TYPE.	z/OS

Table 552. MQINQ attribute selectors for the queue manager (continued)

Table 552. MQINQ attribute selectors for the queue manager (continued)			
Selector	**Length of field**	**Description**	**Note**
MQIA_RECEIVE_TIMEOUT_MIN	MQLONG	Minimum time that a TCP/IP channel waits to receive data, including heartbeats, from its partner, before returning to the inactive state	z/OS
MQIA_RECEIVE_TIMEOUT_TYPE	MQLONG	Approximately how long a TCP/IP channel waits to receive data, including heartbeats, from its partner, before returning to the inactive state. MQIA_RECEIVE_TIMEOUT_TYPE is the qualifier applied to MQIA_RECEIVE_TIMEOUT.	z/OS
MQIA_REMOTE_EVENT	MQLONG	Control attribute for remote events	Not z/OS
MQIA_SECURITY_CASE	MQLONG	Case of security profiles	z/OS
MQIA_SSL_EVENT	MQLONG	Control attribute for channel events	
MQIA_SSL_FIPS_REQUIRED	MQLONG	Use only FIPS-certified algorithms for cryptography	
MQIA_SSL_RESET_COUNT	MQLONG	TLS key reset count	
MQIA_START_STOP_EVENT	MQLONG	Control attribute for start stop events	Not z/OS
MQIA_STATISTICS_AUTO_CLUSSDR	MQLONG	Controls collection of statistics monitoring information for cluster sender channels	
MQIA_STATISTICS_CHANNEL	MQLONG	Controls collection of statistics data for channels	
MQIA_STATISTICS_INTERVAL	MQLONG	How often to write statistics monitoring data	Not z/OS
MQIA_STATISTICS_MQI	MQLONG	Controls collection of statistics monitoring information for queue manager	Not z/OS
MQIA_STATISTICS_Q	MQLONG	Controls collection of statistics data for queues	Not z/OS
MQIA_SYNCPOINT	MQLONG	sync point availability	
MQIA_TCP_CHANNELS	MQLONG	Maximum number of channels that can be current, or clients that can be connected, using the TCP/IP transmission protocol	z/OS
MQIA_TCP_KEEP_ALIVE	MQLONG	Whether to use the TCP KEEPALIVE facility to check that the other end of the connection is still available	z/OS

Table 552. MQINQ attribute selectors for the queue manager (continued)			
Selector	**Length of field**	**Description**	**Note**
MQIA_TCP_STACK_TYPE	MQLONG	Whether the channel initiator can use only the TCP/IP address space specified in TCPNAME, or can optionally bind to any selected TCP/IP address	z/OS
MQIA_TRACE_ROUTE_RECORDING	MQLONG	Controls recording of trace-route information	z/OS
MQIA_TREE_LIFE_TIME	MQLONG	Lifetime of unused non-administrative topics	
MQIA_TRIGGER_INTERVAL	MQLONG	Trigger interval	

IntAttrCount

Type: MQLONG - input

This is the number of elements in the *IntAttrs* array. Zero is a valid value.

If IntAttrCount is at least the number of MQIA_* selectors in the **Selectors** parameter, all integer attributes requested are returned.

IntAttrs

Type: MQLONG x *IntAttrCount* - output

This is an array of *IntAttrCount* integer attribute values.

Integer attribute values are returned in the same order as the MQIA_* selectors in the **Selectors** parameter. If the array contains more elements than the number of MQIA_* selectors, the excess elements are unchanged.

If *Hobj* represents a queue, but an attribute selector does not apply to that type of queue, the specific value MQIAV_NOT_APPLICABLE is returned. It is returned for the corresponding element in the *IntAttrs* array.

If the **IntAttrCount** or **SelectorCount** parameter is zero, *IntAttrs* is not referred to. In this case, the parameter address passed by programs written in C or S/390 assembler might be null.

CharAttrLength

Type: MQLONG - input

This is the length in bytes of the **CharAttrs** parameter.

CharAttrLength must be at least the sum of the lengths of the requested character attributes (see Selectors). Zero is a valid value.

CharAttrs

Type: MQCHAR x *CharAttrLength* - output

This is the buffer in which the character attributes are returned, concatenated together. The length of the buffer is given by the **CharAttrLength** parameter.

Character attributes are returned in the same order as the MQCA_* selectors in the **Selectors** parameter. The length of each attribute string is fixed for each attribute (see Selectors), and the value in it is padded to the right with blanks if necessary. You can provider a buffer larger than needed to contain all the requested character attributes and padding. The bytes beyond the last attribute value returned are unchanged.

If *Hobj* represents a queue, but an attribute selector does not apply to that type of queue, a character string consisting entirely of asterisks (*) is returned. The asterisk is returned as the value of that attribute in *CharAttrs*.

If the *CharAttrLength* or **SelectorCount** parameter is zero, *CharAttrs* is not referred to. In this case, the parameter address passed by programs written in C or S/390 assembler might be null.

CompCode
Type: MQLONG - output

The completion code:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_CHAR_ATTRS_TOO_SHORT
(2008, X'7D8') Not enough space allowed for character attributes.

MQRC_INT_ATTR_COUNT_TOO_SMALL
(2022, X'7E6') Not enough space allowed for integer attributes.

MQRC_SELECTOR_NOT_FOR_TYPE
(2068, X'814') Selector not applicable to queue type.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CHAR_ATTR_LENGTH_ERROR
(2006, X'7D6') Length of character attributes not valid.

MQRC_CHAR_ATTRS_ERROR
(2007, X'7D7') Character attributes string not valid.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_INT_ATTR_COUNT_ERROR
(2021, X'7E5') Count of integer attributes not valid.

MQRC_INT_ATTRS_ARRAY_ERROR
(2023, X'7E7') Integer attributes array not valid.

MQRC_NOT_OPEN_FOR_INQUIRE
(2038, X'7F6') Queue not open for inquire.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_DELETED
(2052, X'804') Queue deleted.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SELECTOR_COUNT_ERROR
(2065, X'811') Count of selectors not valid.

MQRC_SELECTOR_ERROR
(2067, X'813') Attribute selector not valid.

MQRC_SELECTOR_LIMIT_EXCEEDED
(2066, X'812') Count of selectors too large.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes; see Messages and reason codes

Usage notes

1. The values returned are a snapshot of the selected attributes. There is no guarantee that the attributes remain the same before the application can act upon the returned values.
2. When you open a model queue, a dynamic local queue is created. A dynamic local queue is created even if you open the model queue to inquire about its attributes.

The attributes of the dynamic queue are largely the same as the attributes of the model queue at the time that the dynamic queue is created. If you then use the MQINQ call on this queue, the queue manager returns the attributes of the dynamic queue, and not the attributes of the model queue. See Table 561 on page 825 for details of which attributes of the model queue are inherited by the dynamic queue.

3. If the object being inquired is an alias queue, the attribute values returned by the MQINQ call are the attributes of the alias queue. The are not the attributes of the base queue or topic to which the alias resolves.
4. If the object being inquired is a cluster queue, the attributes that can be inquired depend on how the queue is opened:
   - You can open a cluster queue for inquire plus one or more of the input, browse, or set operations. To do so, there must be a local instance of the cluster queue for the open to succeed. In this case, the attributes that can be inquired are the attributes that are valid for local queues.

     If the cluster queue is open for inquire without input, browse, or set specified, the call returns completion code MQCC_WARNING and reason code MQRC_SELECTOR_NOT_FOR_TYPE (2068) if you attempt to inquire attributes which are valid only for local queues, and not cluster queues.
   - You can open a cluster queue for inquire while passing the base queue manager name of the connected queue manager.

     To do so, there must be a local instance of the cluster queue for the open to succeed. If the base queue manager is not passed, the call returns completion code MQCC_WARNING and reason code MQRC_SELECTOR_NOT_FOR_TYPE (2068) if you attempt to inquire attributes which are valid only for local queues, and not cluster queues
   - If the cluster queue is opened for inquire alone, or inquire and output, only the attributes listed can be inquired. The **QType** attribute has the value MQQT_CLUSTER in this case:
     - MQCA_Q_DESC
     - MQCA_Q_NAME
     - MQIA_DEF_BIND
     - MQIA_DEF_PERSISTENCE
     - MQIA_DEF_PRIORITY
     - MQIA_INHIBIT_PUT
     - MQIA_Q_TYPE

     You can open the cluster queue with no fixed binding. You can open it with MQOO_BIND_NOT_FIXED specified on the MQOPEN call. Alternatively, specify MQOO_BIND_AS_Q_DEF, and set the **DefBind** attribute of the queue to MQBND_BIND_NOT_FIXED. If you open a cluster queue with no fixed binding, successive MQINQ calls for the queue might inquire different instances of the cluster queue. However, it is typical for all the instances have the same attribute values.
   - An alias queue object can be defined for a cluster. Because TARGTYPE and TARGET are not cluster attributes, the process performing an MQOPEN process on the alias queue is not aware of the object to which the alias resolves.

     During the initial MQOPEN, the alias queue resolves to a queue manager and a queue in the cluster. Name resolution takes place again at the remote queue manager and it is here that the TARGTPYE of the alias queue is resolved.

     If the alias queue resolves to a topic alias, then publication of messages put to the alias queue takes place at this remote queue manager.

   See Cluster queues
5. You might want to inquire a number of attributes, and then set some of them using the MQSET call. To program inquire and set efficiently, position the attributes to be set at the beginning of the selector arrays. If you do so, the same arrays with reduced counts can be used for MQSET.

6. If more than one of the warning situations arise (see the **CompCode** parameter), the reason code returned is the first one in the following list that applies:

   a. MQRC_SELECTOR_NOT_FOR_TYPE

   b. MQRC_INT_ATTR_COUNT_TOO_SMALL

   c. MQRC_CHAR_ATTRS_TOO_SHORT

7. The following topic have information about object attributes:

   - "Attributes for queues" on page 823
   - "Attributes for namelists" on page 856
   - "Attributes for process definitions" on page 858
   - "Attributes for the queue manager" on page 786

C invocation

```
MQINQ (Hconn, Hobj, SelectorCount, Selectors, IntAttrCount, IntAttrs,
      CharAttrLength, CharAttrs, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;           /* Connection handle */
MQHOBJ   Hobj;            /* Object handle */
MQLONG   SelectorCount;   /* Count of selectors */
MQLONG   Selectors[n];    /* Array of attribute selectors */
MQLONG   IntAttrCount;    /* Count of integer attributes */
MQLONG   IntAttrs[n];     /* Array of integer attributes */
MQLONG   CharAttrLength;  /* Length of character attributes buffer */
MQCHAR   CharAttrs[n];    /* Character attributes */
MQLONG   CompCode;        /* Completion code */
MQLONG   Reason;          /* Reason code qualifying CompCode */
```

COBOL invocation

```
     CALL 'MQINQ' USING HCONN, HOBJ, SELECTORCOUNT, SELECTORS-TABLE,
                        INTATTRCOUNT, INTATTRS-TABLE, CHARATTRLENGTH,
                        CHARATTRS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN             PIC S9(9) BINARY.
**   Object handle
 01  HOBJ              PIC S9(9) BINARY.
**   Count of selectors
 01  SELECTORCOUNT     PIC S9(9) BINARY.
**   Array of attribute selectors
 01  SELECTORS-TABLE.
  02  SELECTORS         PIC S9(9) BINARY OCCURS n TIMES.
**   Count of integer attributes
 01  INTATTRCOUNT      PIC S9(9) BINARY.
**   Array of integer attributes
 01  INTATTRS-TABLE.
  02  INTATTRS          PIC S9(9) BINARY OCCURS n TIMES.
**   Length of character attributes buffer
 01  CHARATTRLENGTH    PIC S9(9) BINARY.
**   Character attributes
 01  CHARATTRS         PIC X(n).
**   Completion code
 01  COMPCODE          PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON            PIC S9(9) BINARY.
```

PL/I invocation

```
call MQINQ (Hconn, Hobj, SelectorCount, Selectors, IntAttrCount,
           IntAttrs, CharAttrLength, CharAttrs, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn           fixed bin(31);  /* Connection handle */
dcl Hobj            fixed bin(31);  /* Object handle */
dcl SelectorCount   fixed bin(31);  /* Count of selectors */
dcl Selectors(n)    fixed bin(31);  /* Array of attribute selectors */
dcl IntAttrCount    fixed bin(31);  /* Count of integer attributes */
dcl IntAttrs(n)     fixed bin(31);  /* Array of integer attributes */
dcl CharAttrLength  fixed bin(31);  /* Length of character attributes
                                       buffer */
dcl CharAttrs       char(n);        /* Character attributes */
dcl CompCode        fixed bin(31);  /* Completion code */
dcl Reason          fixed bin(31);  /* Reason code qualifying
                                       CompCode */
```

High Level Assembler invocation

```
         CALL MQINQ,(HCONN,HOBJ,SELECTORCOUNT,SELECTORS,INTATTRCOUNT,  X
               INTATTRS,CHARATTRLENGTH,CHARATTRS,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN           DS  F      Connection handle
HOBJ            DS  F      Object handle
SELECTORCOUNT   DS  F      Count of selectors
SELECTORS       DS  (n)F   Array of attribute selectors
INTATTRCOUNT    DS  F      Count of integer attributes
INTATTRS        DS  (n)F   Array of integer attributes
CHARATTRLENGTH  DS  F      Length of character attributes buffer
CHARATTRS       DS  CL(n)  Character attributes
COMPCODE        DS  F      Completion code
REASON          DS  F      Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQINQ Hconn, Hobj, SelectorCount, Selectors, IntAttrCount, IntAttrs,
      CharAttrLength, CharAttrs, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn          As Long   'Connection handle'
Dim Hobj           As Long   'Object handle'
Dim SelectorCount  As Long   'Count of selectors'
Dim Selectors      As Long   'Array of attribute selectors'
Dim IntAttrCount   As Long   'Count of integer attributes'
Dim IntAttrs       As Long   'Array of integer attributes'
Dim CharAttrLength As Long   'Length of character attributes buffer'
Dim CharAttrs      As String 'Character attributes'
Dim CompCode       As Long   'Completion code'
Dim Reason         As Long   'Reason code qualifying CompCode'
```

MQINQMP - Inquire message property

The MQINQMP call returns the value of a property of a message.

Syntax

MQINQMP (*Hconn*, *Hmsg*, *InqPropOpts*, *Name*, *PropDesc*, *Type*, *ValueLength*, *Value*, *DataLength*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created using MQHC_UNASSOCIATED_HCONN then a valid connection must be established on the thread inquiring a property of the message handle otherwise the call fails with MQRC_CONNECTION_BROKEN.

Hmsg

Type: MQHMSG - input

This is the message handle to be inquired. The value was returned by a previous **MQCRTMH** call.

InqPropOpts

Type: MQIMPO - input/output

See the MQIMPO data type for details.

Name

Type: MQCHARV - input/output

The name of the property to inquire.

If no property with this name can be found, the call fails with reason MQRC_PROPERTY_NOT_AVAILABLE.

You can use the wildcard character percent sign (%) at the end of the property name. The wildcard matches zero or more characters, including the period (.) character. This allows an application to inquire the value of many properties. Call MQINQMP with option MQIMPO_INQ_FIRST to get the first matching property and again with the option MQIMPO_INQ_NEXT to get the next matching property. When no more matching properties are available, the call fails with MQRC_PROPERTY_NOT_AVAILABLE. If the *ReturnedName* field of the InqPropOpts structure is initialized with an address or offset for the returned name of the property, this is completed on return from MQINQMP with the name of the property that has been matched. If the *VSBufSize* field of the *ReturnedName* in the InqPropOpts structure is less than the length of the returned property name the completion code is set MQCC_FAILED with reason MQRC_PROPERTY_NAME_TOO_BIG.

Properties that have known synonyms are returned as follows:

1. Properties with the prefix "mqps." are returned as the IBM MQ property name. For example, "MQTopicString" is the returned name rather than "mqps.Top"
2. Properties with the prefix "jms." or "mcd." are returned as the JMS header field name, for example, "JMSExpiration" is the returned name rather than "jms.Exp".
3. Properties with the prefix "usr." are returned without that prefix, for example, "Color" is returned rather than "usr.Color".

Properties with synonyms are only returned once.

In the C programming language, the following macro variables are defined for inquiring on all properties and then all properties that begin "usr.":

MQPROP_INQUIRE_ALL
Inquire on all properties of the message.

MQPROP_INQUIRE_ALL can be used in the following way:

```
MQCHARV Name = {MQPROP_INQUIRE_ALL};
```

MQPROP_INQUIRE_ALL_USR
Inquire on all properties of the message that start "usr.". The returned name is returned without the "usr." prefix.

If MQIMP_INQ_NEXT is specified but Name has changed since the previous call or this is the first call, then MQIMPO_INQ_FIRST is implied.

See Property names and Property name restrictions for further information about the use of property names.

PropDesc
Type: MQPD - output

This structure is used to define the attributes of a property, including what happens if the property is not supported, what message context the property belongs to, and what messages the property should be copied into. See MQPD for details of this structure.

Type
Type: MQLONG - input/output

On return from the MQINQMP call this parameter is set to the data type of *Value*. The data type can be any of the following:

MQTYPE_BOOLEAN
A boolean.

MQTYPE_BYTE_STRING
a byte string.

MQTYPE_INT8
An 8-bit signed integer.

MQTYPE_INT16
A 16-bit signed integer.

MQTYPE_INT32
A 32-bit signed integer.

MQTYPE_INT64
A 64-bit signed integer.

MQTYPE_FLOAT32
A 32-bit floating-point number.

MQTYPE_FLOAT64
A 64-bit floating-point number.

MQTYPE_STRING
A character string.

MQTYPE_NULL
The property exists but has a null value.

If the data type of the property value is not recognized then MQTYPE_STRING is returned and a string representation of the value is placed into the *Value* area. A string representation of the data type can be found in the *TypeString* field of the *InqPropOpts* parameter. A warning completion code is returned with reason MQRC_PROP_TYPE_NOT_SUPPORTED.

Additionally, if the option MQIMPO_CONVERT_TYPE is specified, conversion of the property value is requested. Use *Type* as an input to specify the data type that you want the property to be returned

as. See the description of the MQIMPO_CONVERT_TYPE option of the MQIMPO structure for details of data type conversion.

If you do not request type conversion, you can use the following value on input:

MQTYPE_AS_SET
The value of the property is returned without converting its data type.

ValueLength
Type: MQLONG - input

The length in bytes of the Value area. Specify zero for properties that you do not require the value returned for. These could be properties which are designed by an application to have a null value or an empty string. Also specify zero if the MQIMPO_QUERY_LENGTH option has been specified; in this case no value is returned.

Value
Type: MQBYTEx *ValueLength* - output

This is the area to contain the inquired property value. The buffer should be aligned on a boundary appropriate for the value being returned. Failure to do so can result in an error when the value is later accessed.

If *ValueLength* is less than the length of the property value, as much of the property value as possible is moved into *Value* and the call fails with completion code MQCC_FAILED and reason MQRC_PROPERTY_VALUE_TOO_BIG.

The character set of the data in *Value* is given by the ReturnedCCSID field in the InqPropOpts parameter. The encoding of the data in *Value* is given by the ReturnedEncoding field in the InqPropOpts parameter.

In the C programming language, the parameter is declared as a pointer-to-void; the address of any type of data can be specified as the parameter.

If the *ValueLength* parameter is zero, *Value* is not referred to and its value passed by programs written in C or System/390 assembler can be null.

DataLength
Type: MQLONG - output

This is the length in bytes of the actual property value as returned in the *Value* area.

If *DataLength* is less than the property value length, *DataLength* is still filled in on return from the MQINQMP call. This allows the application to determine the size of the buffer required to accommodate the property value, and then reissue the call with a buffer of the appropriate size.

The following values can also be returned.

If the *Type* parameter is set to MQTYPE_STRING or MQTYPE_BYTE_STRING:

MQVL_EMPTY_STRING
The property exists but contains no characters or bytes.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_PROP_NAME_NOT_CONVERTED
(2492, X'09BC') Returned property name not converted.

MQRC_PROP_VALUE_NOT_CONVERTED
(2466, X'09A2') Property value not converted.

MQRC_PROP_TYPE_NOT_SUPPORTED
(2467, X'09A3') Property data type is not supported.

MQRC_RFH_FORMAT_ERROR
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'0852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'086D') Primary and home ASIDs differ.

MQRC_BUFFER_ERROR
(2004, X'07D4') Value parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'07D5') Value length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CONNECTION_BROKEN
(2009, X'07D9') Connection to queue manager lost.

MQRC_DATA_LENGTH_ERROR
(2010, X'07DA') Data length parameter not valid.

MQRC_IMPO_ERROR
(2464, X'09A0') Inquire message property options structure not valid.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07F8') Options not valid or not consistent.

MQRC_PD_ERROR
(2482, X'09B2') Property descriptor structure not valid.

MQRC_PROP_CONV_NOT_SUPPORTED
(2470, X'09A6') Conversion from the actual to requested data type not supported.

MQRC_PROPERTY_NAME_ERROR
(2442, X'098A') Invalid property name.

MQRC_PROPERTY_NAME_TOO_BIG
(2465, X'09A1') Property name too large for returned name buffer.

MQRC_PROPERTY_NOT_AVAILABLE
(2471, X'09A7) Property not available.

MQRC_PROPERTY_VALUE_TOO_BIG
(2469, X'09A5') Property value too large for the Value area.

MQRC_PROP_NUMBER_FORMAT_ERROR
: (2472, X'09A8') Number format error encountered in value data.

MQRC_PROPERTY_TYPE_ERROR
: (2473, X'09A9') Invalid requested property type.

MQRC_SOURCE_CCSID_ERROR
: (2111, X'083F') Property name coded character set identifier not valid.

MQRC_STORAGE_NOT_AVAILABLE
: (2071, X'0871') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
: (2195, X'0893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C invocation

```
MQINQMP (Hconn, Hmsg, &InqPropOpts, &Name, &PropDesc, &Type,
ValueLength, Value, &DataLength, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN Hconn;       /* Connection handle */
MQHMSG  Hmsg;        /* Message handle */
MQIMPO  InqPropOpts; /* Options that control the action of MQINQMP */
MQCHARV Name;        /* Property name */
MQPD    PropDesc;    /* Property descriptor */
MQLONG  Type;        /* Property data type */
MQLONG  ValueLength; /* Length in bytes of the Value area */
MQBYTE  Value[n];    /* Area to contain the property value */
MQLONG  DataLength;  /* Length of the property value */
MQLONG  CompCode;    /* Completion code */
MQLONG  Reason;      /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQINQMP' USING HCONN, HMSG, INQMSGOPTS, NAME, PROPDESC, TYPE,
VALUELENGTH, VALUE, DATALENGTH, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN       PIC S9(9) BINARY.
**   Message handle
 01  HMSG            PIC S9(18) BINARY.
**   Options that control the action of MQINQMP
 01  INQMSGOPTS.
     COPY CMQIMPOV.
**   Property name
 01  NAME.
     COPY CMQCHRVV.
**   Property descriptor
 01  PROPDESC.
     COPY CMQPDV.
**   Property data type
 01  TYPE        PIC S9(9) BINARY.
**   Length in bytes of the VALUE area
 01  VALUELENGTH PIC S9(9) BINARY.
**   Area to contain the property value
 01  VALUE       PIC X(n).
**   Length of the property value
 01  DATALENGTH  PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE    PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON      PIC S9(9) BINARY.
```

PL/I invocation

```
call MQINQMP (Hconn, Hmsg, InqPropOpts, Name, PropDesc, Type,
ValueLength, Value, DataLength, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn       fixed bin(31);  /* Connection handle */
dcl Hmsg        fixed bin(63);  /* Message handle */
dcl InqPropOpts like MQIMPO;    /* Options that control the action of MQINQMP */
dcl Name        like MQCHARV;   /* Property name */
dcl PropDesc    like MQPD;      /* Property descriptor */
dcl Type        fixed bin (31); /* Property data type */
dcl ValueLength fixed bin (31); /* Length in bytes of the Value area */
dcl Value       char (n);       /* Area to contain the property value */
dcl DataLength  fixed bin (31); /* Length of the property value */
dcl CompCode    fixed bin (31); /* Completion code */
dcl Reason      fixed bin (31); /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQINQMP,(HCONN,HMSG,INQMSGOPTS,NAME,PROPDESC,TYPE,
VALUELENGTH,VALUE,DATALENGTH,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN        DS         F     Connection handle
HMSG         DS         D     Message handle
INQMSGOPTS   CMQIMPOA   ,     Options that control the action of MQINQMP
NAME         CMQCHRVA   ,     Property name
PROPDESC     CMQPDA     ,     Property descriptor
TYPE         DS         F     Property data type
VALUELENGTH  DS         F     Length in bytes of the VALUE area
VALUE        DS         CL(n) Area to contain the property value
DATALENGTH   DS         F     Length of the property value
COMPCODE     DS         F     Completion code
REASON       DS         F     Reason code qualifying COMPCODE
```

MQMHBUF - Convert message handle into buffer

The MQMHBUF call converts a message handle into a buffer and is the inverse of the MQBUFMH call.

Syntax

MQMHBUF (*Hconn*, *Hmsg*, *MsgHBufOpts*, *Name*, *MsgDesc*, *BufferLength*, *Buffer*, *DataLength*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created using MQHC_UNASSOCIATED_HCONN, a valid connection must be established on the thread deleting the message handle. If a valid connection is not established, the call fails with MQRC_CONNECTION_BROKEN.

Hmsg

Type: MQHMSG - input

This is the message handle for which a buffer is required. The value was returned by a previous MQCRTMH call.

MsgHBufOpts
Type: MQMHBO - input

The MQMHBO structure allows applications to specify options that control how buffers are produced from message handles.

See “MQMHBO - Message handle to buffer options” on page 469 for details.

Name
Type: MQCHARV - input

The name of the property or properties to put into the buffer.

If no property matching the name can be found, the call fails with MQRC_PROPERTY_NOT_AVAILABLE.

You can use a wildcard to put more than one property into the buffer. To do this, use the wildcard character '%' at the end of the property name. This wildcard matches zero or more characters, including the '.' character.

In the C programming language, the following macro variables are defined for inquiring on all properties and all properties that begin 'usr':

MQPROP_INQUIRE_ALL
Put all properties of the message into the buffer

MQPROP_INQUIRE_ALL_USR
Put all properties of the message that start with the characters 'usr.' into the buffer.

See Property names and Property name restrictions for further information about the use of property names.

MsgDesc
Type: MQMD - input/output

The *MsgDesc* structure describes the contents of the buffer area.

On output, the *Encoding*, *CodedCharSetId* and *Format* fields are set to correctly describe the encoding, character set identifier, and format of the data in the buffer area as written by the call.

Data in this structure is in the character set and encoding of the application.

BufferLength
Type: MQLONG - input

BufferLength is the length of the Buffer area, in bytes.

Buffer
Type: MQBYTExBufferLength - output

Buffer defines the area to contain the message properties. You must align the buffer on a 4-byte boundary.

If *BufferLength* is less than the length required to store the properties in *Buffer*, MQMHBUF fails with MQRC_PROPERTY_VALUE_TOO_BIG.

The contents of the buffer can change even if the call fails.

DataLength
Type: MQLONG - output

DataLength is the length, in bytes, of the returned properties in the buffer. If the value is zero, no properties matched the value given in *Name* and the call fails with reason code MQRC_PROPERTY_NOT_AVAILABLE.

If *BufferLength* is less than the length required to store the properties in the buffer, the MQMHBUF call fails with MQRC_PROPERTY_VALUE_TOO_BIG, but a value is still entered into *DataLength*. This

allows the application to determine the size of the buffer required to accommodate the properties, and then reissue the call with the required *BufferLength*.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_MHBO_ERROR
(2501, X'095C') Message handle to buffer options structure not valid.

MQRC_BUFFER_ERROR
(2004, X'07D4') Buffer parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'07D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_CONNECTION_BROKEN
(2009, X'07D9') Connection to queue manager lost.

MQRC_DATA_LENGTH_ERROR
(2010, X'07DA') Data length parameter not valid.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle not valid.

MQRC_MD_ERROR
(2026, X'07EA') Message descriptor not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_PROPERTY_NAME_ERROR
(2442, X'098A') Property name is not valid.

MQRC_PROPERTY_NOT_AVAILABLE
(2471, X'09A7') Property not available.

MQRC_PROPERTY_VALUE_TOO_BIG
(2469, X'09A5') BufferLength value is too small to contain specified properties.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C invocation

```
MQMHBUF (Hconn, Hmsg, &MsgHBufOpts, &Name, &MsgDesc, BufferLength, Buffer,
         &DataLength, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN Hconn;        /* Connection handle */
MQHMSG  Hmsg;         /* Message handle */
MQMHBO  MsgHBufOpts;  /* Options that control the action of MQMHBUF */
MQCHARV Name;         /* Property name */
MQMD    MsgDesc;      /* Message descriptor */
MQLONG  BufferLength; /* Length in bytes of the Buffer area */
MQBYTE  Buffer[n];    /* Area to contain the properties */
MQLONG  DataLength;   /* Length of the properties */
MQLONG  CompCode;     /* Completion code */
MQLONG  Reason;       /* Reason code qualifying CompCode */
```

Usage notes

MQMHBUF converts a message handle into a buffer.

You can use it with an MQGET API exit to access certain properties, using the message property APIs, and then pass these in a buffer back to an application designed to use MQRFH2 headers rather than message handles.

This call is the inverse of the MQBUFMH call, which you can use to parse message properties from a buffer into a message handle.

COBOL invocation

```
     CALL 'MQMHBUF' USING HCONN, HMSG, MSGHBUFOPTS, NAME, MSGDESC,
                          BUFFERLENGTH, BUFFER, DATALENGTH, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Message handle
 01  HMSG          PIC S9(18) BINARY.
**   Options that control the action of MQMHBUF
 01  MSGHBUFOPTS.
     COPY CMQMHBOV.
**   Property name
 01  NAME
     COPY CMQCHRVV.
**   Message descriptor
 01  MSGDESC
     COPY CMQMDV.
**   Length in bytes of the Buffer area */
 01  BUFFERLENGTH  PIC S9(9) BINARY.
**   Area to contain the properties
 01  BUFFER        PIC X(n).
**   Length of the properties
 01  DATALENGTH    PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQMHBUF (Hconn, Hmsg, MsgHBufOpts, Name, MsgDesc, BufferLength, Buffer,
DataLength, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn        fixed bin(31); /* Connection handle */
dcl Hmsg         fixed bin(63); /* Message handle */
dcl MsgHBufOpts  like MQMHBO;   /* Options that control the action of MQMHBUF */
dcl Name         like MQCHARV;  /* Property name */
dcl MsgDesc      like MQMD;     /* Message descriptor */
dcl BufferLength fixed bin(31); /* Length in bytes of the Buffer area */
dcl Buffer       char(n);       /* Area to contain the properties */
dcl DataLength   fixed bin(31); /* Length of the properties */
dcl CompCode     fixed bin(31); /* Completion code */
dcl Reason       fixed bin(31); /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQMHBUF,(HCONN,HMSG,MSGHBUFOPTS,NAME,MSGDESC,BUFFERLENGTH,
                BUFFER,DATALENGTH,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN        DS       F      Connection handle
HMSG         DS       D      Message handle
MSGHBUFOPTS  CMQMHBOA ,      Options that control the action of MQMHBUF
NAME         CMQCHRVA ,      Property name
MSGDESC      CMQMDA   ,      Message descriptor
BUFFERLENGTH DS       F      Length in bytes of the BUFFER area
BUFFER       DS       CL(n)  Area to contain the properties
DATALENGTH   DS       F      Length of the properties
COMPCODE     DS       F      Completion code
REASON       DS       F      Reason code qualifying COMPCODE
```

MQOPEN - Open object

The MQOPEN call establishes access to an object.

The following types of object are valid:

- Queue (including distribution lists)
- Namelist
- Process definition
- Queue manager
- Topic

Syntax

MQOPEN (*Hconn*, *ObjDesc*, *Options*, *Hobj*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of Hconn was returned by a previous MQCONN or MQCONNX call.

z/OS On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN
Default connection handle.

ObjDesc
Type: MQOD - input/output

This is a structure that identifies the object to be opened; see "MQOD - Object descriptor" on page 471 for details.

If the ObjectName field in the **ObjDesc** parameter is the name of a model queue, a dynamic local queue is created with the attributes of the model queue; this happens whatever options you specify on the **Options** parameter. Subsequent operations using the Hobj returned by the MQOPEN call are performed on the new dynamic queue, and not on the model queue. This is true even for the MQINQ and MQSET calls. The name of the model queue in the **ObjDesc** parameter is replaced with the name of the dynamic queue created. The type of the dynamic queue is determined by the value of the **DefinitionType** attribute of the model queue (see "Attributes for queues" on page 823). For information about the close options applicable to dynamic queues, see the description of the MQCLOSE call.

Options
Type: MQLONG - input

You must specify at least one of the following options:

- MQOO_BROWSE
- MQOO_INPUT_* (only one of these)
- MQOO_INQUIRE
- MQOO_OUTPUT
- MQOO_SET
- MQOO_BIND_* (only one of these)

See the following table for details of these options; other options can be specified as required. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations). Combinations that are not valid are noted; all other combinations are valid. Only options that are applicable to the type of object specified by ObjDesc are allowed.

Table 553. Valid MQOPEN options for queues and topics

Option	Alias [1]	Local and Model	Remote	Nonlocal Cluster	Distribution list	Topic
MQOO_INPUT_AS_Q_DEF	Yes	Yes	No	No	No	No
MQOO_INPUT_SHARED	Yes	Yes	No	No	No	No
MQOO_INPUT_EXCLUSIVE	Yes	Yes	No	No	No	No
MQOO_OUTPUT	Yes	Yes	Yes	Yes	Yes	Yes
MQOO_BROWSE	Yes	Yes	No	No	No	No
MQOO_CO_OP	Yes	Yes	No	No	No	No
MQOO_INQUIRE	Yes	Yes	[2]	Yes	No	No
MQOO_SET	Yes	Yes	[2]	No	No	No
MQOO_BIND_ON_OPEN [3]	Yes	Yes	Yes	Yes	Yes	No
MQOO_BIND_NOT_FIXED [3]	Yes	Yes	Yes	Yes	Yes	No
MQOO_BIND_ON_GROUP [3]	Yes	Yes	Yes	Yes	Yes	No
MQOO_BIND_AS_Q_DEF [3]	Yes	Yes	Yes	Yes	Yes	No

Table 553. Valid MQOPEN options for queues and topics (continued)						
Option	Alias [1]	Local and Model	Remote	Nonlocal Cluster	Distribution list	Topic
MQOO_SAVE_ALL_CONTEXT	Yes	Yes	No	No	No	No
MQOO_PASS_IDENTITY_CONTEXT	Yes	Yes	Yes	Yes	Yes	[4]
MQOO_PASS_ALL_CONTEXT	Yes	Yes	Yes	Yes	Yes	Yes
MQOO_SET_IDENTITY_CONTEXT	Yes	Yes	Yes	Yes	Yes	[4]
MQOO_SET_ALL_CONTEXT	Yes	Yes	Yes	Yes	Yes	Yes
MQOO_NO_READ_AHEAD	Yes	Yes	No	No	No	No
MQOO_READ_AHEAD	Yes	Yes	No	No	No	No
MQOO_READ_AHEAD_AS_Q_DEF	Yes	Yes	No	No	No	No
MQOO_ALTERNATE_USER_AUTHORITY	Yes	Yes	Yes	Yes	Yes	Yes
MQOO_FAIL_IF_QUIESCING	Yes	Yes	Yes	Yes	Yes	Yes
MQOO_RESOLVE_LOCAL_Q	Yes	Yes	Yes	Yes	No	No
MQOO_RESOLVE_LOCAL_TOPIC	No	No	No	No	No	Yes
MQOO_NO_MULTICAST	No	No	No	No	No	Yes

Notes:

1. The validity of options for aliases depends on the validity of the option for the queue to which the alias resolves.
2. This option is valid only for the local definition of a remote queue.
3. This option can be specified for any queue type, but is ignored if the queue is not a cluster queue. However, the **DefBind** queue attribute overrides the base queue even when the alias queue is not in a cluster.
4. These attributes can be used with a topic, but affect only the context set for the retained message, not the context fields sent to any subscriber.

Access options: The following options control the type of operations that can be performed on the object:

MQOO_INPUT_AS_Q_DEF

Open queue to get messages using queue-defined default.

The queue is opened for use with subsequent MQGET calls. The type of access is either shared or exclusive, depending on the value of the **DefInputOpenOption** queue attribute; see "Attributes for queues" on page 823 for details.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

MQOO_INPUT_SHARED

Open queue to get messages with shared access.

The queue is opened for use with subsequent MQGET calls. The call can succeed if the queue is currently open by this or another application with MQOO_INPUT_SHARED, but fails with reason code MQRC_OBJECT_IN_USE if the queue is currently open with MQOO_INPUT_EXCLUSIVE.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

MQOO_INPUT_EXCLUSIVE

Open queue to get messages with exclusive access.

The queue is opened for use with subsequent MQGET calls. The call fails with reason code MQRC_OBJECT_IN_USE if the queue is currently open by this or another application for input of any type (MQOO_INPUT_SHARED or MQOO_INPUT_EXCLUSIVE).

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

MQOO_OUTPUT

Open queue to put messages, or a topic or topic string to publish messages.

The queue or topic is opened for use with subsequent MQPUT calls.

An MQOPEN call with this option can succeed even if the **InhibitPut** queue attribute is set to MQQA_PUT_INHIBITED (although subsequent MQPUT calls fail while the attribute is set to this value).

This option is valid for all types of queue, including distribution lists, and topics.

The following notes apply to these options:

- Only one of these options can be specified.
- An MQOPEN call with one of these options can succeed even if the **InhibitGet** queue attribute is set to MQQA_GET_INHIBITED (although subsequent MQGET calls fail while the attribute is set to this value).
- If the queue is defined as not being shareable (that is, the **Shareability** queue attribute has the value MQQA_NOT_SHAREABLE), attempts to open the queue for shared access are treated as attempts to open the queue with exclusive access.
- If an alias queue is opened with one of these options, the test for exclusive use (or for whether another application has exclusive use) is against the base queue to which the alias resolves.
- These options are not valid if **ObjectQMgrName** is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

MQOO_BROWSE

Open queue to browse messages.

The queue is opened for use with subsequent MQGET calls with one of the following options:

- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_NEXT
- MQGMO_BROWSE_MSG_UNDER_CURSOR

This is allowed even if the queue is currently open for MQOO_INPUT_EXCLUSIVE. An MQOPEN call with the MQOO_BROWSE option establishes a browse cursor, and positions it logically before the first message on the queue; see MQGMO - Options field for further information.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues. It is also not valid if `ObjectQMgrName` is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

MQOO_CO_OP

Open as a cooperating member of the set of handles.

This option is valid only with the MQOO_BROWSE option. If it is specified without MQOO_BROWSE, MQOPEN returns with MQRC_OPTIONS_ERROR.

The handle returned is considered to be a member of a cooperating set of handles for subsequent MQGET calls with one of the following options:

- MQGMO_MARK_BROWSE_CO_OP
- MQGMO_UNMARKED_BROWSE_MSG

- MQGMO_UNMARK_BROWSE_CO_OP

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

MQOO_INQUIRE
Open object to inquire attributes.

The queue, namelist, process definition, or queue manager is opened for use with subsequent MQINQ calls.

This option is valid for all types of object other than distribution lists. It is not valid if `ObjectQMgrName` is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

MQOO_SET
Open queue to set attributes.

The queue is opened for use with subsequent MQSET calls.

This option is valid for all types of queue other than distribution lists. It is not valid if `ObjectQMgrName` is the name of a local definition of a remote queue; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

Binding options: The following options apply when the object being opened is a cluster queue; these options control the binding of the queue handle to an instance of the cluster queue:

MQOO_BIND_ON_OPEN
The local queue manager binds the queue handle to an instance of the destination queue when the queue is opened. As a result, all messages put using this handle are sent to the same instance of the destination queue, and by the same route.

This option is valid only for queues, and affects only cluster queues. If specified for a queue that is not a cluster queue, the option is ignored.

MQOO_BIND_NOT_FIXED
This stops the local queue manager binding the queue handle to an instance of the destination queue. As a result, successive MQPUT calls using this handle send the messages to different instances of the destination queue, or to the same instance but by different routes. It also allows the instance selected to be changed later by the local queue manager, by a remote queue manager, or by a message channel agent (MCA), according to network conditions.

Note: Client and server applications that need to exchange a series of messages to complete a transaction must not use MQOO_BIND_NOT_FIXED (or MQOO_BIND_AS_Q_DEF when `DefBind` has the value MQBND_BIND_NOT_FIXED), because successive messages in the series might be sent to different instances of the server application.

If MQOO_BROWSE or one of the MQOO_INPUT_* options is specified for a cluster queue, the queue manager is forced to select the local instance of the cluster queue. As a result, the binding of the queue handle is fixed, even if MQOO_BIND_NOT_FIXED is specified.

If MQOO_INQUIRE is specified with MQOO_BIND_NOT_FIXED, successive MQINQ calls using that handle might inquire different instances of the cluster queue, although typically all the instances have the same attribute values.

MQOO_BIND_NOT_FIXED is valid only for queues, and affects only cluster queues. If specified for a queue that is not a cluster queue, the option is ignored.

MQOO_BIND_ON_GROUP
Allows an application to request that a group of messages are all allocated to the same destination instance.

This option is valid only for queues, and affects only cluster queues. If specified for a queue that is not a cluster queue, the option is ignored.

MQOO_BIND_AS_Q_DEF

The local queue manager binds the queue handle in the way defined by the **DefBind** queue attribute. The value of this attribute is either MQBND_BIND_ON_OPEN, MQBND_BIND_NOT_FIXED, or MQBND_BIND_ON_GROUP.

MQOO_BIND_AS_Q_DEF is the default when MQOO_BIND_ON_OPEN, MQOO_BIND_NOT_FIXED, or MQOO_BIND_ON_GROUP is not specified.

MQOO_BIND_AS_Q_DEF aids program documentation. It is not intended that this option is used with either of the other two bind options, but because its value is zero such use cannot be detected.

Context options: The following options control the processing of message context:

MQOO_SAVE_ALL_CONTEXT

Context information is associated with this queue handle. This information is set from the context of any message retrieved using this handle. For more information about message context, see Message context and Controlling context information.

This context information can be passed to a message that is then put on a queue using the MQPUT or MQPUT1 calls. See the MQPMO_PASS_IDENTITY_CONTEXT and MQPMO_PASS_ALL_CONTEXT options described in "MQPMO - Put message options" on page 491.

Until a message has been successfully retrieved, context cannot be passed to a message being put on a queue.

A message retrieved using one of the MQGMO_BROWSE_* browse options does not have its context information saved (although the context fields in the **MsgDesc** parameter are set after a browse).

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues. One of the MQOO_INPUT_* options must be specified.

MQOO_PASS_IDENTITY_CONTEXT

This allows the MQPMO_PASS_IDENTITY_CONTEXT option to be specified in the **PutMsgOpts** parameter when a message is put on a queue; this gives the message the identity context information from an input queue that was opened with the MQOO_SAVE_ALL_CONTEXT option. For more information about message context, see Message context and Controlling context information.

The MQOO_OUTPUT option must be specified.

This option is valid for all types of queue, including distribution lists.

MQOO_PASS_ALL_CONTEXT

This allows the MQPMO_PASS_ALL_CONTEXT option to be specified in the **PutMsgOpts** parameter when a message is put on a queue; this gives the message the identity and origin context information from an input queue that was opened with the MQOO_SAVE_ALL_CONTEXT option. For more information about message context, see Message context and Controlling context information.

This option implies MQOO_PASS_IDENTITY_CONTEXT, which need not therefore be specified. The MQOO_OUTPUT option must be specified.

This option is valid for all types of queue, including distribution lists.

MQOO_SET_IDENTITY_CONTEXT

This allows the MQPMO_SET_IDENTITY_CONTEXT option to be specified in the **PutMsgOpts** parameter when a message is put on a queue; this gives the message the identity context information contained in the **MsgDesc** parameter specified on the MQPUT or MQPUT1 call. For more information about message context, see Message context and Controlling context information.

This option implies MQOO_PASS_IDENTITY_CONTEXT, which need not therefore be specified. The MQOO_OUTPUT option must be specified.

This option is valid for all types of queue, including distribution lists.

MQOO_SET_ALL_CONTEXT
This allows the MQPMO_SET_ALL_CONTEXT option to be specified in the **PutMsgOpts** parameter when a message is put on a queue; this gives the message the identity and origin context information contained in the **MsgDesc** parameter specified on the MQPUT or MQPUT1 call. For more information about message context, see Message context and Controlling context information.

This option implies the following options, which need not therefore be specified:

- MQOO_PASS_IDENTITY_CONTEXT
- MQOO_PASS_ALL_CONTEXT
- MQOO_SET_IDENTITY_CONTEXT

The MQOO_OUTPUT option must be specified.

This option is valid for all types of queue, including distribution lists.

Read ahead options:

When you call MQOPEN with MQOO_READ_AHEAD, the IBM MQ client only enables read-ahead if certain conditions are met. These conditions include:

- Both the client and remote queue manager must be at IBM WebSphere MQ 7.0 or later.
- The client application must be compiled and linked against the threaded IBM MQ MQI client libraries.
- The client channel must be using TCP/IP protocol
- The channel must have a non-zero SharingConversations (SHARECNV) setting in both the client and server channel definitions.

The following options control whether non-persistent messages are sent to the client before an application requests them. The following notes apply to the read ahead options:

- Only one of these options can be specified.
- These options are valid only for local, alias, and model queues. They are not valid for remote queues, distribution lists, topics or queue managers.
- These options are only applicable when one of MQOO_BROWSE, MQOO_INPUT_SHARED and MQOO_INPUT_EXCLUSIVE are also specified although it is not an error to specify these options with MQOO_INQUIRE or MQOO_SET.
- If the application is not running as an IBM MQ client, these options are ignored.

MQOO_NO_READ_AHEAD
Non-persistent messages are not sent the client before an application requests them.

MQOO_READ_AHEAD
Non-persistent messages are sent to the client before an application requests them.

MQOO_READ_AHEAD_AS_Q_DEF
Read ahead behavior is determined by the default read ahead attribute of the queue being opened. This is the default value.

Other options: The following options control authorization checking, what happens when the queue manager is quiescing, whether to resolve the local queue name, and multicast:

MQOO_ALTERNATE_USER_AUTHORITY
The *AlternateUserId* field in the **ObjDesc** parameter contains a user identifier to use to validate this MQOPEN call. The call can succeed only if this *AlternateUserId* is authorized to open the object with the specified access options, regardless of whether the user identifier under which the application is running is authorized to do so. This does not apply to any context

options specified, however, which are always checked against the user identifier under which the application is running.

This option is valid for all types of object.

MQOO_FAIL_IF_QUIESCING
The MQOPEN call fails if the queue manager is in quiescing state.

z/OS On z/OS, for a CICS or IMS application, this option also forces the MQOPEN call to fail if the connection is in quiescing state.

This option is valid for all types of object.

For information about client channels see Overview of IBM MQ MQI clients.

MQOO_RESOLVE_LOCAL_Q
Fill the ResolvedQName in the MQOD structure with the name of the local queue that was opened. Similarly, the ResolvedQMgrName is filled with the name of the local queue manager hosting the local queue. If the MQOD structure is less than Version 3, MQOO_RESOLVE_LOCAL_Q is ignored with no error being returned.

The local queue is always returned when either a local, alias, or model queue is opened, but this is not the case when, for example, a remote queue or a non-local cluster queue is opened without the MQOO_RESOLVE_LOCAL_Q option; the ResolvedQName and ResolvedQMgrName are filled with the RemoteQName and RemoteQMgrName found in the remote queue definition, or similarly with the chosen remote cluster queue.

If you specify MQOO_RESOLVE_LOCAL_Q when opening, for example, a remote queue, ResolvedQName is the transmission queue to which messages are put. The ResolvedQMgrName is filled with the name of the local queue manager hosting the transmission queue.

If you are authorized for browse, input, or output on a queue, you have the required authority to specify this flag on the MQOPEN call. No special authority is needed.

This option is valid only for queues and queue managers.

MQOO_RESOLVE_LOCAL_TOPIC
Fill the ResolvedQName in the MQOD structure with the name of the administrative topic opened.

MQOO_NO_MULTICAST
Publication messages are not sent using multicast.

This option is valid only with the MQOO_OUTPUT option. If it is specified without MQOO_OUTPUT, MQOPEN returns with MQRC_OPTIONS_ERROR.

This option is valid only for a topic.

Hobj
Type: MQHOBJ - output

This handle represents the access that has been established to the object. It must be specified on subsequent IBM MQ calls that operate on the object. It ceases to be valid when the MQCLOSE call is issued, or when the unit of processing that defines the scope of the handle terminates.

The scope of the object handle returned is the same as the scope of the connection handle specified on the call. See MQCONN - Hconn parameter for information about handle scope.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ALIAS_BASE_Q_TYPE_ERROR
(2001, X'7D1') Alias base queue not a valid type.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_NOT_AVAILABLE
(2345, X'929') Coupling facility not available.

MQRC_CF_STRUC_AUTH_FAILED
(2348, X'92C') Coupling-facility structure authorization check failed.

MQRC_CF_STRUC_ERROR
(2349, X'92D') Coupling-facility structure not valid.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CF_STRUC_LIST_HDR_IN_USE
(2347, X'92B') Coupling-facility structure list-header in use.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CLUSTER_EXIT_ERROR
(2266, X'8DA') Cluster workload exit failed.

MQRC_CLUSTER_PUT_INHIBITED
(2268, X'8DC') Put calls inhibited for all queues in cluster.

MQRC_CLUSTER_RESOLUTION_ERROR
(2189, X'88D') Cluster name resolution failed.

MQRC_CLUSTER_RESOURCE_ERROR
(2269, X'8DD') Cluster resource error.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_DB2_NOT_AVAILABLE
(2342, X'926') Db2 subsystem not available.

MQRC_DEF_XMIT_Q_TYPE_ERROR
(2198, X'896') Default transmission queue not local.

MQRC_DEF_XMIT_Q_USAGE_ERROR
(2199, X'897') Default transmission queue usage error.

MQRC_DYNAMIC_Q_NAME_ERROR
(2011, X'7DB') Name of dynamic queue not valid.

MQRC_HANDLE_NOT_AVAILABLE
(2017, X'7E1') No more handles available.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

MQRC_NAME_IN_USE
(2201, X'899') Name in use.

MQRC_NAME_NOT_VALID_FOR_TYPE
(2194, X'892') Object name not valid for object type.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_OBJECT_ALREADY_EXISTS
(2100, X'834') Object exists.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OBJECT_IN_USE
(2042, X'7FA') Object already open with conflicting options.

MQRC_OBJECT_LEVEL_INCOMPATIBLE
(2360, X'938') Object level not compatible.

MQRC_OBJECT_NAME_ERROR
(2152, X'868') Object name not valid.

MQRC_OBJECT_NOT_UNIQUE
(2343, X'927') Object not unique.

MQRC_OBJECT_Q_MGR_NAME_ERROR
(2153, X'869') Object queue manager name not valid.

MQRC_OBJECT_RECORDS_ERROR
(2155, X'86B') Object records not valid.

MQRC_OBJECT_STRING_ERROR
(2441, X'0989') Objectstring field not valid

MQRC_OBJECT_TYPE_ERROR
(2043, X'7FB') Object type not valid.

MQRC_OD_ERROR
(2044, X'7FC') Object descriptor structure not valid.

MQRC_OPTION_NOT_VALID_FOR_TYPE
(2045, X'7FD') Option not valid for object type.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_PAGESET_FULL
(2192, X'890') External storage medium is full.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_Q_TYPE_ERROR
(2057, X'809') Queue type not valid.

MQRC_RECS_PRESENT_ERROR
(2154, X'86A') Number of records present not valid.

MQRC_REMOTE_Q_NAME_ERROR
(2184, X'888') Remote queue name not valid.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_RESPONSE_RECORDS_ERROR
(2156, X'86C') Response records not valid.

MQRC_SECURITY_ERROR
(2063, X'80F') Security error occurred.

MQRC_SELECTOR_SYNTAX_ERROR
2459 (X'099B') An MQOPEN, MQPUT1 or MQSUB call was issued but a selection string was specified which contained a syntax error.

MQRC_STOPPED_BY_CLUSTER_EXIT
(2188, X'88C') Call rejected by cluster workload exit.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UNKNOWN_ALIAS_BASE_Q
(2082, X'822') Unknown alias base queue.

MQRC_UNKNOWN_DEF_XMIT_Q
(2197, X'895') Unknown default transmission queue.

MQRC_UNKNOWN_OBJECT_NAME
(2085, X'825') Unknown object name.

MQRC_UNKNOWN_OBJECT_Q_MGR
(2086, X'826') Unknown object queue manager.

MQRC_UNKNOWN_REMOTE_Q_MGR
(2087, X'827') Unknown remote queue manager.

MQRC_UNKNOWN_XMIT_Q
(2196, X'894') Unknown transmission queue.

MQRC_WRONG_CF_LEVEL
(2366, X'93E') Coupling-facility structure is wrong level.

MQRC_XMIT_Q_TYPE_ERROR
(2091, X'82B') Transmission queue not local.

MQRC_XMIT_Q_USAGE_ERROR
(2092, X'82C') Transmission queue with wrong usage.

For detailed information about these codes, see:

- z/OS IBM MQ for z/OS messages, completion, and reason codes for IBM MQ for z/OS.
- Messages and reason codes for all other IBM MQ platforms except z/OS.

General usage notes

1. The object opened is one of the following:
   - A queue to:
     - Get or browse messages (using the MQGET call)
     - Put messages (using the MQPUT call)
     - Inquire about the attributes of the queue (using the MQINQ call)
     - Set the attributes of the queue (using the MQSET call)

     If the queue named is a model queue, a dynamic local queue is created. See the **`ObjDesc`** parameter described in "MQOPEN - Open object" on page 720.

     A distribution list is a special type of queue object that contains a list of queues. It can be opened to put messages, but not to get or browse messages, or to inquire or set attributes. See usage note 8 for further details.

     A queue that has `QSGDISP(GROUP)` is a special type of queue definition that cannot be used with the MQOPEN or MQPUT1 calls.
   - A namelist to inquire about the names of the queues in the list (using the MQINQ call).
   - A process definition to inquire about the process attributes (using the MQINQ call).
   - The queue manager to inquire about the attributes of the local queue manager (using the MQINQ call).
   - A topic to publish a message (using the MQPUT call)
2. An application can open the same object more than once. A different object handle is returned for each open. Each handle that is returned can be used for the functions for which the corresponding open was performed.
3. If the object being opened is a queue other than a cluster queue, all name resolution within the local queue manager takes place at the time of the MQOPEN call. This can include:
   - Resolution of the name of a local definition of a remote queue to the name of the remote queue manager, and the name by which the queue is known at the remote queue manager
   - Resolution of the remote queue manager name to the name of a local transmission queue

- z/OS On z/OS only, resolution of the remote queue manager name to the name of the shared transmission queue used by the IGQ agent (applies only if the local and remote queue managers belong to the same queue sharing group)
- Alias resolution to the name of a base queue or a topic object.

However, be aware that subsequent MQINQ or MQSET calls for the handle relate solely to the name that has been opened, and not to the object resulting after name resolution has occurred. For example, if the object opened is an alias, the attributes returned by the MQINQ call are the attributes of the alias, not the attributes of the base queue or a topic object to which the alias resolves.

If the object being opened is a cluster queue, name resolution can occur at the time of the MQOPEN call, or be deferred until later. The point at which resolution occurs is controlled by the MQOO_BIND_* options specified on the MQOPEN call:

- MQOO_BIND_ON_OPEN
- MQOO_BIND_NOT_FIXED
- MQOO_BIND_AS_Q_DEF
- MQOO_BIND_ON_GROUP

See Name resolution for more information about name resolution for cluster queues.

4. An MQOPEN call with the MQOO_BROWSE option establishes a browse cursor, for use with MQGET calls that specify the object handle and one of the browse options. This allows the queue to be scanned without altering its contents. A message that has been found by browsing can be removed from the queue by using the MQGMO_MSG_UNDER_CURSOR option.

   Multiple browse cursors can be active for a single application by issuing several MQOPEN requests for the same queue.

5. Applications started by a trigger monitor are passed the name of the queue that is associated with the application when the application is started. This queue name can be specified in the **ObjDesc** parameter to open the queue. See “MQTMC2 - Trigger message 2 (character format)” on page 596 for further details.

Read ahead options

When you call MQOPEN with MQOO_READ_AHEAD, the IBM MQ client only enables read-ahead if certain conditions are met. These conditions include:

- Both the client and remote queue manager must be at IBM WebSphere MQ 7.0 or later.
- The client application must be compiled and linked against the threaded IBM MQ MQI client libraries.
- The client channel must be using TCP/IP protocol
- The channel must have a non-zero SharingConversations (SHARECNV) setting in both the client and server channel definitions.

The following notes apply to the use of read ahead options.

1. The read ahead options are applicable only when one, and only one, of the MQOO_BROWSE, MQOO_INPUT_SHARED and MQOO_INPUT_EXCLUSIVE options are also specified. An error is not thrown if a read ahead options are specified with the MQOO_ INQUIRE or MQOO_SET options.
2. Read ahead is not enabled when requested if the options used on the first MQGET call are not supported for use with read ahead. Also, read ahead is disabled when the client is connecting to a queue manager that does not support read ahead.
3. If the application is not running as an IBM MQ client, read ahead options are ignored.

Cluster queues

The following notes apply to the use of cluster queues.

1. When a cluster queue is opened for the first time, and the local queue manager is not a full repository queue manager, the local queue manager obtains information about the cluster queue from a full repository queue manager. When the network is busy, it can take several seconds for the local queue manager to receive the needed information from the repository queue manager. As a result, the application issuing the MQOPEN call might have to wait for up to 10 seconds before control returns from the MQOPEN call. If the local queue manager does not receive the needed information about the cluster queue within this time, the call fails with reason code MQRC_CLUSTER_RESOLUTION_ERROR.
2. When a cluster queue is opened and there are multiple instances of the queue in the cluster, the instance opened depends on the options specified on the MQOPEN call:
   - If the options specified include any of the following:
     - MQOO_BROWSE
     - MQOO_INPUT_AS_Q_DEF
     - MQOO_INPUT_EXCLUSIVE
     - MQOO_INPUT_SHARED
     - MQOO_SET

     the instance of the cluster queue opened must be the local instance. If there is no local instance of the queue, the MQOPEN call fails.
   - If the options specified include none of the options described previously, but include one or both of the following:
     - MQOO_INQUIRE
     - MQOO_OUTPUT

     the instance opened is the local instance if there is one, and a remote instance otherwise (if using the CLWLUSEQ defaults). The instance chosen by the queue manager can, however, be altered by a cluster workload exit (if there is one).
3. If there is a subscription for the queue, but it is not acknowledged by a full repository, the object is not present in the cluster and the call fails with reason code MQRC_OBJECT_NAME.

For more information about cluster queues, see Cluster queues.

Distribution lists

The following notes apply to the use of distribution lists.

Distribution lists are supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

and for IBM MQ MQI clients connected to these systems.

1. Fields in the MQOD structure must be set as follows when opening a distribution list:
   - `Version` must be MQOD_VERSION_2 or greater.
   - `ObjectType` must be MQOT_Q.
   - `ObjectName` must be blank or the null string.
   - `ObjectQMgrName` must be blank or the null string.
   - `RecsPresent` must be greater than zero.

- One of ObjectRecOffset and ObjectRecPtr must be zero and the other nonzero.
- No more than one of ResponseRecOffset and ResponseRecPtr can be nonzero.
- There must be RecsPresent object records, addressed by either ObjectRecOffset or ObjectRecPtr. The object records must be set to the names of the destination queues to be opened.
- If one of ResponseRecOffset and ResponseRecPtr is nonzero, there must be RecsPresent response records present. They are set by the queue manager if the call completes with reason code MQRC_MULTIPLE_REASONS.

A version-2 MQOD can also be used to open a single queue that is not in a distribution list, by ensuring that RecsPresent is zero.

2. Only the following open options are valid in the **Options** parameter:
   - MQOO_OUTPUT
   - MQOO_PASS_*_CONTEXT
   - MQOO_SET_*_CONTEXT
   - MQOO_ALTERNATE_USER_AUTHORITY
   - MQOO_FAIL_IF_QUIESCING
3. The destination queues in the distribution list can be local, alias, or remote queues, but they cannot be model queues. If a model queue is specified, that queue fails to open, with reason code MQRC_Q_TYPE_ERROR. However, this does not prevent other queues in the list being opened successfully.
4. The completion code and reason code parameters are set as follows:
   - If the open operations for the queues in the distribution list all succeed or fail in the same way, the completion code and reason code parameters are set to describe the common result. The MQRR response records (if provided by the application) are not set in this case.

     For example, if every open succeeds, the completion code is set to MQCC_OK and the reason code is set to MQRC_NONE; if every open fails because none of the queues exists, the parameters are set to MQCC_FAILED and MQRC_UNKNOWN_OBJECT_NAME.
   - If the open operations for the queues in the distribution list do not all succeed or fail in the same way:
     - The completion code parameter is set to MQCC_WARNING if at least one open succeeded, and to MQCC_FAILED if all failed.
     - The reason code parameter is set to MQRC_MULTIPLE_REASONS.
     - The response records (if provided by the application) are set to the individual completion codes and reason codes for the queues in the distribution list.
5. When a distribution list has been opened successfully, the handle Hobj returned by the call can be used on subsequent MQPUT calls to put messages to queues in the distribution list, and on an MQCLOSE call to relinquish access to the distribution list. The only valid close option for a distribution list is MQCO_NONE.

   The MQPUT1 call can also be used to put a message to a distribution list; the MQOD structure defining the queues in the list is specified as a parameter on that call.
6. Each successfully opened destination in the distribution list counts as a separate handle when checking whether the application has exceeded the permitted maximum number of handles (see the **MaxHandles** queue manager attribute). This is true even when two or more of the destinations in the distribution list resolve to the same physical queue. If the MQOPEN or MQPUT1 call for a distribution list would cause the number of handles in use by the application to exceed MaxHandles, the call fails with reason code MQRC_HANDLE_NOT_AVAILABLE.
7. Each destination that is opened successfully has the value of its **OpenOutputCount** attribute incremented by one. If two or more of the destinations in the distribution list resolve to the same

physical queue, that queue has its **OpenOutputCount** attribute incremented by the number of destinations in the distribution list that resolve to that queue.

8. Any change to the queue definitions that would have caused a handle to become invalid had the queues been opened individually (for example, a change in the resolution path), does not cause the distribution-list handle to become invalid. However, it does result in a failure for that particular queue when the distribution-list handle is used on a subsequent MQPUT call.
9. A distribution list can contain only one destination.

Remote queues

The following notes apply to the use of remote queues.

A remote queue can be specified in one of two ways in the **ObjDesc** parameter of this call.

- By specifying for `ObjectName` the name of a local definition of the remote queue. In this case, `ObjectQMgrName` refers to the local queue manager, and can be specified as blanks or (in the C programming language) a null string.

  The security validation performed by the local queue manager verifies that the user is authorized to open the local definition of the remote queue.
- By specifying for `ObjectName` the name of the remote queue as known to the remote queue manager. In this case, `ObjectQMgrName` is the name of the remote queue manager.

  The security validation performed by the local queue manager verifies that the user is authorized to send messages to the transmission queue resulting from the name resolution process.

In either case:

- No messages are sent by the local queue manager to the remote queue manager to check that the user is authorized to put messages on the queue.
- When a message arrives at the remote queue manager, the remote queue manager might reject it because the user originating the message is not authorized.

See the `ObjectName` and `ObjectQMgrName` fields described in "MQOD - Object descriptor" on page 471 for more information.

Objects

Security

The following notes relate to the security aspects of using MQOPEN.

The queue manager performs security checks when an MQOPEN call is issued, to verify that the user identifier under which the application is running has the appropriate level of authority before access is permitted. The authority check is made on the name of the object being opened, and not on the name, or names, resulting after a name has been resolved.

If the object being opened is an alias queue which points at a topic object, the queue manager performs a security check on the alias queue name, before performing a security check for the topic as if the topic object had been used directly.

If the object being opened is a topic object, whether with `ObjectName` alone or by using the `ObjectString` (with or without a basing `ObjectName`), the queue manager performs the security check by using the resultant topic string, taken from within the topic object specified in `ObjectName`, and if required concatenating it with that provided in `ObjectString`, and then finding the closest topic object at or above that point in the topic tree to perform the security check against. This might not be the same topic object that was specified in `ObjectName`.

If the object being opened is a model queue, the queue manager performs a full security check against both the name of the model queue and the name of the dynamic queue that is created. If the resulting

dynamic queue is then opened explicitly, a further resource security check is performed against the name of the dynamic queue.

z/OS On z/OS, the queue manager performs security checks only if security is enabled. For more information about security checking, see Setting up security on z/OS .

Attributes

The following notes relate to attributes.

The attributes of an object can change while an application has the object open. In many cases, the application does not notice this, but for certain attributes the queue manager marks the handle as no longer valid. These attributes are:

- Any attribute that affects the name resolution of the object. This applies regardless of the open options used, and includes the following:
  - A change to the **BaseQName** attribute of an alias queue that is open.
  - A change to the **TargetType** attribute of an alias queue that is open.
  - A change to the **RemoteQName** or **RemoteQMgrName** queue attributes, for any handle that is open for this queue, or for a queue that resolves through this definition as a queue manager alias.
  - Any change that causes a currently open handle for a remote queue to resolve to a different transmission queue, or to fail to resolve to one at all. For example, this can include:
    - A change to the **XmitQName** attribute of the local definition of a remote queue, whether the definition is being used for a queue, or for a queue manager alias.
    - z/OS On z/OS only, a change to the value of the **IntraGroupqueuing** queue manager attribute, or a change in the definition of the shared transmission queue (SYSTEM.QSG.TRANSMIT.QUEUE) used by the IGQ agent.

    There is one exception to this: the creation of a new transmission queue. A handle that would have resolved to this queue had it been present when the handle was opened, but instead resolved to the default transmission queue, is not made invalid.
  - A change to the **DefXmitQName** queue manager attribute. In this case all open handles that resolved to the previously named queue (that resolved to it only because it was the default transmission queue) are marked as invalid. Handles that resolved to this queue for other reasons are not affected.
- The **Shareability** queue attribute, if there are two or more handles that are currently providing MQOO_INPUT_SHARED access for this queue, or for a queue that resolves to this queue. If so, all handles that are open for this queue, or for a queue that resolves to this queue, are marked as invalid, regardless of the open options.

  z/OS On z/OS, the handles previously described are marked as invalid if one or more handles is currently providing MQOO_INPUT_SHARED or MQOO_INPUT_EXCLUSIVE access to the queue.
- The **Usage** queue attribute, for all handles that are open for this queue, or for a queue that resolves to this queue, regardless of the open options.

When a handle is marked as invalid, all subsequent calls (other than MQCLOSE) using this handle fail with reason code MQRC_OBJECT_CHANGED. The application must issue an MQCLOSE call (using the original handle) and then reopen the queue. Any uncommitted updates against the old handle from previous successful calls can still be committed or backed out, as required by the application logic.

If changing an attribute causes this to happen, use a special force version of the call.

C invocation

```
MQOPEN (Hconn, &ObjDesc, Options, &Hobj, &CompCode,
       &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQOD     ObjDesc;   /* Object descriptor */
MQLONG   Options;   /* Options that control the action of MQOPEN */
MQHOBJ   Hobj;      /* Object handle */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQOPEN' USING HCONN, OBJDESC, OPTIONS, HOBJ, COMPCODE, REASON
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Object descriptor
 01  OBJDESC.
     COPY CMQODV.
**   Options that control the action of MQOPEN
 01  OPTIONS   PIC S9(9) BINARY.
**   Object handle
 01  HOBJ      PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQOPEN (Hconn, ObjDesc, Options, Hobj, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn     fixed bin(31);  /* Connection handle */
dcl ObjDesc   like MQOD;      /* Object descriptor */
dcl Options   fixed bin(31);  /* Options that control the action of
                                 MQOPEN */
dcl Hobj      fixed bin(31);  /* Object handle */
dcl CompCode  fixed bin(31);  /* Completion code */
dcl Reason    fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQOPEN,(HCONN,OBJDESC,OPTIONS,HOBJ,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS      F  Connection handle
OBJDESC   CMQODA  ,  Object descriptor
OPTIONS   DS      F  Options that control the action of MQOPEN
HOBJ      DS      F  Object handle
COMPCODE  DS      F  Completion code
REASON    DS      F  Reason code qualifying COMPCODE
```

Visual Basic invocation

Windows

```
MQOPEN Hconn, ObjDesc, Options, Hobj, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn    As Long 'Connection handle'
Dim ObjDesc  As MQOD 'Object descriptor'
Dim Options  As Long 'Options that control the action of MQOPEN'
Dim Hobj     As Long 'Object handle'
Dim CompCode As Long 'Completion code'
Dim Reason   As Long 'Reason code qualifying CompCode'
```

MQPUT - Put message

The MQPUT call puts a message on a queue or distribution list, or to a topic. The queue, distribution list, or topic must already be open.

Syntax

MQPUT (*Hconn*, *Hobj*, *MsgDesc*, *PutMsgOpts*, *BufferLength*, *Buffer*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of Hconn was returned by a previous MQCONN or MQCONNX call.

z/OS On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Hobj

Type: MQHOBJ - input

This handle represents the queue to which the message is added, or the topic to which the message is published. The value of Hobj was returned by a previous MQOPEN call that specified the MQOO_OUTPUT option.

MsgDesc

Type: MQMD - input/output

This structure describes the attributes of the message being sent, and receives information about the message after the put request is complete. See “MQMD - Message descriptor” on page 413 for details.

If the application provides a version-1 MQMD, the message data can be prefixed with an MQMDE structure to specify values for the fields that exist in the version-2 MQMD but not the version-1. The *Format* field in the MQMD must be set to MQFMT_MD_EXTENSION to indicate that an MQMDE is present. See “MQMDE - Message descriptor extension” on page 463 for more details.

The application does not need to provide an MQMD structure if a valid message handle is supplied in the OriginalMsgHandle or NewMsgHandle fields of the MQPMO structure. If nothing is provided in one of these fields, the descriptor of the message is taken from the descriptor associated with the message handles.

If you use, or plan to use, API exits then we recommend that you explicitly supply an MQMD structure and do not use the message descriptors associated with the message handles. This is because the API Exit associated with MQPUT or MQPUT1 call is unable to ascertain which MQMD values are used by the queue manager to complete the MQPUT or MQPUT1 request.

PutMsgOpts

Type: MQPMO - input/output

See "MQPMO - Put message options" on page 491 for details.

BufferLength

Type: MQLONG - input

The length of the message in `Buffer`. Zero is valid, and indicates that the message contains no application data. The upper limit for `BufferLength` depends on various factors:

- If the destination is a local queue or resolves to a local queue, the upper limit depends on whether:
  - The local queue manager supports segmentation.
  - The sending application specifies the flag that allows the queue manager to segment the message. This flag is MQMF_SEGMENTATION_ALLOWED, and can be specified either in a version-2 MQMD, or in an MQMDE used with a version-1 MQMD.

  If both of these conditions are satisfied, `BufferLength` cannot exceed 999 999 999 minus the value of the `Offset` field in MQMD. The longest logical message that can be put is therefore 999 999 999 bytes (when `Offset` is zero). However, resource constraints imposed by the operating system or environment in which the application is running might result in a lower limit.

  If one or both of the previous conditions is not satisfied, `BufferLength` cannot exceed the smaller of the queue's **MaxMsgLength** attribute and queue manager's **MaxMsgLength** attribute.
- If the destination is a remote queue or resolves to a remote queue, the conditions for local queues apply, but at each queue manager through which the message must pass in order to reach the destination queue ; in particular:
  1. The local transmission queue used to store the message temporarily at the local queue manager
  2. Intermediate transmission queues (if any) used to store the message at queue managers on the route between the local and destination queue managers
  3. The destination queue at the destination queue manager

  The longest message that can be put is therefore governed by the most restrictive of these queues and queue managers.

  When a message is on a transmission queue, additional information resides with the message data, and this reduces the amount of application data that can be carried. In this situation, subtract MQ_MSG_HEADER_LENGTH bytes from the `MaxMsgLength` values of the transmission queues when determining the limit for `BufferLength`.

  Note: Only failure to comply with condition 1 can be diagnosed synchronously (with reason code MQRC_MSG_TOO_BIG_FOR_Q or MQRC_MSG_TOO_BIG_FOR_Q_MGR) when the message is put. If conditions 2 or 3 are not satisfied, the message is redirected to a dead-letter (undelivered-message) queue, either at an intermediate queue manager or at the destination queue manager. If this happens, a report message is generated if one was requested by the sender.

Buffer

Type: MQBYTExBufferLength - input

This is a buffer containing the application data to be sent. The buffer must be aligned on a boundary appropriate to the nature of the data in the message. 4-byte alignment is suitable for most messages (including messages containing IBM MQ header structures), but some messages might require more stringent alignment. For example, a message containing a 64-bit binary integer might require 8-byte alignment.

If `Buffer` contains character or numeric data, set the `CodedCharSetId` and `Encoding` fields in the **MsgDesc** parameter to the values appropriate to the data; this enables the receiver of the message to convert the data (if necessary) to the character set and encoding used by the receiver.

Note: All the other parameters on the MQPUT call must be in the character set and encoding of the local queue manager (given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE).

In the C programming language, the parameter is declared as a pointer-to-void; the address of any type of data can be specified as the parameter.

If the **BufferLength** parameter is zero, `Buffer` is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler can be null.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying `CompCode`.

If `CompCode` is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If `CompCode` is MQCC_WARNING:

MQRC_INCOMPLETE_GROUP
(2241, X'8C1') Message group not complete.

MQRC_INCOMPLETE_MSG
(2242, X'8C2') Logical message not complete.

MQRC_INCONSISTENT_PERSISTENCE
(2185, X'889') Inconsistent persistence specification.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

MQRC_PRIORITY_EXCEEDS_MAXIMUM
(2049, X'801') Message Priority exceeds maximum value supported.

MQRC_UNKNOWN_REPORT_OPTION
(2104, X'838') Report option(s) in message descriptor not recognized.

If `CompCode` is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ALIAS_TARGTYPE_CHANGED
(2480, X'09B0') Subscription target type has changed from queue to topic object.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BACKED_OUT
(2003, X'7D3') Unit of work backed out.

MQRC_BUFFER_ERROR
(2004, X'7D4') Buffer parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CALL_INTERRUPTED
(2549, X'9F5') MQPUT or MQCMIT was interrupted and reconnection processing cannot reestablish a definite outcome.

MQRC_CF_NOT_AVAILABLE
(2345, X'929') Coupling facility not available.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CFGR_ERROR
(2416, X'970') PCF group parameter structure MQCFGR in the message data is not valid.

MQRC_CFH_ERROR
(2235, X'8BB') PCF header structure not valid.

MQRC_CFIF_ERROR
(2414, X'96E') PCF integer filter parameter structure in the message data is not valid.

MQRC_CFIL_ERROR
(2236, X'8BC') PCF integer list parameter structure or PCIF*64 integer list parameter structure not valid.

MQRC_CFIN_ERROR
(2237, X'8BD') PCF integer parameter structure or PCIF*64 integer parameter structure not valid.

MQRC_CFSF_ERROR
(2415, X'96F') PCF string filter parameter structure in the message data is not valid.

MQRC_CFSL_ERROR
(2238, X'8BE') PCF string list parameter structure not valid.

MQRC_CFST_ERROR
(2239, X'8BF') PCF string parameter structure not valid.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CLUSTER_EXIT_ERROR
(2266, X'8DA') Cluster workload exit failed.

MQRC_CLUSTER_RESOLUTION_ERROR
(2189, X'88D') Cluster name resolution failed.

MQRC_CLUSTER_RESOURCE_ERROR
(2269, X'8DD') Cluster resource error.

MQRC_COD_NOT_VALID_FOR_XCF_Q
(2106, X'83A') COD report option not valid for XCF queue.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CONTENT_ERROR
2554 (X'09FA') Message content could not be parsed to determine whether the message should be delivered to a subscriber with an extended message selector.

MQRC_CONTEXT_HANDLE_ERROR
(2097, X'831') Queue handle referred to does not save context.

MQRC_CONTEXT_NOT_AVAILABLE
(2098, X'832') Context not available for queue handle referred to.

MQRC_DATA_LENGTH_ERROR
(2010, X'7DA') Data length parameter not valid.

MQRC_DH_ERROR
(2135, X'857') Distribution header structure not valid.

MQRC_DLH_ERROR
(2141, X'85D') Dead letter header structure not valid.

MQRC_EPH_ERROR
(2420, X'974') Embedded PCF structure not valid.

MQRC_EXPIRY_ERROR
(2013, X'7DD') Expiry time not valid.

MQRC_FEEDBACK_ERROR
(2014, X'7DE') Feedback code not valid.

MQRC_GLOBAL_UOW_CONFLICT
(2351, X'92F') Global units of work conflict.

MQRC_GROUP_ID_ERROR
(2258, X'8D2') Group identifier not valid.

MQRC_HANDLE_IN_USE_FOR_UOW
(2353, X'931') Handle in use for global unit of work.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HEADER_ERROR
(2142, X'85E') MQ header structure not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_IIH_ERROR
(2148, X'864') IMS information header structure not valid.

MQRC_INCOMPLETE_GROUP
(2241, X'8C1') Message group not complete.

MQRC_INCOMPLETE_MSG
(2242, X'8C2') Logical message not complete.

MQRC_INCONSISTENT_PERSISTENCE
(2185, X'889') Inconsistent persistence specification.

MQRC_INCONSISTENT_UOW
(2245, X'8C5') Inconsistent unit-of-work specification.

MQRC_LOCAL_UOW_CONFLICT
(2352, X'930') Global unit of work conflicts with local unit of work.

MQRC_MD_ERROR
(2026, X'7EA') Message descriptor not valid.

MQRC_MDE_ERROR
(2248, X'8C8') Message descriptor extension not valid.

MQRC_MISSING_REPLY_TO_Q
(2027, X'7EB') Missing reply-to queue or MQPMO_SUPPRESS_REPLYTO was used

MQRC_MISSING_WIH
(2332, X'91C') Message data does not begin with MQWIH.

MQRC_MSG_FLAGS_ERROR
(2249, X'8C9') Message flags not valid.

MQRC_MSG_SEQ_NUMBER_ERROR
(2250, X'8CA') Message sequence number not valid.

MQRC_MSG_TOO_BIG_FOR_Q
(2030, X'7EE') Message length greater than maximum for queue.

MQRC_MSG_TOO_BIG_FOR_Q_MGR
(2031, X'7EF') Message length greater than maximum for queue manager.

MQRC_MSG_TYPE_ERROR
(2029, X'7ED') Message type in message descriptor not valid.

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

MQRC_NO_DESTINATIONS_AVAILABLE
(2270, X'8DE') No destination queues available.

MQRC_NOT_OPEN_FOR_OUTPUT
(2039, X'7F7') Queue not open for output.

MQRC_NOT_OPEN_FOR_PASS_ALL
(2093, X'82D') Queue not open for pass all context.

MQRC_NOT_OPEN_FOR_PASS_IDENT
(2094, X'82E') Queue not open for pass identity context.

MQRC_NOT_OPEN_FOR_SET_ALL
(2095, X'82F') Queue not open for set all context.

MQRC_NOT_OPEN_FOR_SET_IDENT
(2096, X'830') Queue not open for set identity context.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OFFSET_ERROR
(2251, X'8CB') Message segment offset not valid.

MQRC_OPEN_FAILED
(2137, X'859') Object not opened successfully.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_ORIGINAL_LENGTH_ERROR
(2252, X'8CC') Original length not valid.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_PAGESET_FULL
(2192, X'890') External storage medium is full.

MQRC_PCF_ERROR
(2149, X'865') PCF structures not valid.

MQRC_PERSISTENCE_ERROR
(2047, X'7FF') Persistence not valid.

MQRC_PERSISTENT_NOT_ALLOWED
(2048, X'800') Queue does not support persistent messages.

MQRC_PMO_ERROR
(2173, X'87D') Put-message options structure not valid.

MQRC_PMO_RECORD_FLAGS_ERROR
(2158, X'86E') Put message record flags not valid.

MQRC_PRIORITY_ERROR
(2050, X'802') Message priority not valid.

MQRC_PUBLICATION_FAILURE
(2502, X'9C6') The publication has not been delivered to any of the subscribers.

MQRC_PUT_INHIBITED
(2051, X'803') Put calls inhibited for the queue, for the queue to which this queue resolves, or the topic.

MQRC_PUT_MSG_RECORDS_ERROR
(2159, X'86F') Put message records not valid.

MQRC_PUT_NOT_RETAINED
(2479, X'09AF') Publication could not be retained

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_FULL
(2053, X'805') Queue already contains maximum number of messages.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_Q_SPACE_NOT_AVAILABLE
(2056, X'808') No space available on disk for queue.

MQRC_RECONNECT_FAILED
(2548, X'9F4') After reconnecting, an error occurred reinstating the handles for a reconnectable connection.

MQRC_RECS_PRESENT_ERROR
(2154, X'86A') Number of records present not valid.

MQRC_REPORT_OPTIONS_ERROR
(2061, X'80D') Report options in message descriptor not valid.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_RESPONSE_RECORDS_ERROR
(2156, X'86C') Response records not valid.

MQRC_RFH_ERROR
(2334, X'91E') MQRFH or MQRFH2 structure not valid.

MQRC_RMH_ERROR
(2220, X'8AC') Reference message header structure not valid.

MQRC_SEGMENT_LENGTH_ZERO
(2253, X'8CD') Length of data in message segment is zero.

MQRC_SEGMENTS_NOT_SUPPORTED
(2365, X'93D') Segments not supported.

MQRC_SELECTION_NOT_AVAILABLE
2551 (X'09F7') A possible subscriber for the publication exists, but the queue manager cannot check whether to send the publication to the subscriber.

MQRC_STOPPED_BY_CLUSTER_EXIT
(2188, X'88C') Call rejected by cluster workload exit.

MQRC_STORAGE_CLASS_ERROR
(2105, X'839') Storage class error.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_SYNCPOINT_LIMIT_REACHED
(2024, X'7E8') No more messages can be handled within current unit of work.

MQRC_SYNCPOINT_NOT_AVAILABLE
(2072, X'818') Syncpoint support not available.

MQRC_TM_ERROR
(2265, X'8D9') Trigger message structure not valid.

MQRC_TMC_ERROR
(2191, X'88F') Character trigger message structure not valid.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UOW_ENLISTMENT_ERROR
(2354, X'932') Enlistment in global unit of work failed.

MQRC_UOW_MIX_NOT_SUPPORTED
(2355, X'933') Mixture of unit-of-work calls not supported.

MQRC_UOW_NOT_AVAILABLE
(2255, X'8CF') Unit of work not available for the queue manager to use.

MQRC_WIH_ERROR
(2333, X'91D') MQWIH structure not valid.

MQRC_WRONG_MD_VERSION
(2257, X'8D1') Wrong version of MQMD supplied.

MQRC_XQH_ERROR
(2260, X'8D4') Transmission queue header structure not valid.

For detailed information about these codes, see Messages and reason codes.

Topic usage notes

1. The following notes apply to the use of topics:

   a. When using MQPUT to publish messages on a topic, where one or more subscribers to that topic cannot be given the publication due to a problem with their subscriber queue (for example it is full), the Reason code returned to the MQPUT call and the delivery behavior is dependent on the setting of the PMSGDLV or NPMSGDLV attributes on the TOPIC. Note delivery of a publication to the dead letter queue when MQRO_DEAD_LETTER_Q is specified, or discarding the message when MQRO_DISCARD_MSG is specified, is considered as a successful delivery of the message. If none of the publications are delivered, the MQPUT returns with MQRC_PUBLICATION_FAILURE. This can happen in the following cases:

      - A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALL and any subscription (durable or not) has a queue which cannot receive the publication.

- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLDUR and a durable subscription has a queue which cannot receive the publication.

The MQPUT can return with MQRC_NONE even though publications could not be delivered to some subscribers in the following cases:

- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLAVAIL and any subscription, durable or not, has a queue which cannot receive the publication.
- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLDUR and a non-durable subscription has a queue which cannot receive the publication.

You can use the USEDLQ topic attribute to determine whether the dead-letter queue is used when publication messages cannot be delivered to their correct subscriber queue. For more information about the use of USEDLQ, see DEFINE TOPIC.

b. If there are no subscribers to the topic being used, the message published is not sent to any queue and is discarded. It does not matter whether the message is persistent or non-persistent, or whether it has unlimited expiry or has an expiry time, it is still discarded if there are no subscribers. The exception to this is if the message is to be retained, in which case, although it is not sent to any subscribers' queues, it is stored against the topic to be delivered to any new subscriptions or to any subscribers that ask for retained publications using MQSUBRQ.

MQPUT and MQPUT1

You can use both the MQPUT and MQPUT1 calls to put messages on a queue; which call to use depends on the circumstances

- Use the MQPUT call to place multiple messages on the same queue.

  An MQOPEN call specifying the MQOO_OUTPUT option is issued first, followed by one or more MQPUT requests to add messages to the queue; finally the queue is closed with an MQCLOSE call. This gives better performance than repeated use of the MQPUT1 call.
- Use the MQPUT1 call to put only one message on a queue.

  This call encapsulates the MQOPEN, MQPUT, and MQCLOSE calls into a single call, minimizing the number of calls that must be issued.

Destination Queues

The following notes apply to the use of destination queues:

1. If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if the conditions detailed are satisfied. Some conditions apply to both local and remote destination queues; other conditions apply only to remote destination queues.

   Conditions that apply to local and remote destination queues

   - All the MQPUT calls are within the same unit of work, or none of them is within a unit of work.

     Be aware that when messages are put onto a particular queue within a single unit of work, messages from other applications might be interspersed with the sequence of messages on the queue.
   - All the MQPUT calls are made using the same object handle `Hobj`.

     In some environments, message sequence is also preserved when different object handles are used, if the calls are made from the same application. The meaning of *same application* is determined by the environment:

     – z/OS On z/OS, the application is:

       - For CICS, the CICS task

- For IMS, the task
- For z/OS batch, the task

– On IBM i, the application is the job.

– On Windows and UNIX, the application is the thread.

- The messages all have the same priority.
- The messages are not put to a cluster queue with MQOO_BIND_NOT_FIXED specified (or with MQOO_BIND_AS_Q_DEF in effect when the DefBind queue attribute has the value MQBND_BIND_NOT_FIXED).

Additional conditions that apply to remote destination queues

- There is only one path from the sending queue manager to the destination queue manager.

  If some messages in the sequence might go on a different path (for example, because of reconfiguration, traffic balancing, or path selection based on message size), the order of the messages at the destination queue manager cannot be guaranteed.
- Messages are not placed temporarily on dead-letter queues at the sending, intermediate, or destination queue managers.

  If one or more of the messages is put temporarily on a dead-letter queue (for example, because a transmission queue or the destination queue is temporarily full), the messages can arrive on the destination queue out of sequence.
- The messages are either all persistent or all nonpersistent.

  If a channel on the route between the sending and destination queue managers has its **NonPersistentMsgSpeed** attribute set to MQNPMS_FAST, nonpersistent messages can jump ahead of persistent messages, resulting in the order of persistent messages relative to nonpersistent messages not being preserved. However, the order of persistent messages relative to each other, and of nonpersistent messages relative to each other, is preserved.

If these conditions are not satisfied, you can use message groups to preserve message order, but this requires both the sending and receiving applications to use the message-grouping support. For more information about message groups, see:

- MQMD - MsgFlags field
- MQPMO_LOGICAL_ORDER
- MQGMO_LOGICAL_ORDER

Distribution Lists

The following notes apply to the use of distribution lists.

Distribution lists are supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

and for IBM MQ MQI clients connected to these systems.

1. You can put messages to a distribution list using either a version-1 or a version-2 MQPMO. If you use a version-1 MQPMO (or a version-2 MQPMO with `RecsPresent` equal to zero), the application can provide no put message records or response records. You cannot identify the queues that encounter errors if the message is sent successfully to some queues in the distribution list and not others.

If the application provides put message records or response records, set the `Version` field to MQPMO_VERSION_2.

You can also use a version-2 MQPMO to send messages to a single queue that is not in a distribution list, by ensuring that `RecsPresent` is zero.

2. The completion code and reason code parameters are set as follows:

   - If the puts to the queues in the distribution list all succeed or fail in the same way, the completion code and reason code parameters are set to describe the common result. The MQRR response records (if provided by the application) are not set in this case.

     For example, if every put succeeds, the completion code and reason code are set to MQCC_OK and MQRC_NONE; if every put fails because all the queues are inhibited for puts, the parameters are set to MQCC_FAILED and MQRC_PUT_INHIBITED.
   - If the puts to the queues in the distribution list do not all succeed or fail in the same way:
     - The completion code parameter is set to MQCC_WARNING if at least one put succeeded, and to MQCC_FAILED if all failed.
     - The reason code parameter is set to MQRC_MULTIPLE_REASONS.
     - The response records (if provided by the application) are set to the individual completion codes and reason codes for the queues in the distribution list.

     If the put to a destination fails because the open for that destination failed, the fields in the response record are set to MQCC_FAILED and MQRC_OPEN_FAILED; that destination is included in `InvalidDestCount`.
3. If a destination in the distribution list resolves to a local queue, the message is placed on that queue in normal form (that is, not as a distribution-list message). If more than one destination resolves to the same local queue, one message is placed on the queue for each such destination.

   If a destination in the distribution list resolves to a remote queue, a message is placed on the appropriate transmission queue. Where several destinations resolve to the same transmission queue, a single distribution-list message containing those destinations can be placed on the transmission queue, even if those destinations were not adjacent in the list of destinations provided by the application. However, this can be done only if the transmission queue supports distribution-list messages (see DistLists).

   If the transmission queue does not support distribution lists, one copy of the message in normal form is placed on the transmission queue for each destination that uses that transmission queue.

   If a distribution list with the application message data is too large for a transmission queue, the distribution list message is split into smaller distribution-list messages, each containing fewer destinations. If the application message data only just fits on the queue, distribution-list messages cannot be used at all, and the queue manager generates one copy of the message in normal form for each destination that uses that transmission queue.

   If different destinations have different message priority or message persistence (this can occur when the application specifies MQPRI_PRIORITY_AS_Q_DEF or MQPER_PERSISTENCE_AS_Q_DEF), the messages are not held in the same distribution-list message. Instead, the queue manager generates as many distribution-list messages as are necessary to accommodate the differing priority and persistence values.
4. A put to a distribution list can result in:
   - A single distribution-list message, or
   - A number of smaller distribution-list messages, or
   - A mixture of distribution list messages and normal messages, or
   - Normal messages only.

   Which of the above occurs depends on whether:
   - The destinations in the list are local, remote, or a mixture.

- The destinations have the same message priority and message persistence.
- The transmission queues can hold distribution-list messages.
- The transmission queues' maximum message lengths are large enough to accommodate the message in distribution-list form.

However, regardless of which of the above occurs, each *physical* message resulting (that is, each normal message or distribution-list message resulting from the put) counts as only *one* message when:

- Checking whether the application has exceeded the permitted maximum number of messages in a unit of work (see the **MaxUncommittedMsgs** queue manager attribute).
- Checking whether the triggering conditions are satisfied.
- Incrementing queue depths and checking whether the queues' maximum queue depth would be exceeded.

5. Any change to the queue definitions that would have caused a handle to become invalid had the queues been opened individually (for example, a change in the resolution path), does not cause the distribution-list handle to become invalid. However, it does result in a failure for that particular queue when the distribution-list handle is used on a subsequent MQPUT call.

Headers

If a message is put with one or more IBM MQ header structures at the beginning of the application message data, the queue manager performs certain checks on the header structures to verify that they are valid. If the queue manager detects an error, the call fails with an appropriate reason code. The checks performed vary according to the particular structures that are present:

- Checks are performed only if a version-2 or later MQMD is used on the MQPUT or MQPUT1 call. Checks are not performed if a version-1 MQMD is used, even if an MQMDE is present at the start of the message data.
- Structures that are not supported by the local queue manager, and structures following the first MQDLH in the message, are not validated.
- The MQDH and MQMDE structures are validated completely by the queue manager.
- Other structures are validated partially by the queue manager (not all fields are checked).

General checks performed by the queue manager include the following:

- The `StrucId` field must be valid.
- The `Version` field must be valid.
- The `StrucLength` field must specify a value that is large enough to include the structure plus any variable-length data that forms part of the structure.
- The `CodedCharSetId` field must not be zero, or a negative value that is not valid (MQCCSI_DEFAULT, MQCCSI_EMBEDDED, MQCCSI_Q_MGR, and MQCCSI_UNDEFINED are not valid in most IBM MQ header structures).
- The **BufferLength** parameter of the call must specify a value that is large enough to include the structure (the structure must not extend beyond the end of the message).

In addition to general checks on structures, the following conditions must be satisfied:

- The sum of the lengths of the structures in a PCF message must equal the length specified by the **BufferLength** parameter on the MQPUT or MQPUT1 call. A PCF message is a message that has a format name of MQFMT_ADMIN, MQFMT_EVENT, or MQFMT_PCF.
- An IBM MQ structure must not be truncated, except in the following situations where truncated structures are permitted:
  - Messages that are report messages.
  - PCF messages.
  - Messages containing an MQDLH structure. (Structures following the first MQDLH can be truncated; structures preceding the MQDLH cannot.)

- An IBM MQ structure must not be split over two or more segments; the structure must be contained entirely within one segment.

Buffer

For the Visual Basic programming language, the following points apply:

- If the size of the **Buffer** parameter is less than the length specified by the **BufferLength** parameter, the call fails with reason code MQRC_BUFFER_LENGTH_ERROR.
- The **Buffer** parameter is declared as being of type `String`. If the data to be placed on the queue is not of type `String`, use the MQPUTAny call in place of MQPUT.

  The MQPUTAny call has the same parameters as the MQPUT call, except that the **Buffer** parameter is declared as being of type Any, allowing any type of data to be placed on the queue. However, this means that `Buffer` cannot be checked to ensure that it is at least `BufferLength` bytes in size.

C invocation

```
MQPUT (Hconn, Hobj, &MsgDesc, &PutMsgOpts, BufferLength, Buffer,
      &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQHOBJ   Hobj;          /* Object handle */
MQMD     MsgDesc;       /* Message descriptor */
MQPMO    PutMsgOpts;    /* Options that control the action of MQPUT */
MQLONG   BufferLength;  /* Length of the message in Buffer */
MQBYTE   Buffer[n];     /* Message data */
MQLONG   CompCode;      /* Completion code */
MQLONG   Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
     CALL 'MQPUT' USING HCONN, HOBJ, MSGDESC, PUTMSGOPTS, BUFFERLENGTH,
                        BUFFER, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Object handle
 01  HOBJ          PIC S9(9) BINARY.
**   Message descriptor
 01  MSGDESC.
     COPY CMQMDV.
**   Options that control the action of MQPUT
 01  PUTMSGOPTS.
     COPY CMQPMOV.
**   Length of the message in BUFFER
 01  BUFFERLENGTH  PIC S9(9) BINARY.
**   Message data
 01  BUFFER        PIC X(n).
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQPUT (Hconn, Hobj, MsgDesc, PutMsgOpts, BufferLength, Buffer,
           CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn         fixed bin(31);  /* Connection handle */
dcl Hobj          fixed bin(31);  /* Object handle */
dcl MsgDesc       like MQMD;      /* Message descriptor */
dcl PutMsgOpts    like MQPMO;     /* Options that control the action of
                                     MQPUT */
dcl BufferLength  fixed bin(31);  /* Length of the message in Buffer */
dcl Buffer        char(n);        /* Message data */
dcl CompCode      fixed bin(31);  /* Completion code */
dcl Reason        fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQPUT,(HCONN,HOBJ,MSGDESC,PUTMSGOPTS,BUFFERLENGTH, X
               BUFFER,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN         DS       F      Connection handle
HOBJ          DS       F      Object handle
MSGDESC       CMQMDA   ,      Message descriptor
PUTMSGOPTS    CMQPMOA  ,      Options that control the action of MQPUT
BUFFERLENGTH  DS       F      Length of the message in BUFFER
BUFFER        DS       CL(n)  Message data
COMPCODE      DS       F      Completion code
REASON        DS       F      Reason code qualifying COMPCODE
```

Visual Basic invocation

Windows

```
MQPUT Hconn, Hobj, MsgDesc, PutMsgOpts, BufferLength, Buffer, CompCode,
      Reason
```

Declare the parameters as follows:

```
Dim Hconn        As Long   'Connection handle'
Dim Hobj         As Long   'Object handle'
Dim MsgDesc      As MQMD   'Message descriptor'
Dim PutMsgOpts   As MQPMO  'Options that control the action of MQPUT'
Dim BufferLength As Long   'Length of the message in Buffer'
Dim Buffer       As String 'Message data'
Dim CompCode     As Long   'Completion code'
Dim Reason       As Long   'Reason code qualifying CompCode'
```

MQPUT1 - Put one message

The MQPUT1 call puts one message on a queue, or distribution list, or to a topic.

The queue, distribution list, or topic does not need to be open.

Syntax

MQPUT1 (*Hconn*, *ObjDesc*, *MsgDesc*, *PutMsgOpts*, *BufferLength*, *Buffer*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

z/OS On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

ObjDesc

Type: MQOD - input/output

This is a structure that identifies the queue to which the message is added, or the topic to which the message is published. See "MQOD - Object descriptor" on page 471 for details.

If the structure is a queue, the user must be authorized to open the queue for output. The queue must not be a model queue.

MsgDesc

Type: MQMD - input/output

This structure describes the attributes of the message being sent, and receives feedback information after the put request is complete. See "MQMD - Message descriptor" on page 413 for details.

If the application provides a version-1 MQMD, the message data can be prefixed with an MQMDE structure to specify values for the fields that exist in the version-2 MQMD but not the version-1. Set the `Format` field in the MQMD to MQFMT_MD_EXTENSION to indicate that an MQMDE is present. See "MQMDE - Message descriptor extension" on page 463 for more details.

The application does not need to provide an MQMD structure if a valid message handle is supplied in the `MsgHandle` field of the MQGMO structure or in the `OriginalMsgHandle` or `NewMsgHandle` fields of the MQPMO structure. If nothing is provided in one of these fields, the descriptor of the message is taken from the descriptor associated with the message handles.

PutMsgOpts

Type: MQPMO - input/output

See "MQPMO - Put message options" on page 491 for details.

BufferLength

Type: MQLONG - input

The length of the message in `Buffer`. Zero is valid, and indicates that the message contains no application data. The upper limit depends on various factors; see "MQPUT - Put message" on page 738 for the description of the **BufferLength** parameter.

Buffer

Type: MQBYTExBufferLength - input

This is a buffer containing the application message data to be sent. Align the buffer on a boundary appropriate to the nature of the data in the message. 4-byte alignment is suitable for most messages (including messages containing IBM MQ header structures), but some messages might require more stringent alignment. For example, a message containing a 64-bit binary integer might require 8-byte alignment.

If `Buffer` contains character or numeric data, set the `CodedCharSetId` and `Encoding` fields in the **MsgDesc** parameter to the values appropriate to the data; this enables the receiver of the message to convert the data (if necessary) to the character set and encoding used by the receiver.

Note: All the other parameters on the MQPUT1 call must be in the character set and encoding of the local queue manager (given by the **CodedCharSetId** queue manager attribute and MQENC_NATIVE).

In the C programming language, the parameter is declared as a pointer-to-void; the address of any type of data can be specified as the parameter.

If the **BufferLength** parameter is zero, Buffer is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler can be null.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying CompCode.

If CompCode is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If CompCode is MQCC_WARNING:

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

MQRC_INCOMPLETE_GROUP
(2241, X'8C1') Message group not complete.

MQRC_INCOMPLETE_MSG
(2242, X'8C2') Logical message not complete.

MQRC_PRIORITY_EXCEEDS_MAXIMUM
(2049, X'801') Message Priority exceeds maximum value supported.

MQRC_UNKNOWN_REPORT_OPTION
(2104, X'838') Report options in message descriptor not recognized.

If CompCode is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ALIAS_BASE_Q_TYPE_ERROR
(2001, X'7D1') Alias base queue not a valid type.

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BACKED_OUT
(2003, X'7D3') Unit of work backed out.

MQRC_BUFFER_ERROR
(2004, X'7D4') Buffer parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_NOT_AVAILABLE
(2345, X'929') coupling facility not available.

MQRC_CF_STRUC_AUTH_FAILED
(2348, X'92C') Coupling-facility structure authorization check failed.

MQRC_CF_STRUC_ERROR
(2349, X'92D') Coupling-facility structure not valid.

MQRC_CF_STRUC_FAILED
(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE
(2346, X'92A') Coupling-facility structure in use.

MQRC_CF_STRUC_LIST_HDR_IN_USE
(2347, X'92B') Coupling-facility structure list-header in use.

MQRC_CFGR_ERROR
(2416, X'970') PCF group parameter structure MQCFGR in the message data is not valid.

MQRC_CFH_ERROR
(2235, X'8BB') PCF header structure not valid.

MQRC_CFIF_ERROR
(2414, X'96E') PCF integer filter parameter structure in the message data is not valid.

MQRC_CFIL_ERROR
(2236, X'8BC') PCF integer list parameter structure or PCIF*64 integer list parameter structure not valid.

MQRC_CFIN_ERROR
(2237, X'8BD') PCF integer parameter structure or PCIF*64 integer parameter structure not valid.

MQRC_CFSF_ERROR
(2415, X'96F') PCF string filter parameter structure in the message data is not valid.

MQRC_CFSL_ERROR
(2238, X'8BE') PCF string list parameter structure not valid.

MQRC_CFST_ERROR
(2239, X'8BF') PCF string parameter structure not valid.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CLUSTER_EXIT_ERROR
(2266, X'8DA') Cluster workload exit failed.

MQRC_CLUSTER_RESOLUTION_ERROR
(2189, X'88D') Cluster name resolution failed.

MQRC_CLUSTER_RESOURCE_ERROR
(2269, X'8DD') Cluster resource error.

MQRC_COD_NOT_VALID_FOR_XCF_Q
(2106, X'83A') COD report option not valid for XCF queue.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_QUIESCING
(2202, X'89A') Connection quiescing.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_CONTENT_ERROR
2554 (X'09FA') Message content could not be parsed to determine whether the message can be delivered to a subscriber with an extended message selector.

MQRC_CONTEXT_HANDLE_ERROR
(2097, X'831') Queue handle referred to does not save context.

MQRC_CONTEXT_NOT_AVAILABLE
(2098, X'832') Context not available for queue handle referred to.

MQRC_DATA_LENGTH_ERROR
(2010, X'7DA') Data length parameter not valid.

MQRC_DB2_NOT_AVAILABLE
(2342, X'926') Db2 subsystem not available.

MQRC_DEF_XMIT_Q_TYPE_ERROR
(2198, X'896') Default transmission queue not local.

MQRC_DEF_XMIT_Q_USAGE_ERROR
(2199, X'897') Default transmission queue usage error.

MQRC_DH_ERROR
(2135, X'857') Distribution header structure not valid.

MQRC_DLH_ERROR
(2141, X'85D') Dead letter header structure not valid.

MQRC_EPH_ERROR
(2420, X'974') Embedded PCF structure not valid.

MQRC_EXPIRY_ERROR
(2013, X'7DD') Expiry time not valid.

MQRC_FEEDBACK_ERROR
(2014, X'7DE') Feedback code not valid.

MQRC_GLOBAL_UOW_CONFLICT
(2351, X'92F') Global units of work conflict.

MQRC_GROUP_ID_ERROR
(2258, X'8D2') Group identifier not valid.

MQRC_HANDLE_IN_USE_FOR_UOW
(2353, X'931') Handle in use for global unit of work.

MQRC_HANDLE_NOT_AVAILABLE
(2017, X'7E1') No more handles available.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HEADER_ERROR
(2142, X'85E') IBM MQ header structure not valid.

MQRC_IIH_ERROR
(2148, X'864') IMS information header structure not valid.

MQRC_LOCAL_UOW_CONFLICT
(2352, X'930') Global unit of work conflicts with local unit of work.

MQRC_MD_ERROR
(2026, X'7EA') Message descriptor not valid.

MQRC_MDE_ERROR
(2248, X'8C8') Message descriptor extension not valid.

MQRC_MISSING_REPLY_TO_Q
(2027, X'7EB') Missing reply-to queue.

MQRC_MISSING_WIH
(2332, X'91C') Message data does not begin with MQWIH.

MQRC_MSG_FLAGS_ERROR
(2249, X'8C9') Message flags not valid.

MQRC_MSG_SEQ_NUMBER_ERROR
(2250, X'8CA') Message sequence number not valid.

MQRC_MSG_TOO_BIG_FOR_Q
(2030, X'7EE') Message length greater than maximum for queue.

MQRC_MSG_TOO_BIG_FOR_Q_MGR
(2031, X'7EF') Message length greater than maximum for queue manager.

MQRC_MSG_TYPE_ERROR
(2029, X'7ED') Message type in message descriptor not valid.

MQRC_MULTIPLE_REASONS
(2136, X'858') Multiple reason codes returned.

MQRC_NO_DESTINATIONS_AVAILABLE
(2270, X'8DE') No destination queues available.

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_OBJECT_IN_USE
(2042, X'7FA') Object already open with conflicting options.

MQRC_OBJECT_LEVEL_INCOMPATIBLE
(2360, X'938') Object level not compatible.

MQRC_OBJECT_NAME_ERROR
(2152, X'868') Object name not valid.

MQRC_OBJECT_NOT_UNIQUE
(2343, X'927') Object not unique.

MQRC_OBJECT_Q_MGR_NAME_ERROR
(2153, X'869') Object queue manager name not valid.

MQRC_OBJECT_RECORDS_ERROR
(2155, X'86B') Object records not valid.

MQRC_OBJECT_TYPE_ERROR
(2043, X'7FB') Object type not valid.

MQRC_OD_ERROR
(2044, X'7FC') Object descriptor structure not valid.

MQRC_OFFSET_ERROR
(2251, X'8CB') Message segment offset not valid.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_ORIGINAL_LENGTH_ERROR
(2252, X'8CC') Original length not valid.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_PAGESET_FULL
(2192, X'890') External storage medium is full.

MQRC_PCF_ERROR
(2149, X'865') PCF structures not valid.

MQRC_PERSISTENCE_ERROR
(2047, X'7FF') Persistence not valid.

MQRC_PERSISTENT_NOT_ALLOWED
(2048, X'800') Queue does not support persistent messages.

MQRC_PMO_ERROR
(2173, X'87D') Put-message options structure not valid.

MQRC_PMO_RECORD_FLAGS_ERROR
(2158, X'86E') Put message record flags not valid.

MQRC_PRIORITY_ERROR
(2050, X'802') Message priority not valid.

MQRC_PUBLICATION_FAILURE
(2502, X'9C6') The publication has not been delivered to any of the subscribers.

MQRC_PUT_INHIBITED
(2051, X'803') Put calls inhibited for the queue.

MQRC_PUT_MSG_RECORDS_ERROR
(2159, X'86F') Put message records not valid.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_FULL
(2053, X'805') Queue already contains maximum number of messages.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_QUIESCING
(2161, X'871') Queue manager quiescing.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_Q_SPACE_NOT_AVAILABLE
(2056, X'808') No space available on disk for queue.

MQRC_Q_TYPE_ERROR
(2057, X'809') Queue type not valid.

MQRC_RECS_PRESENT_ERROR
(2154, X'86A') Number of records present not valid.

MQRC_REMOTE_Q_NAME_ERROR
(2184, X'888') Remote queue name not valid.

MQRC_REPORT_OPTIONS_ERROR
(2061, X'80D') Report options in message descriptor not valid.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_RESPONSE_RECORDS_ERROR
(2156, X'86C') Response records not valid.

MQRC_RFH_ERROR
(2334, X'91E') MQRFH or MQRFH2 structure not valid.

MQRC_RMH_ERROR
(2220, X'8AC') Reference message header structure not valid.

MQRC_SECURITY_ERROR
(2063, X'80F') Security error occurred.

MQRC_SEGMENT_LENGTH_ZERO
(2253, X'8CD') Length of data in message segment is zero.

MQRC_SELECTION_NOT_AVAILABLE
2551 (X'09F7') A possible subscriber for the publication exists, but the queue manager cannot check whether to send the publication to the subscriber.

MQRC_STOPPED_BY_CLUSTER_EXIT
(2188, X'88C') Call rejected by cluster workload exit.

MQRC_STORAGE_CLASS_ERROR
(2105, X'839') Storage class error.

MQRC_STORAGE_MEDIUM_FULL
(2192, X'890') External storage medium is full.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_SYNCPOINT_LIMIT_REACHED
(2024, X'7E8') No more messages can be handled within current unit of work.

MQRC_SYNCPOINT_NOT_AVAILABLE
(2072, X'818') Syncpoint support not available.

MQRC_TM_ERROR
(2265, X'8D9') Trigger message structure not valid.

MQRC_TMC_ERROR
(2191, X'88F') Character trigger message structure not valid.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

MQRC_UNKNOWN_ALIAS_BASE_Q
(2082, X'822') Unknown alias base queue.

MQRC_UNKNOWN_DEF_XMIT_Q
(2197, X'895') Unknown default transmission queue.

MQRC_UNKNOWN_OBJECT_NAME
(2085, X'825') Unknown object name.

MQRC_UNKNOWN_OBJECT_Q_MGR
(2086, X'826') Unknown object queue manager.

MQRC_UNKNOWN_REMOTE_Q_MGR
(2087, X'827') Unknown remote queue manager.

MQRC_UNKNOWN_XMIT_Q
(2196, X'894') Unknown transmission queue.

MQRC_UOW_ENLISTMENT_ERROR
(2354, X'932') Enlistment in global unit of work failed.

MQRC_UOW_MIX_NOT_SUPPORTED
(2355, X'933') Mixture of unit-of-work calls not supported.

MQRC_UOW_NOT_AVAILABLE
(2255, X'8CF') Unit of work not available for the queue manager to use.

MQRC_WIH_ERROR
(2333, X'91D') MQWIH structure not valid.

MQRC_WRONG_CF_LEVEL
(2366, X'93E') Coupling-facility structure is wrong level.

MQRC_WRONG_MD_VERSION
(2257, X'8D1') Wrong version of MQMD supplied.

MQRC_XMIT_Q_TYPE_ERROR
(2091, X'82B') Transmission queue not local.

MQRC_XMIT_Q_USAGE_ERROR
(2092, X'82C') Transmission queue with wrong usage.

MQRC_XQH_ERROR
(2260, X'8D4') Transmission queue header structure not valid.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. Both the MQPUT and MQPUT1 calls can be used to put messages on a queue; which call to use depends on the circumstances:
   - Use the MQPUT call to place multiple messages on the *same* queue.

     An MQOPEN call specifying the MQOO_OUTPUT option is issued first, followed by one or more MQPUT requests to add messages to the queue; finally the queue is closed with an MQCLOSE call. This gives better performance than repeated use of the MQPUT1 call.
   - Use the MQPUT1 call to put only *one* message on a queue.

     This call encapsulates the MQOPEN, MQPUT, and MQCLOSE calls into a single call, minimizing the number of calls that must be issued.
2. If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if certain conditions are satisfied. However, in most environments the MQPUT1 call does not satisfy these conditions, and so does not preserve message order. The MQPUT call must be used instead in these environments. See MQPUT usage notes for details.
3. The MQPUT1 call can be used to put messages to distribution lists. For general information about this, see the usage notes for the MQOPEN and MQPUT calls.

   Distribution lists are supported in the following environments:

   - AIX
   - IBM i
   - Linux
   - Solaris
   - Windows

   and for IBM MQ clients connected to these systems.

   The following differences apply when using the MQPUT1 call:

   a. If the application provides MQRR response records, they must be provided using the MQOD structure; they cannot be provided using the MQPMO structure.

   b. The reason code MQRC_OPEN_FAILED is never returned by MQPUT1 in the response records; if a queue fails to open, the response record for that queue contains the reason code resulting from the open operation.

      If an open operation for a queue succeeds with a completion code of MQCC_WARNING, the completion code and reason code in the response record for that queue are replaced by the completion and reason codes resulting from the put operation.

      As with the MQOPEN and MQPUT calls, the queue manager sets the response records (if provided) only when the outcome of the call is not the same for all queues in the distribution list; this is indicated by the call completing with reason code MQRC_MULTIPLE_REASONS.
4. If the MQPUT1 call is used to put a message on a cluster queue, the call behaves as though MQOO_BIND_NOT_FIXED had been specified on the MQOPEN call.

5. If a message is put with one or more IBM MQ header structures at the beginning of the application message data, the queue manager performs certain checks on the header structures to verify that they are valid. For more information about this, see the usage notes for the MQPUT call.
6. If more than one of the warning situations arise (see the **CompCode** parameter), the reason code returned is the first one in the following list that applies:
    a. MQRC_MULTIPLE_REASONS
    b. MQRC_INCOMPLETE_MSG
    c. MQRC_INCOMPLETE_GROUP
    d. MQRC_PRIORITY_EXCEEDS_MAXIMUM or MQRC_UNKNOWN_REPORT_OPTION
7. For the Visual Basic programming language, the following points apply:
    - If the size of the **Buffer** parameter is less than the length specified by the **BufferLength** parameter, the call fails with reason code MQRC_BUFFER_LENGTH_ERROR.
    - The **Buffer** parameter is declared as being of type `String`. If the data to be placed on the queue is not of type `String`, use the MQPUT1Any call in place of MQPUT1.

      The MQPUT1Any call has the same parameters as the MQPUT1 call, except that the **Buffer** parameter is declared as being of type `Any`, allowing any type of data to be placed on the queue. However, this means that `Buffer` cannot be checked to ensure that it is at least `BufferLength` bytes in size.
8. When an MQPUT1 call is issued with MQPMO_SYNCPOINT, the default behavior changes, so that the put operation is completed asynchronously. This might cause a change in the behavior of some applications that rely on certain fields in the MQOD and MQMD structures being returned, but which now contain undefined values. An application can specify MQPMO_SYNC_RESPONSE to ensure that the put operation is performed synchronously and that all the appropriate field values are completed.

C invocation

```
MQPUT1 (Hconn, &ObjDesc, &MsgDesc, &PutMsgOpts,
       BufferLength, Buffer, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;         /* Connection handle */
MQOD     ObjDesc;       /* Object descriptor */
MQMD     MsgDesc;       /* Message descriptor */
MQPMO    PutMsgOpts;    /* Options that control the action of MQPUT1 */
MQLONG   BufferLength;  /* Length of the message in Buffer */
MQBYTE   Buffer[n];     /* Message data */
MQLONG   CompCode;      /* Completion code */
MQLONG   Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
     CALL 'MQPUT1' USING HCONN, OBJDESC, MSGDESC, PUTMSGOPTS,
                         BUFFERLENGTH, BUFFER, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Object descriptor
 01  OBJDESC.
     COPY CMQODV.
**   Message descriptor
 01  MSGDESC.
     COPY CMQMDV.
**   Options that control the action of MQPUT1
```

```
 01  PUTMSGOPTS.
     COPY CMQPMOV.
**   Length of the message in BUFFER
 01  BUFFERLENGTH  PIC S9(9) BINARY.
**   Message data
 01  BUFFER        PIC X(n).
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

PL/I invocation

```
call MQPUT1 (Hconn, ObjDesc, MsgDesc, PutMsgOpts, BufferLength, Buffer,
            CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn         fixed bin(31);  /* Connection handle */
dcl ObjDesc       like MQOD;      /* Object descriptor */
dcl MsgDesc       like MQMD;      /* Message descriptor */
dcl PutMsgOpts    like MQPMO;     /* Options that control the action of
                                     MQPUT1 */
dcl BufferLength  fixed bin(31);  /* Length of the message in Buffer */
dcl Buffer        char(n);        /* Message data */
dcl CompCode      fixed bin(31);  /* Completion code */
dcl Reason        fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
         CALL MQPUT1,(HCONN,OBJDESC,MSGDESC,PUTMSGOPTS,BUFFERLENGTH,   X
               BUFFER,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN         DS       F      Connection handle
OBJDESC       CMQODA   ,      Object descriptor
MSGDESC       CMQMDA   ,      Message descriptor
PUTMSGOPTS    CMQPMOA  ,      Options that control the action of MQPUT1
BUFFERLENGTH  DS       F      Length of the message in BUFFER
BUFFER        DS       CL(n)  Message data
COMPCODE      DS       F      Completion code
REASON        DS       F      Reason code qualifying COMPCODE
```

Visual Basic invocation

Windows

```
MQPUT1 Hconn, ObjDesc, MsgDesc, PutMsgOpts, BufferLength, Buffer,
       CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn        As Long   'Connection handle'
Dim ObjDesc      As MQOD   'Object descriptor'
Dim MsgDesc      As MQMD   'Message descriptor'
Dim PutMsgOpts   As MQPMO  'Options that control the action of MQPUT1'
Dim BufferLength As Long   'Length of the message in Buffer'
Dim Buffer       As String 'Message data'
Dim CompCode     As Long   'Completion code'
Dim Reason       As Long   'Reason code qualifying CompCode'
```

MQSET - Set object attributes

Use the MQSET call to change the attributes of an object represented by a handle. The object must be a queue.

Syntax

MQSET (*Hconn*, *Hobj*, *SelectorCount*, *Selectors*, *IntAttrCount*, *IntAttrs*, *CharAttrLength*, *CharAttrs*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of Hconn was returned by a previous MQCONN or MQCONNX call.

z/OS On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Hobj

Type: MQHOBJ - input

This handle represents the queue object with attributes that are to be set. The handle was returned by a previous MQOPEN call that specified the MQOO_SET option.

SelectorCount

Type: MQLONG - input

This is the count of selectors that are supplied in the Selectors array. It is the number of attributes that are to be set. Zero is a valid value. The maximum number allowed is 256.

Selectors

Type: MQLONGxSelectorCount - input

This is an array of **SelectorCount** attribute selectors; each selector identifies an attribute (integer or character) with a value that is to be set.

Each selector must be valid for the type of queue that Hobj represents. Only certain MQIA_* and MQCA_* values are allowed; as listed later.

Selectors can be specified in any order. Attribute values that correspond to integer attribute selectors (MQIA_* selectors) must be specified in IntAttrs in the same order in which these selectors occur in Selectors. Attribute values that correspond to character attribute selectors (MQCA_* selectors) must be specified in CharAttrs in the same order in which those selectors occur. MQIA_* selectors can be interleaved with the MQCA_* selectors; only the relative order within each type is important.

You can specify the same selector more than once; if you do, the last value specified for a particular selector is the one that takes effect.

Note:

1. The integer and character attribute selectors are allocated within two different ranges; the MQIA_* selectors reside within the range MQIA_FIRST through MQIA_LAST, and the MQCA_* selectors within the range MQCA_FIRST through MQCA_LAST.

   For each range, the constants MQIA_LAST_USED and MQCA_LAST_USED define the highest value that the queue manager accepts.

2. If all the MQIA_* selectors occur first, the same element numbers can be used to address corresponding elements in the Selectors and IntAttrs arrays.

3. If the **SelectorCount** parameter is zero, Selectors is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler might be null.

The attributes that can be set are listed in the following table. No other attributes can be set using this call. For the MQCA_* attribute selectors, the constant that defines the length in bytes of the string that is required in CharAttrs is supplied in parentheses.

Table 554. MQSET attribute selectors for queues

Selector	Description	Note
MQCA_TRIGGER_DATA	Trigger data (MQ_TRIGGER_DATA_LENGTH).	
MQIA_DIST_LISTS	Distribution list support.	1
MQIA_INHIBIT_GET	Whether get operations are allowed.	
MQIA_INHIBIT_PUT	Whether put operations are allowed.	
MQIA_TRIGGER_CONTROL	Trigger control.	
MQIA_TRIGGER_DEPTH	Trigger depth.	
MQIA_TRIGGER_MSG_PRIORITY	Threshold message priority for triggers.	
MQIA_TRIGGER_TYPE	Trigger type.	

Note:

1. Supported only on the following platforms:

- AIX
- IBM i
- Linux
- Solaris
- Windows

and for IBM MQ MQI clients connected to these systems.

IntAttrCount

Type: MQLONG - input

This is the number of elements in the IntAttrs array, and must be at least the number of MQIA_* selectors in the **Selectors** parameter. Zero is a valid value if there are none.

IntAttrs

Type: MQLONGxIntAttrCount - input

This is an array of IntAttrCount integer attribute values. These attribute values must be in the same order as the MQIA_* selectors in the Selectors array.

If the **IntAttrCount** or **SelectorCount** parameter is zero, IntAttrs is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler might be null.

CharAttrLength

Type: MQLONG - input

This is the length in bytes of the **CharAttrs** parameter, and must be at least the sum of the lengths of the character attributes specified in the Selectors array. Zero is a valid value if there are no MQCA_* selectors in Selectors.

CharAttrs

Type: MQCHAR x CharAttrLength - input

This is the buffer containing the character attribute values, concatenated together. The length of the buffer is given by the **CharAttrLength** parameter.

The characters attributes must be specified in the same order as the MQCA_* selectors in the Selectors array. The length of each character attribute is fixed (see Selectors). If the value to be set for an attribute contains fewer nonblank characters than the defined length of the attribute, pad the value in CharAttrs to the right with blanks to make the attribute value match the defined length of the attribute.

If the **CharAttrLength** or **SelectorCount** parameter is zero, CharAttrs is not referred to; in this case, the parameter address passed by programs written in C or System/390 assembler might be null.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

The reason code qualifying CompCode.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If CompCode is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE

(2204, X'89C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR

(2130, X'852') Unable to load adapter service module.

MQRC_API_EXIT_ERROR

(2374, X'946') API exit failed.

MQRC_API_EXIT_LOAD_ERROR

(2183, X'887') Unable to load API exit.

MQRC_ASID_MISMATCH

(2157, X'86D') Primary and home ASIDs differ.

MQRC_CALL_IN_PROGRESS

(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CF_NOT_AVAILABLE

(2345, X'929') Coupling facility not available.

MQRC_CF_STRUC_FAILED

(2373, X'945') Coupling-facility structure failed.

MQRC_CF_STRUC_IN_USE

(2346, X'92A') Coupling-facility structure in use.

MQRC_CF_STRUC_LIST_HDR_IN_USE

(2347, X'92B') Coupling-facility structure list-header in use.

MQRC_CHAR_ATTR_LENGTH_ERROR

(2006, X'7D6') Length of character attributes not valid.

MQRC_CHAR_ATTRS_ERROR

(2007, X'7D7') Character attributes string not valid.

MQRC_CICS_WAIT_FAILED
(2140, X'85C') Wait request rejected by CICS.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_NOT_AUTHORIZED
(2217, X'8A9') Not authorized for connection.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_DB2_NOT_AVAILABLE
(2342, X'926') Db2 subsystem not available.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_HOBJ_ERROR
(2019, X'7E3') Object handle not valid.

MQRC_INHIBIT_VALUE_ERROR
(2020, X'7E4') Value for inhibit-get or inhibit-put queue attribute not valid.

MQRC_INT_ATTR_COUNT_ERROR
(2021, X'7E5') Count of integer attributes not valid.

MQRC_INT_ATTRS_ARRAY_ERROR
(2023, X'7E7') Integer attributes array not valid.

MQRC_NOT_OPEN_FOR_SET
(2040, X'7F8') Queue not open for set.

MQRC_OBJECT_CHANGED
(2041, X'7F9') Object definition changed since opened.

MQRC_OBJECT_DAMAGED
(2101, X'835') Object damaged.

MQRC_PAGESET_ERROR
(2193, X'891') Error accessing page-set data set.

MQRC_Q_DELETED
(2052, X'804') Queue has been deleted.

MQRC_Q_MGR_NAME_ERROR
(2058, X'80A') Queue manager name not valid or not known.

MQRC_Q_MGR_NOT_AVAILABLE
(2059, X'80B') Queue manager not available for connection.

MQRC_Q_MGR_STOPPING
(2162, X'872') Queue manager shutting down.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SELECTOR_COUNT_ERROR
(2065, X'811') Count of selectors not valid.

MQRC_SELECTOR_ERROR
(2067, X'813') Attribute selector not valid.

MQRC_SELECTOR_LIMIT_EXCEEDED
(2066, X'812') Count of selectors too large.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_SUPPRESSED_BY_EXIT
(2109, X'83D') Call suppressed by exit program.

MQRC_TRIGGER_CONTROL_ERROR
(2075, X'81B') Value for trigger-control attribute not valid.

MQRC_TRIGGER_DEPTH_ERROR
(2076, X'81C') Value for trigger-depth attribute not valid.

MQRC_TRIGGER_MSG_PRIORITY_ERR
(2077, X'81D') Value for trigger-message-priority attribute not valid.

MQRC_TRIGGER_TYPE_ERROR
(2078, X'81E') Value for trigger-type attribute not valid.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. Using this call, the application can specify an array of integer attributes, or a collection of character attribute strings, or both. If no errors occur, the attributes specified are all set simultaneously. If an error occurs (for example, if a selector is not valid, or an attempt is made to set an attribute to a value that is not valid), the call fails and no attributes are set.
2. The values of attributes can be determined using the MQINQ call; see “MQINQ - Inquire object attributes” on page 694 for details.

   Note: Not all attributes with values that can be inquired using the MQINQ call can have their values changed using the MQSET call. For example, no process-object or queue manager attributes can be set with this call.
3. Attribute changes are preserved across restarts of the queue manager (other than alterations to temporary dynamic queues, which do not survive restarts of the queue manager).
4. You cannot change the attributes of a model queue using the MQSET call. However, if you open a model queue using the MQOPEN call with the MQOO_SET option, you can use the MQSET call to set the attributes of the dynamic local queue that is created by the MQOPEN call.
5. If the object being set is a cluster queue, there must be a local instance of the cluster queue for the open to succeed.

For more information about object attributes, see:

- “Attributes for queues” on page 823
- “Attributes for namelists” on page 856
- “Attributes for process definitions” on page 858
- “Attributes for the queue manager” on page 786

C invocation

```
MQSET (Hconn, Hobj, SelectorCount, Selectors, IntAttrCount, IntAttrs,
      CharAttrLength, CharAttrs, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;           /* Connection handle */
MQHOBJ   Hobj;            /* Object handle */
MQLONG   SelectorCount;   /* Count of selectors */
MQLONG   Selectors[n];    /* Array of attribute selectors */
MQLONG   IntAttrCount;    /* Count of integer attributes */
MQLONG   IntAttrs[n];     /* Array of integer attributes */
MQLONG   CharAttrLength;  /* Length of character attributes buffer */
MQCHAR   CharAttrs[n];    /* Character attributes */
MQLONG   CompCode;        /* Completion code */
MQLONG   Reason;          /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQSET' USING HCONN, HOBJ, SELECTORCOUNT, SELECTORS-TABLE,
                    INTATTRCOUNT, INTATTRS-TABLE, CHARATTRLENGTH,
                    CHARATTRS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN            PIC S9(9) BINARY.
**   Object handle
 01  HOBJ             PIC S9(9) BINARY.
**   Count of selectors
 01  SELECTORCOUNT    PIC S9(9) BINARY.
**   Array of attribute selectors
 01  SELECTORS-TABLE.
  02  SELECTORS        PIC S9(9) BINARY OCCURS n TIMES.
**   Count of integer attributes
 01  INTATTRCOUNT     PIC S9(9) BINARY.
**   Array of integer attributes
 01  INTATTRS-TABLE.
  02  INTATTRS         PIC S9(9) BINARY OCCURS n TIMES.
**   Length of character attributes buffer
 01  CHARATTRLENGTH   PIC S9(9) BINARY.
**   Character attributes
 01  CHARATTRS        PIC X(n).
**   Completion code
 01  COMPCODE         PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON           PIC S9(9) BINARY.
```

PL/I invocation

```
call MQSET (Hconn, Hobj, SelectorCount, Selectors, IntAttrCount,
           IntAttrs, CharAttrLength, CharAttrs, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn           fixed bin(31);  /* Connection handle */
dcl Hobj            fixed bin(31);  /* Object handle */
dcl SelectorCount   fixed bin(31);  /* Count of selectors */
dcl Selectors(n)    fixed bin(31);  /* Array of attribute selectors */
dcl IntAttrCount    fixed bin(31);  /* Count of integer attributes */
dcl IntAttrs(n)     fixed bin(31);  /* Array of integer attributes */
dcl CharAttrLength  fixed bin(31);  /* Length of character attributes
                                       buffer */
dcl CharAttrs       char(n);        /* Character attributes */
dcl CompCode        fixed bin(31);  /* Completion code */
dcl Reason          fixed bin(31);  /* Reason code qualifying
                                       CompCode */
```

High Level Assembler invocation

```
CALL MQSET,(HCONN,HOBJ,SELECTORCOUNT,SELECTORS,INTATTRCOUNT,  X
             INTATTRS,CHARATTRLENGTH,CHARATTRS,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN           DS  F      Connection handle
HOBJ            DS  F      Object handle
SELECTORCOUNT   DS  F      Count of selectors
SELECTORS       DS  (n)F   Array of attribute selectors
INTATTRCOUNT    DS  F      Count of integer attributes
INTATTRS        DS  (n)F   Array of integer attributes
CHARATTRLENGTH  DS  F      Length of character attributes buffer
CHARATTRS       DS  CL(n)  Character attributes
```

```
COMPCODE         DS  F       Completion code
REASON           DS  F       Reason code qualifying COMPCODE
```

Visual Basic invocation

```
MQSET Hconn, Hobj, SelectorCount, Selectors, IntAttrCount, IntAttrs,
      CharAttrLength, CharAttrs, CompCode, Reason
```

Declare the parameters as follows:

```
Dim Hconn          As Long   'Connection handle'
Dim Hobj           As Long   'Object handle'
Dim SelectorCount  As Long   'Count of selectors'
Dim Selectors      As Long   'Array of attribute selectors'
Dim IntAttrCount   As Long   'Count of integer attributes'
Dim IntAttrs       As Long   'Array of integer attributes'
Dim CharAttrLength As Long   'Length of character attributes buffer'
Dim CharAttrs      As String 'Character attributes'
Dim CompCode       As Long   'Completion code'
Dim Reason         As Long   'Reason code qualifying CompCode'
```

MQSETMP - Set message property

Use the MQSETMP call to set or modify a property of a message handle.

Syntax

`MQSETMP` (*Hconn*, *Hmsg*, *SetPropOpts*, *Name*, *PropDesc*, *Type*, *ValueLength*, *Value*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager.

The value must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter. If the message handle was created using MQHC_UNASSOCIATED_HCONN, a valid connection must be established on the thread setting a property of the message handle, otherwise the call fails with reason code MQRC_CONNECTION_BROKEN.

Hmsg

Type: MQHMSG - input

This is the message handle to be modified. The value was returned by a previous MQCRTMH call.

SetPropOpts

Type: MQSMPO - input

Control how message properties are set.

This structure allows applications to specify options that control how message properties are set. The structure is an input parameter on the MQSETMP call. See MQSMPO for further information.

Name

Type: MQCHARV- input

This is the name of the property to set.

See Property names and Property name restrictions for further information about the use of property names.

PropDesc

Type: MQPD - input/output

This structure is used to define the attributes of a property, including:

- what happens if the property is not supported
- what message context the property belongs to
- what messages the property is copied into as it flows

See MQPD for further information about this structure.

Type

Type: MQLONG - input

The data type of the property being set. It can be one of the following:

MQTYPE_BOOLEAN
A Boolean. *ValueLength* must be 4.

MQTYPE_BYTE_STRING
A byte string. *ValueLength* must be zero or greater.

MQTYPE_INT8
An 8-bit signed integer. *ValueLength* must be 1.

MQTYPE_INT16
A 16-bit signed integer. *ValueLength* must be 2.

MQTYPE_INT32
A 32-bit signed integer. *ValueLength* must be 4.

MQTYPE_INT64
A 64-bit signed integer. *ValueLength* must be 8.

MQTYPE_FLOAT32
A 32-bit floating-point number. *ValueLength* must be 4.

Note: this type is not supported with applications using IBM COBOL for z/OS.

MQTYPE_FLOAT64
A 64-bit floating-point number. *ValueLength* must be 8.

Note: this type is not supported with applications using IBM COBOL for z/OS.

MQTYPE_STRING
A character string. *ValueLength* must be zero or greater, or the special value MQVL_NULL_TERMINATED.

MQTYPE_NULL
The property exists but has a null value. *ValueLength* must be zero.

ValueLength

Type: MQLONG - input

The length in bytes of the property value in the *Value* parameter. Zero is valid only for null values or for strings or byte strings. Zero indicates that the property exists but that the value contains no characters or bytes.

The value must be greater than or equal to zero or the following special value if the *Type* parameter has MQTYPE_STRING set:

MQVL_NULL_TERMINATED
The value is delimited by the first null encountered in the string. The null is not included as part of the string. This value is invalid if MQTYPE_STRING is not also set.

Note: The null character used to terminate a string if MQVL_NULL_TERMINATED is set is a null from the character set of the Value.

Value

Type: MQBYTExValueLength - input

The value of the property to be set. The buffer must be aligned on a boundary appropriate to the nature of the data in the value.

In the C programming language, the parameter is declared as a pointer-to-void; the address of any type of data can be specified as the parameter.

If *ValueLength* is zero, *Value* is not referred to. In this case, the parameter address passed by programs written in C or System/390 assembler can be null.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_RFH_FORMAT_ERROR
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CompCode* is MQCC_FAILED:

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'089C') Adapter not available.

MQRC_ADAPTER_SERV_LOAD_ERROR
(2130, X'852') Unable to load adapter service module.

MQRC_ASID_MISMATCH
(2157, X'86D') Primary and home ASIDs differ.

MQRC_BUFFER_ERROR
(2004, X'07D4') Value parameter not valid.

MQRC_BUFFER_LENGTH_ERROR
(2005, X'07D5') Value length parameter not valid.

MQRC_CALL_IN_PROGRESS
(2219, X'08AB') MQI call entered before previous call completed.

MQRC_HMSG_ERROR
(2460, X'099C') Message handle pointer not valid.

MQRC_MSG_HANDLE_IN_USE
(2499, X'09C3') Message handle already in use.

MQRC_OPTIONS_ERROR
(2046, X'07FE') Options not valid or not consistent.

MQRC_PD_ERROR
(2482, X'09B2') Property descriptor structure not valid.

MQRC_PROPERTY_NAME_ERROR
(2442, X'098A') Invalid property name.

MQRC_PROPERTY_TYPE_ERROR
(2473, X'09A9') Invalid property data type.

MQRC_PROP_NUMBER_FORMAT_ERROR
(2472, X'09A8') Number format error encountered in value data.

MQRC_SMPO_ERROR
(2463, X'099F') Set message property options structure not valid.

MQRC_SOURCE_CCSID_ERROR
(2111, X'083F') Property name coded character set identifier not valid.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C invocation

```
MQSETMP (Hconn, Hmsg, &SetPropOpts, &Name, &PropDesc, Type,
ValueLength, &Value, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;       /* Connection handle */
MQHMSG   Hmsg;        /* Message handle */
MQSMPO   SetPropOpts; /* Options that control the action of MQSETMP */
MQCHARV  Name;        /* Property name */
MQPD     PropDesc;    /* Property descriptor */
MQLONG   Type;        /* Property data type */
MQLONG   ValueLength; /* Length of property value in Value */
MQBYTE   Value[n];    /* Property value */
MQLONG   CompCode;    /* Completion code */
MQLONG   Reason;      /* Reason code qualifying CompCode */
```

COBOL invocation

```
     CALL 'MQSETMP' USING HCONN, HMSG, SETMSGOPTS, NAME, PROPDESC, TYPE,
                          VALUELENGTH, VALUE, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN     PIC S9(9) BINARY.
**   Message handle
 01  HMSG    PIC S9(18) BINARY.
**   Options that control the action of MQSETMP
 01  SETMSGOPTS.
     COPY CMQSMPOV.
**   Property name
 01  NAME
    COPY CMQCHRVV.
**   Property descriptor
 01  PROPDESC.
     COPY CMQPDV.
**   Property data type
 01  TYPE          PIC S9(9) BINARY.
**   Length of property value in VALUE
 01  VALUELENGTH   PIC S9(9) BINARY.
**   Property value
 01  VALUE         PIC X(n).
**   Completion code
 01  COMPCODE  PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON    PIC S9(9) BINARY.
```

PL/I invocation

```
call MQSETMP (Hconn, Hmsg, SetPropOpts, Name, PropDesc, Type, ValueLength,
              Value, CompCode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn       fixed bin(31);  /* Connection handle */
dcl Hmsg        fixed bin(63);  /* Message handle */
dcl SetPropOpts like MQSMPO;    /* Options that control the action of MQSETMP */
dcl Name        like MQCHARV;   /* Property name */
dcl PropDesc    like MQPD;      /* Property descriptor */
dcl Type        fixed bin(31);  /* Property data type */
dcl ValueLength fixed bin(31);  /* Length of property value in Value */
dcl Value       char(n);        /* Property value */
dcl CompCode    fixed bin(31);  /* Completion code */
dcl Reason      fixed bin(31);  /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
         CALL MQSETMP,(HCONN,HMSG,SETMSGHOPTS,NAME,PROPDESC,TYPE,VALUELENGTH,
               VALUE,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN        DS         F     Connection handle
HMSG         DS         D     Message handle
SETMSGOPTS   CMQSMPOA   ,     Options that control the action of MQSETMP
NAME         CMQCHRVA   ,     Property name
PROPDESC     CMQPDA     ,     Property descriptor
TYPE         DS         F     Property data type
VALUELENGTH  DS         F     Length of property value in VALUE
VALUE        DS         CL(n) Property value
COMPCODE     DS         F     Completion code
REASON       DS         F     Reason code qualifying COMPCODE
```

MQSTAT - Retrieve status information

Use the MQSTAT call to retrieve status information. The type of status information returned is determined by the Type value specified on the call.

Syntax

MQSTAT (*Hconn*, *Type*, *Stat*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Type

Type: MQLONG - input

Type of status information being requested. The > valid values are:

MQSTAT_TYPE_ASYNC_ERROR
Return information about previous asynchronous put operations.

MQSTAT_TYPE_RECONNECTION

Return information about reconnection. If the connection is reconnecting or failed to reconnect, the information describes the failure which caused the connection to begin reconnecting.

This value is only valid for client connections. For other types of connection, the call fails with reason code **MQRC_ENVIRONMENT_ERROR**

MQSTAT_TYPE_RECONNECTION_ERROR

Return information about a previous failure related to reconnect. If the connection failed to reconnect, the information describes the failure which caused reconnection to fail.

This value is only valid for client connections. For other types of connection, the call fails with reason code **MQRC_ENVIRONMENT_ERROR**.

Stat
Type: MQSTS - input/output

Status information structure. See “MQSTS - Status reporting structure” on page 581 for details.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_API_EXIT_ERROR
(2374, X'946') API exit failed

MQRC_API_EXIT_LOAD_ERROR
(2183, X'887') Unable to load API exit.

MQRC_CALL_IN_PROGRESS
(2219, X'8AB') MQI call entered before previous call complete.

MQRC_CONNECTION_BROKEN
(2009, X'7D9') Connection to queue manager lost.

MQRC_CONNECTION_STOPPING
(2203, X'89B') Connection shutting down.

MQRC_FUNCTION_NOT_SUPPORTED
(2298, X'8FA') The function requested is not available in the current environment.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_Q_MGR_STOPPING
(2162,X'872' - Queue manager stopping

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_STAT_TYPE_ERROR
(2430, X'97E' Error with MQSTAT type

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_STS_ERROR
(2426, X'97A') Error with MQSTS structure

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

Usage notes

1. A call to `MQSTAT` specifying a type of `MQSTAT_TYPE_ASYNC_ERROR` returns information about previous asynchronous `MQPUT` and `MQPUT1` operations. The `MQSTS` structure passed back on return from the `MQSTAT` call contains the first recorded asynchronous warning or error information for that connection. If further errors or warnings follow the first, they do not normally alter these values. However, if an error occurs with a completion code of `MQCC_WARNING`, a subsequent failure with a completion code of `MQCC_FAILED` is returned instead.
2. If no errors have occurred since the connection was established or since the last call to `MQSTAT` then a `CompCode` of `MQCC_OK` and Reason of `MQRC_NONE` are returned in the `MQSTS` structure.
3. Counts of the number of asynchronous calls that have been processed under the connection handle are returned by way of three counter fields; `PutSuccessCount`, `PutWarningCount` and `PutFailureCount`. These counters are incremented by the queue manager each time an asynchronous operation is processed successfully, has a warning, or fails (note that for accounting purposes a put to a distribution list counts once per destination queue rather than once per distribution list). A counter is not incremented beyond the maximum positive value `AMQ_LONG_MAX`.
4. A successful call to `MQSTAT` results in any previous error information or counts being reset.
5. The behavior of `MQSTAT` depends on the value of the **`MQSTAT Type`** parameter you provide.
6. **MQSTAT_TYPE_ASYNC_ERROR**
    a. A call to `MQSTAT` specifying a type of `MQSTAT_TYPE_ASYNC_ERROR` returns information about previous asynchronous `MQPUT` and `MQPUT1` operations. The `MQSTS` structure passed back on return from the `MQSTAT` call contains the first recorded asynchronous warning or error information for that connection. If further errors or warnings follow the first, they do not normally alter these values. However, if an error occurs with a completion code of `MQCC_WARNING`, a subsequent failure with a completion code of `MQCC_FAILED` is returned instead.
    b. If no errors have occurred since the connection was established or since the last call to `MQSTAT` then a `CompCode` of `MQCC_OK` and Reason of `MQRC_NONE` are returned in the `MQSTS` structure.
    c. Counts of the number of asynchronous calls that have been processed under the connection handle are returned by way of three counter fields; `PutSuccessCount`, `PutWarningCount` and `PutFailureCount`. These counters are incremented by the queue manager each time an asynchronous operation is processed successfully, has a warning, or fails (note that for accounting purposes a put to a distribution list counts once per destination queue rather than once per distribution list). A counter is not incremented beyond the maximum positive value `AMQ_LONG_MAX`.
    d. A successful call to `MQSTAT` results in any previous error information or counts being reset.

MQSTAT_TYPE_RECONNECTION

Suppose you call `MQSTAT` with Type set to `MQSTAT_TYPE_RECONNECTION` inside an event handler during reconnection. Consider these examples.

The client is attempting reconnection or failed to reconnect.
CompCode in the MQSTS structure is MQCC_FAILED and Reason might be either MQRC_CONNECTION_BROKEN or MQRC_Q_MGR_QUIESCING. ObjectType is MQOT_Q_MGR, ObjectName is the name of the queue manager, and ObjectQMgrName is blank.

The client completed reconnection successfully or was never disconnected.
CompCode in the MQSTS structure is MQCC_OK and the Reason is MQRC_NONE

Subsequent calls to MQSTAT return the same results.

MQSTAT_TYPE_RECONNECTION_ERROR

Suppose you call MQSTAT with Type set to MQSTAT_TYPE_RECONNECTION_ERROR in response to receiving MQRC_RECONNECT_FAILED to an MQI call. Consider these examples.

An authorization failure occurred when a queue was being reopened during reconnection to a different queue manager.
CompCode in the MQSTS structure is MQCC_FAILED and Reason is the reason that the reconnection failed, such as MQRC_NOT_AUTHORIZED. ObjectType is the type of object that caused the problem, such as MQOT_QUEUE, ObjectName is the name of the queue and ObjectQMgrName the name of the queue manager owning the queue.

A socket connection error occurred during reconnection.
CompCode in the MQSTS structure is MQCC_FAILED and Reason is the reason that the reconnection failed, such as MQRC_HOST_NOT_AVAILABLE. ObjectType is MQOT_Q_MGR, ObjectName is the name of the queue manager, and ObjectQMgrName is blank.

Subsequent calls to MQSTAT return the same results.

C invocation

```
MQSTAT (Hconn, StatType, &Stat, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN Hconn;        /* Connection Handle */
MQLONG StatType;    /* Status type */
MQSTS Stat;           /* Status information structure */
MQLONG CompCode;    /* Completion code */
MQLONG Reason;        /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQSTAT' USING HCONN, STATTYPE, STAT, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**    Connection handle
 01    HCONN      PIC S9(9)      BINARY.
**    Status type
 01    STATTYPE   PIC S9(9)      BINARY.
**    Status information
 01    STAT.
    COPY CMQSTSV.
**    Completion code
 01    COMPCODE   PIC S9(9)      BINARY.
**    Reason code qualifying COMPCODE
 01    REASON     PIC S9(9)      BINARY.
```

PL/I invocation

```
call MQSTAT (Hconn, StatType, Stat, Compcode, Reason);
```

Declare the parameters as follows:

```
dcl Hconn       fixed bin(31); /* Connection handle */
dcl StatType    fixed bin(31); /* Status type */
dcl Stat        like MQSTS;    /* Status information structure */
dcl CompCode    fixed bin(31); /* Completion code */
dcl Reason      fixed bin(31); /* Reason code qualifying CompCode */
```

System/390 Assembler invocation

```
CALL MQSTAT,(HCONN,STATTYPE,STAT,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS      F    Connection handle
STATTYPE  DS      F    Status type
STAT      CMQSTSA,     Status information structure
COMPCODE  DS      F    Completion code
REASON    DS      F    Reason code qualifying COMPCODE
```

MQSUB - Register subscription

Use the MQSUB call to register the applications subscription to a particular topic.

Syntax

MQSUB (*Hconn*, *SubDesc*, *Hobj*, *Hsub*, *Compcode*, *Reason*)

Parameters

Hconn
Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN
Default connection handle.

SubDesc
Type: MQSD - input/output

This is a structure that identifies the object in use that is being registered by the application. See "MQSD - Subscription descriptor" on page 557 for more information.

Hobj
Type: MQHOBJ - input/output

This handle represents the access that has been established to obtain the messages sent to this subscription. These messages can either be stored on a specific queue or the queue manager can manage their storage without using a specific queue.

To use a specific queue, you must associate it with the subscription when the subscription is created. You can do this in two ways:

- By using the DEFINE SUB MQSC command and provided that command with the name of a queue object.
- By providing this handle when calling MQSUB with the MQSO_CREATE

  If this handle is provided as an input parameter on the call, it must be a valid object handle returned from a previous MQOPEN call of a queue using at least one of the following options:

  - MQOO_INPUT_*
  - MQOO_BROWSE
  - MQOO_OUTPUT (if the queue is a remote queue)

  If this is not the case, the call fails with MQRC_HOBJ_ERROR. It cannot be an object handle to an alias queue that resolves to a topic object. If so, the call fails with MQRC_HOBJ_ERROR.

If the queue manager is to manage the storage of messages sent to this subscription, this should be set when you create the subscription, by using the MQSO_MANAGED option. The queue manager then returns this handle as an output parameter on the call. The handle that is returned is known as a managed handle. If MQHO_NONE is specified but MQSO_MANAGED is not specified, the call fails with MQRC_HOBJ_ERROR.

When a managed handle is returned to you by the queue manager, you can use it on an MQGET or MQCB call with or without browse options, on an MQINQ call, or on MQCLOSE. You cannot use it on MQPUT, MQSUB, MQSET; attempting to do so fails with MQRC_NOT_OPEN_FOR_OUTPUT, MQRC_HOBJ_ERROR, or MQRC_NOT_OPEN_FOR_SET.

If this subscription is being resumed using the MQSO_RESUME option in the MQSD structure, the handle can be returned to the application in this parameter by setting MQSO_MANAGED to MQHO_NONE. You can do this whether the subscription is using a managed handle or not and it can be useful to provide subscriptions created using DEFINE SUB with the handle to the subscription queue defined on that command. In the case where an administratively created subscription is being resumed, the queue opens with MQOO_INPUT_AS_Q_DEF and MQOO_BROWSE. If you need to specify other options, the application must open the subscription queue explicitly and provide the object handle on the call. If there is a problem opening the queue the call fails with MQRC_INVALID_DESTINATION. If the *Hobj* is provided, it must be equivalent to the *Hobj* in the original MQSUB call. This means if an object handle returned from an MQOPEN call is being provided, the handle must be to the same queue as previously used. If it is not the same queue, the call fails with MQRC_HOBJ_ERROR.

If this subscription is being altered using the MQSO_ALTER option in the MQSD structure, then a different *Hobj* can be provided. Any publications that have been delivered to the queue and were previously identified through this parameter stay on that queue and it is the responsibility of the application to retrieve those messages if the **Hobj** parameter now represents a different queue.

Table 555. Using hobj with various subscription options

Options	*Hobj*	Description
MQSO_CREATE + MQSO_MANAGED	Ignored on input	Creates a subscription with storage of messages managed by the queue manager
MQSO_CREATE	A valid object handle	Creates a subscription providing a specific queue as the destination for messages.
MQSO_RESUME	MQHO_NONE	Resumes a previously created subscription whether it was managed or not, and has the queue manager return the object handle for use by the application.

Table 555. Using hobj with various subscription options (continued)		
Options	***Hobj***	**Description**
MQSO_RESUME	A valid, matching, object handle	Resumes a previously created subscription that uses a specific queue as the destination for messages and use an object handle with specific open options.
MQSO_ALTER + MQSO_MANAGED	MQHO_NONE	Alters an existing subscription that was previously using a specific queue, so it is now a managed subscription. The class of destination (managed or not) cannot be changed.
MQSO_ALTER	A valid object handle	Alters an existing subscription, whether it was managed or not, so that it now uses a specific queue. When the MQSO_MANAGED option is not used, the queue provided can be changed, but the class of destination (managed or not) cannot be changed.

Whether it was provided or returned, *Hobj* must be specified on subsequent MQGET or MQCB calls that want to receive the publication messages sent to this subscription.

The *Hobj* handle is no longer valid when the MQCLOSE call is issued on it, or when the unit of processing that defines the scope of the handle terminates (until the application disconnects). The scope of the object handle returned is the same as that of the connection handle specified on the call. See Hconn (MQHCONN) - output for information about handle scope. An MQCLOSE of the *Hobj* handle does not affect the *Hsub* handle.

Hsub

Type: MQHOBJ - output

This handle represents the subscription that has been made. It can be used for two further operations:

- It can be used on a subsequent MQSUBRQ call to request that publications be sent when the MQSO_PUBLICATIONS_ON_REQUEST option has been used when making the subscription.
- It can be used on a subsequent MQCLOSE call to remove the subscription that has been made. The *Hsub* handle ceases to be valid when the MQCLOSE call is issued, or when the unit of processing that defines the scope of the handle terminates. The scope of the object handle returned is the same as that of the connection handle specified on the call. An MQCLOSE of the *Hsub* handle does not affect the *Hobj* handle.

This handle cannot be passed to an MQGET or MQCB call. You must use the **Hobj** parameter. You cannot use this handle on any IBM MQ call other than MQCLOSE or MQSUBRQ. Passing this handle to any other IBM MQ call results in MQRC_HOBJ_ERROR.

CompCode

Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK

Successful completion

MQCC_WARNING

Warning (partial completion)

MQCC_FAILED
Call failed

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK, the reason code is as follows:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED, the reason code is one of the following:

MQRC_CLUSTER_RESOLUTION_ERROR
(2189, X'88D') Cluster name resolution failed.

MQRC_DURABILITY_NOT_ALLOWED
2436 (X'0984') An MQSUB call using the MQSO_DURABLE option failed.

MQRC_FUNCTION_NOT_SUPPORTED
2298 (X'08FA') The function requested is not available in the current environment.

MQRC_HOBJ_ERROR
2019 (X'07E3') Object handle Hobj not valid.

MQRC_IDENTITY_MISMATCH
2434 (X'0982') Subscription name matches existing subscription.

MQRC_NOT_AUTHORIZED
2035 (X'07F3') The user is not authorized to perform the operation.

MQRC_NO_SUBSCRIPTION
2428 (X'097C') The identified subscription name does not exist.

MQRC_OBJECT_STRING_ERROR
2441 (X'0989') Objectstring field not valid.

MQRC_OPTIONS_ERROR
2046 (X'07FE') Options parameter or field contains options that are not valid, or a combination of options that is not valid.

MQRC_Q_MGR_QUIESCING
2161 (X'0871') Queue manager quiescing.

MQRC_RECONNECT_Q_MGR_REQD
2555 (X'09FB'X) The MQCNO_RECONNECT_Q_MGR option is required.

MQRC_RETAINED_MSG_Q_ERROR
2525 (X'09DD') Retained publications which exist for the subscribed topic string, cannot be retrieved.

MQRC_RETAINED_NOT_DELIVERED
2526 (X'09DE') The retained publications which exist for the subscribed topic string, cannot be delivered to the subscription destination queue, and cannot be delivered to the dead-letter queue.

MQRC_SD_ERROR
2424 (X'0978') Subscription descriptor (MQSD) not valid.

MQRC_SELECTION_NOT_AVAILABLE
2551 (X'09F7') The selection string does not follow the IBM MQ selector syntax and no extended message selection provider was available.

MQRC_SELECTION_STRING_ERROR
2519 (X'09D7') The selection string must be specified as described in the MQCHARV structure documentation.

MQRC_SELECTOR_SYNTAX_ERROR
2459 (X'099B') An MQOPEN, MQPUT1, or MQSUB call was issued but a selection string was specified which contained a syntax error.

MQRC_SUB_USER_DATA_ERROR
2431 (X'097F') SubUserData field not valid.

MQRC_SUB_NAME_ERROR
2440 (X'0988') SubName field not valid.

MQRC_SUB_ALREADY_EXISTS
2432 (X'0980') Subscription already exists.

MQRC_SUB_USER_DATA_ERROR
2431 (X'097F') SubUserData field not valid.

MQRC_TOPIC_STRING_ERROR
2425 (X'0979') Topic string is not valid.

MQRC_UNKNOWN_OBJECT_NAME
2085 (X'0825') Object identified in the MQSD ObjectName field cannot be found.

MQRC_SUB_JOIN_NOT_ALTERABLE
29440 (X'7300') Subscription sharing mode is incompatible with existing subscription. This error could be returned when attempting to resume a JMS 2.0 shared subscription in a non-JMS application.

For detailed information about these codes, see Messages and reason codes.

Usage notes

- The subscription is made to a topic, named either using the short name of a pre-defined topic object, the full name of the topic string, or it is formed by the concatenation of two parts. See the description of *ObjectName* and *ObjectString* in "MQSD - Subscription descriptor" on page 557.
- The queue manager performs security checks when an MQSUB call is issued, to verify that the user identifier under which the application is running has the appropriate level of authority before access is permitted. The appropriate topic object is located in the topic hierarchy and an authority check is made on this topic object to ensure authority to subscribe is set. If the MQSO_MANAGED option is not used, an authority check is made on the destination queue to ensure that authority for output is set. If the MQSO_MANAGED option is used, no authority check is made on the managed queue for output or inquire access.
- If you do not provide an Hobj as input, the MQSUB call allocates two handles, an object handle (Hobj) and a subscription handle (Hsub).
- The Hobj returned on the MQSUB call when the MQSO_MANAGED option is used, can be inquired in order to find out attributes such as the Backout threshold and the Excessive backout requeue name. You can also inquire the name of the managed queue, but you must not attempt to directly open this queue.
- Subscriptions can be grouped allowing only a single publication to be delivered to the group of subscriptions even where more than one of the group matched the publication. Subscriptions are grouped using the MQSO_GROUP_SUB option and in order to group subscriptions they must be
  - using the same named queue (that is not using the MQSO_MANAGED option) on the same queue manager - represented by the Hobj parameter on the MQSUB call
  - share the same SubCorrelId
  - be of the same SubLevel

  These attributes define the set of subscriptions considered to be in the group, and are also the attributes that cannot be altered if a subscription is grouped. Alteration of SubLevel results in MQRC_SUBLEVEL_NOT_ALTERABLE, and alteration of any of the others (which can be changed if a subscription is not grouped) results in MQRC_GROUPING_NOT_ALTERABLE.
- Successful completion of the MQSUB call does not mean that the action completed. To check that this call has completed, see the DEFINE SUB step in Checking that async commands for distributed networks have finished.

- Fields in the MQSD are filled in on return from an MQSUB call which uses the MQSO_RESUME option. The MQSD returned can be passed directly into an MQSUB call which uses the MQSO_ALTER option with any changes you need to make to the subscription applied to the MQSD. Some fields have special considerations as noted in the table.

Table 556. Special considerations for fields in the MQSD

Field name in MQSD	**Special considerations**
Access or creation options	Some of the options can be reset on return from the MQSUB call. If you then reuse the MQSD in an MQSUB call, the option you require must be explicitly set.
Durability options, Destination options, Registration Options & Wildcard options	These options are set as appropriate
Publication options	These options are set as appropriate, except for MQSO_NEW_PUBLICATIONS_ONLY which is only applicable to MQSO_CREATE.
Other options	These options are unchanged on return from an MQSUB call. They control how the API call is issued and are not stored with the subscription. They must be set as required on any subsequent MQSUB call reusing the MQSD.
ObjectName	This input only field is unchanged on return from an MQSUB call.
ObjectString	This input only field is unchanged on return from an MQSUB call. The Full topic name used is returned in the *ResObjectString* field, if a buffer is provided.
AlternateUserId and AlternateSecurityId	These input only fields are unchanged on return from an MQSUB call. They control how the API call is issued and are not stored with the subscription. They must set as required on any subsequent MQSUB call reusing the MQSD.
SubExpiry	On return from an MQSUB call using the MQSO_RESUME option, this field is set to the original expiry of the subscription and not the remaining expiry time. If you then reuse the MQSD in an MQSUB call using the MQSO_ALTER option you reset the expiry of the subscription to start counting down again.
SubName	This field is an input field on an MQSUB call and is not changed on output.

Table 556. Special considerations for fields in the MQSD (continued)	
Field name in MQSD	**Special considerations**
SubUserData and SelectionString	These variable length fields are returned on output from an MQSUB call using the MQSO_RESUME option, if a buffer is provided, and also a positive buffer length in *VSBufSize*. If no buffer is provided only the length is returned in the *VSLength* field of the MQCHARV. If the buffer provided is smaller than the space required to return the field, only *VSBufSize* bytes are returned in the provided buffer. If you then reuse the MQSD in an MQSUB call using the MQSO_ALTER option and a buffer is not provided but a non-zero *VSLength* is provided, if that length matches the existing length of the field, no alteration is made to the field.
SubCorrelId and PubAccountingToken	If you do not use MQSO_SET_CORREL_ID, then the *SubCorrelId* is generated by the queue manager. If you do not use MQSO_SET_IDENTITY_CONTEXT, then the *PubAccountingToken* is generated by the queue manager. These fields are returned in the MQSD from an MQSUB call using the MQSO_RESUME option. If they are generated by the queue manager, the generated value is returned on an MQSUB call using the MQSO_CREATE or MQSO_ALTER option.
PubPriority, SubLevel & PubApplIdentityData	These fields are returned in the MQSD.
ResObjectString	This output only field is returned in the MQSD if a buffer is provided.

C invocation

```
MQSUB (Hconn, &SubDesc, &Hobj, &Hsub, &CompCode, &Reason)
```

Declare the parameters as follows:

```
MQHCONN Hconn;    /* Connection handle */
MQSD    SubDesc;  /* Subscription descriptor */
MQHOBJ  Hobj;     /* Object handle */
MQHOBJ  Hsub;     /* Subscription handle */
MQLONG  CompCode; /* Completion code */
MQLONG  Reason;   /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQSUB' USING HCONN, SUBDESC, HOBJ, HSUB, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN    PIC S9(9) BINARY.
**   Subscription descriptor
```

```
 01  SUBDESC.
     COPY CMQSDV.
**   Object handle
 01  HOBJ     PIC S9(9) BINARY.
**   Subscription handle
 01  HSUB     PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON   PIC S9(9) BINARY.
```

PL/I invocation

```
call MQSUB (Hconn, SubDesc, Hobj, Hsub, CompCode, Reason)
```

Declare the parameters as follows:

```
dcl Hconn    fixed bin(31); /* Connection handle */
dcl SubDesc  like MQSD;     /* Subscription descriptor */
dcl Hobj     fixed bin(31); /* Object handle */
dcl Hsub     fixed bin(31); /* Subscription handle */
dcl CompCode fixed bin(31); /* Completion code */
dcl Reason   fixed bin(31); /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQSUB,(HCONN,SUBDESC,HOBJ,HSUB,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN    DS      F  Connection handle
SUBDESC  CMQSDA  ,  Subscription descriptor
HOBJ     DS      F  Object handle
HSUB     DS      F  Subscription handle
COMPCODE DS      F  Completion code
REASON   DS      F  Reason code qualifying COMPCODE
```

MQSUBRQ - Subscription request

Use the MQSUBRQ call to make a request for the retained publication, when the subscriber has been registered with MQSO_PUBLICATIONS_ON_REQUEST.

Syntax

MQSUBRQ (*Hconn*, *Hsub*, *Action*, *SubRqOpts*, *Compcode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *Hconn* :

MQHC_DEF_HCONN

Default connection handle.

Hsub

Type: MQHOBJ - input

This handle represents the subscription for which an update is to be requested. The value of *Hsub* was returned from a previous MQSUB call.

Action
Type: MQLONG - input

This parameter controls the particular action that is being requested on the subscription. The following value must be specified:

MQSR_ACTION_PUBLICATION

This action requests that an update publication is sent for the specified topic. It can be used only if the subscriber specified the option MQSO_PUBLICATIONS_ON_REQUEST on the MQSUB call when it made the subscription. If the queue manager has a retained publication for the topic, this is sent to the subscriber. If not, the call fails. If an application is sent a publication which was retained, this is indicated by the MQIsRetained message property of that publication.

Since the topic in the existing subscription represented by the Hsub parameter can contain wildcards, the subscriber might receive multiple retained publications.

SubRqOpts
Type: MQSRO - input/output

These options control the action of MQSUBRQ, see "MQSRO - Subscription request options" on page 579 for details.

If no options are required, programs written in C or S/390 assembler can specify a null parameter address instead of specifying the address of an MQSRO structure.

CompCode
Type: MQLONG - output

The completion code; it is one of the following:

MQCC_OK
Successful completion

MQCC_WARNING
Warning (partial completion)

MQCC_FAILED
Call failed

Reason
Type: MQLONG - output

The reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_FUNCTION_NOT_SUPPORTED
2298 (X'08FA') The function requested is not available in the current environment.

MQRC_NO_RETAINED_MSG
2437 (X'0985') There are no retained publications currently stored for this topic.

MQRC_OPTIONS_ERROR
2046 (X'07FE') Options parameter or field contains options that are not valid, or a combination of options that is not valid.

MQRC_Q_MGR_QUIESCING
2161 (X'0871') Queue manager quiescing.

MQRC_SRO_ERROR
2438 (X'0986') On the MQSUBRQ call, the Subscription Request Options MQSRO is not valid.

MQRC_RETAINED_MSG_Q_ERROR
2525 (X'09DD') Retained publications which exist for the subscribed topic string, cannot be retrieved.

MQRC_RETAINED_NOT_DELIVERED
2526 (X'09DE') The retained publications which exist for the subscribed topic string, cannot be delivered to the subscription destination queue, and cannot be delivered to the dead-letter queue.

For detailed information about these codes, see Messages and reason codes.

Usage notes

The following usage notes apply to the use of the Action code MQSR_ACTION_PUBLICATION:

1. If this verb completes successfully, the retained publications matching the subscription specified have been sent to the subscription and can be received by using MQGET or MQCB using the Hobj returned on the original MQSUB verb that created the subscription.
2. If the topic subscribed to by the original MQSUB verb that created the subscription contained a wildcard, more than one retained publication can be sent. The number of publications sent as a result of this call is recorded in the NumPubs field in the SubRqOpts structure.
3. If this verb completes with a reason code of MQRC_NO_RETAINED_MSG then there were no currently retained publications for the topic specified.#
4. If this verb completes with a reason code of MQRC_RETAINED_MSG_Q_ERROR or MQRC_RETAINED_NOT_DELIVERED then there are currently retained publications for the topic specified but an error has occurred that that meant they were unable to be delivered.
5. The application must have a current subscription to the topic before it can make this call. If the subscription was made in a previous instance of the application and a valid handle to the subscription is not available, the application must first call MQSUB with the MQSO_RESUME option to obtain a handle to it for use in this call.
6. The publications are sent to the destination that is registered for use with the current subscription of this application. If the publications must be sent somewhere else, the subscription must first be altered using the MQSUB call with the MQSO_ALTER option.

C invocation

```
MQSUB (Hconn, Hsub, Action, &SubRqOpts, &CompCode, &Reason)
```

Declare the parameters as follows:

```
MQHCONN Hconn;     /* Connection handle */
MQHOBJ  Hsub;      /* Subscription handle */
MQLONG  Action;    /* Action requested by MQSUBRQ */
MQSRO   SubRqOpts; /* Options that control the action of MQSUBRQ */
MQLONG  CompCode;  /* Completion code */
MQLONG  Reason;    /* Reason code qualifying CompCode */
```

COBOL invocation

```
CALL 'MQSUBRQ' USING HCONN, HSUB, ACTION, SUBRQOPTS, COMPCODE, REASON.
```

Declare the parameters as follows:

```
** Connection handle
01 HCONN PIC S9(9) BINARY.
** Subscription handle
01 HSUB PIC S9(9) BINARY.
** Action requested by MQSUBRQ
01 ACTION PIC S9(9) BINARY.
```

```
** Options that control the action of MQSUBRQ
01 SUBRQOPTS.
COPY CMQSROV.
** Completion code
01 COMPCODE PIC S9(9) BINARY.
** Reason code qualifying COMPCODE
01 REASON PIC S9(9) BINARY.
```

PL/I invocation

```
call MQSUBRQ (Hconn, Hsub, Action, SubRqOpts, CompCode, Reason)
```

Declare the parameters as follows:

```
dcl Hconn fixed bin(31);    /* Connection handle */
dcl Hsub fixed bin(31);     /* Subscription handle */
dcl Action fixed bin(31);   /* Action requested by MQSUBRQ */
dcl SubRqOpts like MQSRO;   /* Options that control the action of MQSUBRQ */
dcl CompCode fixed bin(31); /* Completion code */
dcl Reason fixed bin(31);   /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQSUBRQ,(HCONN, HSUB, ACTION, SUBRQOPTS,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN DS F Connection handle
HSUB DS F Subscription handle
ACTION DS F Action requested by MQSUBRQ
SUBRQOPTS CMQSROA , Options that control the action of MQSUBRQ
COMPCODE DS F Completion code
REASON DS F Reason code qualifying COMPCODE
```

Attributes of objects

This collection of topics lists only those IBM MQ objects that can be the subject of an MQINQ function call, and gives details of the attributes that can be inquired on and the selectors to be used.

Attributes for the queue manager

Some queue manager attributes are fixed for particular implementations; others can be changed by using the MQSC command ALTER QMGR.

The attributes can also be displayed by using the command DISPLAY QMGR. Most queue manager attributes can be inquired by opening a special MQOT_Q_MGR object, and using the MQINQ call with the handle returned.

The following table summarizes the attributes that are specific to the queue manager. The attributes are described in alphabetical order.

Note: The names of the attributes shown in this section are descriptive names used with the MQINQ call; the names are the same as for the PCF commands. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for more information.

Table 557. Attributes for the queue manager

Attribute	Description
AccountingConnOverride	Override accounting settings.
AccountingInterval	How often to write intermediate accounting records.
ActivityConnOverride	Override activity settings.

Table 557. Attributes for the queue manager (continued)	
Attribute	**Description**
ActivityTrace	Controls the collection of IBM MQ MQI application activity trace.
AdoptNewMCACheck	Elements checked to determine whether to adopt new MCA.
AdoptNewMCAType	Whether to restart automatically an orphaned instance of an MCA of a particular channel type.
AlterationDate	Date when definition was last changed
AlterationTime	Time when definition was last changed
AuthorityEvent	Controls whether authorization (Not Authorized) events are generated
BridgeEvent	Control attribute for bridge events.
ChannelAutoDef	Controls whether automatic channel definition is permitted
ChannelAutoDefEvent	Controls whether channel automatic-definition events are generated
ChannelAutoDefExit	Name of user exit for automatic channel definition
ChannelEvent	Control attribute for channel events.
ChannelInitiatorControl	Control attribute for channel initiator
ChannelMonitoring	Online monitoring data for channels
ChannelStatistics	Controls collection of statistics data for channels.
ChinitAdapters	Number of adapter subtasks for processing IBM MQ calls.
ChinitDispatchers	Number of dispatchers to use for the channel initiator.
	Reserved for IBM use.
ChinitTraceAutoStart	Whether channel initiator trace should start automatically.
ChinitTraceTableSize	Size of channel initiator's trace data space.
ClusterSenderMonitoringDefault	Online monitoring data default for cluster sender channels
ClusterSenderStatistics	Controls collection of statistics monitoring information for cluster sender channels.
ClusterWorkloadData	User data for cluster workload exit
ClusterWorkloadExit	Name of user exit for cluster workload management
ClusterWorkloadLength	Maximum length of message data passed to cluster workload exit
CLWLMRUChannels	Number of most recently used channels for cluster workload balancing
CLWLUseQ	Cluster workload use remote queue.
CodedCharSetId	Coded character set identifier
CommandEvent	Control attribute for command events.
CommandInputQName attribute	Command input queue name
CommandLevel	Command level
CommandServerControl attribute	Control attribute for command server.
Configuration Event attribute	Control attribute for configuration events.
DeadLetterQName	Name of dead-letter queue
DEFCLXQ	Default cluster transmission queue type
DefXmitQName	Default transmission queue name
DistLists	Distribution list support
DNSGroup	Name of group for TCP listener when using Workload Manager Dynamic Domain Name Services support.
DNSWLM	Whether TCP listener registers with Workload Manager for Dynamic Domain Name Services.
ExpiryInterval	Interval between scans for expired messages
IGQPutAuthority	Intra-group queuing put authority
IGQUserId	Intra-group queuing user identifier
InhibitEvent	Controls whether inhibit (Inhibit Get and Inhibit Put) events are generated
IPAddressVersion	Version of the Internet Protocol address

Attribute	Description
IntraGroupqueuing	Intra-group queuing support
ListenerTimer	Time interval between attempts to restart listener after APPC or TCP/IP failure.
LocalEvent	Controls whether local error events are generated
LoggerEvent	Controls whether logger events are generated
LUGroupName	Generic LU name for LU 6.2 listener that handles inbound transmissions for queue sharing group.
LUName	Name of LU to use for outbound LU 6.2 transmissions.
LU62ARMSuffix	Suffix of SYS1.PARMLIB member APPCPMxx, that nominates LUADD for this channel initiator.
LU62Channels	Maximum number of current channels or connected clients that use LU 6.2.
MaxActiveChannels	Maximum number of channels that can be active at any time.
MaxChannels	Maximum number of current channels.
MaxHandles	Maximum number of handles
MaxMsgLength	Maximum message length in bytes
MaxPriority attribute	Maximum priority
MaxPropertiesLength	Maximum length of property data in bytes
MaxUncommittedMsgs	Maximum number of uncommitted messages within a unit of work
MQIAccounting	Controls collection of accounting information for MQI data.
MQIStatistics	Controls collection of statistics monitoring information for queue manager.
MsgMarkBrowseInterval	Interval after which the queue manager can remove the mark from browsed messages.
OutboundPortMin	With *OutboundPortMin*, defines range of port numbers to use when binding outgoing channels.
OutboundPortMin	With *OutboundPortMax*, defines range of port numbers to use when binding outgoing channels.
PerformanceEvent	Controls whether performance-related events are generated
Platform	Platform on which the queue manager is running
PubSubNPInputMsg	Whether to discard (or keep) an undelivered input message
PubSubNPResponse	Controls the behavior of undelivered
PubSubMaxMsgRetryCount	The number of retries when processing (under syncpoint) a failed command message
PubSubSyncPoint	Whether only persistent (or all) messages should be processed under syncpoint
PubSubMode	Whether the queued publish/subscribe interface is running
QMgrDesc	Queue manager description
QMgrIdentifier	Unique internally generated identifier of queue manager
QMgrName	Queue manager name
QSGName	Name of queue sharing group
QueueAccounting	Controls collection of accounting information for queues.
QueueMonitoring	Online monitoring data for queues
QueueStatistics	Controls collection of statistics data for queues.
ReceiveTimeout	How long TCP/IP channel waits for data before returning to inactive state.
ReceiveTimeoutMin	Qualifier for *ReceiveTimeout*.
ReceiveTimeoutType	Minimum time that TCP/IP channel waits for data before returning to inactive state.
RemoteEvent	Controls whether remote error events are generated
RepositoryName	Name of cluster for which this queue manager provides repository services
RepositoryNamelist	Name of namelist object containing names of clusters for which this queue manager provides repository services
ScyCase	Case of security profiles
SharedQMgrName	Shared queue queue manager name
"SPLCAP" on page 819	IBM MQ Advanced Message security protection for a queue manager turned on or off.

Table 557. Attributes for the queue manager (continued)

Attribute	Description
SSLCRLNamelist 1	Name of namelist object containing names of authentication information objects.
SSLCryptoHardware 1	Cryptographic hardware configuration string.
SSLEvent	Control attribute for TLS events.
SSLFIPSRequired	Use only FIPS-certified algorithms for cryptography.
SSLKeyRepository 1	Location of TLS key repository.
SSLKeyResetCount	TLS key reset count.
SSLTasks 1	Number of server subtasks for processing TLS calls.
StatisticsInterval	How often to write statistics monitoring data.
StartStopEvent	Controls whether start and stop events are generated
SyncPoint	Syncpoint availability
TCPChannels	Maximum number of current channels or connected clients that use TCP/IP.
TCPKeepAlive	Whether to use TCP KEEPALIVE to check other end of connection.
TCPName	Name of TCP/IP system that you are using.
TCPStackType	How channel initiator can use TCP/IP addresses.
TraceRouteRecording attribute	Controls recording of trace-route information.
TriggerInterval	Trigger-message interval
Version	Version
XrCapability	Specifies whether Telemetry commands are supported.

Table 557. Attributes for the queue manager (continued)

Notes:

1. This attribute cannot be inquired using the MQINQ call, and is not described in this section. See Change Queue Manager for details of this attribute.

Related tasks

Specifying that only FIPS-certified CipherSpecs are used at run time on the MQI client

Related reference

Federal Information Processing Standards (FIPS) for UNIX, Linux, and Windows

AccountingConnOverride (MQLONG)

This allows applications to override the setting of the ACCTMQI and ACCTQDATA values in the Qmgr attribute.

The value is one of the following:

MQMON_DISABLED
: Applications cannot override the setting of the ACCTMQI and ACCTQ Qmgr attributes using the Options field in the MQCNO structure on the MQCONNX call. This is the default value.

MQMON_ENABLED
: Applications can override the ACCTQ and ACCTMQI Qmgr attributes using the Options field in the MQCNO structure.

Changes to this value are only effective for connections to the queue manager after the change to the attribute.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_ACCOUNTING_CONN_OVERRIDE selector with the MQINQ call.

AccountingInterval (MQLONG)

This specifies how long before intermediate accounting records are written (in seconds).

The value is an integer in the range 0 to 604800, with a default value of 1800 (30 minutes). Specify 0 to turn off intermediate records.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Linux Linux
- Windows Windows

To determine the value of this attribute, use the MQIA_ACCOUNTING_INTERVAL selector with the MQINQ call.

ActivityConnOverride (MQLONG)

This allows applications to override the setting of the ACTVTRC value in the queue manager attribute.

The value is one of the following:

MQMON_DISABLED
Applications cannot override the setting of the ACTVTRC queue manager attribute using the Options field in the MQCNO structure on the MQCONNX call. This is the default value.

MQMON_ENABLED
Applications can override the ACTVTRC queue manager attribute using the Options field in the MQCNO structure.

Changes to this value are only effective for connections to the queue manager after the change to the attribute.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_ACTIVITY_CONN_OVERRIDE selector with the `MQINQ` call.

ActivityTrace (MQLONG)

This controls the collection of IBM MQ MQI application activity trace.

The value is one of the following:

MQMON_ON
Collect IBM MQ MQI application activity trace.

MQMON_OFF
Do not collect IBM MQ MQI application activity trace. This is the default value.

If you set the queue manager attribute ACTVCONO to ENABLED, this value might be overridden for individual connections using the Options field in the MQCNO structure.

Changes to this value are only effective for connections to the queue manager after the change to the attribute.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_ACTIVITY_TRACE selector with the MQINQ call.

AdoptNewMCACheck (MQLONG)

This defines the elements to check to determine whether to adopt an MCA when a new inbound channel is detected that has the same name as an MCA that is already active

The value is one of the following:

MQADOPT_CHECK_Q_MGR_NAME
Check the queue manager name.

MQADOPT_CHECK_NET_ADDR
Check the network address.

MQADOPT_CHECK_ALL
Check the queue manager name and network address. If possible, perform this check to protect your channels from being shut down, inadvertently or maliciously. This is the default value.

MQADOPT_CHECK_NONE
Do not check any elements.

Changes to this attribute take effect the next time that a channel attempts to adopt a channel.

z/OS This attribute is supported only on z/OS.

To determine the value of this attribute, use the MQIA_ADOPTNEWMCA_CHECK selector with the MQINQ call.

AdoptNewMCAType (MQLONG)

This specifies whether to restart automatically an orphaned instance of an MCA of a particular channel type when a new inbound channel request matching the AdoptNewMCACheck attribute is detected

It is one of the following values:

MQADOPT_TYPE_NO
Adopting orphaned channel instances is not required. This is the default value.

MQADOPT_TYPE_ALL
Adopt all channel types.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_ADOPTNEWMCA_TYPE selector with the MQINQ call.

AlterationDate (MQCHAR12)

This is the date when the definition was last changed. The format of the date is YYYY-MM-DD, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the MQCA_ALTERATION_DATE selector with the MQINQ call. The length of this attribute is given by MQ_DATE_LENGTH.

AlterationTime (MQCHAR8)

This is the time when the definition was last changed. The format of the time is HH.MM.SS.

To determine the value of this attribute, use the MQCA_ALTERATION_TIME selector with the MQINQ call. The length of this attribute is given by MQ_TIME_LENGTH.

AuthorityEvent (MQLONG)

This controls whether authorization (Not Authorized) events are generated. It is one of the following values:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_AUTHORITY_EVENT selector with the MQINQ call.

BridgeEvent (MQLONG)

This specifies whether IMS bridge events are generated.

The value is one of the following:

MQEVR_ENABLED
Generate IMS bridge events, as follows:

MQRC_BRIDGE_STARTED
MQRC_BRIDGE_STOPPED

MQEVR_DISABLED
Do not generate IMS bridge events; this is the default value.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_BRIDGE_EVENT selector with the MQINQ call.

ChannelAutoDef (MQLONG)

This attribute controls the automatic definition of channels of type MQCHT_RECEIVER and MQCHT_SVRCONN. Automatic definition of MQCHT_CLUSSDR channels is always enabled. The value is one of the following:

MQCHAD_DISABLED
Channel auto-definition disabled.

MQCHAD_ENABLED
Channel auto-definition enabled.

Multi This attribute is supported only on Multiplatforms.

To determine the value of this attribute, use the MQIA_CHANNEL_AUTO_DEF selector with the MQINQ call.

ChannelAutoDefEvent (MQLONG)

This controls whether channel automatic-definition events are generated. It applies to channels of type MQCHT_RECEIVER, MQCHT_SVRCONN, and MQCHT_CLUSSDR. The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

Multi This attribute is supported only on Multiplatforms.

To determine the value of this attribute, use the MQIA_CHANNEL_AUTO_DEF_EVENT selector with the MQINQ call.

ChannelAutoDefExit (MQCHARn)

This is the name of the user exit for automatic channel definition. If this name is nonblank, and *ChannelAutoDef* has the value MQCHAD_ENABLED, the exit is called each time that the queue manager is about to create a channel definition. This applies to channels of type MQCHT_RECEIVER, MQCHT_SVRCONN, and MQCHT_CLUSSDR. The exit can then do one of the following:

- Create the channel definition without change.
- Modify the attributes of the channel definition that is created.
- Suppress creation of the channel entirely.

Note: Both the length and the value of this attribute are environment specific. See the introduction to the MQCD structure in "MQCD - Channel definition" on page 1464 for details of the value of this attribute in various environments.

z/OS On z/OS, this attribute applies only to cluster-sender and cluster-receiver channels.

To determine the value of this attribute, use the MQCA_CHANNEL_AUTO_DEF_EXIT selector with the MQINQ call. The length of this attribute is given by MQ_EXIT_NAME_LENGTH.

ChannelEvent (MQLONG)

This specifies whether channel events are generated.

It is one of the following values:

MQEVR_EXCEPTION
Only generate the following channel events:

- MQRC_CHANNEL_ACTIVATED
- MQRC_CHANNEL_CONV_ERROR
- MQRC_CHANNEL_NOT_ACTIVATED
- MQRC_CHANNEL_STOPPED with the following ReasonQualifiers:

  MQRQ_CHANNEL_STOPPED_ERROR
  MQRQ_CHANNEL_STOPPED_RETRY
  MQRQ_CHANNEL_STOPPED_DISABLED

  MQRC_CHANNEL_STOPPED_BY_USER

MQEVR_ENABLED
Generate all channel events. That is, in addition to those generated by EXCEPTION, generate the following channel events:

- MQRC_CHANNEL_STARTED
- MQRC_CHANNEL_STOPPED with the following ReasonQualifier:

  MQRQ_CHANNEL_STOPPED_OK

MQEVR_DISABLED
Do not generate channel events; this is the default value.

To determine the value of this attribute, use the MQIA_CHANNEL_EVENT selector with the MQINQ call.

ChannelInitiatorControl (MQLONG)

This specifies whether the channel initiator is to be started when the queue manager starts.

It is one of the following values:

MQSVC_CONTROL_MANUAL
The channel initiator is not to be started automatically.

MQSVC_CONTROL_Q_MGR
The channel initiator is to be started automatically when the queue manager starts.

To determine the value of this attribute, use the MQIA_CHINIT_CONTROL selector with the MQINQ call.

ChannelMonitoring (MQLONG)

This attribute specifies online monitoring data for channels.

The value is one of the following:

MQMON_NONE
Disable data collection for channel monitoring for all channels regardless of the setting of the MONCHL channel attribute. This is the default value.

MQMON_OFF
Turn monitoring data collection off for channels that specify QMGR in the MONCHL channel attribute.

MQMON_LOW
Turn monitoring data collection on with a low ratio of data collection for channels specifying QMGR in the MONCHL channel attribute.

MQMON_MEDIUM
Turn monitoring data collection on with a moderate ratio of data collection for channels specifying QMGR in the MONCHL channel attribute.

MQMON_HIGH
Turn monitoring data collection on with a high ratio of data collection for channels specifying QMGR in the MONCHL channel attribute.

z/OS On z/OS systems, enabling this parameter simply turns on statistics data collection, regardless of the value you select. Specifying `LOW`, `MEDIUM`, or `HIGH` makes no difference to your results.

To determine the value of this attribute, use the MQIA_MONITORING_CHANNEL selector with the MQINQ call.

ChannelStatistics (MQLONG)

This controls the collection of statistics data for channels.

The value is one of the following:

MQMON_NONE
Disable data collection for channel statistics for all channels regardless of the setting of the STATCHL channel attribute. This is the default value.

MQMON_OFF
Turn statistics data collection off for channels that specify QMGR in the STATCHL channel attribute.

MQMON_LOW
Turn statistics data collection on with a low ratio of data collection for channels specifying QMGR in the STATCHL channel attribute.

MQMON_MEDIUM
Turn statistics data collection on with a moderate ratio of data collection for channels specifying QMGR in the STATCHL channel attribute.

MQMON_HIGH
Turn statistics data collection on with a high ratio of data collection for channels specifying QMGR in the STATCHL channel attribute.

For most systems you are recommended to use MEDIUM. However, for a channel that processes a high volume of messages each second, you might want to reduce the sampling level by selecting LOW. Also, for a channel that processes only a few messages, and for which the most current information is important, you might want to select HIGH.

z/OS On z/OS systems, enabling this parameter simply turns on statistics data collection, regardless of the value you select. Specifying `LOW`, `MEDIUM`, or `HIGH` makes no difference to your results. This parameter must be enabled in order to collect channel accounting records.

To determine the value of this attribute, use the MQIA_STATISTICS_CHANNEL selector with the MQINQ call.

ChinitAdapters (MQLONG)

This is the number of adapter subtasks to use to process IBM MQ calls. The value must be 0 - 9999, with a default value of 8.

The ratio of adapters to dispatchers (the ChinitDispatchers attribute) should be about 8 to 5. However, if you have only few channels, you do not have to decrease the value of this parameter from the default value. You can use the following values: for a test system, 8 (default); for a production system, 20. Ideally, you should have 20 adapters, which gives greater parallelism of IBM MQ calls. This is important for persistent messages. Fewer adapters might be better for nonpersistent messages.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_CHINIT_ADAPTERS selector with the MQINQ call.

ChinitDispatchers (MQLONG)

This is the number of dispatchers to use for the channel initiator. The value must be 0 - 9999, with a default value of 5.

As a guideline, allow one dispatcher for 50 current channels. However, if you have only few channels, you do not have to decrease the value of this attribute from the default value. If you are using TCP/IP, the greatest number of dispatchers that are used for TCP/IP channels is 100, even if you specify a larger value here. You can use the following settings: test systems, 5 (the default); production systems, 20 (you need 20 dispatchers to handle up to 1000 active channels).

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_CHINIT_DISPATCHERS selector with the MQINQ call.

ChinitTraceAutoStart (MQLONG)

This specifies whether to start channel initiator trace automatically.

The value is one of the following:

MQTRAXSTR_YES
: Start channel initiator trace automatically. This is the default value.

MQTRAXSTR_NO
: Do not start channel initiator trace automatically.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_CHINIT_TRACE_AUTO_START selector with the MQINQ call.

ChinitTraceTableSize (MQLONG)

This is the size of the channel initiator's trace data space (in MB).

The value must be in the range 0 through 2048, with a default value of 2.

Note: Whenever you use large z/OS data spaces, ensure that you have sufficient auxiliary storage on your system to support any related z/OS paging activity. You might also need to increase the size of your SYS1.DUMP data sets.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_CHINIT_TRACE_TABLE_SIZE selector with the MQINQ call.

ClusterSenderMonitoringDefault (MQLONG)

This specifies the value to be substituted for the ChannelMonitoring attribute of automatically-defined cluster sender channels.

The value is one of the following:

MQMON_Q_MGR
: Collection of online monitoring data is inherited from the setting of the queue manager **ChannelMonitoring** attribute. This is the default value.

MQMON_OFF
: Monitoring for the channel is disabled

MQMON_LOW
: Unless *ChannelMonitoring* is MQMON_NONE, monitoring is enabled with a low rate of data collection with a minimal effect on system performance. The data collected is not likely to be the most current.

MQMON_MEDIUM
: Unless *ChannelMonitoring* is MQMON_NONE, monitoring is enabled with a moderate rate of data collection with limited effect on system performance.

MQMON_HIGH
: Unless *ChannelMonitoring* is MQMON_NONE, monitoring is enabled with a high rate of data collection with a likely effect on system performance. The data collected is the most current available.

To determine the value of this attribute, use the MQIA_MONITORING_AUTO_CLUSSDR selector with the MQINQ call.

ClusterSenderStatistics (MQLONG)

Because cluster sender channels can be automatically defined from the definition of CLUSRCVR in the repository, you cannot alter the setting of the STATCHL attribute for these auto-defined cluster sender channels using ALTER channel. For these channels the decision of whether to collect online monitoring data is based on the setting of this queue manager attribute.

The value is one of the following:

MQMON_Q_MGR
: Statistics data collection for auto-defined cluster sender channels is based on the value of the queue manager attribute STATCHL. This is the default value.

MQMON_OFF
: Switch off statistics data collection for auto-defined cluster sender channels.

MQMON_LOW
: Enable statistics data collection for auto-defined cluster sender channels with a low ratio of data collection.

MQMON_MEDIUM
: Enable statistics data collection for auto-defined cluster sender channels with a moderate ratio of data collection.

MQMON_HIGH
: Enable statistics data collection for auto-defined cluster sender channels with a high ratio of data collection.

For most systems we recommend MEDIUM. However, for an auto-defined cluster sender channel that processes a high volume of messages each second, you might want to reduce the sampling level by selecting LOW. Also, for a channel that processes only a few messages, and for which the most current information is important, you might want to select HIGH.

z/OS On z/OS systems, enabling this parameter simply turns on statistics data collection, regardless of the value you select. Specifying LOW, MEDIUM, or HIGH makes no difference to your results. This parameter must be enabled in order to collect channel accounting records.

To determine the value of this attribute, use the MQIA_STATISTICS_AUTO_CLUSSDR selector with the MQINQ call.

ClusterWorkloadData (MQCHAR32)

This is a user-defined 32-byte character string that is passed to the cluster workload exit when it is called. If there is no data to pass to the exit, the string is blank.

To determine the value of this attribute, use the MQCA_CLUSTER_WORKLOAD_DATA selector with the MQINQ call.

ClusterWorkloadExit (MQCHARn)

This is the name of the user exit for cluster workload management. If this name is not blank, the exit is called each time that a message is put to a cluster queue or moved from one cluster-sender queue to another. The exit can then either accept the queue instance selected by the queue manager as the destination for the message, or select another queue instance.

Note: Both the length and the value of this attribute are environment specific.

To determine the value of this attribute, use the MQCA_CLUSTER_WORKLOAD_EXIT selector with the MQINQ call. The length of this attribute is given by MQ_EXIT_NAME_LENGTH.

ClusterWorkloadLength (MQLONG)

This is the maximum length of message data that is passed to the cluster workload exit. The actual length of data passed to the exit is the minimum of the following:

- The length of the message.
- The queue manager's **MaxMsgLength** attribute.
- The **ClusterWorkloadLength** attribute.

To determine the value of this attribute, use the MQIA_CLUSTER_WORKLOAD_LENGTH selector with the MQINQ call.

CLWLMRUChannels (MQLONG)

This specifies the maximum number of most-recently-used cluster channels, to be considered for use by the cluster workload choice algorithm.

This is a value in the range 1 through 999999999.

To determine the value of this attribute, use the MQIA_CLWL_MRU_CHANNELS selector with the MQINQ call.

CLWLUseQ (MQLONG)

This specifies whether to use remote queues for the cluster workload.

The value is one of the following:

MQCLWL_USEQ_ANY
Use both local and remote queues.

MQCLWL_USEQ_LOCAL
Do not use remote queues. This is the default value.

To determine the value of this attribute, use the MQIA_CLWL_USEQ selector with the MQINQ call.

CodedCharSetId (MQLONG)

This defines the character set used by the queue manager for all character string fields defined in the MQI such as the names of objects, and queue creation date and time. The character set must be one that has single-byte characters for the characters that are valid in object names. It does not apply to application data carried in the message. The value depends on the environment:

- On z/OS, the value is set from the system parameters when the queue manager is started; the default value is 500.
- On Windows, the value is the primary CODEPAGE of the user creating the queue manager.
- On IBM i, the value is that which is set in the environment when the queue manager is first created.
- On UNIX, the value is the default CODESET for the locale of the user creating the queue manager.

To determine the value of this attribute, use the MQIA_CODED_CHAR_SET_ID selector with the MQINQ call.

CommandEvent (MQLONG)

This specifies whether command events are generated, as follows:

MQEVR_DISABLED
Do not generate command events. This is the default.

MQEVR_ENABLED
Generate command events.

MQEVR_NO_DISPLAY
Command events are generated for all successful commands other than MQINQ.

To determine the value of this attribute, use the MQIA_COMMAND_EVENT selector with the MQINQ call.

CommandInputQName (MQCHAR48)

This is the name of the command input queue defined on the local queue manager. This is a queue to which users can send commands, if authorized to do so. The name of the queue depends on the environment:

- On z/OS, the name of the queue is SYSTEM.COMMAND.INPUT; MQSC and PCF commands can be sent to it. See The MQSC commands for details of MQSC commands and Definitions of the Programmable Command Formats for details of PCF commands.
- In all other environments, the name of the queue is SYSTEM.ADMIN.COMMAND.QUEUE, and only PCF commands can be sent to it. However, an MQSC command can be sent to this queue if the MQSC command is enclosed within a PCF command of type MQCMD_ESCAPE. See Escape for information about the Escape command.

To determine the value of this attribute, use the MQCA_COMMAND_INPUT_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

CommandLevel (MQLONG)

Note: V 9.1.0 Support for the HP-UX operating system for all IBM MQ components, including server and clients, is removed.

This indicates the level of system control commands supported by the queue manager. This can be one of the following values:

MQCMDL_LEVEL_710
Level 710 of system control commands.

This value is returned by the following versions:

- IBM WebSphere MQ for AIX 7.1

- IBM WebSphere MQ for HP-UX 7.1
- IBM WebSphere MQ for IBM i 7.1
- IBM WebSphere MQ for Linux 7.1
- IBM WebSphere MQ for Solaris 7.1
- IBM WebSphere MQ for Windows 7.1
- IBM WebSphere MQ for z/OS 7.1

MQCMDL_LEVEL_750
Level 750 of system control commands.

This value is returned by the following versions:

- IBM WebSphere MQ for AIX 7.5
- IBM WebSphere MQ for HP-UX 7.5
- IBM WebSphere MQ for IBM i 7.5
- IBM WebSphere MQ for Linux 7.5
- IBM MQ for Solaris 7.5
- IBM WebSphere MQ for Windows 7.5

MQCMDL_LEVEL_800
Level 800 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 8.0
- IBM MQ for HP-UX 8.0
- IBM MQ for IBM i 8.0
- IBM MQ for Linux 8.0
- IBM MQ for Solaris 8.0
- IBM MQ for Windows 8.0
- IBM MQ for z/OS 8.0

MQCMDL_LEVEL_801
Level 801 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 8.0.0 Fix Pack 2
- IBM MQ for HP-UX 8.0.0 Fix Pack 2
- IBM MQ for IBM i 8.0.0 Fix Pack 2
- IBM MQ for Linux 8.0.0 Fix Pack 2
- IBM MQ for Solaris 8.0.0 Fix Pack 2

MQCMDL_LEVEL_802
Level 802 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 8.0.0 Fix Pack 3
- IBM MQ for HP-UX 8.0.0 Fix Pack 3
- IBM MQ for IBM i 8.0.0 Fix Pack 3
- IBM MQ for Linux 8.0.0 Fix Pack 3
- IBM MQ for Solaris 8.0.0 Fix Pack 3
- IBM MQ for Windows 8.0.0 Fix Pack 3

MQCMDL_LEVEL_900
Level 900 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.0
- IBM MQ for HP-UX 9.0
- IBM MQ for IBM i 9.0
- IBM MQ for Linux 9.0
- IBM MQ for Solaris 9.0
- IBM MQ for Windows 9.0
- IBM MQ for z/OS 9.0

MQCMDL_LEVEL_901
Level 901 of system control commands.

This value is returned by the following versions:

- IBM MQ for Linux 9.0.1
- IBM MQ for Windows 9.0.1
- IBM MQ for z/OS 9.0.1

MQCMDL_LEVEL_902
Level 902 of system control commands.

This value is returned by the following versions:

- IBM MQ for Linux 9.0.2
- IBM MQ for Windows 9.0.2
- IBM MQ for z/OS 9.0.2

MQCMDL_LEVEL_903
Level 903 of system control commands.

This value is returned by the following versions:

- IBM MQ for Linux 9.0.3
- IBM MQ for Windows 9.0.3
- IBM MQ for z/OS 9.0.3

MQCMDL_LEVEL_904
Level 904 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.0.4
- IBM MQ for Linux 9.0.4
- IBM MQ for Windows 9.0.4
- IBM MQ for z/OS 9.0.4

MQCMDL_LEVEL_905
Level 905 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.0.5
- IBM MQ for Linux 9.0.5
- IBM MQ for Windows 9.0.5
- IBM MQ for z/OS 9.0.5

MQCMDL_LEVEL_910
Level 910 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.0
- IBM MQ for IBM i 9.1.0
- IBM MQ for Linux 9.1.0
- IBM MQ for Solaris 9.1.0
- IBM MQ for Windows 9.1.0
- IBM MQ for z/OS 9.1.0

MQCMDL_LEVEL_911
Level 911 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.1
- IBM MQ for Linux 9.1.1
- IBM MQ for Windows 9.1.1
- IBM MQ for z/OS 9.1.1

MQCMDL_LEVEL_912
Level 912 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.2
- IBM MQ for Linux 9.1.2
- IBM MQ for Windows 9.1.2
- IBM MQ for z/OS 9.1.2

MQCMDL_LEVEL_913
Level 913 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.3
- IBM MQ for Linux 9.1.3
- IBM MQ for Windows 9.1.3
- IBM MQ for z/OS 9.1.3

MQCMDL_LEVEL_914
Level 914 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.4
- IBM MQ for Linux 9.1.4
- IBM MQ for Windows 9.1.4
- IBM MQ for z/OS 9.1.4

MQCMDL_LEVEL_915
Level 915 of system control commands.

This value is returned by the following versions:

- IBM MQ for AIX 9.1.5
- IBM MQ for Linux 9.1.5
- IBM MQ for Windows 9.1.5

- IBM MQ for z/OS 9.1.5

The set of system control commands that corresponds to a particular value of the **CommandLevel** attribute varies according to the value of the **Platform** attribute; both must be used to decide which system control commands are supported.

To determine the value of this attribute, use the MQIA_COMMAND_LEVEL selector with the MQINQ call.

CommandServerControl (MQLONG)

Specifies whether the command server is to be started when the queue manager starts.

The value can be any of the following values:

MQSVC_CONTROL_MANUAL
The command server is not to be started automatically.

MQSVC_CONTROL_Q_MGR
The command server is to be started automatically when the queue manager starts.

This attribute is not supported on z/OS.

To determine the value of this attribute, use the MQIA_CMD_SERVER_CONTROL selector with the MQINQ call.

ConfigurationEvent (MQLONG)

Controls whether configuration events are generated.

To determine the value of this attribute, use the MQIA_CONFIGURATION_EVENT selector with the MQINQ call.

The value can be any of the following values:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

Multi V 9.1.5 *CurrentQFileSize (MQLONG)*

The current size of the queue file in megabytes, rounded up to the nearest megabyte.

Table 558. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The value for this queue status attribute is whatever size the queue currently is, rounded up to the nearest megabyte. For a new queue with default attributes the value of **CurrentQFileSize** is 1.

The maximum value of this attribute is 99,999,9999 MB and there is no default value for this attribute.

Multi V 9.1.5 *CurrentMaxQFileSize (MQLONG)*

The current maximum size the queue file can grow to, rounded up to the nearest megabyte, given the current block size in use on a queue.

Table 559. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The use of this field is two fold:

- If you set **MaxQFileSize** to the default value for the current block size, **CurrentMaxQFileSize** shows the actual value that the default value equates to.
- If **CurrentMaxQFileSize** does not match **MaxQFileSize**, you know the queue must be drained in order to adopt a bigger granularity.

Note: See Modifying IBM MQ queue files for more information on changing the size of queue files and block size and granularity.

The maximum value of this attribute is 99,999,9999 MB and there is no default value. The value is whatever the maximum value currently set is; for a new queue with the default attributes, the value of **CurrentMaxQFileSize** is 2,088,960 MB.

DeadLetterQName (MQCHAR48)

This is the name of a queue defined on the local queue manager as the dead-letter (undelivered-message) queue. Messages are sent to this queue if they cannot be routed to their correct destination.

For example, messages are put on this queue when:

- A message arrives at a queue manager, destined for a queue that is not yet defined on that queue manager
- A message arrives at a queue manager, but the queue for which it is destined cannot receive it because, possibly:
  - The queue is full
  - Put requests are inhibited
  - The sending node does not have authority to put messages on the queue

Applications can also put messages on the dead-letter queue.

Report messages are treated in the same way as ordinary messages; if the report message cannot be delivered to its destination queue (usually the queue specified by the *ReplyToQ* field in the message descriptor of the original message), the report message is placed on the dead-letter (undelivered-message) queue.

Note: Messages that have passed their expiry time (see MQMD - Expiry field) are **not** transferred to this queue when they are discarded. However, an expiration report message (MQRO_EXPIRATION) is still generated and sent to the *ReplyToQ* queue, if requested by the sending application.

Messages are not put on the dead-letter (undelivered-message) queue when the application that issued the put request has been notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call (for example, a message put on a local queue for which put requests are inhibited).

Messages on the dead-letter (undelivered-message) queue sometimes have their application message data prefixed with an MQDLH structure. This structure contains extra information that indicates why the message was placed on the dead-letter (undelivered-message) queue. See "MQDLH - Dead letter header" on page 343 for more details of this structure.

This queue must be a local queue, with a **Usage** attribute of MQUS_NORMAL.

If a queue manager does not support a dead-letter (undelivered-message) queue, or one has not been defined, the name is all blanks. All IBM MQ queue managers support a dead-letter (undelivered-message) queue, but by default it is not defined.

If the dead-letter (undelivered-message) queue is not defined, full, or unusable for some other reason, a message which would have been transferred to it by a message channel agent is retained instead on the transmission queue.

To determine the value of this attribute, use the MQCA_DEAD_LETTER_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

DefClusterXmitQueueType (MQLONG)

The `DefClusterXmitQueueType` attribute controls which transmission queue is selected by default by cluster-sender channels to get messages from, to send the messages to cluster-receiver channels.

The values of **DefClusterXmitQueueType** are `MQCLXQ_SCTQ` or `MQCLXQ_CHANNEL`.

MQCLXQ_SCTQ

All cluster-sender channels send messages from `SYSTEM.CLUSTER.TRANSMIT.QUEUE`. The `correlID` of messages placed on the transmission queue identifies which cluster-sender channel the message is destined for.

SCTQ is set when a queue manager is defined. This behavior is implicit in versions of IBM WebSphere MQ, earlier than IBM WebSphere MQ 7.5. In earlier versions, the queue manager attribute `DefClusterXmitQueueType` was not present.

MQCLXQ_CHANNEL

Each cluster-sender channel sends messages from a different transmission queue. Each transmission queue is created as a permanent dynamic queue from the model queue `SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE`.

If the queue manager attribute, `DefClusterXmitQueueType`, is set to `CHANNEL`, the default configuration is changed to cluster-sender channels being associated with individual cluster transmission queues. The transmission queues are permanent-dynamic queues created from the model queue `SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE`. Each transmission queue is associated with one cluster-sender channel. As one cluster-sender channel services a cluster transmission queue, the transmission queue contains messages for only one queue manager in one cluster. You can configure clusters so that each queue manager in a cluster contains only one cluster queue. In this case, the message traffic from a queue manager to each cluster queue is transferred separately from messages to other queues.

To query the value, call `MQINQ`, or send an Inquire Queue Manager (`MQCMD_INQUIRE_Q_MGR`) PCF command, setting the `MQIA_DEF_CLUSTER_XMIT_Q_TYPE` selector. To change the value, send a Change Queue Manager (`MQCMD_CHANGE_Q_MGR`) PCF command, setting the `MQIA_DEF_CLUSTER_XMIT_Q_TYPE` selector.

Related reference

Change Queue Manager

Inquire Queue Manager

"MQINQ - Inquire object attributes" on page 694

The `MQINQ` call returns an array of integers and a set of character strings containing the attributes of an object.

DefXmitQName (MQCHAR48)

This is the name of the transmission queue that is used for the transmission of messages to remote queue managers, if there is no other indication of which transmission queue to use.

If there is no default transmission queue, the name is entirely blank. The initial value of this attribute is blank.

To determine the value of this attribute, use the MQCA_DEF_XMIT_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

DistLists (MQLONG)

This indicates whether the local queue manager supports distribution lists on the MQPUT and MQPUT1 calls. It is one of the following values:

MQDL_SUPPORTED

Distribution lists supported.

MQDL_NOT_SUPPORTED

Distribution lists not supported.

To determine the value of this attribute, use the MQIA_DIST_LISTS selector with the MQINQ call.

DNSGroup (MQCHAR18)

This parameter is no longer used. See What changed in IBM MQ 8.0.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQCA_DNS_GROUP selector with the MQINQ call. The length of this attribute is given by MQ_DNS_GROUP_NAME_LENGTH.

DNSWLM (MQLONG)

This parameter is no longer used. See What changed in IBM MQ 8.0.

The value is one of the following:

MQDNSWLM_YES
: This value may be seen on a queue manager migrated from an earlier release. The value is ignored.

MQDNSWLM_NO
: This is the only value supported by the queue manager.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_DNS_WLM selector with the MQINQ call.

ExpiryInterval (MQLONG)

This indicates the frequency with which the queue manager scans the queues looking for expired messages. It is either a time interval in seconds in the range 1 through 99 999 999, or the following special value:

MQEXPI_OFF
: The queue manager does not scan the queues looking for expired messages.

To determine the value of this attribute, use the MQIA_EXPIRY_INTERVAL selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

IGQPutAuthority (MQLONG)

This attribute applies only if the local queue manager is a member of a queue sharing group. It indicates the type of authority checking that is performed when the local intra-group queuing agent (IGQ agent) removes a message from the shared transmission queue and places the message on a local queue. The value is one of the following:

MQIGQPA_DEFAULT
: The user identifier checked for authorization is the value of the `UserIdentifier` field in the *separate* MQMD that is associated with the message when the message is on the shared transmission queue. This is the user identifier of the program that placed the message on the shared transmission queue, and is usually the same as the user identifier under which the remote queue manager is running.

  If the RESLEVEL profile indicates that more than one user identifier is to be checked, the user identifier of the local IGQ agent (`IGQUserId`) is also checked.

MQIGQPA_CONTEXT
: The user identifier checked for authorization is the value of the `UserIdentifier` field in the *separate* MQMD that is associated with the message when the message is on the shared transmission queue. This is the user identifier of the program that placed the message on the shared transmission queue, and is usually the same as the user identifier under which the remote queue manager is running.

  If the RESLEVEL profile indicates that more than one user identifier is to be checked, the user identifier of the local IGQ agent (`IGQUserId`) and the value of the `UserIdentifier` field in the *embedded* MQMD are also checked. The latter user identifier is usually the user identifier of the application that originated the message.

MQIGQPA_ONLY_IGQ
: The user identifier checked for authorization is the user identifier of the local IGQ agent (`IGQUserId`).

If the RESLEVEL profile indicates that more than one user identifier is to be checked, this user identifier is used for all checks.

MQIGQPA_ALTERNATE_OR_IGQ
The user identifier checked for authorization is the user identifier of the local IGQ agent (*IGQUserId*).

If the RESLEVEL profile indicates that more than one user identifier is to be checked, the value of the *UserIdentifier* field in the *embedded* MQMD is also checked. This user identifier is usually the user identifier of the application that originated the message.

To determine the value of this attribute, use the MQIA_IGQ_PUT_AUTHORITY selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

IGQUserId (MQLONG)

This attribute is applicable only if the local queue manager is a member of a queue sharing group. It specifies the user identifier that is associated with the local intra-group queuing agent (IGQ agent). This identifier is one of the user identifiers that can be checked for authorization when the IGQ agent puts messages on local queues. The actual user identifiers checked depend on the setting of the **IGQPutAuthority** attribute, and on external security options.

If *IGQUserId* is blank, no user identifier is associated with the IGQ agent and the corresponding authorization check is not performed (although other user identifiers might still be checked for authorization).

To determine the value of this attribute, use the MQCA_IGQ_USER_ID selector with the MQINQ call. The length of this attribute is given by MQ_USER_ID_LENGTH.

z/OS This attribute is supported only on z/OS.

InhibitEvent (MQLONG)

This controls whether inhibit (Inhibit Get and Inhibit Put) events are generated. The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_INHIBIT_EVENT selector with the MQINQ call.

On z/OS, you cannot use the MQINQ call to determine the value of this attribute.

IntraGroupqueuing (MQLONG)

This attribute applies only if the local queue manager is a member of a queue sharing group. It indicates whether intra-group queuing is enabled for the queue sharing group. The value is one of the following:

MQIGQ_DISABLED
All messages destined for other queue managers in the queue sharing group are transmitted using conventional channels..

MQIGQ_ENABLED
Messages destined for other queue managers in the queue sharing group are transmitted using the shared transmission queue if the following condition is satisfied:

- The length of the message data plus transmission header does not exceed 63 KB (64 512 bytes).

  It is recommended that somewhat more space than the size of MQXQH be allocated for the transmission header; the constant MQ_MSG_HEADER_LENGTH is provided for this purpose.

If this condition is not satisfied, the message is transmitted using conventional channels.

Note: When intra-group queuing is enabled, the order of messages transmitted using the shared transmission queue is not preserved relative to those transmitted using conventional channels.

To determine the value of this attribute, use the MQIA_INTRA_GROUP_queuing selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

IPAddressVersion (MQLONG)

Specifies which IP address version, either IPv4 or IPv6, is used.

This attribute is only relevant for systems that run both IPv4 and IPv6 and only affects channels defined as having a *TransportType* of MQXPY_TCP when one of the following conditions is true:

- The channel's *ConnectionName* is a host name that resolves to both an IPv4 and IPv6 address and its **LocalAddress** parameter is not specified.
- The channel's *ConnectionName* and *LocalAddress* are both host names that resolve to both IPv4 and IPv6 addresses.

The value can be any of the following values:

MQIPADDR_IPv4
IPv4 is used.

MQIPADDR_IPv6
IPv6 is used.

To determine the value of this attribute, use the MQIA_IP_ADDRESS_VERSION selector with the MQINQ call.

ListenerTimer (MQLONG)

This is the time interval (in seconds) between IBM MQ attempts to restart the listener if there has been an APPC or TCP/IP failure. The value must be between 5 and 9999, with a default value of 60.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_LISTENER_TIMER selector with the MQINQ call.

LocalEvent (MQLONG)

This controls whether local error events are generated. The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_LOCAL_EVENT selector with the MQINQ call.

On z/OS, you cannot use the MQINQ call to determine the value of this attribute.

LoggerEvent (MQLONG)

This controls whether recovery log events are generated. The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_LOGGER_EVENT selector with the MQINQ call.

Multi This attribute is supported only on Multiplatforms.

LUGroupName (MQCHAR8)

This is the generic LU name for the LU 6.2 listener that handles inbound transmissions for the queue sharing group. If you leave this name blank, you cannot use this listener.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQCA_LU_GROUP_NAME selector with the MQINQ call. The length of this attribute is given by MQ_LU_NAME_LENGTH.

LUName (MQCHAR8)

This is the name of the LU to use for outbound LU 6.2 transmissions. Set this to the same LU that the listener uses for inbound transmissions. If you leave this name blank, the APPC/MVS default LU is used; this is variable, so always set LUName if you are using LU6.2.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQCA_LU_NAME selector with the MQINQ call. The length of this attribute is given by MQ_LU_NAME_LENGTH.

LU62ARMSuffix (MQCHAR2)

This is the suffix of the SYS1.PARMLIB member APPCPMxx, that nominates the LUADD for this channel initiator. The z/OS command SET APPC=xx is issued when ARM restarts the channel initiator. If you leave this name is blank, no SET APPC=xx is issued.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQCA_LU62_ARM_SUFFIX selector with the MQINQ call. The length of this attribute is given by MQ_ARM_SUFFIX_LENGTH.

LU62Channels (MQLONG)

This is the maximum number of channels that can be current, or clients that can be connected, that use the LU 6.2 transmission protocol.

The value must be in the range 0 through 9999, with a default value of 200. If you set this to zero, the LU 6.2 transmission protocol is not used.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_LU62_CHANNELS selector with the MQINQ call.

MaxActiveChannels (MQLONG)

This attribute is the maximum number of channels that can be *active* at any time.

The default is the value specified for the `MaxChannels` attribute.

For z/OS, the value must be in the range 1 through 9 999.

For all other platforms, the default value is 999 999 999, which means the number of active channels is unlimited, or it can be set to an actual number to impose a limit.

The **MaxActiveChannels** parameter is a queue manager attribute on z/OS only. On the other platforms, **MaxActiveChannels** is an attribute in the `qm.ini` file. See Configuration file stanzas for distributed queuing for information on how you set the **MaxActiveChannels** attribute on other platforms.

To determine the value of this attribute, use the MQIA_ACTIVE_CHANNELS selector with the **MQINQ** call.

Related concepts

Channel states

MaxChannels (MQLONG)

This attribute is the maximum number of channels that can be *current* (including server-connection channels with connected clients).

For z/OS, the value must be in the range 1 through 9 999, with a default value of 200.

A system that is busy serving connections from the network might need a higher number than the default setting. Determine the value that is correct for your environment, ideally by observing the behavior of your system during testing.

For all other platforms, the default value is 100. You can set **MaxChannels** to a different value to limit the maximum number of current channels if required.

The **MaxChannels** parameter is a queue manager attribute on z/OS only. On the other platforms, **MaxChannels** is an attribute in the `qm.ini` file. See Configuration file stanzas for distributed queuing for information on how you set the **MaxChannels** attribute on other platforms.

To determine the value of this attribute, use the MQIA_MAX_CHANNELS selector with the **MQINQ** call.

Related concepts

Channel states

MaxHandles (MQLONG)

This is the maximum number of open handles that any one task can use concurrently. Each successful MQOPEN call for a single queue (or for an object that is not a queue) uses one handle. That handle becomes available for reuse when the object is closed. However, when a distribution list is opened, each queue in the distribution list is allocated a separate handle, and so that MQOPEN call uses as many handles as there are queues in the distribution list. This must be taken into account when deciding on a suitable value for *MaxHandles*.

The MQPUT1 call performs an MQOPEN call as part of its processing; as a result, MQPUT1 uses as many handles as MQOPEN would, but the handles are used only for the duration of the MQPUT1 call itself.

On z/OS, *task* means a CICS task, an MVS task, or an IMS dependent region.

The value is in the range 1 through 999 999 999. The default value is determined by the environment:

- On z/OS, the default value is 100.
- In all other environments, the default value is 256.

To determine the value of this attribute, use the MQIA_MAX_HANDLES selector with the MQINQ call.

MaxMsgLength (MQLONG)

This is the length of the longest *physical* message that the queue manager can handle. However, because the **MaxMsgLength** queue manager attribute can be set independently of the **MaxMsgLength** queue attribute, the longest physical message that can be placed on a queue is the lesser of those two values.

If the queue manager supports segmentation, an application can put a logical message that is longer than the lesser of the two **MaxMsgLength** attributes, but only if the application specifies the MQMF_SEGMENTATION_ALLOWED flag in MQMD. If that flag is specified, the upper limit for the length of a logical message is 999 999 999 bytes, but usually resource constraints imposed by the operating system, or by the environment in which the application is running, result in a lower limit.

The lower limit for the **MaxMsgLength** attribute is 32 KB (32 768 bytes). The upper limit is 100 MB (104 857 600 bytes).

To determine the value of this attribute, use the MQIA_MAX_MSG_LENGTH selector with the MQINQ call.

MaxPriority (MQLONG)

This is the maximum message priority supported by the queue manager. Priorities range from zero (lowest) to *MaxPriority* (highest).

To determine the value of this attribute, use the MQIA_MAX_PRIORITY selector with the MQINQ call.

MaxPropertiesLength (MQLONG)

This is used to control the size of the properties that can flow with a message. This includes both the property name in bytes and the size of the property value also in bytes.

To determine the value of this attribute, use the MQIA_MAX_PROPERTIES_LENGTH selector with the MQINQ call.

Multi V 9.1.5 *MaxQFileSize (MQLONG)*

The maximum size, in megabytes, that a queue file can grow to.

Table 560. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

It is possible for a queue file to exceed the maximum size, if it is configured to a value lower than the current queue file size. If that happens the queue file no longer accepts new messages, but allows existing messages to be consumed. When the queue file size has dropped below the configured value, new messages are allowed to be put to the queue.

Note: This figure can differ from the value of the attribute configured on the queue, because internally the queue manager might need to use a larger block size to reach the chosen size. See Modifying IBM MQ queue files for more information on changing the size of queue files and block size and granularity.

When the granularity needs changing because this attribute has been increased, warning message AMQ7493W `Granularity changed` is written to the AMQERR logs. This gives you an indication that you need to plan for the queue to be emptied, in order for IBM MQ to adopt the new granularity.

The maximum value of this attribute is 267,386,880 MB and the default value, and migrated value, is 2,088,960 MB which is the current maximum for a queue with a granularity equaling 512.

To determine the value of this attribute, use the MQIA_MAX_Q_FILE_SIZE selector with the MQINQ call.

MaxUncommittedMsgs (MQLONG)

This is the maximum number of uncommitted messages that can exist within a unit of work. The number of uncommitted messages is the sum of the following since the start of the current unit of work:

- Messages put by the application with the MQPMO_SYNCPOINT option
- Messages retrieved by the application with the MQGMO_SYNCPOINT option
- Trigger messages and COA report messages generated by the queue manager for messages put with the MQPMO_SYNCPOINT option
- COD report messages generated by the queue manager for messages retrieved with the MQGMO_SYNCPOINT option

The following messages are not counted as uncommitted:

- Messages put or retrieved by the application outside a unit of work
- Trigger messages or COA/COD report messages generated by the queue manager as a result of messages put or retrieved outside a unit of work
- Expiration report messages generated by the queue manager (even if the call causing the expiration report message specified MQGMO_SYNCPOINT)
- Event messages generated by the queue manager (even if the call causing the event message specified MQPMO_SYNCPOINT or MQGMO_SYNCPOINT)

Note:

1. Exception report messages are generated by the Message Channel Agent (MCA), or by the application, and are treated in the same way as ordinary messages put or retrieved by the application.

2. When a message or segment is put with the MQPMO_SYNCPOINT option, the number of uncommitted messages is incremented by one regardless of how many physical messages actually result from the put. (More than one physical message might result if the queue manager must subdivide the message or segment.)
3. When a distribution list is put with the MQPMO_SYNCPOINT option, the number of uncommitted messages is incremented by one *for each physical message that is generated*. This can be as small as one, or as great as the number of destinations in the distribution list.

The lower limit for this attribute is 1; the upper limit is 999 999 999. The default value is 10000.

To determine the value of this attribute, use the MQIA_MAX_UNCOMMITTED_MSGS selector with the MQINQ call.

MQIAccounting (MQLONG)

This controls the collection of accounting information for MQI data.

The value is one of the following:

MQMON_ON
Collect API accounting data.

MQMON_OFF
Do not collect API accounting data. This is the default value.

If you set the queue manager attribute ACCTCONO to ENABLED, this value might be overridden for individual connections using the Options field in the MQCNO structure. Changes to this value are only effective for connections to the queue manager that occur after the change to the attribute.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_ACCOUNTING_MQI selector with the MQINQ call.

MQIStatistics (MQLONG)

This controls the collection of statistics monitoring information for the queue manager.

The value is one of the following:

MQMON_ON
Collect MQI statistics.

MQMON_OFF
Do not collect MQI statistics. This is the default value.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_STATISTICS_MQI selector with the MQINQ call.

MsgMarkBrowseInterval (MQLONG)

Time interval in milliseconds after which the queue manager can automatically remove the mark from browse messages.

This is a time interval (in milliseconds) after which the queue manager can automatically remove the mark from browse messages.

This attribute describes the time interval for which messages that have been marked as browsed by a call to MQGET, using the get message option MQGMO_MARK_BROWSE_CO_OP, are expected to remain marked as browsed.

The queue manager might automatically unmark browsed messages that have been marked as browsed for the cooperating set of handles when they have been marked for more than this approximate interval.

This does not affect the state of any message marked as browse, that was obtained by a call to MQGET, using the get message option MQGMO_MARK_BROWSE_HANDLE.

The maximum value is 999 999 999 and the default value is 5000. A special value of -1 for *MsgMarkBrowseInterval* represents an unlimited time interval.

Attention: This value should not be below the default of 5000.

To determine the value of this attribute, use the MQIA_MSG_MARK_BROWSE_INTERVAL selector with the MQINQ call.

OutboundPortMax (MQLONG)

This is the highest port number in the range, defined by OutboundPortMin and OutboundPortMax, of port numbers to be used to bind outgoing channels.

The value is an integer in the range 0 through 65535, and must be equal to or greater than the OutboundPortMin value. The default value is 0.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_OUTBOUND_PORT_MAX selector with the MQINQ call.

OutboundPortMin (MQLONG)

This is the lowest port number in the range, defined by OutboundPortMin and OutboundPortMax, of port numbers to be used to bind outgoing channels.

The value is an integer in the range 0 through 65535, and must be equal to or less than the OutboundPortMax value. The default value is 0.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_OUTBOUND_PORT_MIN selector with the MQINQ call.

PerformanceEvent (MQLONG)

This controls whether performance-related events are generated. It is one of the following values:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_PERFORMANCE_EVENT selector with the MQINQ call.

Platform (MQLONG)

This indicates the operating system on which the queue manager is running:

MQPL_AIX
AIX (same value as MQPL_UNIX).

MQPL_APPLIANCE
IBM MQ Appliance

MQPL_MVS
z/OS (same value as MQPL_ZOS).

MQPL_OS390
z/OS (same value as MQPL_ZOS).

MQPL_OS400
IBM i.

MQPL_UNIX
UNIX.

MQPL_WINDOWS_NT
Windows systems.

MQPL_ZOS
z/OS.

To determine the value of this attribute, use the MQIA_PLATFORM selector with the MQINQ call.

PubSubNPInputMsg (MQLONG)

Whether to discard or keep an undelivered input message.

The value is one of the following:

MQUNDELIVERED_DISCARD
Non-persistent input messages may be discarded if they cannot be processed.

This is the default value.

MQUNDELIVERED_KEEP
Non-persistent input messages will not be discarded if they cannot be processed. In this situation the queued publish/subscribe interface will continue to retry the process at appropriate intervals and does not continue processing subsequent messages.

To determine the value of this attribute, use the MQIA_PUBSUB_NP_MSG selector with the MQINQ call.

PubSubNPResponse (MQLONG)

Controls the behavior of undelivered response messages.

The value is one of the following:

MQUNDELIVERED_NORMAL
Non-persistent responses which cannot be placed on the reply queue are put on the dead letter queue, if they cannot be placed on the DLQ then they are discarded.

MQUNDELIVERED_SAFE
Non-persistent responses which cannot be placed on the reply queue are put on the dead letter queue. If the response cannot be set and cannot be placed on the DLQ then the queued publish/subscribe interface will roll back the current operation and then retry at appropriate intervals and does not continue processing subsequent messages.

MQUNDELIVERED_DISCARD
Non-persistent responses are not placed on the reply queue are discarded.

This is the default value for new queue managers.

MQUNDELIVERED_KEEP
Non-persistent responses are not placed on the dead letter queue or discarded. Instead, the queued publish/subscribe interface will back out the current operation and then retry it at appropriate intervals.

To determine the value of this attribute, use the MQIA_PUBSUB_NP_RESP selector with the MQINQ call.

Default value for migrated queue managers.

If the queue manager has been migrated from IBM MQ V6.0, the initial value of this attribute depends on the values of *DiscardNonPersistentResponse* and *DLQNonPersistentResponse* before migration, as shown in the following table.

		DLQNonPersistentResponse		
		Yes	**No**	**Not set**
DiscardNonPersistentResponse	**Yes**	MQUNDELIVERED_NORMAL	MQUNDELIVERED_DISCARD	MQUNDELIVERED_NORMAL
	No	MQUNDELIVERED_SAFE	MQUNDELIVERED_KEEP	MQUNDELIVERED_SAFE
	Not set	If SyncPointPersistent = No, MQUNDELIVERED_SAFE else MQUNDELIVERED_NORMAL	If SyncPointPersistent = No, MQUNDELIVERED_KEEP else MQUNDELIVERED_DISCARD	If SyncPointPersistent = No, MQUNDELIVERED_SAFE else MQUNDELIVERED_NORMAL

PubSubMaxMsgRetryCount (MQLONG)

The number of retries when processing a failed command message under syncpoint.

The value is one of the following:

0 - 999 999 999
The default value is 5.

To determine the value of this attribute, use the MQIA_PUBSUB_MAXMSG_RETRY_COUNT selector with the MQINQ call.

PubSubSyncPoint (MQLONG)

Whether only persistent messages or all messages are processed under syncpoint.

The value is one of the following:

MQSYNCPOINT_IFPER
This makes the queued publish/subscribe interface receive non-persistent messages outside syncpoint. If the daemon receives a publication outside syncpoint, the daemon forwards the publication to subscribers known to it outside syncpoint.

This is the default value.

MQSYNCPOINT_YES
This makes the queued publish/subscribe interface receive all messages under syncpoint.

To determine the value of this attribute, use the MQIA_PUBSUB_SYNC_PT selector with the MQINQ call.

PubSubMode (MQLONG)

Whether the publish/subscribe engine and the queued publish/subscribe interface are running, therefore allowing applications to publish/subscribe by using the application programming interface and the queues that are being monitored by the queued publish/subscribe interface.

The value is one of the following:

MQPSM_COMPAT
The publish/subscribe engine is running. It is therefore possible to publish/subscribe by using the application programming interface. The queued publish/subscribe interface is not running, therefore any message that is put to the queues that are monitored by the queued publish/subscribe interface is not acted on. This setting is used for compatibility with WebSphere Message Broker V6 or earlier versions using this queue manager, because it must read the same queues from which the queued publish/subscribe interface normally reads.

MQPSM_DISABLED
The publish/subscribe engine and the queued publish/subscribe interface are not running. It is therefore not possible to publish/subscribe by using the application programming interface. Any publish/subscribe messages that are put to the queues that are monitored by the queued publish/subscribe interface are not acted on.

MQPSM_ENABLED
: The publish/subscribe engine and the queued publish/subscribe interface are running. It is therefore possible to publish/subscribe by using the application programming interface and the queues that are being monitored by the queued publish/subscribe interface. This is the queue manager's initial default value.

To determine the value of this attribute, use the MQIA_PUBSUB_MODE selector with the MQINQ call.

QMgrDesc (MQCHAR64)

Use this field for a commentary describing the queue manager. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, this field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

- On z/OS, the default value is the product name and version number.
- In all other environments, the default value is blanks.

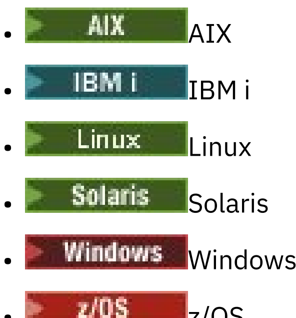
To determine the value of this attribute, use the MQCA_Q_MGR_DESC selector with the MQINQ call. The length of this attribute is given by MQ_Q_MGR_DESC_LENGTH.

QMgrIdentifier (MQCHAR48)

This is an internally-generated unique name for the queue manager.

To determine the value of this attribute, use the MQCA_Q_MGR_IDENTIFIER selector with the MQINQ call. The length of this attribute is given by MQ_Q_MGR_IDENTIFIER_LENGTH.

This attribute is supported in the following environments:



- AIX
- IBM i
- Linux
- Solaris
- Windows
- z/OS

and IBM MQ clients connected to these systems.

QMgrName (MQCHAR48)

This is the name of the local queue manager, that is, the name of the queue manager to which the application is connected.

The first 12 characters of the name are used to construct a unique message identifier (see MQMD - MsgId field). Queue managers that can intercommunicate must therefore have names that differ in the first 12 characters, in order for message identifiers to be unique in the queue manager network.

On z/OS, the name is the same as the subsystem name, which is limited to 4 nonblank characters.

To determine the value of this attribute, use the MQCA_Q_MGR_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_MGR_NAME_LENGTH.

QSGName (MQCHAR4)

This is the name of the queue sharing group to which the local queue manager belongs. If the local queue manager does not belong to a queue sharing group, the name is blank.

To determine the value of this attribute, use the MQCA_QSG_NAME selector with the MQINQ call. The length of this attribute is given by MQ_QSG_NAME_LENGTH.

z/OS This attribute is supported only on z/OS.

QueueAccounting (MQLONG)

This controls the collection of accounting information for queues.

The value is one of the following:

MQMON_NONE
Do not collect accounting data for queues, regardless of the setting of the queue accounting attribute ACCTQ. This is the default value.

MQMON_OFF
Do not collect accounting data for queues that specify QMGR in the ACCTQ queue attribute.

MQMON_ON
Collect accounting data for queues that specify QMGR in the ACCTQ queue attribute.

Changes to this value are only effective for connections to the queue manager that occur after the change to the attribute.

To determine the value of this attribute, use the MQIA_ACCOUNTING_Q selector with the MQINQ call.

QueueMonitoring (MQLONG)

This specifies the default setting for online monitoring of queues.

If the **QueueMonitoring** queue attribute is set to MQMON_Q_MGR, this attribute specifies the value which is assumed by the channel. The value can be:

MQMON_OFF
Online monitoring data collection is turned off. This is the queue manager's initial default value.

MQMON_NONE
Online monitoring data collection is turned off for queues regardless of the setting of their **QueueMonitoring** attribute.

MQMON_LOW
Online monitoring data collection is turned on, with a low ratio of data collection.

MQMON_MEDIUM
Online monitoring data collection is turned on, with a moderate ratio of data collection.

MQMON_HIGH
Online monitoring data collection is turned on, with a high ratio of data collection.

To determine the value of this attribute, use the MQIA_MONITORING_Q selector with the MQINQ call.

QueueStatistics (MQLONG)

This controls the collection of statistics data for queues.

It is one of the following values:

MQMON_NONE
Do not collect queue statistics for queues, regardless of the setting of the **QueueStatistics** queue attribute. This is the default value.

MQMON_OFF
Do not collect statistics data for queues that specify Queue Manager in the **QueueStatistics** queue attribute.

MQMON_ON
Collect statistics data for queues that specify Queue Manager in the **QueueStatistics** queue attribute.

To determine the value of this attribute, use the MQIA_STATISTICS_Q selector with the MQINQ call.

ReceiveTimeout (MQLONG)

This specifies how long a TCP/IP channel waits to receive data, including heartbeats, from its partner before returning to the inactive state. It applies only to message channels and not to MQI channels.

The exact meaning of the ReceiveTimeout is altered by the value specified in ReceiveTimeoutType. ReceiveTimeoutType can be set to one of the following:

- MQRCVTIME_EQUAL - this value is the number in seconds for the channel to wait. Specify a value in the range 0 - 999999.
- MQRCVTIME_ADD - this value is the number in seconds to add to the negotiated HBINT, and it determines how long a channel waits. Specify a value in the range 1 - 999999.
- MQRCVTIME_MULTIPLY - this value is a multiplier to apply to the negotiated HBINT. Specify a value of 0 or a value in the range 2 - 99.

The default value is 0.

Set ReceiveTimeoutType to MQRCVTIME_MULTIPLY or MQRCVTIME_EQUAL, and ReceiveTimeout to 0, to stop a channel from timing out its wait to receive data from its partner.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_RECEIVE_TIMEOUT selector with the MQINQ call.

ReceiveTimeoutMin (MQLONG)

This is the minimum time, in seconds, that a TCP/IP channel waits to receive data, including heartbeats, from its partner, before returning to the inactive state.

It applies only to message channels, not to MQI channels. The value must be in the range 0 through 999999, with a default of 0.

If you use ReceiveTimeoutType to specify that the TCP/IP channel wait time is to be calculated relative to the negotiated value of HBINT, and the resultant value is less than the value of this parameter, this value is used instead.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_RECEIVE_TIMEOUT_MIN selector with the MQINQ call.

ReceiveTimeoutType (MQLONG)

This is the qualifier, applied to ReceiveTimeout to define how long a TCP/IP channel waits to receive data, including heartbeats, from its partner, before returning to the inactive state. It applies only to message channels, not to MQI channels.

The value is one of the following:

MQRCVTIME_MULTIPLY
ReceiveTimeout is a multiplier to apply to the negotiated HBINT value to determine how long a channel waits. This is the default value.

MQRCVTIME_ADD
ReceiveTimeout is a value, in seconds, to add to the negotiated HBINT value to determine how long a channel waits.

MQRCVTIME_EQUAL
ReceiveTimeout is a value, in seconds, that the channel waits.

To stop a channel timing out its wait to receive data from its partner, set ReceiveTimeoutType to MQRCVTIME_MULTIPLY or MQRCVTIME_EQUAL, and ReceiveTimeout to 0.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_RECEIVE_TIMEOUT_TYPE selector with the MQINQ call.

RemoteEvent (MQLONG)

This controls whether remote error events are generated. It is one of the following values:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_REMOTE_EVENT selector with the MQINQ call.

RepositoryName (MQCHAR48)

This is the name of a cluster for which this queue manager provides a repository-manager service. If the queue manager provides this service for more than one cluster, *RepositoryNamelist* specifies the name of a namelist object that identifies the clusters, and *RepositoryName* is blank. At least one of *RepositoryName* and *RepositoryNamelist* must be blank.

To determine the value of this attribute, use the MQCA_REPOSITORY_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_MGR_NAME_LENGTH.

RepositoryNamelist (MQCHAR48)

This is the name of a namelist object that contains the names of clusters for which this queue manager provides a repository-manager service. If the queue manager provides this service for only one cluster, the namelist object contains only one name. Alternatively, *RepositoryName* can be used to specify the name of the cluster, in which case *RepositoryNamelist* is blank. At least one of *RepositoryName* and *RepositoryNamelist* must be blank.

To determine the value of this attribute, use the MQCA_REPOSITORY_NAMELIST selector with the MQINQ call. The length of this attribute is given by MQ_NAMELIST_NAME_LENGTH.

ScyCase(MQCHAR8)

Specifies whether the queue manager supports security profile names in mixed case, or in uppercase only.

The value is one of the following:

MQSCYC_UPPER
Security profile names must be in uppercase.

MQSCYC_MIXED
Security profile names can be in uppercase or in mixed case.

Changes to this attribute take effect when a Refresh Security command is run with *SecurityType(MQSECTYPE_CLASSES)* specified.

z/OS This attribute is supported only on z/OS.

To determine the value of this attribute, use the MQIA_SECURITY_CASE selector with the MQINQ call.

SharedQMgrName (MQLONG)

This specifies whether the *ObjectQmgrName* should be used or treated as the local queue manager on an MQOPEN call, for a shared queue, when the *ObjectQmgrName* is that of another queue manager in the queue sharing group.

The value can be any of the following values:

MQSQQM_USE
: *ObjectQmgrName* is used and the appropriate transmission queue is opened.

MQSQQM_IGNORE
: If the target queue is shared, and the *ObjectQmgrName* is that of a queue manager in the same queue sharing group, the open is performed locally.

This attribute is valid only on z/OS.

To determine the value of this attribute, use the MQIA_SHARED_Q_Q_MGR_NAME selector with the MQINQ call.

SPLCAP

Indicates whether security capabilities of Advanced Message Security are available for a queue manager.

MQCAP_SUPPORTED
: This is the default value if the AMS component is installed for the installation that the queue manager is running under.

MQCAP_NOT_SUPPORTED

SSLEvent (MQLONG)

This specifies whether TLS events are generated.

It is one of the following values:

MQEVR_ENABLED
: Generate TLS events, as follows:

  MQRC_CHANNEL_SSL_ERROR

MQEVR_DISABLED
: Do not generate TLS events; this is the default value.

To determine the value of this attribute, use the MQIA_SSL_EVENT selector with the MQINQ call.

SSLFIPSRequired (MQLONG)

Note: On UNIX, Linux, and Windows, IBM MQ provides FIPS 140-2 compliance through the "IBM Crypto for C" cryptographic module. The certificate for this module has been moved to the Historical status. Customers should view the IBM Crypto for C certificate and be aware of any advice provided by NIST. A replacement FIPS 140-3 module is currently in progress and its status can be viewed by searching for it in the NIST CMVP modules in process list.

This lets you specify that only FIPS-certified algorithms are to be used if the cryptography is executed in IBM MQ, rather than in cryptographic hardware. If cryptographic hardware is configured, the cryptography modules used are those modules provided by the hardware product; these modules might or might not be FIPS-certified to a particular level depending on the hardware product in use.

The value is one of the following values:

MQSSL_FIPS_NO
: Use any CipherSpec supported on the platform in use. This value is the default value.

MQSSL_FIPS_YES
: Use only FIPS-certified cryptographic algorithms in the CipherSpecs allowed on all TLS connections from and to this queue manager.

This parameter is valid only on UNIX, Linux, Windows, and z/OS platforms.

To determine the value of this attribute, use the MQIA_SSL_FIPS_REQUIRED selector with the MQINQ call.

Related tasks

Specifying that only FIPS-certified CipherSpecs are used at run time on the MQI client

Related reference

Federal Information Processing Standards (FIPS) for UNIX, Linux, and Windows

SSLKeyResetCount (MQLONG)

This specifies when TLS channel message channel agents (MCAs) that initiate communication reset the secret key used for encryption on the channel.

The value represents the total number of unencrypted bytes that are sent and received on the channel before the secret key is renegotiated. The number of bytes includes control information sent by the MCA.

The value is a number in the range 0 through 999 999 999, with a default value of 0. If you specify a TLS secret key reset count in the range 1 byte through 32 KB, TLS channels will use a secret key reset count of 32 KB. This is to avoid the processing cost of excessive key resets which would occur for small TLS secret key reset values.

The secret key is renegotiated when the total number of unencrypted bytes sent and received by the initiating channel MCA exceeds the specified value. If channel heartbeats are enabled, the secret key is renegotiated before data is sent or received following a channel heartbeat, or when the total number of unencrypted bytes exceeds the specified value, whichever comes first.

The count of bytes sent and received for renegotiation includes control information sent and received by the channel MCA and is reset whenever a renegotiation occurs.

Use a value of 0 to indicate that secret keys are never renegotiated.

To determine the value of this attribute, use the MQIA_SSL_RESET_COUNT selector with the MQINQ call.

StartStopEvent (MQLONG)

This controls whether start and stop events are generated. The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_START_STOP_EVENT selector with the MQINQ call.

StatisticsInterval (MQLONG)

This specifies how often (in seconds) to write statistics monitoring data to the monitoring queue.

The value is an integer in the range 0 to 604800, with a default value of 1800 (30 minutes).

To determine the value of this attribute, use the MQIA_STATISTICS_INTERVAL selector with the MQINQ call.

SyncPoint (MQLONG)

This indicates whether the local queue manager supports units of work and syncpointing with the MQGET, MQPUT, and MQPUT1 calls.

MQSP_AVAILABLE
Units of work and syncpointing available.

MQSP_NOT_AVAILABLE
Units of work and syncpointing not available.

- On z/OS this value is never returned.

To determine the value of this attribute, use the MQIA_SYNCPOINT selector with the MQINQ call.

TCPChannels (MQLONG)

This is the maximum number of channels that can be current, or clients that can be connected, that use the TCP/IP transmission protocol.

The value must be in the range 0 through 9999, with a default value of 200. If you specify 0, TCP/IP is not used.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_TCP_CHANNELS selector with the MQINQ call.

TCPKeepAlive (MQLONG)

This specifies whether to use TCP KEEPALIVE to check that the other end of the connection is still available. If it is not available, the channel is closed.

The value is one of the following:

MQTCPKEEP_YES
Use TCP KEEPALIVE as specified in the TCP profile configuration data set. If you specify the channel attribute KeepAliveInterval (KAINT), the value to which it is set is used.

MQTCPKEEP_NO
Do not use TCP KEEPALIVE. This is the default value.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_TCP_KEEP_ALIVE selector with the MQINQ call.

TCPName (MQCHAR8)

This is the name of either the only or preferred TCP/IP stack that will be used, depending on the value of TCPStackType. This parameter is only applicable in CINET multiple stack environments. The default value is TCPIP.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQCA_TCP_NAME selector with the MQINQ call. The length of this attribute is given by MQ_TCP_NAME_LENGTH.

TCPStackType (MQLONG)

This specifies whether the channel initiator can use only the TCP/IP stack specified in TCPName, or can optionally bind to any selected TCP/IP stack. This parameter is only applicable in CINET multiple stack environments.

The value is one of the following:

MQTCPSTACK_SINGLE
The channel initiator can use only the TCP/IP address spaces named in TCPName. This is the default value.

MQTCPSTACK_MULTIPLE
The channel initiator can use any TCP/IP address space available to it. It defaults to the one specified in TCPName if no other is specified for a channel or listener.

This attribute is supported on z/OS only.

To determine the value of this attribute, use the MQIA_TCP_STACK_TYPE selector with the MQINQ call.

TraceRouteRecording (MQLONG)

This controls the recording of trace- route information.

The value is one of the following:

MQRECORDING_DISABLED
No appending to trace- route messages allowed.

MQRECORDING_Q
Put trace- route messages to fixed named queue.

MQRECORDING_MSG
Put trace- route messages to a queue determined using the message itself. This is the default value

To determine the value of this attribute, use the MQIA_TRACE_ROUTE_RECORDING selector with the MQINQ call.

TriggerInterval (MQLONG)

This is a time interval (in milliseconds) used to restrict the number of trigger messages. This is relevant only when the *TriggerType* is MQTT_FIRST. In this case trigger messages are usually generated only when a suitable message arrives on the queue, and the queue was previously empty. Under certain circumstances, however, an additional trigger message can be generated with MQTT_FIRST triggering even if the queue was not empty. These additional trigger messages are not generated more often than every *TriggerInterval* milliseconds.

For more information on triggering, see Triggering channels.

The value is not less than 0 and not greater than 999 999 999. The default value is 999 999 999.

To determine the value of this attribute, use the MQIA_TRIGGER_INTERVAL selector with the MQINQ call.

TriggerInterval (MQLONG)

This is a time interval (in milliseconds) used to restrict the number of trigger messages. This is relevant only when the *TriggerType* is MQTT_FIRST. In this case trigger messages are usually generated only when a suitable message arrives on the queue, and the queue was previously empty. Under certain circumstances, however, an additional trigger message can be generated with MQTT_FIRST triggering even if the queue was not empty. These additional trigger messages are not generated more often than every *TriggerInterval* milliseconds.

For more information on triggering, see Triggering channels.

The value is not less than 0 and not greater than 999 999 999. The default value is 999 999 999.

To determine the value of this attribute, use the MQIA_TRIGGER_INTERVAL selector with the MQINQ call.

Version (MQCFST)

This is the version of the IBM MQ code as VVRRMMFF, where:

VV - Version

RR - Release

MM - Maintenance level

FF - Fix level

XrCapability(MQLONG)

This controls whether MQ Telemetry commands are supported by the queue manager.

The value is one of the following:

MQCAP_SUPPORTED
MQ Telemetry component installed and Telemetry commands are supported.

MQCAP_NOT_SUPPORTED
MQ Telemetry component not installed.

This attribute is supported only on the following platforms:

- IBM i IBM i
- UNIX UNIX
- Windows Windows

To determine the value of this attribute, use the MQIA_XR_CAPABILITY selector with the MQINQ call.

Attributes for queues

There are five types of queue definition. Some queue attributes apply to all types of queue; other queue attributes apply only to certain types of queue.

Types of queue

The queue manager supports the following types of queue definition:

Local queue
You can store messages on a local queue.

z/OS On z/OS you can make it a shared or private queue.

A queue is known to a program as *local* if it is owned by the queue manager to which the program is connected. You can get messages from, and put messages on, local queues.

The queue definition object holds the definition information of the queue as well as the physical messages put on the queue.

Local queue manager queue
The queue exists on the local queue manager.

z/OS The queue is known as a private queue on z/OS.

z/OS **Shared queue (z/OS only)**
The queue exists in a shared repository that is accessible to all the queue managers that belong to the queue sharing group that owns the shared repository.

Applications connected to any queue manager in the queue sharing group can place messages on and remove messages from queues of this type. Such queues are effectively the same as local queues. The value of the **QType** queue attribute is MQQT_LOCAL.

Applications connected to the local queue manager can place messages on and remove messages from queues of this type. The value of the **QType** queue attribute is MQQT_LOCAL.

Cluster queue

You can store messages on a cluster queue on the queue manager where it is defined. A cluster queue is a queue that is hosted by a cluster queue manager and made available to other queue managers in the cluster. The value of the **QType** queue attribute is MQQT_CLUSTER.

A cluster queue definition is advertised to other queue managers in the cluster. The other queue managers in the cluster can put messages to a cluster queue without needing a corresponding remote-queue definition. A cluster queue can be advertised in more than one cluster by using a cluster namelist.

When a queue is advertised, any queue manager in the cluster can put messages to it. To put a message, the queue manager must find out, from the full repositories, where the queue is hosted. Then it adds some routing information to the message and puts the message on a cluster transmission queue.

A queue manager can store messages for other queue managers in a cluster on multiple transmission queues. You can configure a queue manager to store messages on multiple cluster transmission queues in two different ways. If you set the queue manager attribute **DEFCLXQ** to CHANNEL, a different cluster transmission queue is created automatically from SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE for each cluster-sender channel. If you set the

CLCHNAME transmission queue option to match one or more cluster-senders channel, the queue manager can store messages for the matching channels on that transmission queue.

Attention: If you are using dedicated SYSTEM.CLUSTER.TRANSMIT.QUEUES with a queue manager that was upgraded from a version of the product earlier than IBM WebSphere MQ 7.5, ensure that the SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE has the SHARE/NOSHARE option set to **SHARE**.

z/OS A cluster queue can be a queue that is shared by members of a queue sharing group in IBM MQ for z/OS.

Remote queue

A remote queue is not a physical queue; it is the local definition of a queue that exists on a remote queue manager. The local definition of the remote queue contains information that tells the local queue manager how to route messages to the remote queue manager.

Applications connected to the local queue manager can place messages on queues of this type; the messages are placed on the local transmission queue used to route messages to the remote queue manager. Applications cannot remove messages from remote queues. The value of the **QType** queue attribute is MQQT_REMOTE.

You can also use a remote queue definition for:

- Reply-queue aliasing

  In this case the name of the definition is the name of a reply-to queue. For more information, see Reply-to queue aliases and clusters.
- Queue manager aliasing

  In this case the name of the definition is an alias for a queue manager, and not the name of a queue. For more information, see Queue manager aliases and clusters.

Alias queue

This is not a physical queue; it is an alternative name for a local queue, a shared queue, a cluster queue, or a remote queue. The name of the queue to which the alias resolves is part of the definition of the alias queue.

Applications connected to the local queue manager can place messages on queues of this type; the messages are placed on the queue to which the alias resolves. Applications can remove messages from queues of this type if the alias resolves to a local queue, a shared queue, or a cluster queue that has a local instance. The value of the **QType** queue attribute is MQQT_ALIAS.

Model queue

This is not a physical queue; it is a set of queue attributes from which a local queue can be created.

Messages cannot be stored on queues of this type.

Queue limits

From IBM MQ 9.1.0 Fix Pack 5, the queue manager limits the maximum queue file size to 2 TB by default.

Queue attributes

Some queue attributes apply to all types of queue; other queue attributes apply only to certain types of queue. The types of queue to which an attribute applies are shown in Table 561 on page 825 and subsequent tables.

Table 561 on page 825 summarizes the attributes that are specific to queues. The attributes are described in alphabetical order.

Note: The names of the attributes shown in this section are descriptive names used with the MQINQ and MQSET calls; the names are the same as for the PCF commands. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for details.

In the following table, the columns apply as follows:

- The column for local queues applies also to shared queues.
- The column for model queues indicates which attributes are inherited by the local queue created from the model queue.
- The column for cluster queues indicates the attributes that can be inquired when the cluster queue is opened for inquire alone, or for inquire and output. If any other attributes are inquired, the call returns completion code MQCC_WARNING and reason code MQRC_SELECTOR_NOT_FOR_TYPE (2068).

  If the cluster queue is opened for inquire plus one or more of input, browse, or set, the column for local queues applies instead.

  If the cluster queue is opened for inquire alone, or for inquire and output, plus specifying the base queue manager name, the column for local queues applies instead.

Table 561. Attributes for queues

Attribute	Description	Local	Model	Alias	Remote	Cluster
AlterationDate	Date when definition was last changed	X		X	X	
AlterationTime	Time when definition was last changed	X		X	X	
BackoutRequeueQName	Excessive backout requeue queue name	X	X			
BackoutThreshold	Backout threshold	X	X			
BaseQName	Queue name to which alias resolves			X		
CFStrucName	Coupling-facility structure name	X	X			
CLCHNAME	Cluster-sender channel names	✓	✓			
ClusterName	Name of cluster to which queue belongs	X		X	X	X
ClusterNamelist	Name of namelist object containing names of clusters to which queue belongs	X		X	X	
CLWLQueuePriority	Cluster workload queue priority	X		X	X	X
CLWLQueueRank	Cluster workload queue rank	X		X	X	X
CLWLUseQ	Use remote queue	X				
CreationDate	Date that the queue was created	X				
CreationTime	Time that the queue was created	X				
CurrentQDepth	Current queue depth	X				
DefaultPutResponse	Default put response	✓	✓	✓	✓	
DefBind	Default binding	X		X	X	X
DefinitionType attribute	Queue definition type	X	X			
DefInputOpenOption	Default input open option	X	X			
DefPersistence	Default message persistence	X	X	X	X	X
DefPriority	Default message priority	✓	✓	✓	✓	✓
DefReadAhead	Default read ahead	X	X	X		

Attribute	Description	Local	Model	Alias	Remote	Cluster
DistLists	Distribution list support	X	X			
HardenGetBackout	Whether to maintain an accurate backout count	X	X			
IndexType	Index type	X	X			
InhibitGet	Whether get operations for the queue are allowed	X	X	X		
InhibitPut	Whether put operations for the queue are allowed	X	X	X	X	X
InitiationQName	Name of initiation queue	X	X			
MaxMsgLength	Maximum message length in bytes	X	X			
MaxQDepth	Maximum queue depth	X	X			
MsgDeliverySequence attribute	Message delivery sequence	X	X			
NonPersistentMessage Class	Reliability goal for non-persistent messages	X	X			
OpenInputCount	Number of opens for input	X				
OpenOutputCount	Number of opens for output	X				
PropertyControl	Property control	✓	✓	✓		
ProcessName	Process name	X	X			
QDepthHighEvent attribute	Whether Queue Depth High events are generated	X	X			
QDepthHighLimit	High limit for queue depth	X	X			
QDepthLowEvent attribute	Whether Queue Depth Low events are generated	X	X			
QDepthLowLimit attribute	Low limit for queue depth	X	X			
QDepthMaxEvent	Whether Queue Full events are generated	X	X			
QDesc	Queue description	X	X	X	X	X
QName	Queue name	X		X	X	X
QServiceInterval	Target for queue service interval	X	X			
QServiceIntervalEvent attribute	Whether Service Interval High or Service Interval OK events are generated	X	X			
QSGDisp attribute	Queue sharing group disposition	X		X	X	
QueueAccounting	Queue accounting data collection	X	X	X	X	X
QueueMonitoring	Online monitoring data for queues	X	✓			
QueueStatistics	Queue statistics data collection	X	X	X	X	X
QType	Queue type	X		X	X	X
RemoteQMgrName	Name of remote queue manager				X	
RemoteQName	Name of remote queue				X	
RetentionInterval	Retention interval	X	X			
Scope	Whether an entry for the queue also exists in a cell directory	X		X	X	
Shareability	Queue shareability	X	X			

Table 561. Attributes for queues (continued)

Attribute	Description	Local	Model	Alias	Remote	Cluster
StorageClass	Storage class for queue	X	X			
TriggerControl	Trigger control	X	X			
TriggerData	Trigger data	X	X			
TriggerDepth	Trigger depth	X	X			
TriggerMsgPriority	Threshold message priority for triggers	X	X			
TriggerType	Trigger type	X	X			
Usage attribute	Queue usage	X	X			
XmitQName	Transmission queue name				X	

Table 561. Attributes for queues (continued)

Related concepts

Cluster queues

Local queues

AlterationDate (MQCHAR12)

Date when definition was last changed.

Table 562. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

This is the date when the definition was last changed. The format of the date is YYYY-MM-DD, padded with two trailing blanks to make the length 12 bytes (for example, 1992-09-23¬¬, where ¬¬ represents two blank characters).

The values of certain attributes (for example, *CurrentQDepth*) change as the queue manager operates. Changes to these attributes do not affect *AlterationDate*.

To determine the value of this attribute, use the MQCA_ALTERATION_DATE selector with the MQINQ call. The length of this attribute is given by MQ_DATE_LENGTH.

AlterationTime (MQCHAR8)

Time when definition was last changed.

Table 563. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

This is the time when the definition was last changed. The format of the time is HH.MM.SS using the 24-hour clock, with a leading zero if the hour is less than 10 (for example 09.10.20).

- On z/OS, the time is Greenwich Mean Time (GMT), subject to the system clock being set accurately to GMT.
- In other environments, the time is local time.

The values of certain attributes (for example, *CurrentQDepth*) change as the queue manager operates. Changes to these attributes do not affect *AlterationTime*.

To determine the value of this attribute, use the MQCA_ALTERATION_TIME selector with the MQINQ call. The length of this attribute is given by MQ_TIME_LENGTH.

BackoutRequeueQName (MQCHAR48)

This is the excessive backout requeue queue name. Apart from allowing its value to be queried, the queue manager takes no action based on the value of this attribute.

Table 564. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

Applications running inside WebSphere Application Server and those that use the IBM MQ Application Server Facilities use this attribute to determine where messages that have been backed out should go. For all other applications, the queue manager takes no action based on the value of the attribute.

IBM MQ classes for JMS uses this attribute to determine where to transfer a message that has already been backed out the maximum number of times as specified by the *BackoutThreshold* attribute.

To determine the value of this attribute, use the MQCA_BACKOUT_REQ_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

BackoutThreshold (MQLONG)

This is the backout threshold. Apart from allowing its value to be queried, the queue manager takes no action based on the value of this attribute.

Table 565. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

Applications running inside of WebSphere Application Server and those that use the IBM MQ Application Server Facilities will use this attribute to determine if a message should be backed out. For all other applications, the queue manager takes no action based on the value of the attribute.

IBM MQ classes for JMS uses this attribute to determine how many times to allow a message to be backed out before transferring the message to the queue specified by the *BackoutRequeueQName* attribute.

To determine the value of this attribute, use the MQIA_BACKOUT_THRESHOLD selector with the MQINQ call.

BaseQName (MQCHAR48)

This is the name of a queue that is defined to the local queue manager.

Table 566. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
		X		

(For more information on queue names, see MQOD - ObjectName field.) The queue is one of the following types:

MQQT_LOCAL
Local queue.

MQQT_REMOTE
Local definition of a remote queue.

MQQT_CLUSTER
Cluster queue.

To determine the value of this attribute, use the MQCA_BASE_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

BaseType (MQCFIN)

The type of object to which the alias resolves.

Table 567. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
		X		

It is one of the following values:

MQOT_Q
Base object type is a queue

MQOT_TOPIC
Base object type is a topic

CFStrucName (MQCHAR12)

This is the name of the coupling-facility structure where the messages on the queue are stored. The first character of the name is in the range A through Z, and the remaining characters are in the range A through Z, 0 through 9, or blank.

Table 568. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

To get the full name of the structure in the coupling facility, suffix the value of the **QSGName** queue manager attribute with the value of the **CFStrucName** queue attribute.

This attribute applies only to shared queues; it is ignored if *QSGDisp* does not have the value MQQSGD_SHARED.

To determine the value of this attribute, use the MQCA_CF_STRUC_NAME selector with the MQINQ call. The length of this attribute is given by MQ_CF_STRUC_NAME_LENGTH.

z/OS This attribute is supported only on z/OS.

ClusterChannelName (MQCHAR20)

`ClusterChannelName` is the generic name of the cluster-sender channels that use this queue as a transmission queue. The attribute specifies which cluster-sender channels send messages to a cluster-receiver channel from this cluster transmission queue.

Table 569. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The default queue manager configuration is for all cluster-sender channels to send messages from a single transmission queue, `SYSTEM.CLUSTER.TRANSMIT.QUEUE`. The default configuration can be changed by modified by changing the queue manager attribute, **DefClusterXmitQueueType**. The default value of the attribute is `SCTQ`. You can change the value to `CHANNEL`. If you set the

DefClusterXmitQueueType attribute to CHANNEL, each cluster-sender channel defaults to using a specific cluster transmission queue, SYSTEM.CLUSTER.TRANSMIT.*ChannelName*.

You can also set the transmission queue attribute ClusterChannelName attribute to a cluster-sender channel manually. Messages that are destined for the queue manager connected by the cluster-sender channel are stored in the transmission queue that identifies the cluster-sender channel. They are not stored in the default cluster transmission queue. If you set the ClusterChannelName attribute to blanks, the channel switches to the default cluster transmission queue when the channel restarts. The default queue is either SYSTEM.CLUSTER.TRANSMIT.*ChannelName* or SYSTEM.CLUSTER.TRANSMIT.QUEUE, depending on the value of the queue manager DefClusterXmitQueueType attribute.

By specifying asterisks, "*", in **ClusterChannelName**, you can associate a transmission queue with a set of cluster-sender channels. The asterisks can be at the beginning, end, or any number of places in the middle of the channel name string. **ClusterChannelName** is limited to a length of 20 characters: MQ_CHANNEL_NAME_LENGTH.

ClusterName (MQCHAR48)

This is the name of the cluster to which the queue belongs.

Table 570. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	X

If the queue belongs to more than one cluster, *ClusterNamelist* specifies the name of a namelist object that identifies the clusters, and *ClusterName* is blank. At least one of *ClusterName* and *ClusterNamelist* must be blank.

To determine the value of this attribute, use the MQCA_CLUSTER_NAME selector with the MQINQ call. The length of this attribute is given by MQ_CLUSTER_NAME_LENGTH.

ClusterNamelist (MQCHAR48)

This is the name of a namelist object that contains the names of clusters to which this queue belongs.

Table 571. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

If the queue belongs to only one cluster, the namelist object contains only one name. Alternatively, *ClusterName* can be used to specify the name of the cluster, in which case *ClusterNamelist* is blank. At least one of *ClusterName* and *ClusterNamelist* must be blank.

To determine the value of this attribute, use the MQCA_CLUSTER_NAMELIST selector with the MQINQ call. The length of this attribute is given by MQ_NAMELIST_NAME_LENGTH.

CLWLQueuePriority (MQLONG)

This is the cluster workload queue priority, a value in the range 0 through 9 representing the priority of the queue.

Table 572. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	X

For more information, see Cluster queues.

To determine the value of this attribute, use the MQIA_CLWL_Q_PRIORITY selector with the MQINQ call.

CLWLQueueRank (MQLONG)

This is the cluster workload queue rank, a value in the range 0 through 9 representing the rank of the queue.

Table 573. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	X

For more information, see Cluster queues.

To determine the value of this attribute, use the MQIA_CLWL_Q_RANK selector with the MQINQ call.

CLWLUseQ (MQLONG)

This defines the behavior of an MQPUT when the target queue has both a local instance and at least one remote cluster instance. If the put originates from a cluster channel, this attribute does not apply.

Table 574. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

The value is one of the following:

MQCLWL_USEQ_ANY
Use remote and local queues.

MQCLWL_USEQ_LOCAL
Do not use remote queues.

MQCLWL_USEQ_AS_Q_MGR
Inherit definition from queue manager's MQIA_CLWL_USEQ.

For more information, see Cluster queues.

To determine the value of this attribute, use the MQIA_CLWL_USEQ selector with the MQINQ call. The length of this attribute is given by MQ_CLWL_USEQ_LENGTH.

CreationDate (MQCHAR12)

This is the date when the queue was created.

Table 575. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

The format of the date is `YYYY-MM-DD`, padded with two trailing blanks to make the length 12 bytes (for example, `2013-09-23¬¬`, where ¬¬ represents 2 blank characters).

- On IBM i, the creation date of a queue can differ from that of the underlying operating system entity (file or userspace) that represents the queue.

To determine the value of this attribute, use the MQCA_CREATION_DATE selector with the MQINQ call. The length of this attribute is given by MQ_CREATION_DATE_LENGTH.

CreationTime (MQCHAR8)

This is the time when the queue was created.

Table 576. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

The format of the time is HH.MM.SS using the 24-hour clock, with a leading zero if the hour is less than 10 (for example 09.10.20).

- On z/OS, the time is Greenwich Mean Time (GMT), subject to the system clock being set accurately to GMT.
- In other environments, the time is local time.
- On IBM i, the creation time of a queue can differ from that of the underlying operating system entity (file or userspace) that represents the queue.

To determine the value of this attribute, use the MQCA_CREATION_TIME selector with the MQINQ call. The length of this attribute is given by MQ_CREATION_TIME_LENGTH.

CurrentQDepth (MQLONG)

This is the number of messages currently on the queue.

Table 577. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

It is incremented during an MQPUT call, and during backout of an MQGET call. It is decremented during a nonbrowse MQGET call, and during backout of an MQPUT call. The effect of this is that the count includes messages that have been put on the queue within a unit of work, but that have not yet been committed, even though they are not eligible to be retrieved by the MQGET call. Similarly, it excludes messages that have been retrieved within a unit of work using the MQGET call, but that have yet to be committed.

The count also includes messages that have passed their expiry time but have not yet been discarded, although these messages are not eligible to be retrieved. See MQMD - Expiry field for more information.

Unit-of-work processing and the segmentation of messages can both cause *CurrentQDepth* to exceed *MaxQDepth*. However, this does not affect the retrievability of the messages; *all* messages on the queue can be retrieved using the MQGET call in the normal way.

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the MQIA_CURRENT_Q_DEPTH selector with the MQINQ call.

DefaultPutResponse (MQLONG)

Specifies the type of response to be used for put operations to the queue when an application specifies MQPMO_RESPONSE_AS_Q_DEF.

Table 578. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	

It is one of the following values:

MQPRT_SYNC_RESPONSE
The put operation is issued synchronously, returning a response.

MQPRT_ASYNC_RESPONSE
The put operation is issued asynchronously, returning a subset of MQMD fields.

DefBind (MQLONG)

This is the default binding that is used when MQOO_BIND_AS_Q_DEF is specified on the MQOPEN call and the queue is a cluster queue.

Table 579. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	X

The value is one of the following:

MQBND_BIND_ON_OPEN
Binding fixed by MQOPEN call.

MQBND_BIND_NOT_FIXED
Binding not fixed.

MQBND_BIND_ON_GROUP
Allows an application to request that a group of messages are all allocated to the same destination instance. Because this value is new in IBM WebSphere MQ 7.1, it must not be used if any of the applications opening this queue are connecting to IBM WebSphere MQ 7.0.1 or earlier queue managers.

To determine the value of this attribute, use the MQIA_DEF_BIND selector with the MQINQ call.

DefinitionType (MQLONG)

This indicates how the queue was defined.

Table 580. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

The value is one of the following:

MQQDT_PREDEFINED
The queue is a permanent queue created by the system administrator; only the system administrator can delete it.

Predefined queues are created using the DEFINE MQSC command, and can be deleted only by using the DELETE MQSC command. Predefined queues cannot be created from model queues.

Commands can be issued either by an operator, or by an authorized user sending a command message to the command input queue (see CommandInputQName attribute for more information).

MQQDT_PERMANENT_DYNAMIC
The queue is a permanent queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value MQQDT_PERMANENT_DYNAMIC for the **DefinitionType** attribute.

This type of queue can be deleted using the MQCLOSE call. See "MQCLOSE - Close object" on page 639 for more details.

The value of the **QSGDisp** attribute for a permanent dynamic queue is MQQSGD_Q_MGR.

MQQDT_TEMPORARY_DYNAMIC
The queue is a temporary queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value MQQDT_TEMPORARY_DYNAMIC for the **DefinitionType** attribute.

This type of queue is deleted automatically by the MQCLOSE call when it is closed by the application that created it.

The value of the **QSGDisp** attribute for a temporary dynamic queue is MQQSGD_Q_MGR.

MQQDT_SHARED_DYNAMIC
The queue is a shared permanent queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value MQQDT_SHARED_DYNAMIC for the **DefinitionType** attribute.

This type of queue can be deleted using the MQCLOSE call. See "MQCLOSE - Close object" on page 639 for more details.

The value of the **QSGDisp** attribute for a shared dynamic queue is MQQSGD_SHARED.

This attribute in a model queue definition does not indicate how the model queue was defined, because model queues are always predefined. Instead, the value of this attribute in the model queue is used to determine the *DefinitionType* of each of the dynamic queues created from the model queue definition using the MQOPEN call.

To determine the value of this attribute, use the MQIA_DEFINITION_TYPE selector with the MQINQ call.

DefInputOpenOption (MQLONG)

This is the default way in which to open the queue for input.

Table 581. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

It applies if the MQOO_INPUT_AS_Q_DEF option is specified on the MQOPEN call when the queue is opened. The value is one of the following:

MQOO_INPUT_EXCLUSIVE
Open queue to get messages with exclusive access.

The queue is opened for use with subsequent MQGET calls. The call fails with reason code MQRC_OBJECT_IN_USE if the queue is currently open by this or another application for input of any type (MQOO_INPUT_SHARED or MQOO_INPUT_EXCLUSIVE).

MQOO_INPUT_SHARED
Open queue to get messages with shared access.

The queue is opened for use with subsequent MQGET calls. The call can succeed if the queue is currently open by this or another application with MQOO_INPUT_SHARED, but fails with reason code MQRC_OBJECT_IN_USE if the queue is currently open with MQOO_INPUT_EXCLUSIVE.

To determine the value of this attribute, use the MQIA_DEF_INPUT_OPEN_OPTION selector with the MQINQ call.

DefPersistence (MQLONG)

This is the default persistence of messages on the queue. It applies if MQPER_PERSISTENCE_AS_Q_DEF is specified in the message descriptor when the message is put.

Table 582. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

If there is more than one definition in the queue-name resolution path, the default persistence is taken from the value of this attribute in the *first* definition in the path at the time of the MQPUT or MQPUT1 call. This could be:

- An alias queue
- A local queue
- A local definition of a remote queue

- A queue manager alias
- A transmission queue (for example, the *DefXmitQName* queue)

The value is one of the following:

MQPER_PERSISTENT
The message survives system failures and queue manager restarts. Persistent messages cannot be placed on:

- Temporary dynamic queues
- Shared queues that map to a CFSTRUCT object at CFLEVEL(2) or below, or where the CFSTRUCT object is defined as RECOVER(NO).

Persistent messages can be placed on permanent dynamic queues, and predefined queues.

MQPER_NOT_PERSISTENT
The message does not normally survive system failures or queue manager restarts. This applies even if an intact copy of the message is found on auxiliary storage during a queue manager restart.

In the case of shared queues, nonpersistent messages *do* survive restarts of queue managers in the queue sharing group, but do not survive failures of the coupling facility used to store messages on the shared queues.

Both persistent and nonpersistent messages can exist on the same queue.

To determine the value of this attribute, use the MQIA_DEF_PERSISTENCE selector with the MQINQ call.

DefPriority (MQLONG)

This is the default priority for messages on the queue. This applies if MQPRI_PRIORITY_AS_Q_DEF is specified in the message descriptor when the message is put on the queue.

Table 583. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

If there is more than one definition in the queue-name resolution path, the default priority for the message is taken from the value of this attribute in the *first* definition in the path at the time of the put operation. This could be:

- An alias queue
- A local queue
- A local definition of a remote queue
- A queue manager alias
- A transmission queue (for example, the *DefXmitQName* queue)

The way in which a message is placed on a queue depends on the value of the queue's **MsgDeliverySequence** attribute:

- If the **MsgDeliverySequence** attribute is MQMDS_PRIORITY, the logical position at which a message is placed on the queue depends on the value of the *Priority* field in the message descriptor.
- If the **MsgDeliverySequence** attribute is MQMDS_FIFO, messages are placed on the queue as though they had a priority equal to the *DefPriority* of the resolved queue, regardless of the value of the *Priority* field in the message descriptor. However, the *Priority* field retains the value specified by the application that put the message. See MsgDeliverySequence attribute for more information.

Priorities are in the range zero (lowest) through *MaxPriority* (highest); see MaxPriority attribute.

To determine the value of this attribute, use the MQIA_DEF_PRIORITY selector with the MQINQ call.

DefReadAhead (MQLONG)

Specifies the default read ahead behavior for non-persistent messages delivered to the client.

Table 584. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X		

DefReadAhead can be set to one of the following values::

MQREADA_NO
Non-persistent messages are not sent ahead to the client before an applications requests them. A maximum of one non-persistent message can be lost if the client ends abnormally.

MQREADA_YES
Non-persistent messages are sent ahead to the client before an application requests them. Non-persistent messages can be lost if the client ends abnormally or if the client does not consume all the messages it is sent.

MQREADA_DISABLED
Read ahead of non-persistent messages in not enabled for this queue. Messages are not sent ahead to the client regardless of whether read ahead is requested by the client application.

To determine the value of this attribute, use the MQIA_DEF_READ_AHEAD selector with the MQINQ call.

DefPResp (MQLONG)

The default put response type (DEFPRESP) attribute defines the value used by applications when the PutResponseType within MQPMO has been set to MQPMO_RESPONSE_AS_Q_DEF. This attribute is valid for all queue types.

Table 585. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X	X	X

The value is one of the following:

SYNC
The put operation is issued synchronously returning a response.

ASYNC
The put operation is issued asynchronously, returning a subset of MQMD fields.

To determine the value of this attribute, use the MQIA_DEF_PUT_RESPONSE_TYPE selector with the MQINQ call.

DistLists (MQLONG)

This indicates whether distribution-list messages can be placed on the queue.

Table 586. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

A message channel agent (MCA) sets the attribute to inform the local queue manager whether the queue manager at the other end of the channel supports distribution lists. This latter queue manager (called the *partnering* queue manager) is the one that next receives the message, after it has been removed from the local transmission queue by a sending MCA.

The sending MCA sets the attribute whenever it establishes a connection to the receiving MCA on the partnering queue manager. In this way, the sending MCA can cause the local queue manager to place on the transmission queue only messages that the partnering queue manager can process correctly.

This attribute is primarily for use with transmission queues, but the processing described is performed regardless of the usage defined for the queue (see Usage attribute).

The value is one of the following:

MQDL_SUPPORTED
: Distribution-list messages can be stored on the queue, and transmitted to the partnering queue manager in that form. This reduces the amount of processing required to send the message to multiple destinations.

MQDL_NOT_SUPPORTED
: Distribution-list messages cannot be stored on the queue, because the partnering queue manager does not support distribution lists. If an application puts a distribution-list message, and that message is to be placed on this queue, the queue manager splits the distribution-list message and places the individual messages on the queue instead. This increases the amount of processing required to send the message to multiple destinations, but ensures that the messages are processed correctly by the partnering queue manager.

To determine the value of this attribute, use the MQIA_DIST_LISTS selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

This attribute is not supported on z/OS.

HardenGetBackout (MQLONG)

For each message, a count is kept of the number of times that the message is retrieved by an MQGET call within a unit of work, and that unit of work subsequently backed out.

Table 587. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This count is available in the *BackoutCount* field in the message descriptor after the MQGET call has completed.

The message backout count survives restarts of the queue manager. However, to ensure that the count is accurate, information has to be *hardened* (recorded on disk or other permanent storage device) each time that an MQGET call retrieves a message within a unit of work for this queue. If this is not done, the queue manager fails, and the MQGET call backs out, the count might or might not be incremented.

Hardening information for each MQGET call within a unit of work, however, imposes additional processing cost, so set the **HardenGetBackout** attribute to MQQA_BACKOUT_HARDENED only if it is essential that the count is accurate.

On IBM i, UNIX, and Windows, the message backout count is always hardened, regardless of the setting of this attribute.

The following values are possible:

MQQA_BACKOUT_HARDENED
: Hardening is used to ensure that the backout count for messages on this queue is accurate.

MQQA_BACKOUT_NOT_HARDENED
: Hardening is not used to ensure that the backout count for messages on this queue is accurate. The count might therefore be lower than it should be.

To determine the value of this attribute, use the MQIA_HARDEN_GET_BACKOUT selector with the MQINQ call.

IndexType (MQLONG)

This specifies the type of index that the queue manager maintains for messages on the queue.

Table 588. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

The type of index required depends on how the application retrieves messages, and whether the queue is a shared queue or a nonshared queue (see QSGDisp attribute). The following values are possible for `IndexType`:

MQIT_NONE
No index is maintained by the queue manager for this queue. Use this value for queues that are typically processed sequentially, that is, without using any selection criteria on the MQGET call.

MQIT_MSG_ID
The queue manager maintains an index that uses the message identifiers of the messages on the queue. Use this value queues where the application typically retrieves messages using the message identifier as the selection criterion on the MQGET call.

MQIT_CORREL_ID
The queue manager maintains an index that uses the correlation identifiers of the messages on the queue. Use this value for queues where the application typically retrieves messages using the correlation identifier as the selection criterion on the MQGET call.

MQIT_MSG_TOKEN

Important: This index type should only be used for queues used with the IBM MQ Workflow for z/OS product.

The queue manager maintains an index that uses the message tokens of the messages on the queue for use with the workload manager (WLM) functions of z/OS.

You *must* specify this option for WLM-managed queues; do not specify it for any other type of queue. Also, do not use this value for a queue where an application is not using the z/OS workload manager functions, but is retrieving messages using the message token as a selection criterion on the MQGET call.

MQIT_GROUP_ID
The queue manager maintains an index that uses the group identifiers of the messages on the queue. This value must be used for queues where the application retrieves messages using the MQGMO_LOGICAL_ORDER option on the MQGET call.

A queue with this index type cannot be a transmission queue. A shared queue with this index type must be defined to map to a CFSTRUCT object at CFLEVEL(3) or higher.

Note:

1. The physical order of messages on a queue with index type MQIT_GROUP_ID is not defined, as the queue is optimized for efficient retrieval of messages using the MQGMO_LOGICAL_ORDER option on the MQGET call. This means that the physical order of the messages is not typically the order in which the messages arrived on the queue.
2. If an MQIT_GROUP_ID queue has a `MsgDeliverySequence` of MQMDS_PRIORITY, the queue manager uses message priorities 0 and 1 to optimize the retrieval of messages in logical order. As a result, the first message in a group must not have a priority of zero or one; if it does, the message is processed as though it had a priority of two. The `Priority` field in the MQMD structure is not changed.

For more information about message groups, see the description of the group and segment options in MQGMO - Options field.

The index type that should be used in various cases is shown in Table 589 on page 839 and Table 590 on page 839.

Table 589. Suggested or required values of queue index type when MQGMO_LOGICAL_ORDER not specified

Selection criteria on MQGET call	Index type for nonshared queue	Index type for shared queue
None	Any	Any
Selection using one identifier:		
Message identifier	MQIT_MSG_ID suggested	MQIT_NONE or MQIT_MSG_ID required; MQIT_MSG_ID suggested
Correlation identifier	MQIT_CORREL_ID suggested	MQIT_CORREL_ID required
Group identifier	MQIT_GROUP_ID suggested	MQIT_GROUP_ID required
Selection using two identifiers:		
Message identifier plus correlation identifier	MQIT_MSG_ID or MQIT_CORREL_ID suggested	MQIT_NONE or MQIT_MSG_ID or MQIT_CORREL_ID required (For efficiency, it is suggested that the index type is chosen to match the MQMD field which will have the most distinct keys)
Message identifier plus group identifier	MQIT_MSG_ID or MQIT_GROUP_ID suggested	Not supported
Correlation identifier plus group identifier	MQIT_CORREL_ID or MQIT_GROUP_ID suggested	Not supported
Selection using three identifiers:		
Message identifier plus correlation identifier plus group identifier	MQIT_MSG_ID or MQIT_CORREL_ID or MQIT_GROUP_ID suggested	Not supported
Selection using group-related criteria:		
Group identifier plus message sequence number	MQIT_GROUP_ID required	MQIT_GROUP_ID required
Message sequence number (must be 1)	MQIT_GROUP_ID required	MQIT_GROUP_ID required
Selection using message token:		
Message token for application use	Do not use MQIT_MSG_TOKEN	
Message token for WLM use	MQIT_MSG_TOKEN required	Not supported

Table 590. Suggested or required values of queue index type when MQGMO_LOGICAL_ORDER specified

Selection criteria on MQGET call	Index type for nonshared queue	Index type for shared queue
None	MQIT_GROUP_ID required	MQIT_GROUP_ID required
Selection using one identifier:		
Message identifier	MQIT_GROUP_ID required	Not supported

Selection criteria on MQGET call	Index type for nonshared queue	Index type for shared queue
Correlation identifier	MQIT_GROUP_ID required	Not supported
Group identifier	MQIT_GROUP_ID required	MQIT_GROUP_ID required
Selection using two identifiers:		
Message identifier plus correlation identifier	MQIT_GROUP_ID required	Not supported
Message identifier plus group identifier	MQIT_GROUP_ID required	Not supported
Correlation identifier plus group identifier	MQIT_GROUP_ID required	Not supported
Selection using three identifiers:		
Message identifier plus correlation identifier plus group identifier	MQIT_GROUP_ID required	Not supported

Table 590. Suggested or required values of queue index type when MQGMO_LOGICAL_ORDER specified (continued)

To determine the value of this attribute, use the MQIA_INDEX_TYPE selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

InhibitGet (MQLONG)

This controls whether get operations for this queue are allowed.

Table 591. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X		

If the queue is an alias queue, get operations must be allowed for both the alias and the base queue at the time of the get operation, for the MQGET call to succeed. The value is one of the following:

MQQA_GET_INHIBITED

Get operations are inhibited.

MQGET calls fail with reason code MQRC_GET_INHIBITED. This includes MQGET calls that specify MQGMO_BROWSE_FIRST or MQGMO_BROWSE_NEXT.

Note: If an MQGET call operating within a unit of work completes successfully, changing the value of the **InhibitGet** attribute subsequently to MQQA_GET_INHIBITED does not prevent the unit of work being committed.

MQQA_GET_ALLOWED

Get operations are allowed.

To determine the value of this attribute, use the MQIA_INHIBIT_GET selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

InhibitPut (MQLONG)

This controls whether put operations for this queue are allowed.

Table 592. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

If there is more than one definition in the queue-name resolution path, put operations must be allowed for *every* definition in the path (including any queue manager alias definitions) at the time of the put operation, for the MQPUT or MQPUT1 call to succeed. The value is one of the following:

MQQA_PUT_INHIBITED
Put operations are inhibited.

MQPUT and MQPUT1 calls fail with reason code MQRC_PUT_INHIBITED.

Note: If an MQPUT call operating within a unit of work completes successfully, changing the value of the **InhibitPut** attribute subsequently to MQQA_PUT_INHIBITED does not prevent the unit of work being committed.

MQQA_PUT_ALLOWED
Put operations are allowed.

To determine the value of this attribute, use the MQIA_INHIBIT_PUT selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

InitiationQName (MQCHAR48)

This is the name of a queue defined on the local queue manager; the queue must be of type MQQT_LOCAL.

Table 593. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

The queue manager sends a trigger message to the initiation queue when application start-up is required as a result of a message arriving on the queue to which this attribute belongs. The initiation queue must be monitored by a trigger monitor application that starts the appropriate application after receipt of the trigger message.

To determine the value of this attribute, use the MQCA_INITIATION_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

MaxMsgLength (MQLONG)

This is an upper limit for the length of the longest *physical* message that can be placed on the queue.

Table 594. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

However, because the **MaxMsgLength** queue attribute can be set independently of the **MaxMsgLength** queue manager attribute, the actual upper limit for the length of the longest physical message that can be placed on the queue is the lesser of those two values.

If the queue manager supports segmentation, it is possible for an application to put a *logical* message that is longer than the lesser of the two **MaxMsgLength** attributes, but only if the application specifies the MQMF_SEGMENTATION_ALLOWED flag in MQMD. If that flag is specified, the upper limit for the length of a logical message is 999 999 999 bytes, but usually resource constraints imposed by the operating system, or by the environment in which the application is running, result in a lower limit.

An attempt to place on the queue a message that is too long fails with one of the following reason codes:

- MQRC_MSG_TOO_BIG_FOR_Q if the message is too big for the queue
- MQRC_MSG_TOO_BIG_FOR_Q_MGR if the message is too big for the queue manager, but not too big for the queue

The lower limit for the **MaxMsgLength** attribute is zero; the upper limit is 100 MB (104 857 600 bytes).

For more information, see MQPUT - BufferLength parameter.

To determine the value of this attribute, use the MQIA_MAX_MSG_LENGTH selector with the MQINQ call.

MaxQDepth (MQLONG)

This is the defined upper limit for the number of physical messages that can exist on the queue at any one time.

Table 595. Queue types to which this attribute applies

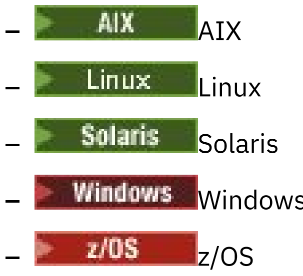
Local	Model	Alias	Remote	Cluster
X	X			

An attempt to put a message on a queue that already contains **MaxQDepth** messages fails with reason code MQRC_Q_FULL.

Unit-of-work processing and the segmentation of messages can both cause the actual number of physical messages on the queue to exceed **MaxQDepth**. However, this does not affect the retrievability of the message because all messages on the queue can be retrieved using the MQGET call.

The value of this attribute is zero or greater. The upper limit is determined by the environment:

- On the following platforms, the value cannot exceed 999 999 999:



  - AIX
  - Linux
  - Solaris
  - Windows
  - z/OS
- IBM i On IBM i, the value cannot exceed 640 000.

Note: The storage space available to the queue might be exhausted even if there are fewer than **MaxQDepth** messages on the queue.

To determine the value of this attribute, use the MQIA_MAX_Q_DEPTH selector with the MQINQ call.

MsgDeliverySequence (MQLONG)

Table 596. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This determines the order in which the MQGET call returns messages to the application :

MQMDS_FIFO
: Messages are returned in FIFO order (first in, first out).

  An MQGET call returns the *first* message that satisfies the selection criteria specified on the call, regardless of the priority of the message.

MQMDS_PRIORITY
Messages are returned in priority order.

An MQGET call returns the *highest-priority* message that satisfies the selection criteria specified on the call. Within each priority level, messages are returned in FIFO order (first in, first out).

- On z/OS, if the queue has an *IndexType* of MQIT_GROUP_ID, the **MsgDeliverySequence** attribute specifies the order in which message groups are returned to the application. The particular sequence in which the groups are returned is determined by the position or priority of the first message in each group. The physical order of messages on the queue is not defined, as the queue is optimized for efficient retrieval of messages using the MQGMO_LOGICAL_ORDER option on the MQGET call.
- On z/OS, if *IndexType* is MQIT_GROUP_ID and *MsgDeliverySequence* is MQMDS_PRIORITY, the queue manager uses message priorities zero and one to optimize the retrieval of messages in logical order. As a result, the first message in a group must not have a priority of zero or one; if it does, the message is processed as though it had a priority of two. The *Priority* field in the MQMD structure is not changed.

If the relevant attributes are changed while there are messages on the queue, the delivery sequence is as follows:

- The order in which messages are returned by the MQGET call is determined by the values of the **MsgDeliverySequence** and **DefPriority** attributes in force for the queue at the time that the message arrives on the queue:
  - If *MsgDeliverySequence* is MQMDS_FIFO when the message arrives, the message is placed on the queue as though its priority were *DefPriority*. This does not affect the value of the *Priority* field in the message descriptor of the message; that field retains the value it had when the message was first put.
  - If *MsgDeliverySequence* is MQMDS_PRIORITY when the message arrives, the message is placed on the queue at the place appropriate to the priority given by the *Priority* field in the message descriptor.

  If the value of the **MsgDeliverySequence** attribute is changed while there are messages on the queue, the order of the messages on the queue is not changed.

  If the value of the **DefPriority** attribute is changed while there are messages on the queue, the messages are not necessarily delivered in FIFO order, even though the **MsgDeliverySequence** attribute is set to MQMDS_FIFO; those that were placed on the queue at the higher priority are delivered first.

To determine the value of this attribute, use the MQIA_MSG_DELIVERY_SEQUENCE selector with the MQINQ call.

NonPersistentMessageClass (MQLONG)

The reliability goal for nonpersistent messages.

Table 597. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This specifies the circumstances under which nonpersistent messages put on this queue are discarded:

MQNPM_CLASS_NORMAL
Nonpersistent messages are limited to the lifetime of the queue manager session; the messages are discarded in the event of a queue manager restart. This is valid only for non-shared queues, and is the default value.

MQNPM_CLASS_HIGH
The queue manager attempts to retain nonpersistent messages for the lifetime of the queue. Nonpersistent messages might still be lost in the event of a failure. This value is enforced for shared queues.

To determine the value of this attribute, use the MQIA_NPM_CLASS selector with the MQINQ call.

OpenInputCount (MQLONG)

This is the number of handles that are currently valid for removing messages from the queue by means of the MQGET call.

Table 598. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

It is the total number of such handles known to the *local* queue manager. If the queue is a shared queue, the count does not include opens for input that were performed for the queue at other queue managers in the queue sharing group to which the local queue manager belongs.

The count includes handles where an alias queue that resolves to this queue was opened for input. The count does not include handles where the queue was opened for actions that did not include input (for example, a queue opened only for browse).

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the MQIA_OPEN_INPUT_COUNT selector with the MQINQ call.

OpenOutputCount (MQLONG)

This is the number of handles that are currently valid for adding messages to the queue by means of the MQPUT call.

Table 599. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

It is the total number of such handles known to the *local* queue manager; it does not include opens for output that were performed for this queue at remote queue managers. If the queue is a shared queue, the count does not include opens for output that were performed for the queue at other queue managers in the queue sharing group to which the local queue manager belongs.

The count includes handles where an alias queue that resolves to this queue was opened for output. The count does not include handles where the queue was opened for actions that did not include output (for example, a queue opened only for inquire).

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the MQIA_OPEN_OUTPUT_COUNT selector with the MQINQ call.

ProcessName (MQCHAR48)

This is the name of a process object that is defined on the local queue manager. The process object identifies a program that can service the queue.

Table 600. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

To determine the value of this attribute, use the MQCA_PROCESS_NAME selector with the MQINQ call. The length of this attribute is given by MQ_PROCESS_NAME_LENGTH.

PropertyControl (MQLONG)

Specifies how message properties are handled for messages that are retrieved from queues using the MQGET call with the MQGMO_PROPERTIES_AS_Q_DEF option.

Table 601. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X		

The value is one of the following:

MQPROP_ALL
All properties of the message are included with the message when it is delivered to the application. The properties, except those in the message descriptor (or extension), are placed in one or more MQRFH2 headers in the message data. If a message handle is supplied then the behavior is to return the properties in the message handle.

MQPROP_COMPATIBILITY
If the message contains a property with a prefix of mcd., jms., usr. or mqext., all message properties are delivered to the application in an MQRFH2 header. Otherwise all properties of the message, except those contained in the message descriptor (or extension), are discarded and are no longer accessible to the application. This is the default value; it allows applications which expect JMS related properties to be in an MQRFH2 header in the message data to continue to work unmodified. If a message handle is supplied then the behavior is to return the properties in the message handle..

MQPROP_FORCE_MQRFH2
Properties are always returned in the message data in an MQRFH2 header regardless of whether the application specifies a message handle. A valid message handle supplied in the MsgHandle field of the MQGMO structure on the MQGET call is ignored. Properties of the message are not accessible via the message handle.

MQPROP_NONE
All properties of the message, except those in the message descriptor (or extension), are removed from the message before the message is delivered to the application. If a message handle is supplied then the behavior is to return the properties in the message handle.

This parameter is applicable to Local, Alias and Model queues. To determine its value, use the MQIA_PROPERTY_CONTROL selector with the MQINQ call.

QDepthHighEvent (MQLONG)

This controls whether Queue Depth High events are generated.

Table 602. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

A Queue Depth High event indicates that an application has put a message on a queue, and this has caused the number of messages on the queue to become greater than or equal to the queue depth high threshold (see the **QDepthHighLimit** attribute).

Note: The value of this attribute can change dynamically.

The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_Q_DEPTH_HIGH_EVENT selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QDepthHighLimit (MQLONG)

This is the threshold against which the queue depth is compared to generate a Queue Depth High event.

Table 603. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This event indicates that an application has put a message on a queue, and that this has caused the number of messages on the queue to become greater than or equal to the queue depth high threshold. See QDepthHighEvent attribute.

The value is expressed as a percentage of the maximum queue depth (**MaxQDepth** attribute), and is greater than or equal to 0 and less than or equal to 100. The default value is 80.

To determine the value of this attribute, use the MQIA_Q_DEPTH_HIGH_LIMIT selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QDepthLowEvent (MQLONG)

This controls whether Queue Depth Low events are generated.

Table 604. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

A Queue Depth Low event indicates that an application has retrieved a message from a queue, and that this has caused the number of messages on the queue to become less than or equal to the queue depth low threshold (see QDepthLowLimit attribute).

Note: The value of this attribute can change dynamically.

The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_Q_DEPTH_LOW_EVENT selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QDepthLowLimit (MQLONG)

This is the threshold against which the queue depth is compared to generate a Queue Depth Low event.

Table 605. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This event indicates that an application has retrieved a message from a queue, and that this has caused the number of messages on the queue to become less than or equal to the queue depth low threshold. See QDepthLowEvent attribute.

The value is expressed as a percentage of the maximum queue depth (**MaxQDepth** attribute), and is greater than or equal to 0 and less than or equal to 100. The default value is 20.

To determine the value of this attribute, use the MQIA_Q_DEPTH_LOW_LIMIT selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QDepthMaxEvent (MQLONG)

This controls whether Queue Full events are generated. A Queue Full event indicates that a put to a queue has been rejected because the queue is full, that is, the queue depth has already reached its maximum value.

Table 606. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

Note: The value of this attribute can change dynamically.

The value is one of the following:

MQEVR_DISABLED
Event reporting disabled.

MQEVR_ENABLED
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_Q_DEPTH_MAX_EVENT selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QDesc (MQCHAR64)

Use this field for descriptive commentary.

Table 607. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, the field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the MQCA_Q_DESC selector with the MQINQ call. The length of this attribute is given by MQ_Q_DESC_LENGTH.

QName (MQCHAR48)

This is the name of a queue defined on the local queue manager.

Table 608. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	X

All queues defined on a queue manager share the same queue namespace. Therefore, an MQQT_LOCAL queue and an MQQT_ALIAS queue cannot have the same name.

To determine the value of this attribute, use the MQCA_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

QServiceInterval (MQLONG)

This is the service interval used for comparison to generate Service Interval High and Service Interval OK events.

Table 609. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

See QServiceIntervalEvent attribute.

The value is in units of milliseconds, and is greater than or equal to zero, and less than or equal to 999 999 999.

To determine the value of this attribute, use the MQIA_Q_SERVICE_INTERVAL selector with the MQINQ call.

This attribute is supported on z/OS, but the MQINQ call cannot be used to determine its value.

QServiceIntervalEvent (MQLONG)

This controls whether Service Interval High or Service Interval OK events are generated.

Table 610. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

- A Service Interval High event is generated when a check indicates that no messages have been retrieved from the queue for at least the time indicated by the **QServiceInterval** attribute.
- A Service Interval OK event is generated when a check indicates that messages have been retrieved from the queue within the time indicated by the **QServiceInterval** attribute.

Note: The value of this attribute can change dynamically.

The value is one of the following:

MQQSIE_HIGH

Queue Service Interval High events enabled.

- Queue Service Interval High events are **enabled** and
- Queue Service Interval OK events are **disabled**.

MQQSIE_OK

Queue Service Interval OK events enabled.

- Queue Service Interval High events are **disabled** and
- Queue Service Interval OK events are **enabled**.

MQQSIE_NONE
No queue service interval events enabled.

- Queue Service Interval High events are **disabled** and
- Queue Service Interval OK events are also **disabled**.

For shared queues, the value of this attribute is ignored; the value MQQSIE_NONE is assumed.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the MQIA_Q_SERVICE_INTERVAL_EVENT selector with the MQINQ call.

On z/OS, you cannot use the MQINQ call to determine the value of this attribute.

QSGDisp (MQLONG)

This specifies the disposition of the queue.

Table 611. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

The value is one of the following:

MQQSGD_Q_MGR
The object has queue manager disposition. This means that the object definition is known only to the local queue manager; the definition is not known to other queue managers in the queue sharing group.

Each queue manager in the queue sharing group can have an object with the same name and type as the current object, but these are separate objects and there is no correlation between them. Their attributes are not constrained to be the same as each other.

MQQSGD_COPY
The object is a local copy of a master object definition that exists in the shared repository. Each queue manager in the queue sharing group can have its own copy of the object. Initially, all copies have the same attributes, but by using MQSC commands, you can alter each copy so that its attributes differ from those of the other copies. The attributes of the copies are resynchronized when the master definition in the shared repository is altered.

MQQSGD_SHARED
The object has shared disposition. This means that there exists in the shared repository a single instance of the object that is known to all queue managers in the queue sharing group. When a queue manager in the group accesses the object, it accesses the single shared instance of the object.

To determine the value of this attribute, use the MQIA_QSG_DISP selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

QueueAccounting (MQLONG)

Table 612. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	

This controls the collection of accounting data for the queue. For accounting data to be collected for this queue, accounting data for this connection must also be enabled, using either the QMGR attribute ACCTQ or the Options field in the MQCNO structure on the MQCONNX call.

This attribute has one of the following values:

MQMON_Q_MGR
Accounting data for this queue is collected based on the setting of the QMGR attribute ACCTQ. This is the default setting.

MQMON_OFF
Do not collect accounting data for this queue.

MQMON_ON
Collect accounting data for this queue.

To determine the value of this attribute, use the MQIA_ACCOUNTING_Q selector with the MQINQ call.

QueueMonitoring (MQLONG)

Controls the collection of online monitoring data for queues.

Table 613. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The value is one of the following:

MQMON_Q_MGR
Collect monitoring data according to the setting of the **QueueMonitoring** queue manager attribute. This is the default value.

MQMON_OFF
Online monitoring data collection is turned off for this queue.

MQMON_LOW
If the value of the **QueueMonitoring** queue manager attribute is not MQMON_NONE, online monitoring data collection is turned on, with a low rate of data collection for this queue.

MQMON_MEDIUM
If the value of the **QueueMonitoring** queue manager attribute is not MQMON_NONE, online monitoring data collection is turned on, with a moderate rate of data collection for this queue.

MQMON_HIGH
If the value of the **QueueMonitoring** queue manager attribute is not MQMON_NONE, online monitoring data collection is turned on, with a high rate of data collection for this queue.

To determine the value of this attribute, use the MQIA_MONITORING_Q selector with the MQINQ call.

QueueStatistics (MQCHAR12)

Table 614. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	

This controls the collection of statistics data for the queue.

This attribute has one of the following values:

MQMON_Q_MGR
Accounting data for this queue is collected based on the setting of the QMGR attribute STATQ. This is the default setting.

MQMON_OFF
Switch off statistics data collection for this queue.

MQMON_ON
Enable statistics data collection for this queue.

QType (MQLONG)

Table 615. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	X

This is the type of queue; it has one of the following values:

MQQT_ALIAS
Alias queue definition.

MQQT_CLUSTER
Cluster queue.

MQQT_LOCAL
Local queue.

MQQT_REMOTE
Local definition of a remote queue.

To determine the value of this attribute, use the MQIA_Q_TYPE selector with the MQINQ call.

RemoteQMgrName (MQCHAR48)

Table 616. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
			X	

This is the name of the remote queue manager on which the queue **RemoteQName** is defined. If the **RemoteQName** queue has a **QSGDisp** value of MQQSGD_COPY or MQQSGD_SHARED, **RemoteQMgrName** can be the name of the queue sharing group that owns **RemoteQName**.

If an application opens the local definition of a remote queue, **RemoteQMgrName** must not be blank and must not be the name of the local queue manager. If **XmitQName** is blank, the local queue with the same name as **RemoteQMgrName** is used as the transmission queue. If there is no queue with the name **RemoteQMgrName**, the queue identified by the **DefXmitQName** queue manager attribute is used.

If this definition is used for a queue manager alias, **RemoteQMgrName** is the name of the queue manager that is being aliased. It can be the name of the local queue manager. Otherwise, if **XmitQName** is blank when the open occurs, there must be a local queue with a name that is the same as **RemoteQMgrName**; this queue is used as the transmission queue.

If this definition is used for a reply-to alias, this name is the name of the queue manager that is to be the **ReplyToQMgr**.

Note: No validation is performed on the value specified for this attribute when the queue definition is created or modified.

To determine the value of this attribute, use the MQCA_REMOTE_Q_MGR_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_MGR_NAME_LENGTH.

RemoteQName (MQCHAR48)

Table 617. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
			X	

This is the name of the queue as it is known on the remote queue manager *RemoteQMgrName*.

If an application opens the local definition of a remote queue, when the open occurs *RemoteQName* must not be blank.

If this definition is used for a queue manager alias definition, when the open occurs *RemoteQName* must be blank.

If the definition is used for a reply-to alias, this name is the name of the queue that is to be the *ReplyToQ*.

Note: No validation is performed on the value specified for this attribute when the queue definition is created or modified.

To determine the value of this attribute, use the MQCA_REMOTE_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

RetentionInterval (MQLONG)

This is the period of time for which to retain the queue. After this time has elapsed, the queue is eligible for deletion.

Table 618. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The time is measured in hours, counting from the date and time when the queue was created. The creation date and time of the queue are recorded in the **CreationDate** and **CreationTime** attributes.

This information is provided to enable a housekeeping application or the operator to identify and delete queues that are no longer required.

Note: The queue manager never takes any action to delete queues based on this attribute, or to prevent the deletion of queues with a retention interval that has not expired; it is the user's responsibility to take any required action.

Use a realistic retention interval to prevent the accumulation of permanent dynamic queues (see DefinitionType attribute). However, this attribute can also be used with predefined queues.

To determine the value of this attribute, use the MQIA_RETENTION_INTERVAL selector with the MQINQ call.

Scope (MQLONG)

This controls whether an entry for this queue also exists in a cell directory.

Table 619. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

A cell directory is provided by an installable Name service. The value is one of the following:

MQSCO_Q_MGR
: The queue definition has queue manager scope: the definition of the queue does not extend beyond the queue manager that owns it. To open the queue for output from some other queue manager, either the name of the owning queue manager must be specified, or the other queue manager must have a local definition of the queue.

MQSCO_CELL
: The queue definition has cell scope: the queue definition is also placed in a cell directory available to all the queue managers in the cell. The queue can be opened for output from any of the queue managers in the cell by specifying the name of the queue; the name of the queue manager that owns the queue need not be specified. However, the queue definition is not available to any queue manager

in the cell that also has a local definition of a queue with that name, as the local definition takes precedence.

A cell directory is provided by an installable Name service.

Model and dynamic queues cannot have cell scope.

This value is only valid if a name service supporting a cell directory has been configured.

To determine the value of this attribute, use the MQIA_SCOPE selector with the MQINQ call.

Support for this attribute is subject to the following restrictions:

- On IBM i, the attribute is supported, but only MQSCO_Q_MGR is valid.
- On z/OS, the attribute is not supported.

Shareability (MQLONG)

This indicates whether the queue can be opened for input multiple times concurrently.

Table 620. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The value is one of the following:

MQQA_SHAREABLE
Queue is shareable.

Multiple opens with the MQOO_INPUT_SHARED option are allowed.

MQQA_NOT_SHAREABLE
Queue is not shareable.

An MQOPEN call with the MQOO_INPUT_SHARED option is treated as MQOO_INPUT_EXCLUSIVE.

To determine the value of this attribute, use the MQIA_SHAREABILITY selector with the MQINQ call.

StorageClass (MQCHAR8)

This is a user-defined name that defines the physical storage used to hold the queue. In practice, a message is written to disk only if it needs to be paged out of its memory buffer.

Table 621. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

To determine the value of this attribute, use the MQCA_STORAGE_CLASS selector with the MQINQ call. The length of this attribute is given by MQ_STORAGE_CLASS_LENGTH.

z/OS This attribute is supported only on z/OS.

TriggerControl (MQLONG)

This controls whether trigger messages are written to an initiation queue to start an application to service the queue.

Table 622. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This is one of the following:

MQTC_OFF
: No trigger messages are to be written for this queue. The value of *TriggerType* is irrelevant in this case.

MQTC_ON
: Trigger messages are to be written for this queue when the appropriate trigger events occur.

To determine the value of this attribute, use the MQIA_TRIGGER_CONTROL selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

TriggerData (MQCHAR64)

This is free-format data that the queue manager inserts into the trigger message when a message arriving on this queue causes a trigger message to be written to the initiation queue.

Table 623. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The content of this data is of no significance to the queue manager. It is meaningful either to the trigger-monitor application that processes the initiation queue, or to the application that the trigger monitor starts.

The character string must not contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the MQCA_TRIGGER_DATA selector with the MQINQ call. To change the value of this attribute, use the MQSET call. The length of this attribute is given by MQ_TRIGGER_DATA_LENGTH.

TriggerDepth (MQLONG)

Table 624. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This is the number of messages of priority *TriggerMsgPriority* or greater that must be on the queue before a trigger message is written. This applies when *TriggerType* is set to MQTT_DEPTH. The value of *TriggerDepth* is one or greater. This attribute is not used otherwise.

To determine the value of this attribute, use the MQIA_TRIGGER_DEPTH selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

TriggerMsgPriority (MQLONG)

This is the message priority below which messages do not contribute to the generation of trigger messages (that is, the queue manager ignores these messages when deciding whether to generate a trigger message).

Table 625. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

TriggerMsgPriority can be in the range zero (lowest) through *MaxPriority* (highest; see MaxPriority attribute); a value of zero causes all messages to contribute to the generation of trigger messages.

To determine the value of this attribute, use the MQIA_TRIGGER_MSG_PRIORITY selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

TriggerType (MQLONG)

This controls the conditions under which trigger messages are written as a result of messages arriving on this queue.

Table 626. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

It has one of the following values:

MQTT_NONE
No trigger messages are written as a result of messages on this queue. This has the same effect as setting *TriggerControl* to MQTC_OFF.

MQTT_FIRST
A trigger message is written whenever the number of messages of priority *TriggerMsgPriority* or greater on the queue changes from 0 to 1.

MQTT_EVERY
A trigger message is written whenever a message of priority *TriggerMsgPriority* or greater arrives on the queue.

MQTT_DEPTH
A trigger message is written whenever the number of messages of priority *TriggerMsgPriority* or greater on the queue equals or exceeds *TriggerDepth*. After the trigger message has been written, *TriggerControl* is set to MQTC_OFF to prevent further triggering until it is explicitly turned on again.

To determine the value of this attribute, use the MQIA_TRIGGER_TYPE selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

Usage (MQLONG)

This indicates what the queue is used for.

Table 627. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

The value is one of the following:

MQUS_NORMAL
This is a queue that applications use when putting and getting messages; the queue is not a transmission queue.

MQUS_TRANSMISSION
This is a queue used to hold messages destined for remote queue managers. When an application sends a message to a remote queue, the local queue manager stores the message temporarily on the appropriate transmission queue in a special format. A message channel agent then reads the message from the transmission queue, and transports the message to the remote queue manager. For more information about configuring remote administration, see Configuring queue managers for remote administration.

Only privileged applications can open a transmission queue for MQOO_OUTPUT to put messages on it directly. Usually, only utility applications do this. Ensure that the message data format is correct (see "MQXQH - Transmission-queue header" on page 608) or errors might occur during the transmission process. Context is not passed or set unless one of the MQPMO_*_CONTEXT context options is specified.

To determine the value of this attribute, use the MQIA_USAGE selector with the MQINQ call.

XmitQName (MQCHAR48)

This is the transmission queue name. If this attribute is nonblank when an open occurs, either for a remote queue or for a queue manager alias definition, it specifies the name of the local transmission queue to be used for forwarding the message.

Table 628. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
			X	

If **XmitQName** is blank, the local queue with a name that is the same as **RemoteQMgrName** is used as the transmission queue. If there is no queue with the name **RemoteQMgrName**, the queue identified by the **DefXmitQName** queue manager attribute is used.

This attribute is ignored if the definition is being used as a queue manager alias and **RemoteQMgrName** is the name of the local queue manager. It is also ignored if the definition is used as a reply-to queue alias definition.

To determine the value of this attribute, use the MQCA_XMIT_Q_NAME selector with the MQINQ call. The length of this attribute is given by MQ_Q_NAME_LENGTH.

Attributes for namelists

The following table summarizes the attributes that are specific to namelists. The attributes are described in alphabetical order.

Namelists are supported on all IBM MQ systems, plus IBM MQ MQI clients connected to these systems.

Note: The names of the attributes shown in this section are descriptive names used with the MQINQ and MQSET calls; the names are the same as for the PCF commands. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for more information.

Table 629. Attributes for namelists

Attribute	Description
AlterationDate	Date when definition was last changed
AlterationTime	Time when definition was last changed
NameCount	Number of names in namelist
NamelistDesc	Namelist description
NamelistName	Namelist name
Names	A list of *NameCount* names
NamelistType	Namelist type
QSGDisp	Queue sharing group disposition

AlterationDate (MQCHAR12)

This is the date when the definition was last changed. The format of the date is YYYY-MM-DD, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the MQCA_ALTERATION_DATE selector with the MQINQ call. The length of this attribute is given by MQ_DATE_LENGTH.

AlterationTime (MQCHAR8)

This is the time when the definition was last changed. The format of the time is HH.MM.SS.

To determine the value of this attribute, use the MQCA_ALTERATION_TIME selector with the MQINQ call. The length of this attribute is given by MQ_TIME_LENGTH.

NameCount (MQLONG)

This is the number of names in the namelist. It is greater than or equal to zero. The following value is defined:

MQNC_MAX_NAMELIST_NAME_COUNT
Maximum number of names in a namelist.

To determine the value of this attribute, use the MQIA_NAME_COUNT selector with the MQINQ call.

NamelistDesc (MQCHAR64)

Use this field for descriptive commentary; its value is established by the definition process. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, this field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the MQCA_NAMELIST_DESC selector with the MQINQ call.

The length of this attribute is given by MQ_NAMELIST_DESC_LENGTH.

NamelistName (MQCHAR48)

This is the name of a namelist that is defined on the local queue manager. For more information about namelist names, see the Other object names section.

Each namelist has a name that is different from the names of other namelists belonging to the queue manager, but might duplicate the names of other queue manager objects of different types (for example, queues).

To determine the value of this attribute, use the MQCA_NAMELIST_NAME selector with the MQINQ call.

The length of this attribute is given by MQ_NAMELIST_NAME_LENGTH.

NamelistType (MQLONG)

This specifies the nature of the names in the namelist, and indicates how the namelist is used. It is one of the following values:

MQNT_NONE
Namelist with no assigned type.

MQNT_Q
Namelist containing the names of queues.

MQNT_CLUSTER
Namelist containing the names of clusters.

MQNT_AUTH_INFO
Namelist containing the names of authentication-information objects.

To determine the value of this attribute, use the MQIA_NAMELIST_TYPE selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

Names (MQCHAR48xNameCount)

This is a list of *NameCount* names, where each name is the name of an object that is defined to the local queue manager. For more information about object names, see Rules for naming IBM MQ objects.

To determine the value of this attribute, use the MQCA_NAMES selector with the MQINQ call.

The length of each name in the list is given by MQ_OBJECT_NAME_LENGTH.

QSGDisp (MQLONG)

This specifies the disposition of the namelist. The value is one of the following:

MQQSGD_Q_MGR
The object has queue manager disposition: the object definition is known only to the local queue manager; the definition is not known to other queue managers in the queue sharing group.

Each queue manager in the queue sharing group can have an object with the same name and type as the current object, but these are separate objects and there is no correlation between them. Their attributes are not constrained to be the same as each other.

MQQSGD_COPY
The object is a local copy of a master object definition that exists in the shared repository. Each queue manager in the queue sharing group can have its own copy of the object. Initially, all copies have the same attributes, but you can alter each copy, using MQSC commands, so that its attributes differ from those of the other copies. The attributes of the copies are resynchronized when the master definition in the shared repository is altered.

To determine the value of this attribute, use the MQIA_QSG_DISP selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

Attributes for process definitions

The following table summarizes the attributes that are specific to process definitions. The attributes are described in alphabetical order.

Note: The names of the attributes in this section are descriptive names used with the MQINQ and MQSET calls; the names are the same as for the PCF commands. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for more information.

Table 630. Attributes for process definitions

Attribute	Description
AlterationDate	Date when definition was last changed
AlterationTime	Time when definition was last changed
ApplId	Application identifier
ApplType	Application type
EnvData	Environment data
ProcessDesc	Process description
ProcessName	Process name
QSGDisp	Queue sharing group disposition
UserData	User data

AlterationDate (MQCHAR12)

This is the date when the definition was last changed. The format of the date is `YYYY-MM-DD`, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the MQCA_ALTERATION_DATE selector with the MQINQ call. The length of this attribute is given by MQ_DATE_LENGTH.

AlterationTime (MQCHAR8)

This is the time when the definition was last changed. The format of the time is `HH.MM.SS`.

To determine the value of this attribute, use the MQCA_ALTERATION_TIME selector with the MQINQ call. The length of this attribute is given by MQ_TIME_LENGTH.

ApplId (MQCHAR256)

This is a character string that identifies the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

The meaning of *ApplId* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ requires *ApplId* to be the name of an executable program. The following notes apply to the environments indicated:

- On z/OS, *ApplId* must be:
  - A CICS transaction identifier, for applications started using the CICS trigger-monitor transaction CKTI
  - An IMS transaction identifier, for applications started using the IMS trigger monitor CSQQTRMN
- On Windows systems, the program name can be prefixed with a drive and directory path.
- On UNIX, the program name can be prefixed with a directory path.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the MQCA_APPL_ID selector with the MQINQ call. The length of this attribute is given by MQ_PROCESS_APPL_ID_LENGTH.

ApplType (MQLONG)

This identifies the nature of the program to be started in response to the receipt of a trigger message. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

ApplType can have any value, but the following values are recommended for standard types; restrict user-defined application types to values in the range MQAT_USER_FIRST through MQAT_USER_LAST:

MQAT_AIX
AIX application (same value as MQAT_UNIX).

MQAT_BATCH
Batch application

MQAT_CICS
CICS transaction.

MQAT_IMS
IMS application.

MQAT_IMS_BRIDGE
IMS bridge application.

MQAT_JAVA
Java application.

MQAT_MVS
MVS or TSO application (same value as MQAT_ZOS).

MQAT_OS390
OS/390 application (same value as MQAT_ZOS).

MQAT_OS400
IBM i application.

MQAT_UNIX
UNIX application.

MQAT_UNKNOWN
Application of unknown type.

MQAT_USER
User application.

MQAT_WINDOWS
64-bit Windows application.

MQAT_WINDOWS_NT
32-bit Windows application.

MQAT_WLM
z/OS workload manager application.

MQAT_ZOS
z/OS application.

MQAT_USER_FIRST
Lowest value for user-defined application type.

MQAT_USER_LAST
Highest value for user-defined application type.

To determine the value of this attribute, use the MQIA_APPL_TYPE selector with the MQINQ call.

EnvData (MQCHAR128)

This is a character string that contains environment-related information pertaining to the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

The meaning of *EnvData* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ appends *EnvData* to the parameter list passed to the started application. The parameter list consists of the MQTMC2 structure, followed by one blank, followed by *EnvData* with trailing blanks removed. The following notes apply to the environments indicated:

- On z/OS:
  - *EnvData* is not used by the trigger-monitor applications provided by IBM MQ.
  - If ApplType is MQAT_WLM, you can supply default values in EnvData for the ServiceName and ServiceStep fields in the work information header (MQWIH).
- On UNIX, *EnvData* can be set to the & character to run the started application in the background.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the MQCA_ENV_DATA selector with the MQINQ call. The length of this attribute is given by MQ_PROCESS_ENV_DATA_LENGTH.

ProcessDesc (MQCHAR64)

Use this field for descriptive commentary. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, the field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the MQCA_PROCESS_DESC selector with the MQINQ call.

The length of this attribute is given by MQ_PROCESS_DESC_LENGTH.

ProcessName (MQCHAR48)

This is the name of a process definition that is defined on the local queue manager.

Each process definition has a name that is different from the names of other process definitions belonging to the queue manager. But the name of the process definition might be the same as the names of other queue manager objects of different types (for example, queues).

To determine the value of this attribute, use the MQCA_PROCESS_NAME selector with the MQINQ call.

The length of this attribute is given by MQ_PROCESS_NAME_LENGTH.

QSGDisp (MQLONG)

This specifies the disposition of the process definition. The value is one of the following:

MQQSGD_Q_MGR
The object has queue manager disposition: the object definition is known only to the local queue manager; the definition is not known to other queue managers in the queue sharing group.

Each queue manager in the queue sharing group can have an object with the same name and type as the current object, but these are separate objects and there is no correlation between them. Their attributes are not constrained to be the same as each other.

MQQSGD_COPY
The object is a local copy of a master object definition that exists in the shared repository. Each queue manager in the queue sharing group can have its own copy of the object. Initially, all copies have the same attributes, but you can alter each copy, using MQSC commands, so that its attributes differ from those of the other copies. The attributes of the copies are resynchronized when the master definition in the shared repository is altered.

To determine the value of this attribute, use the MQIA_QSG_DISP selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

UserData (MQCHAR128)

UserData is a character string that contains user information pertaining to the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue, or the application that is started by the trigger monitor. The information is sent to the initiation queue as part of the trigger message.

The meaning of *UserData* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ passes *UserData* to the started application as part of the parameter list. The parameter list consists of the MQTMC2 structure (containing *UserData*), followed by one blank, followed by *EnvData* with trailing blanks removed.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary. For Microsoft Windows, the character string must not contain double quotation marks if the process definition is going to be passed to **runmqtrm**.

To determine the value of this attribute, use the MQCA_USER_DATA selector with the MQINQ call. The length of this attribute is given by MQ_PROCESS_USER_DATA_LENGTH.

Return codes

For each IBM MQ Message Queue Interface (MQI) and IBM MQ Administration Interface (MQAI) call, a **completion** code and a **reason** code are returned by the queue manager or by an exit routine, to indicate the success or failure of the call.

Applications must not depend upon errors being checked for in a specific order, except where specifically noted. If more than one completion code or reason code could arise from a call, the particular error reported depends on the implementation.

Applications checking for successful completion following an IBM MQ API call must always check the completion code. Do not assume the completion code value, based on the value of the reason code.

Completion codes

The completion code parameter (*CompCode*) allows the caller to see quickly whether the call completed successfully, completed partially, or failed. The following is a list of completion codes, with more detail than is given in the call descriptions:

MQCC_OK
The call completed fully; all output parameters have been set. The **Reason** parameter always has the value MQRC_NONE in this case.

MQCC_WARNING
The call completed partially. Some output parameters might have been set in addition to the *CompCode* and *Reason* output parameters. The **Reason** parameter gives additional information about the partial completion.

MQCC_FAILED
The processing of the call did not complete. The state of the queue manager is unchanged, except where specifically noted. The *CompCode* and *Reason* output parameters have been set; other parameters are unchanged, except where noted.

The reason might be a fault in the application program, or it might be the result of some situation external to the program, for example the user's authority might have been revoked. The **Reason** parameter gives additional information about the error.

Reason codes

The reason code parameter (*Reason*) qualifies the completion code parameter (*CompCode*).

If there is no special reason to report, MQRC_NONE is returned. A successful call returns MQCC_OK and MQRC_NONE.

If the completion code is either MQCC_WARNING or MQCC_FAILED, the queue manager always reports a qualifying reason; details are given under each call description.

Where user exit routines set completion codes and reasons, they must adhere to these rules. In addition, any special reason values defined by user exits must be less than zero, to ensure that they do not conflict with values defined by the queue manager. Exits can set reasons already defined by the queue manager, where appropriate.

Reason codes also occur in:

- The *Reason* field of the MQDLH structure
- The *Feedback* field of the MQMD structure

For complete descriptions of reason codes, see Messages and reason codes.

Rules for validating MQI options

This section lists the situations that produce an MQRC_OPTIONS_ERROR reason code from an MQOPEN, MQPUT, MQPUT1, MQGET, MQCLOSE, or MQSUB call.

MQOPEN call

For the options of the MQOPEN call:

- At least *one* of the following must be specified:
  - MQOO_BROWSE
  - MQOO_INPUT_EXCLUSIVE [1]
  - MQOO_INPUT_SHARED [1]
  - MQOO_INPUT_AS_Q_DEF [1]
  - MQOO_INQUIRE
  - MQOO_OUTPUT

- MQOO_SET
- MQOO_BIND_ON_OPEN [2]
- MQOO_BIND_NOT_FIXED [2]
- MQOO_BIND_ON_GROUP [2]
- MQOO_BIND_AS_Q_DEF [2]

• Only *one* of the following is allowed:

- MQOO_READ_AHEAD
- MQOO_NO_READ_AHEAD
- MQOO_READ_AHEAD_AS_Q_DEF

1. Only *one* of the following is allowed:
   - MQOO_INPUT_EXCLUSIVE
   - MQOO_INPUT_SHARED
   - MQOO_INPUT_AS_Q_DEF
2. Only *one* of the following is allowed:
   - MQOO_BIND_ON_OPEN
   - MQOO_BIND_NOT_FIXED
   - MQOO_BIND_ON_GROUP
   - MQOO_BIND_AS_Q_DEF

   Note: The options that are listed previously are mutually exclusive. However, as the value of MQOO_BIND_AS_Q_DEF is zero, specifying it with either of the other two bind options does not result in reason code MQRC_OPTIONS_ERROR. MQOO_BIND_AS_Q_DEF is provided to aid program documentation.

• If MQOO_SAVE_ALL_CONTEXT is specified, one of the MQOO_INPUT_* options must also be specified.

• If one of the MQOO_SET_*_CONTEXT or MQOO_PASS_*_CONTEXT options are specified, MQOO_OUTPUT must also be specified.

• If MQOO_CO_OP is specified, MQOO_BROWSE must also be specified

• If MQOO_NO_MULTICAST is specified, MQOO_OUTPUT must also be specified.

MQPUT call

For the put-message options:

• The combination of MQPMO_SYNCPOINT and MQPMO_NO_SYNCPOINT is not allowed.

• Only *one* of the following is allowed:

- MQPMO_DEFAULT_CONTEXT
- MQPMO_NO_CONTEXT
- MQPMO_PASS_ALL_CONTEXT
- MQPMO_PASS_IDENTITY_CONTEXT
- MQPMO_SET_ALL_CONTEXT
- MQPMO_SET_IDENTITY_CONTEXT

• Only *one* of the following is allowed:

- MQPMO_ASYNC_RESPONSE
- MQPMO_SYNC_RESPONSE
- MQPMO_RESPONSE_AS_TOPIC_DEF
- MQPMO_RESPONSE_AS_Q_DEF

- MQPMO_ALTERNATE_USER_AUTHORITY is not allowed (it is valid only on the MQPUT1 call).

MQPUT1 call

For the put-message options, the rules are the same as for the MQPUT call, except for the following:

- MQPMO_ALTERNATE_USER_AUTHORITY is allowed.
- MQPMO_LOGICAL_ORDER is not allowed.

MQGET call

For the get-message options:

- Only *one* of the following is allowed:
  - MQGMO_NO_SYNCPOINT
  - MQGMO_SYNCPOINT
  - MQGMO_SYNCPOINT_IF_PERSISTENT
- Only *one* of the following is allowed:
  - MQGMO_BROWSE_FIRST
  - MQGMO_BROWSE_MSG_UNDER_CURSOR
  - MQGMO_BROWSE_NEXT
  - MQGMO_MSG_UNDER_CURSOR
- MQGMO_SYNCPOINT is not allowed with any of the following:
  - MQGMO_BROWSE_FIRST
  - MQGMO_BROWSE_MSG_UNDER_CURSOR
  - MQGMO_BROWSE_NEXT
  - MQGMO_LOCK
  - MQGMO_UNLOCK
- MQGMO_SYNCPOINT_IF_PERSISTENT is not allowed with any of the following:
  - MQGMO_BROWSE_FIRST
  - MQGMO_BROWSE_MSG_UNDER_CURSOR
  - MQGMO_BROWSE_NEXT
  - MQGMO_COMPLETE_MSG
  - MQGMO_UNLOCK
- MQGMO_MARK_SKIP_BACKOUT requires MQGMO_SYNCPOINT to be specified.
- The combination of MQGMO_WAIT and MQGMO_SET_SIGNAL is not allowed.
- If MQGMO_LOCK is specified, one of the following must also be specified:
  - MQGMO_BROWSE_FIRST
  - MQGMO_BROWSE_MSG_UNDER_CURSOR
  - MQGMO_BROWSE_NEXT
- If MQGMO_UNLOCK is specified, only the following values are allowed:
  - MQGMO_NO_SYNCPOINT
  - MQGMO_NO_WAIT

MQCLOSE call

For the options of the MQCLOSE call:

- The combination of MQCO_DELETE and MQCO_DELETE_PURGE is not allowed.
- Only one of the following is allowed:
  - MQCO_KEEP_SUB
  - MQCO_REMOVE_SUB

MQSUB call

For the options of the MQSUB call:

- At least one of the following must be specified:
  - MQSO_ALTER
  - MQSO_RESUME
  - MQSO_CREATE
- Only one of the following is allowed:
  - MQSO_DURABLE
  - MQSO_NON_DURABLE

  Note: The options that are listed previously are mutually exclusive. However, as the value of MQSO_NON_DURABLE is zero, specifying it with MQSO_DURABLE does not result in reason code MQRC_OPTIONS_ERROR. MQSO_NON_DURABLE is provided to aid program documentation.
- The combination of MQSO_GROUP_SUB and MQSO_MANAGED is not allowed.
- MQSO_GROUP_SUB requires MQSO_SET_CORREL_ID to be specified.
- Only one of the following is allowed:
  - MQSO_ANY_USERID
  - MQSO_FIXED_USERID
- MQSO_NEW_PUBLICATIONS_ONLY is allowed in combination with:
  - MQSO_CREATE
  - MQSO_ALTER, if MQSO_NEW_PUBLICATIONS_ONLY was set on the original subscription
- The combination of MQSO_PUBLICATIONS_ON_REQUEST and SubLevel greater than 1 is not allowed.
- Only one of the following is allowed:
  - MQSO_WILDCARD_CHAR
  - MQSO_WILDCARD_TOPIC
- MQSO_NO_MULTICAST requires MQSO_MANAGED to be specified.

Queued publish/subscribe command messages

An application can use MQRFH2 command messages to control a queued publish/subscribe application.

An application that is using MQRFH2 for publish/subscribe can send the following command messages to the SYSTEM.BROKER.CONTROL.QUEUE:

- "Delete Publication message" on page 866
- "Deregister Subscriber message" on page 867
- "Publish message" on page 871
- "Register Subscriber message" on page 873
- "Request Update message" on page 878

If you are writing queued publish/subscribe applications, you must understand these messages, the queue manager response message, and the message descriptor (MQMD); see the following information:

- “Queue Manager Response message” on page 880
- “MQMD settings for publications forwarded by a queue manager” on page 885
- “MQMD settings in queue manager response messages” on page 886
- “Publish/subscribe reason codes” on page 881

The commands are contained in a `psc` folder in the **`NameValueData`** field of the `MQRFH2` header. The message that can be sent by a broker in response to a command message is contained in a `pscr` folder.

The descriptions of each command list the properties that can be contained in a folder. Unless otherwise specified, the properties are optional and can occur only once.

Names of properties are shown as `<Command>`.
Values must be in string format, for example: `Publish`.
A string constant representing the value of a property is shown in parentheses, for example: `(MQPSC_PUBLISH)`.
String constants are defined in the header file `cmqpsc.h` which is supplied with the queue manager.

Delete Publication message

The **`Delete Publication`** command message is sent to a queue manager from a publisher, or from another queue manager, to tell the queue manager to delete any retained publications for the specified topics.

This message is sent to a queue monitored by the queue manager's queued publish/subscribe interface.

The input queue should be the queue that the original publication was sent to.

If you have the authority for some, but not all, of the topics that are specified in the **`Delete Publication`** command message, only those topics are deleted. A **`Broker Response`** message indicates which topics are not deleted.

Similarly, if a **`Publish`** command contains more than one topic, a **`Delete Publication`** command matching some, but not all, of those topics deletes only the publications for the topics that are specified in the **`Delete Publication`** command.

See “MQMD settings for publications forwarded by a queue manager” on page 885 for details of the message descriptor (MQMD) parameters that are needed when sending a command message to the queue manager.

Properties

Command (*MQPSC_COMMAND*)
The value is `DeletePub` (*MQPSC_DELETE_PUBLICATION*).

This property must be specified.

Topic> (*MQPSC_TOPIC*)
The value is a string that contains a topic for which retained publications are to be deleted. Wildcard characters can be included in the string to delete publications on more than one topic.

This property must be specified; it can be repeated for as many topics as needed.

DelOpt (*MQPSC_DELETE_OPTION*)
The delete options property can take one of the following values:

`Local` (*MQPSC_LOCAL*)

All retained publications for the specified topics are deleted at the local queue manager (that is, the queue manager to which this message is sent), whether they were published with the `Local` option or not.

Publications at other queue managers are not affected.

None (*MQPSC_NONE*)

All options take their default values. This has the same effect as omitting the DelOpt property. If other options are specified at the same time, None is ignored.

The default if this property is omitted is that all retained publications for the specified topics are deleted at all queue managers in the network, regardless of whether they were published with the Local option.

Example

Here is an example of NameValueData for a **Delete Publication** command message. This is used by the sample application to delete, at the local queue manager, the retained publication that contains the latest score in the match between Team1 and Team2.

```
<psc>
  <Command>DeletePub</Command>
  <Topic>Sport/Soccer/State/LatestScore/Team1 Team2</Topic>
  <DelOpt>Local</DelOpt>
</psc>
```

Deregister Subscriber message

The **Deregister Subscriber** command message is sent to a queue manager by a subscriber, or by another application on behalf of a subscriber, to indicate that it no longer wants to receive messages matching the given parameters.

This message is sent to SYSTEM.BROKER.CONTROL.QUEUE, the queue manager's control queue. The user must have the necessary authority to put a message onto this queue.

See MQMD settings for publications forwarded by a queue manager for details of the message descriptor (MQMD) parameters that are needed when sending a command message to the queue manager.

An individual subscription can be deregistered by specifying the corresponding topic, subscription point and filter values of the original subscription. If any of the values were not specified (that is, they took the default values) in the original subscription, they should be omitted when the subscription is deregistered.

All subscriptions for a subscriber, or a group of subscribers, can be deregistered by using the DeregAll option. For example, if DeregAll is specified, together with a subscription point (but no topic or filter), then all subscriptions for the subscriber on the specified subscription point are deregistered, regardless of the topic and filter. Any combination of topic, filter and subscription point is allowed; if all three are specified only one subscription can match, and the DeregAll option is ignored.

The message must be sent by the subscriber that registered the subscription; this is confirmed by checking the subscriber's user ID.

Subscriptions can also be deregistered by a system administrator using MQSC or PCF commands. However, the subscriptions registered with a temporary dynamic queue are associated with the queue, not just the queue name. If the queue is deleted, either explicitly, or by the application disconnecting from the queue manager, it is no longer possible to use the **Deregister Subscriber** command to deregister the subscriptions for that queue. The subscriptions can be deregistered using the developer workbench, and they are removed automatically by the queue manager the next time that it matches a publication to the subscription, or the next time the queue manager restarts. Under normal circumstances, applications should deregister their subscriptions before deleting the queue, or disconnecting from the queue manager.

If a subscriber sends a message to deregister a subscription, and receives a response message to say that this was processed successfully, some publications might still reach the subscriber queue if they were being processed by the queue manager at the same time as the subscription was being deregistered. If the messages are not removed from the queue, there might be a buildup of unprocessed messages on the subscriber queue. If the application executes a loop that includes an MQGET call with the appropriate CorrelId after sleeping for a while, these messages are cleared off the queue.

Similarly, if the subscriber uses a permanent dynamic queue, and deregisters and closes the queue with the *MQCO_DELETE_PURGE* option on an MQCLOSE call, the queue might not be empty. If any publications from the queue manager are not yet committed when the queue is deleted, an MQRC_Q_NOT_EMPTY return code is issued by the MQCLOSE call. The application can avoid this problem by sleeping and reissuing the MQCLOSE call from time to time.

Properties

Command (*MQPSC_COMMAND*)
: The value is `DeregSub` (*MQPSC_DEREGISTER_SUBSCRIBER*).

  This property must be specified.

Topic (*MQPSC_TOPIC*)
: The value is a string that contains the topic to be deregistered.

  This property can, optionally, be repeated if multiple topics are to be deregistered. It can be omitted if `DeregAll` is specified in `<RegOpt>`.

  The topics that are specified can be a subset of those that are registered if the subscriber wants to retain subscriptions for other topics. Wildcard characters are allowed, but a topic string that contains wildcard characters must exactly match the corresponding string that was specified in the **`Deregister Subscriber`** command message.

SubPoint (*MQPSC_SUBSCRIPTION_POINT*)
: The value is a string that specifies the subscription point from which the subscription is to be detached.

  This property must not be repeated. It can be omitted if a `<Topic>` is specified, or if `DeregAll` is specified in `<RegOpt>`. If you omit this property, the following happens:

  - If you do **not** specify `DeregAll`, subscriptions matching the `<Topic>` property (and the `<Filter>` property, if present) are deregistered from the default subscription point.
  - If you specify `DeregAll`, all subscriptions (matching the `<Topic>` and `<Filter>` properties if present) are deregistered from all subscription points.

  Note that you cannot specify the default subscription point explicitly. Therefore, there is no way of deregistering all subscriptions from this subscription point only; you must specify the topics.

SubIdentity (*MQPSC_SUBSCRIPTION_IDENTITY*)
: This is a variable-length string with a maximum length of 64 characters. It is used to represent an application with an interest in a subscription. The queue manager maintains a set of subscriber identities for each subscription. Each subscription can allow its identity set to hold only a single identity, or an unlimited number of identities.

  If the `SubIdentity` is in the identity set for the subscription then it is removed from the set. If the identity set becomes empty as a result of this, the subscription is removed from the queue manager, unless `LeaveOnly` is specified as a value of the `RegOpt` property. If the identity set still contains other identities then the subscription is not removed from the queue manager, and publication flow is not interrupted.

  If `SubIdentity` is specified, but the `SubIdentity` is not in the identity set for the subscription, then the **`Deregister Subscriber`** command fails with the return code *MQRCCF_SUB_IDENTITY_ERROR*.

Filter (*MQPSC_FILTER*)
: The value is a string specifying the filter to be deregistered. It must match exactly, including case and any spaces, a subscription filter that has been previously registered.

  This property can, optionally, be repeated if more than one filter is to be deregistered. It can be omitted if a `<Topic>` is specified, or if `DeregAll` is specified in `<RegOpt>`.

  The filters specified can be a subset of those registered if the subscriber wants to retain subscriptions for other filters.

RegOpt (*MQPSC_REGISTRATION_OPTION*)
The registration options property can take the following values:

`DeregAll`
(*MQPSC_DEREGISTER_ALL*)

All matching subscriptions registered for this subscriber are to be deregistered.

If you specify `DeregAll`:

- `<Topic>`, `<SubPoint>`, and `<Filter>` can be omitted.
- `<Topic>` and `<Filter>` can be repeated, if required.
- `<SubPoint>` must not be repeated.

If you do **not** specify `DeregAll`:

- `<Topic>` must be specified, and can be repeated if required.
- `<SubPoint>` and `<Filter>` can be omitted.
- `<SubPoint>` must not be repeated.
- `<Filter>` can be repeated, if required.

If topics and filters are both repeated, then all subscriptions matching all combinations of the two are removed. For example, a **`Deregister Subscriber`** command that specifies three topics and three filters will attempt to remove nine subscriptions.

`CorrelAsId`
(*MQPSC_CORREL_ID_AS_IDENTITY*)

The `CorrelId` in the message descriptor (MQMD), which must not be zero, is used to identify the subscriber. It must match the `CorrelId` used in the original subscription.

`FullResp`
(*MQPSC_FULL_RESPONSE*)

When `FullResp` is specified all attributes of the subscription are returned in the response message, if the command does not fail.

When `FullResp` is specified `DeregAll` is not permitted in the **`Deregister Subscriber`** command. It is also not possible to specify multiple topics. The command fails with return code *MQRCCF_REG_OPTIONS_ERROR*, in both cases.

`LeaveOnly`
(*MQPSC_LEAVE_ONLY*)

When you specify this with a `SubIdentity` which is in the identity set for the subscription the `SubIdentity` is removed from the identity set for the subscription. The subscription is not removed from the queue manager, even if the resulting identity set is empty. If the `SubIdentity` value is not in the identity set the command fails with return code *MQRCCF_SUB_IDENTITY_ERROR*.

If `LeaveOnly` is specified with no `SubIdentity`, the command fails with return code *MQRCCF_REG_OPTIONS_ERROR*.

If neither `LeaveOnly` nor a `SubIdentity` are specified, then the subscription is removed regardless of the contents of the identity set for the subscription.

None
(MQPSC_NONE)

All options take their default values. This has the same effect as omitting the registration options property. If other options are specified at the same time, None is ignored.

`VariableUserId`
(*MQPSC_VARIABLE_USER_ID*)

When specified the identity of the subscriber (queue, queue manager and correlid) is not restricted to a single userid. This differs from the existing behavior of the queue manager that associates the userid of the original registration message with the subscriber's identity and from then on prevents any other user using that identity. If a new subscriber tries to use the same identity, the return code *MQRCCF_DUPLICATE_SUBSCRIPTION* is returned.

Any user can modify or deregister the subscription when they have suitable authority, avoiding the existing check that the userid must match that of the original subscriber.

To add this option to an existing subscription the command must come from the same userid as the original subscription itself.

If the subscription to be deregistered has `VariableUserId` set this must be set at deregister time to indicate which subscription is being deregistered. Otherwise, the userid of the **Deregister Subscriber** command is used to identify the subscription. This is overridden, along with the other subscriber identifiers, if a subscription name is supplied.

The default, if this property is omitted, is that no registration options are set.

QMgrName (*MQPSC_Q_MGR_NAME*)
The value is the queue manager name for the subscriber queue. It must match the `QMgrName` used in the original subscription.

If this property is omitted, the default is the `ReplyToQMgr` name in the message descriptor (MQMD). If the resulting name is blank, it defaults to the name of the queue manager.

QName (*MQPSC_Q_NAME*)
The value is the name of the subscriber queue. It must match the `QName` used in the original subscription.

If this property is omitted, the default is the `ReplyToQ` name in the message descriptor (MQMD), which must not be blank.

SubName (*MQPSC_SUBSCRIPTION_NAME*)
If you specify SubName on a **Deregister Subscriber** command the SubName value takes precedence over all other identifier fields except the userid, unless `VariableUserId` is set on the subscription itself. If `VariableUserId` is not set, the **Deregister Subscriber** command succeeds only if the userid of the command message matches that of the subscription, if not the command fails with return code *MQRCCF_DUPLICATE_IDENTITY*.

If a subscription exists that matches the traditional identity of this command but has no SubName the **Deregister Subscriber** command fails with return code *MQRCCF_SUB_NAME_ERROR*. If an attempt is made to deregister a subscription that has a SubName using a command message that matches the traditional identity but with no SubName specified the command succeeds.

SubUserData (*MQPSC_SUBSCRIPTION_USER_DATA*)
This is a variable-length text string. The value is stored by the queue manager with the subscription but has no influence on the delivery of the publication to the subscriber. The value can be altered by re-registering to the same subscription with a new value. This attribute is for the use of the application.

SubUserData is returned in the Metatopic information (MQCACF_REG_SUB_USER_DATA) for a subscription, if SubUserData is present.

Example

Here is an example of `NameValueData` for a **Deregister Subscriber** command message. In this example, the sample application is deregistering its subscription to the topics which contain the latest score for all matches. The subscriber's identity, including the `CorrelId`, is taken from the defaults in the MQMD.

```
<psc>
  <Command>DeregSub</Command>
  <RegOpt>CorrelAsId</RegOpt>
```

```
    <Topic>Sport/Soccer/State/LatestScore/#</Topic>
  </psc>
```

Publish message

The **Publish** command message is put to a queue, or from a queue manager to a subscriber, to publish information on a specified topic or topics.

Authority to put a message onto a queue and authority to publish information on a specified topic or topics is necessary.

If the user has authority to publish information on some, but not all, topics, only those topics are used to publish; a warning response indicates which topics are not used to publish.

If a subscriber has any matching subscriptions, the queue manager forwards the **Publish** message to the subscriber queues defined in the corresponding **Register Subscriber** command messages.

See Queue Manager Response message for details of the message descriptor (MQMD) parameters needed when sending a command message to the queue manager, and used when a queue manager forwards a publication to a subscriber.

The queue manager forwards the **Publish** message to other queue managers in the network that have matching subscriptions, unless it is a local publication.

Publication data, if any, is included in the body of the message. The data can be described in an <mcd> folder in the `NameValueData` field of the MQRFH2 header.

Properties

Command (*MQPSC_COMMAND*)
The value is `Publish` (*MQPSC_PUBLISH*).

This property must be specified.

Topic (*MQPSC_TOPIC*)
The value is a string that contains a topic that categorizes this publication. No wildcard characters are allowed.

You must add the topic to the namelist SYSTEM.QPUBSUB.QUEUE.NAMELIST, see Adding a stream for instructions on how to complete this task.

This property must be specified, and can optionally be repeated for as many topics as needed.

SubPoint (*MQPSC_SUBSCRIPTION_POINT*)
The subscription point on which the publication is published.

In WebSphere Event Broker 6.0, the value of the `<SubPoint>` property is the value of the Subscription Point attribute of the Publication node that is handling the publishing.

In IBM WebSphere MQ 7.0.1, the value of the `<SubPoint>` property must match the name of a subscription point. See Adding a subscription point.

PubOpt (*MQPSC_PUBLICATION_OPTION*)
The publication options property can take the following values:

`RetainPub`
(*MQPSC_RETAIN_PUB*)

The queue manager is to retain a copy of the publication. If this option is not set, the publication is deleted as soon as the queue manager has sent the publication to all its current subscribers.

`IsRetainedPub`
(*MQPSC_IS_RETAINED_PUB*)

(Can only be set by a queue manager.) This publication has been retained by the queue manager. The queue manager sets this option to notify a subscriber that this publication was published earlier and has been retained, provided that the subscription has been registered with the

InformIfRetained option. It is set only in response to a Register Subscriber or Request Update command message. Retained publications that are sent directly to subscribers do not have this option set.

Local
(*MQPSC_LOCAL*)

This option tells the queue manager that this publication must not be sent to other queue managers. All subscribers that registered at this queue manager receive this publication if they have matching subscriptions.

OtherSubsOnly
(*MQPSC_OTHER_SUBS_ONLY*)

This option allows simpler processing of conference-type applications, where a publisher is also a subscriber to the same topic. It tells the queue manager not to send the publication to the publisher's subscriber queue even if it has a matching subscription. The publisher's subscriber queue consists of its QMgrName, QName, and optional CorrelId, as described in the following list.

CorrelAsId
(*MQPSC_CORREL_ID_AS_IDENTITY*)

The CorrelId in the MQMD (which must not be zero) is part of the publisher's subscriber queue, in applications where the publisher is also a subscriber.

None
(*MQPSC_NONE*)

All options take their default values. This has the same effect as omitting the publication options property. If other options are specified at the same time, None is ignored.

You can have more than one publication option by introducing additional <PubOpt> elements.

The default, if this property is omitted, is that no publication options are set.

PubTime (*MQPSC_PUBLISH_TIMESTAMP*)
The value is an optional publication timestamp set by the publisher. It is 16 characters long with format:

```
YYYYMMDDHHMMSSTH
```

using Universal Time. This information is not checked by the queue manager before being sent to the subscribers.

SeqNum (*MQPSC_SEQUENCE_NUMBER*)
The value is an optional sequence number set by the publisher.

It must be incremented by 1 with each publication. However, this is not checked by the queue manager, which merely transmits this information to subscribers.

If publications on the same topic are published to different interconnected queue managers, it is the responsibility of the publishers to ensure that sequence numbers, if used, are meaningful.

QMgrName (*MQPSC_Q_MGR_NAME*)
The value is a string containing the name of the queue manager for the publisher's subscriber queue, in applications where the publisher is also a subscriber (see OtherSubsOnly).

If this property is omitted, the default is the ReplyToQMgr name in the message descriptor (MQMD). If the resulting name is blank, it defaults to the name of the queue manager.

QName (*MQPSC_Q_NAME*)
The value is a string containing the name of the publisher's subscriber queue, in applications where the publisher is also a subscriber (see OtherSubsOnly).

If this property is omitted, the default is the ReplyToQ name in the message descriptor (MQMD), which must not be blank if OtherSubsOnly is set.

Example

Here are some examples of *NameValueData* for a **Publish** command message.

The first example is for a publication sent by the match simulator in the sample application to indicate that a match has started.

```
<psc>
  <Command>Publish</Command>
  <Topic>Sport/Soccer/Event/MatchStarted</Topic>
</psc>
```

The second example is for a retained publication. The latest score in the match between Team1 and Team2 is published.

```
<psc>
  <Command>Publish</Command>
  <PubOpt>RetainPub</PubOpt>
  <Topic>Sport/Soccer/State/LatestScore/Team1 Team2</Topic>
</psc>
```

Register Subscriber message

The **Register Subscriber** command message is sent to a queue manager by a subscriber, or by another application on behalf of a subscriber, to indicate that it wants to subscribe to one or more topics at a subscription point. A message content filter can also be specified.

In publish/subscribe filter expressions, nesting parentheses causes performance to decrease exponentially. Avoid nesting parentheses to a depth greater than about 6.

The message is sent to SYSTEM.BROKER.CONTROL.QUEUE, which is the queue manager's control queue. Authority to put a message to this queue is required, in addition to access authority (set by the queue manager's system administrator) for the topic, or topics, in the subscription.

If the user has authority on some, but not all, topics, only those with authority are registered; a warning response indicates those that are not registered.

See "MQMD settings in command messages to the queue manager" on page 884 for details of the message descriptor (MQMD) parameters that are needed when sending a command message to the queue manager.

If the reply to queue is a temporary dynamic queue, the subscription is deregistered automatically by the queue manager when the queue is closed.

Properties

Command (*MQPSC_COMMAND*)
: The value is RegSub (*MQPSC_REGISTER_SUBSCRIBER*). This property must be specified.

Topic (*MQPSC_TOPIC*)
: The topic for which the subscriber wants to receive publications. Wildcard characters can be specified as part of the topic.

  If you use the MQSC command **display sub** to examine the subscription created in this way, the value of the `<Topic>` tag is shown as the TOPICSTR property of the subscription.

  This property is required, and can optionally be repeated for as many topics as needed.

SubPoint (*MQPSC_SUBSCRIPTION_POINT*)
: The value is the subscription point to which the subscription is attached.

  If this property is omitted, the default subscription point is used.

  In WebSphere Event Broker 6.0, the value of the `<SubPoint>` property must match the value of the Subscription Point attribute of the Publication nodes that are subscribed to.

In IBM WebSphere MQ 7.0.1, the value of the <SubPoint> property must match the name of a subscription point. See Adding a subscription point.

Filter (*MQPSC_FILTER*)

The value is an SQL expression that is used as a filter on the contents of publication messages. If a publication on the specified topic matches the filter, it is sent to the subscriber. This property corresponds to the Selection String that is used in MQSUB and MQOPEN calls. For more information, see Selecting on the content of a message

If this property is omitted, no content filtering takes place.

RegOpt (*MQPSC_REGISTRATION_OPTION*)

This Registration Options property can take the following values:

AddName

(*MQPSC_ADD_NAME*)

When specified for an existing subscription that matches the traditional identity of this Register Subscription command, but with no current SubName value, the SubName specified in this command is added to the subscription.

If AddName is specified the SubName field is mandatory, otherwise MQRCCF_REG_OPTIONS_ERROR is returned.

CorrelAsId

(*MQPSC_CORREL_ID_AS_IDENTITY*)

The `CorrelId` in the message descriptor (MQMD) is used when sending matching publications to the subscriber queue. The `CorrelId` must not be zero,

FullResp

(*MQPSC_FULL_RESPONSE*)

When specified all attributes of the subscription are returned in the response message, if the command does not fail.

FullResp is valid only when the command message refers to a single subscription. Therefore, only one topic is permitted in the command; otherwise the command fails with return code *MQRCCF_REG_OPTIONS_ERROR*.

InformIfRet

(*MQPSC_INFORM_IF_RETAINED*)

The queue manager informs the subscriber if a publication is retained when it sends a Publish message in response to a **Register Subscriber** or **Request Update** command message. The queue manager does this by including the `IsRetainedPub` publication option in the message.

JoinExcl

(*MQPSC_JOIN_EXCLUSIVE*)

This option indicates that the specified `SubIdentity` should be added as the exclusive member of the identity set for the subscription, and that no other identities can be added to the set.

If the identity has already joined 'shared' and is the sole entry in the set, the set is changed to an exclusive lock held by this identity. Otherwise, if the subscription currently has other identities in the identity set (with shared access) the command fails with return code *MQRCCF_SUBSCRIPTION_IN_USE*.

JoinShared

(*MQPSC_JOIN_SHARED*)

This option indicates that the specified `SubIdentity` should be added to the identity set for the subscription.

If the subscription is currently locked exclusively (using the `JoinExcl` option), the command fails with return code *MQRCCF_SUBSCRIPTION_LOCKED*, unless the identity that has the subscription

locked is the same identity as that in this command message. In this case the lock is automatically modified to a shared lock.

Local
(*MQPSC_LOCAL*)

The subscription is local and is not distributed to other queue managers in the network. Publications made at other queue managers are not delivered to this subscriber, unless it also has a corresponding global subscription.

NewPubsOnly
(*MQPSC_NEW_PUBS_ONLY*)

Retained publications that exist at the time the subscription is registered are not sent to the subscriber; only new publications are sent.

If a subscriber re-registers and changes this option so that it is no longer set, a publication that has already been sent to it might be sent again.

NoAlter
(*MQPSC_NO_ALTER*)

The attributes of an existing matching subscription is not changed.

When a subscription is being created, this option is ignored. All other options specified apply to the new subscription.

If a `SubIdentity` also has one of the join options (`JoinExcl` or `JoinShared`) specified, the identity is added to the identity set regardless of whether `NoAlter` is specified.

None
(*MQPSC_NONE*)

All registration options take their default values.

If the subscriber is already registered, its options are reset to their default values (note that this does not have the same affect as omitting the registration options property), and the subscription expiry is updated from the MQMD of the **Register Subscriber** message.

If other registration options are specified at the same time, None is ignored.

NonPers
(*MQPSC_NON_PERSISTENT*)

Publications matching this subscription are delivered to the subscriber as non-persistent messages.

Pers
(*MQPSC_PERSISTENT*)

Publications matching this subscription are delivered to the subscriber as persistent messages.

PersAsPub
(*MQPSC_PERSISTENT_AS_PUBLISH*)

Publications matching this subscription are delivered to the subscriber with the persistence specified by the publisher. This is the default behavior.

PersAsQueue
(*MQPSC_PERSISTENT_AS_Q*)

Publications matching this subscription are delivered to the subscriber with the persistence specified on the subscriber queue.

PubOnReqOnly
(*MQPSC_PUB_ON_REQUEST_ONLY*)

The queue manager does not send publications to the subscriber, except in response to a **Request Update** command message.

VariableUserId
(*MQPSC_VARIABLE_USER_ID*)

When specified the identity of the subscriber (queue, queue manager and correlid) is not restricted to a single userid. This differs from the existing behavior of the queue manager that associates the userid of the original registration message with the subscriber's identity and from then on prevents any other user using that identity. If a new subscriber tries to use the same identity *MQRCCF_DUPLICATE_SUBSCRIPTION* is returned.

This allows any user to modify or deregister the subscription if the user has suitable authority. There is therefore no need to check that the userid matches that of the original subscriber.

To add this option to an existing subscription the command must come from the same userid as the original subscription itself.

If the subscription of the **Request Update** command has `VariableUserId` set, this must be set at request update time to indicate which subscription is referred to. Otherwise, the userid of the **Request Update** command is used to identify the subscription. This is overridden, along with the other subscriber identifiers, if a subscription name is supplied.

If a **Register Subscriber** command message without this option set refers to an existing subscription which has this option set, the option is removed from this subscription and the userid of the subscription is now fixed. If there already exists a subscriber which has the same identity (queue, queue manager and correlation identifier) but with a different user ID associated to it, the command fails with return code *MQRCCF_DUPLICATE_IDENTITY* because there can only be one userid associated with a subscriber identity.

If the registration options property is omitted and the subscriber is already registered, its registration options are not changed and the subscription expiry is updated from the MQMD of the **Register Subscriber** message.

If the subscriber is not already registered, a new subscription is created with all registration options taking their default values.

The default values are `PersAsPub` and no other options set.

QMgrName (*MQPSC_Q_MGR_NAME*)
The value is the name of the queue manager for the subscriber queue, to which matching publications are sent by the queue manager.

If this property is omitted, the default is the `ReplyToQMgr` name in the message descriptor (MQMD). If the resulting name is blank, it defaults to the queue manager's `QMgrName`.

QName (*MQPSC_Q_NAME*)
The value is the name of the subscriber queue, to which matching publications are sent by the queue manager.

If this property is omitted, the default is the `ReplyToQ` name in the message descriptor (MQMD), which must not be blank in this case.

If the queue is a temporary dynamic queue, nonpersistent delivery of publications (`NonPers`) must be specified in the `<RegOpt>` property.

If the queue is a temporary dynamic queue, the subscription is deregistered automatically by the queue manager when the queue is closed.

SubName (*MQPSC_SUBSCRIPTION_NAME*)
This is a name given to a particular subscription. You can use it instead of the queue manager, queue and optional correlId to refer to a subscription.

If a subscription already exists with this **SubName** , any other attributes of the subscription (Topic, QMgrName, QName, CorrelId, UserId, RegOpts, UserSubData, and Expiry) are overridden with the attributes, if specified, that are passed in the new `Register Subscriber` command message. However, if **SubName** is used with no QName field specified, and a ReplyToQ is specified in the MQMD header, the subscriber queue is changed to be the ReplyToQ.

If a subscription that matches the traditional identity of this command already exists, but has no **SubName** , the Registration command fails with return code *MQRCCF_DUPLICATE_SUBSCRIPTION*, unless the **AddName** option is specified.

If you try to alter an existing named subscription by using another `Register Subscriber` command that specifies the same **SubName** , and the values of Topic, QMgrName, QName, and CorrelId in the new command match a different existing subscription, with or without a SubName defined, the command fails with return code *MQRCCF_DUPLICATE_SUBSCRIPTION*. This prevents two subscription names referring to the same subscription.

SubIdentity (*MQPSC_SUBSCRIPTION_IDENTITY*)

This string is used to represent an application with an interest in a subscription. It is a variable-length character string with a maximum length of 64 characters, and is optional. The queue manager maintains a set of subscriber identities for each subscription. Each subscription can allow its identity set to contain only one identity, or an unlimited number of identities (see the **JoinShared** and **JoinExcl** options).

A subscribe command that specifies the **JoinShared** or **JoinExcl** option adds the **SubIdentity** to the subscription's identity set, if it is not already there and if the existing set of identities allows such an action; that is, no other subscriber has joined exclusively or the identity set is empty.

Any alteration of the subscription's attributes as the result of a `Register Subscriber` command in which a **SubIdentity** is specified, only succeeds if it would be the only member of the set of identities for this subscription. Otherwise the command fails with return code *MQRCCF_SUBSCRIPTION_IN_USE*. This prevents a subscription's attributes from changing without other interested subscribers being aware.

If you specify a character string that is longer than 64 characters, the command fails with return code *MQRCCF_SUB_IDENTITY_ERROR*.

SubUserData (*MQPSC_SUBSCRIPTION_USER_DATA*)

This is a variable-length text string. The value is stored by the queue manager with the subscription, but has no influence on publication delivery to the subscriber. The value can be altered by re-registering to the same subscription with a new value. This attribute is there for the use of the application.

The **SubUserData** is returned in the Metatopic information (*MQCACF_REG_SUB_USER_DATA*) for a subscription if present.

If you specify more than one of the registration option values `NonPers, PersAsPub, PersAsQueue, and Pers`, then only the last one is used. You cannot combine these options in an individual subscription.

Example

Here is an example of `NameValueData` for a **Register Subscriber** command message. In the sample application, the results service uses this message to register a subscription to the topics containing the latest scores in all matches, with the 'Persistent as publish' option set. The subscriber's identity, including the `CorrelId`, is taken from the defaults in the MQMD.

```
<psc>
  <Command>RegSub</Command>
  <RegOpt>PersAsPub</RegOpt>
  <RegOpt>CorrelAsId</RegOpt>
  <Topic>Sport/Soccer/State/LatestScore/#</Topic>
</psc>
```

Request Update message

The **Request Update** command message is sent from a subscriber to a queue manager, to request the current retained publications for the specified topic and subscription point that match the given (optional) filter.

This message is sent to *SYSTEM.BROKER.CONTROL.QUEUE*, the queue manager's control queue. Authority to put a message to this queue is required, in addition to access authority for the topic in the request update; this is set by the queue manager's system administrator.

This command is normally used if the subscriber specified the option PubOnReqOnly when it registered. If the queue manager has any matching retained publications, they are sent to the subscriber. If the queue manager has no matching retained publications, the request fails with return code *MQRCCF_NO_RETAINED_MSG*. The requester must have previously registered a subscription with the same Topic, SubPoint, and Filter values.

Properties

Command (*MQPSC_COMMAND*)
The value is ReqUpdate (*MQPSC_REQUEST_UPDATE*). This property must be specified.

Topic (*MQPSC_TOPIC*)
The value is the topic that the subscriber is requesting; wildcard characters are allowed.

This property must be specified, but only one occurrence is allowed in this message.

SubPoint (*MQPSC_SUBSCRIPTION_POINT*)
The value is the subscription point to which the subscription is attached.

If this property is omitted, the default subscription point is used.

Filter (*MQPSC_FILTER*)
The value is an ESQL expression that is used as a filter on the contents of publication messages. If a publication on the specified topic matches the filter, it is sent to the subscriber.

The <Filter> property should have the same value as that specified on the original subscription for which you are now requesting an update.

If this property is omitted, no content filtering takes place.

RegOpt (*MQPSC_REGISTRATION_OPTION*)
The registration options property can take the following value:

CorrelAsId
(*MQPSC_CORREL_ID_AS_IDENTITY*)

The CorrelId in the message descriptor (MQMD), which must not be zero, is used when sending matching publications to the subscriber queue.

None
(*MQPSC_NONE*)

All options take their default values. This has the same effect as omitting the <RegOpt> property. If other options are specified at the same time, None is ignored.

VariableUserId
(*MQPSC_VARIABLE_USER_ID*)

When specified the identity of the subscriber (queue, queue manager, and correlid) is not restricted to a single userid. This differs from the existing behavior of the queue manager that associates the userid of the original registration message with the subscriber's identity and from then on prevents any other user using that identity. If a new subscriber tries to use the same identity, the command fails with return code *MQRCCF_DUPLICATE_SUBSCRIPTION*.

This allows any user to modify or deregister the subscription when they have suitable authority. Therefore, there is no need to check that the userid matches that of the original subscriber.

To add this option to an existing subscription, the command must come from the same userid as the original subscription.

If the subscription of the **Request Update** command has VariableUserId set, this must be set at request update time to indicate which subscription is referred to. Otherwise, the userid of the **Request Update** command is used to identify the subscription. This is overridden, along with the other subscriber identifiers, if a subscription name is supplied.

The default, if this property is omitted, is that no registration options are set.

QMgrName (*MQPSC_Q_MGR_NAME*)
The value is the name of the queue manager for the subscriber queue, to which the matching retained publication is sent by the queue manager.

If this property is omitted, the default is the ReplyToQMgr name in the message descriptor (MQMD). If the resulting name is blank, it defaults to the queue manager's QMgrName.

QName (*MQPSC_Q_NAME*)
The value is the name of the subscriber queue, to which the matching retained publication is sent by the queue manager.

If this property is omitted, the default is the ReplyToQ name in the message descriptor (MQMD), which must not be blank in this case.

SubName (*MQPSC_SUBSCRIPTION_NAME*)
This is a name given to a particular subscription. If specified on a **Request Update** command the SubName value takes precedence over all other identifier fields except the userid, unless VariableUserId is set on the subscription itself. If VariableUserId is not set, the *Request Update* command succeeds only if the userid of the command message matches that of the subscription. If the userid of the command message does not match that of the subscription, the command fails with return code *MQRCCF_DUPLICATE_IDENTITY*.

If VariableUserId is set, and the userid differs from that of the subscription, the command succeeds if the userid of the new command message has authority to browse the stream queue and put to the subscriber queue of the subscription. Otherwise, the command fails with return code *MQRCCF_NOT_AUTHORIZED*.

If a subscription exists that matches the traditional identity of this command, but has no SubName, the **Request Update** command fails with return code *MQRCCF_SUB_NAME_ERROR*.

If an attempt is made to request an update for a subscription that has a SubName using a command message that matches the traditional identity, but with no SubName specified, the command succeeds.

Example

Here is an example of NameValueData for a **Request Update** command message. In the sample application, the results service uses this message to request retained publications containing the latest scores for all teams. The subscriber's identity, including the CorrelId, is taken from the defaults in the MQMD.

```
<psc>
  <Command>ReqUpdate</Command>
  <RegOpt>CorrelAsId</RegOpt>
  <Topic>Sport/Soccer/State/LatestScore/#</Topic>
</psc>
```

Queue Manager Response message

A **Queue Manager Response** message is sent from a queue manager to the ReplyToQ of a publisher or a subscriber, to indicate the success or failure of a command message received by the queue manager if the command message descriptor specified that a response is required.

The response message is contained within the NameValueData field of the MQRFH2 header, in a <pscr> folder.

In the case of a warning or error, the response message contains the <psc> folder from the command message as well as the <pscr> folder. The message data, if any, is not contained in the queue manager response message. In the case of an error, none of the message that caused an error has been processed; in the case of a warning, some of the message might have been processed successfully.

If there is a failure sending a response:

- For publication messages, the queue manager tries to send the response to the IBM MQ dead-letter queue if the MQPUT fails. This allows the publication to be sent to subscribers even if the response cannot be sent back to the publisher.
- For other messages, or if the publication response cannot be sent to the dead-letter queue, an error is logged and the command message is normally rolled back. Whether this happens depends on how the MQInput node has been configured.

Properties

Completion (*MQPSCR_COMPLETION*)

The completion code, which can take one of three values:

ok

Command completed successfully

warning

Command completed but with warning

error

Command failed

Response (*MQPSCR_RESPONSE*)

The response to a command message, if that command produced a completion code of warning or error. It contains a <Reason> property, and might contain other properties that indicate the cause of the warning or error.

In the case of one or more errors, there is only one response folder, indicating the cause of the first error only. In the case of one or more warnings, there is a response folder for each warning.

Reason (*MQPSCR_REASON*)

The reason code qualifying the completion code, if the completion code is a warning or error. It is set to one of the error codes listed in the following example. The <Reason> property is contained within a <Response> folder. The reason code can be followed by any valid property from the <psc> folder (for example, a topic name), indicating the cause of the error or warning. If you get a reason code of ????, check the data for correctness, for example, matching angled brackets (< >).

Examples

Here are some examples of NameValueData in a **Queue Manager Response** message. A successful response might be the following:

```
<pscr>
  <Completion>ok</Completion>
</pscr>
```

Here is an example of a failure response; the failure is a filter error. The first NameValueData string contains the response; the second contains the original command.

```
<pscr>
  <Completion>error</Completion>
  <Response>
    <Reason>3150</Reason>
  </Reponse>
</pscr>

<psc>
 ...
 command message (to which
 the queue manager is responding)
 ...
</psc>
```

Here is an example of a warning response (due to unauthorized topics). The first NameValueData string contains the response; the second NameValueData string contains the original command.

```
<pscr>
  <Completion>warning</Completion>
  <Response>
    <Reason>3081</Reason>
    <Topic>topic1</Topic>
  </Reponse>
  <Response>
    <Reason>3081</Reason>
    <Topic>topic2</Topic>
  </Reponse>
</pscr>

<psc>
 ...
 command message (to which
 the queue manager is responding)
 ...
</psc>
```

Publish/subscribe reason codes

These reason codes might be returned in the Reason field of a publish/subscribe response <pscr> folder. Constants that can be used to represent these codes in the C or C++ programming languages are also listed.

The MQRC_ constants require the IBM MQ cmqc.h header file. The MQRCCF_ constants require the IBM MQ cmqcfc.h header file (apart from *MQRCCF_FILTER_ERROR* and *MQRCCF_WRONG_USER*, which require the cmqpsc.h header file).

Reason code and text	Explanation	Issued by
2336 MQRC_RFH_COMMAND_ERROR	Valid values for the <Command> field of a <psc> folder are: RegSub, DeregSub, Publish, DeletePub, and ReqUpdate. Any other values result in this error code being issued.	Any command
2337 MQRC_RFH_ PARM_ERROR	The <psc> and <mcd> folders both have a set of valid parameters that can be specified within them. Check the descriptions of these folders and ensure that you have not specified incorrect parameters.	Any command

Reason code and text	Explanation	Issued by
2338 MQRC_RFH_DUPLICATE_PARM	Some parameters (for example, Topic) within a <psc> folder can be repeated, but others (for example, Command) cannot be repeated. Check that you have not duplicated a non-repeatable parameter.	Any command
2339 MQRC_RFH_PARM_MISSING	Some parameters within <psc> or <mcd> folders are optional and can be omitted; some are mandatory and must not be omitted. Check that you have included all mandatory parameters within your <psc> and <mcd> folders.	Any command
2551 MQRC_SELECTION_NOT_AVAILABLE	No extended message selection provider was available to determine which subscribers with a filter specified should receive the publication.	Publish, Register Subscriber, and Request Update
	No extended message selection provider was available to handle the filter of the specified subscriber.	Register Subscriber and Request Update
2554 MQRC_CONTENT_ERROR	An extended message selection provider found an error in the current or retained publication.	Publish and Request Update
3008 MQRCCF_COMMAND_FAILED	An internal error occurred which prevented the command from executing correctly. The error might occur if the command is reissued. The system event log for the queue manager contains information which should be used when reporting the problem to IBM.	Any command
3072 MQRCCF_TOPIC_ERROR	One or more of the values you supplied for the Topic parameter are incorrect. Check that your values for Topic conform to the specified restrictions.	Any command
3073 MQRCCF_NOT_REGISTERED	The combination of SubPoint, Topic, and Filter that you specified on your DeregSub or ReqUpdate command was either not a combination with which you had previously registered or, for the DeregSub command if the DeregAll option was specified, one of the SubPoint, Topic, or Filter properties was not used to deregister any subscription.	Deregister Subscriber and Request Update commands

Reason code and text	Explanation	Issued by
3074 MQRCCF_Q_MGR_NAME_ERROR	The specified queue manager was not valid, or the queue manager was not available or did not exist.	Deregister Subscriber, Publish, Register Subscriber, and Request Update commands
3076 MQRCCF_Q_NAME_ERROR	The specified queue name was not valid, or the queue did not exist on the specified queue manager.	Deregister Subscriber, Publish, Register Subscriber, and Request Update commands
3077 MQRCCF_NO_RETAINED_MSG	There were no retained messages for the topic you specified. This might or might not be an error, depending on the design of your application program.	Request Update command
3079 MQRCCF_INCORRECT_Q	RegSub, DeregSub, and ReqUpdate commands are always sent to the SYSTEM.BROKER.CONTROL.QUEUE queue of the queue manager for which they are intended. Publish and Delete Publication commands are sent to the input queue for the particular publish/subscribe message flow for which they are intended; this is determined when the message flow is designed. This error code is returned if a command is sent to the wrong queue.	Any command
3080 MQRCCF_CORREL_ID_ERROR	You have specified CorrelAsId as one of your RegOpt parameters. However, the CorrelId field of the MQMD does not contain a valid correlation identifier (that is, it is set to MQCI_NONE).	Deregister Subscriber and Register Subscriber commands
3081 MQRCCF_NOT_AUTHORIZED	You are not authorized to perform the requested action. Authorization settings for the queue manager are handled by the system administrator using the Topics Hierarchy editor.	Publish and Register Subscriber commands
3083 MQRCCF_REG_OPTIONS_ERROR	You have specified an unrecognized RegOpt parameter in the <psc> folder that contains your RegSub or DeregSub command.	Deregister Subscriber and Register Subscriber commands
3084 MQRCCF_PUB_OPTIONS_ERROR	You have specified an unrecognized PubOpt parameter in the <psc> folder that contains your Publish command.	Publish command
3087 MQRCCF_DEL_OPTIONS_ERROR	You have specified an unrecognized DelOpt parameter in the <psc> folder that contains your DeletePub command.	Delete Publication command

Reason code and text	Explanation	Issued by
3150 MQRCCF_FILTER_ERROR	The value specified for the Filter parameter is not valid. Check the section that describes the valid syntax for filter expressions and ensure that your expression conforms.	Deregister Subscriber, Register Subscriber, and Request Update commands
3151 MQRCCF_WRONG_USER	A subscription that matches the one specified already exists; however, it was registered by a different user. A subscription can only be changed or deregistered by the user who originally registered it.	Deregister Subscriber, Register Subscriber, and Request Update commands
3152 MQRCCF_DUPLICATE_SUBSCRIPTION	A matching subscription already exists with a different subscription name.	
3153 MQRCCF_SUB_NAME_ERROR	Either the format of the subscription name is not valid, or a matching subscription already exists with no subscription name.	
3154 MQRCCF_SUB_IDENTITY_ERROR	The subscription identity parameter is in error. Either the supplied value exceeds the maximum length allowed, or the subscription identity is not currently a member of the subscription's identity set and a Join registration option was not specified.	
3155 MQRCCF_SUBSCRIPTION_IN_USE	An attempt to modify or deregister a subscription was attempted by a member of the identity set when it was not the only member of this set.	
3156 MQRCCF_SUBSCRIPTION_LOCKED	The subscription is currently exclusively locked by another identity.	
3157 MQRCCF_ALREADY_JOINED	A Join registration option was specified but the subscriber identity was already a member of the subscription's identity set.	

MQMD settings in command messages to the queue manager

Applications that send command messages to the queue manager use the following settings of fields in the message descriptor (MQMD). Fields that are left as the default value, or can be set to any valid value in the usual way, are not listed here.

Report
: See `MsgType` and `CorrelId`.

MsgType
: `MsgType` should be set to either *MQMT_REQUEST* or *MQMT_DATAGRAM*. *MQRC_MSG_TYPE_ERROR* will be returned if `MsgType` is not set to one of these values.

  `MsgType` should be set to *MQMT_REQUEST* for a command message if a response is always required. The MQRO_PAN and MQRO_NAN flags in the `Report` field are not significant in this case.

If MsgType is set to *MQMT_DATAGRAM*, responses depend on the setting of the MQRO_PAN and MQRO_NAN flags in the Report field:

- MQRO_PAN alone means that the queue manager sends a response only if the command succeeds.
- MQRO_NAN alone means that the queue manager sends a response only if the command fails.
- If a command completes with a warning, a response is sent if either MQRO_PAN or MQRO_NAN is set.
- MQRO_PAN + MQRO_NAN means that the queue manager sends a response whether the command succeeds or fails. This has the same effect from the queue manager's perspective as setting MsgType to MQMT_REQUEST.
- If neither MQRO_PAN nor MQRO_NAN is set, no response is ever sent.

Format
Set to MQFMT_RF_HEADER_2

MsgId
This field is normally set to MQMI_NONE, so that the queue manager generates a unique value.

CorrelId
This field can be set to any value. If the sender's identity includes a CorrelId, specify this value, together with MQRO_PASS_CORREL_ID in the Report field, to ensure that it is set in all response messages sent by the queue manager to the sender.

ReplyToQ
This field defines the queue to which responses, if any, are to be sent. This might be the sender's queue; this has the advantage that the QName parameter can be omitted from the message. If, however, responses are to be sent to a different queue, the QName parameter is needed.

ReplyToQMgr
This field defines the queue manager for responses. If you leave this field blank (the default value), the local queue manager puts its own name in this field.

MQMD settings for publications forwarded by a queue manager

A queue manager uses these settings of fields in the message descriptor (MQMD) when it sends a publication to a subscriber. All other fields in the MQMD are set to their default values.

Report
Report is set to MQRO_NONE.

MsgType
MsgType is set to MQMT_DATAGRAM.

Expiry
Expiry is set to the value in the Publish message received from the publisher. In the case of a retained message, the time outstanding is reduced by the approximate time that the message has been at the queue manager.

Format
Format is set to MQFMT_RF_HEADER_2

MsgId
MsgId is set to a unique value.

CorrelId
If CorrelId is part of the subscriber's identity, this is the value specified by the subscriber when registering. Otherwise, it is a non-zero value chosen by the queue manager.

Priority
Priority takes the value set by the publisher, or as resolved if the publisher specified MQPRI_PRIORITY_AS_Q_DEF.

Persistence
`Persistence` takes the value set by the publisher, or as resolved if the publisher specified MQPER_PERSISTENCE_AS_Q_DEF, unless specified otherwise in the `Register Subscriber` message for the subscriber to which this publication is being sent.

ReplyToQ
`ReplyToQ` is set to blanks.

ReplyToQMgr
`ReplyToQMgr` is set to the name of the queue manager.

UserIdentifier
`UserIdentifier` is the subscriber's user identifier, as set when the subscriber registered.

AccountingToken
`AccountingToken` is the subscriber's accounting token, as set when the subscriber first registered.

ApplIdentityData
`ApplIdentityData` is the subscriber's application identity data, as set when the subscriber first registered.

PutApplType
`PutApplType` is set to MQAT_BROKER.

PutApplName
`PutApplName` is set to the first 28 characters of the name of the queue manager.

PutDate
`PutDate` is the date when the message was put.

PutTime
`PutTime` is the time when the message was put.

ApplOriginData
`ApplOriginData` is set to blanks.

MQMD settings in queue manager response messages

A queue manager uses these settings of fields in the message descriptor (MQMD) when sending a reply to a publication message. All other fields in the MQMD are set to their default values.

Report
`Report` is set to all zeros.

MsgType
`MsgType` is set to MQMT_REPLY.

Format
`Format` is set to MQFMT_RF_HEADER_2

MsgId
The setting of `MsgId` depends on the `Report` options in the original command message. By default, it is set to MQMI_NONE, so that the queue manager generates a unique value.

CorrelId
The setting of `CorrelId` depends on the `Report` options in the original command message. By default, this means that the `CorrelId` is set to the same value as the `MsgId` of the command message. This can be used to correlate commands with their responses.

Priority
`Priority` is set to the same value as in the original command message.

Persistence
`Persistence` is set to the value set in the original command message.

Expiry
`Expiry` is set to the same value as in the original command message received by the queue manager.

PutApplType
`PutApplType` is set to MQAT_BROKER.

PutApplName
`PutApplName` is set to the first 28 characters of name of the queue manager.

Other context fields are set as if generated with MQPMO_PASS_IDENTITY_CONTEXT.

Machine encodings

This section describes the structure of the *Encoding* field in the message descriptor.

See "MQMD - Message descriptor" on page 413 for a summary of the fields in the structure.

The *Encoding* field is a 32-bit integer that is divided into four separate subfields; these subfields identify:

- The encoding used for binary integers
- The encoding used for packed-decimal integers
- The encoding used for floating-point numbers
- Reserved bits

Each subfield is identified by a bit mask that has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined:

MQENC_INTEGER_MASK
Mask for binary-integer encoding.

This subfield occupies bit positions 28 through 31 within the *Encoding* field.

MQENC_DECIMAL_MASK
Mask for packed-decimal-integer encoding.

This subfield occupies bit positions 24 through 27 within the *Encoding* field.

MQENC_FLOAT_MASK
Mask for floating-point encoding.

This subfield occupies bit positions 20 through 23 within the *Encoding* field.

MQENC_RESERVED_MASK
Mask for reserved bits.

This subfield occupies bit positions 0 through 19 within the *Encoding* field.

Binary-integer encoding

The following values are valid for the binary-integer encoding:

MQENC_INTEGER_UNDEFINED
Binary integers are represented using an encoding that is undefined.

MQENC_INTEGER_NORMAL
Binary integers are represented in the conventional way:

- The least significant byte in the number has the highest address of any of the bytes in the number; the most significant byte has the lowest address
- The least significant bit in each byte is adjacent to the byte with the next higher address; the most significant bit in each byte is adjacent to the byte with the next lower address

MQENC_INTEGER_REVERSED
Binary integers are represented in the same way as MQENC_INTEGER_NORMAL, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as MQENC_INTEGER_NORMAL.

Packed-decimal-integer encoding

The following values are valid for the packed-decimal-integer encoding:

MQENC_DECIMAL_UNDEFINED
Packed-decimal integers are represented using an encoding that is undefined.

MQENC_DECIMAL_NORMAL
Packed-decimal integers are represented in the conventional way:

- Each decimal digit in the printable form of the number is represented in packed decimal by a single hexadecimal digit in the range X'0' through X'9'. Each hexadecimal digit occupies four bits, and so each byte in the packed decimal number represents two decimal digits in the printable form of the number.
- The least significant byte in the packed-decimal number is the byte that contains the least significant decimal digit. Within that byte, the most significant four bits contain the least significant decimal digit, and the least significant four bits contain the sign. The sign is either X'C' (positive), X'D' (negative), or X'F' (unsigned).
- The least significant byte in the number has the highest address of any of the bytes in the number; the most significant byte has the lowest address.
- The least significant bit in each byte is adjacent to the byte with the next higher address; the most significant bit in each byte is adjacent to the byte with the next lower address.

MQENC_DECIMAL_REVERSED
Packed-decimal integers are represented in the same way as MQENC_DECIMAL_NORMAL, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as MQENC_DECIMAL_NORMAL.

Floating-point encoding

The following values are valid for the floating-point encoding:

MQENC_FLOAT_UNDEFINED
Floating-point numbers are represented using an encoding that is undefined.

MQENC_FLOAT_IEEE_NORMAL
Floating-point numbers are represented using the standard IEEE [4] floating-point format, with the bytes arranged as follows:

- The least significant byte in the mantissa has the highest address of any of the bytes in the number; the byte containing the exponent has the lowest address
- The least significant bit in each byte is adjacent to the byte with the next higher address; the most significant bit in each byte is adjacent to the byte with the next lower address

Details of the IEEE float encoding can be found in IEEE Standard 754.

MQENC_FLOAT_IEEE_REVERSED
Floating-point numbers are represented in the same way as MQENC_FLOAT_IEEE_NORMAL, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as MQENC_FLOAT_IEEE_NORMAL.

MQENC_FLOAT_S390
Floating-point numbers are represented using the standard System/390 floating-point format; this is also used by System/370.

Constructing encodings

To construct a value for the *Encoding* field in MQMD, the relevant constants that describe the required encodings can be added together (do not add the same constant more than once), or combined using the bitwise OR operation (if the programming language supports bit operations).

Whichever method is used, combine only one of the MQENC_INTEGER_* encodings with one of the MQENC_DECIMAL_* encodings and one of the MQENC_FLOAT_* encodings.

[4] The Institute of Electrical and Electronics Engineers

Analyzing encodings

The *Encoding* field contains subfields; because of this, applications that need to examine the integer, packed decimal, or float encoding must use one of the techniques described.

Using bit operations

If the programming language supports bit operations, perform the following steps:

1. Select one of the following values, according to the type of encoding required:
   - MQENC_INTEGER_MASK for the binary integer encoding
   - MQENC_DECIMAL_MASK for the packed decimal integer encoding
   - MQENC_FLOAT_MASK for the floating point encoding

   Call the value A.
2. Combine the *Encoding* field with A using the bitwise AND operation; call the result B.
3. B is the encoding required, and can be tested for equality with each of the values that is valid for that type of encoding.

Using arithmetic

If the programming language *does not* support bit operations, perform the following steps using integer arithmetic:

1. Select one of the following values, according to the type of encoding required:
   - 1 for the binary integer encoding
   - 16 for the packed decimal integer encoding
   - 256 for the floating point encoding

   Call the value A.
2. Divide the value of the *Encoding* field by A ; call the result B.
3. Divide B by 16; call the result C.
4. Multiply C by 16 and subtract from B ; call the result D.
5. Multiply D by A ; call the result E.
6. E is the encoding required, and can be tested for equality with each of the values that is valid for that type of encoding.

Summary of machine architecture encodings

Encodings for machine architectures are shown in Table 631 on page 889.

Table 631. Summary of encodings for machine architectures

Machine architecture	Binary integer encoding	Packed decimal integer encoding	Floating point encoding
IBM i	normal	normal	IEEE normal
Intel x86	reversed	reversed	IEEE reversed
PowerPC®	normal	normal	IEEE normal
System/390	normal	normal	System/390

Report options and message flags

This section describes the *Report* and *MsgFlags* fields that are part of the message descriptor MQMD specified on the MQGET, MQPUT, and MQPUT1 calls.

The topics in this section describe:

- The structure of the report field and how the queue manager processes it
- How an application analyzes the report field
- The structure of the message-flags field

For more information about the MQMD message descriptor, see "MQMD - Message descriptor" on page 413.

Structure of the report field

This information describes the structure of the report field.

The *Report* field is a 32-bit integer that is divided into three separate subfields. These subfields identify:

- Report options that are rejected if the local queue manager does not recognize them
- Report options that are always accepted, even if the local queue manager does not recognize them
- Report options that are accepted only if certain other conditions are satisfied

Each subfield is identified by a bit mask that has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. The bits in a subfield are not necessarily adjacent. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined to identify the subfields:

MQRO_REJECT_UNSUP_MASK

This mask identifies the bit positions within the *Report* field where report options that are not supported by the local queue manager cause the MQPUT or MQPUT1 call to fail with completion code MQCC_FAILED and reason code MQRC_REPORT_OPTIONS_ERROR.

This subfield occupies bit positions 3, and 11 through 13.

MQRO_ACCEPT_UNSUP_MASK

This mask identifies the bit positions within the *Report* field where report options that are not supported by the local queue manager are nevertheless accepted on the MQPUT or MQPUT1 calls. Completion code MQCC_WARNING with reason code MQRC_UNKNOWN_REPORT_OPTION are returned in this case.

This subfield occupies bit positions 0 through 2, 4 through 10, and 24 through 31.

The following report options are included in this subfield:

- MQRO_ACTIVITY
- MQRO_COPY_MSG_ID_TO_CORREL_ID
- MQRO_DEAD_LETTER_Q
- MQRO_DISCARD_MSG
- MQRO_EXCEPTION
- MQRO_EXCEPTION_WITH_DATA
- MQRO_EXCEPTION_WITH_FULL_DATA
- MQRO_EXPIRATION
- MQRO_EXPIRATION_WITH_DATA
- MQRO_EXPIRATION_WITH_FULL_DATA
- MQRO_NAN
- MQRO_NEW_MSG_ID
- MQRO_NONE

- MQRO_PAN
- MQRO_PASS_CORREL_ID
- MQRO_PASS_MSG_ID

MQRO_ACCEPT_UNSUP_IF_XMIT_MASK

This mask identifies the bit positions within the *Report* field where report options that are not supported by the local queue manager are nevertheless accepted on the MQPUT or MQPUT1 calls *provided* that both of the following conditions are satisfied:

- The message is destined for a remote queue manager.
- The application is not putting the message directly on a local transmission queue (that is, the queue identified by the *ObjectQMgrName* and *ObjectName* fields in the object descriptor specified on the MQOPEN or MQPUT1 call is not a local transmission queue).

Completion code MQCC_WARNING with reason code MQRC_UNKNOWN_REPORT_OPTION are returned if these conditions are satisfied, and MQCC_FAILED with reason code MQRC_REPORT_OPTIONS_ERROR if not.

This subfield occupies bit positions 14 through 23.

The following report options are included in this subfield:

- MQRO_COA
- MQRO_COA_WITH_DATA
- MQRO_COA_WITH_FULL_DATA
- MQRO_COD
- MQRO_COD_WITH_DATA
- MQRO_COD_WITH_FULL_DATA

If any options are specified in the *Report* field that the queue manager does not recognize, the queue manager checks each subfield in turn by using the bitwise AND operation to combine the *Report* field with the mask for that subfield. If the result of that operation is not zero, the completion code and reason codes described previously are returned.

If MQCC_WARNING is returned, it is not defined which reason code is returned if other warning conditions exist.

The ability to specify and have accepted report options that are not recognized by the local queue manager is useful when sending a message with a report option that is recognized and processed by a *remote* queue manager.

Analyzing the report field

The *Report* field contains subfields; because of this, applications that need to check whether the sender of the message requested a particular report must use one of the techniques described.

Using bit operations

If the programming language supports bit operations, perform the following steps:

1. Select one of the following values, according to the type of report to be checked:
   - MQRO_COA_WITH_FULL_DATA for COA report
   - MQRO_COD_WITH_FULL_DATA for COD report
   - MQRO_EXCEPTION_WITH_FULL_DATA for exception report
   - MQRO_EXPIRATION_WITH_FULL_DATA for expiration report

   Call the value A.

   On z/OS, use the MQRO_*_WITH_DATA values instead of the MQRO_*_WITH_FULL_DATA values.

2. Combine the *Report* field with A using the bitwise AND operation; call the result B.
3. Test B for equality with each value that is possible for that type of report.

   For example, if A is MQRO_EXCEPTION_WITH_FULL_DATA, test B for equality with each of the following to determine what was specified by the sender of the message:

   - MQRO_NONE
   - MQRO_EXCEPTION
   - MQRO_EXCEPTION_WITH_DATA
   - MQRO_EXCEPTION_WITH_FULL_DATA

   The tests can be performed in whatever order is most convenient for the application logic.

Use a similar method to test for the MQRO_PASS_MSG_ID or MQRO_PASS_CORREL_ID options; select as the value A whichever of these two constants is appropriate, and then proceed as described previously.

Using arithmetic

If the programming language *does not* support bit operations, perform the following steps using integer arithmetic:

1. Select one of the following values, according to the type of report to be checked:

   - MQRO_COA for COA report
   - MQRO_COD for COD report
   - MQRO_EXCEPTION for exception report
   - MQRO_EXPIRATION for expiration report

   Call the value A.
2. Divide the *Report* field by A ; call the result B.
3. Divide B by 8 ; call the result C.
4. Multiply C by 8 and subtract from B ; call the result D.
5. Multiply D by A ; call the result E.
6. Test E for equality with each value that is possible for that type of report.

   For example, if A is MQRO_EXCEPTION, test E for equality with each of the following to determine what was specified by the sender of the message:

   - MQRO_NONE
   - MQRO_EXCEPTION
   - MQRO_EXCEPTION_WITH_DATA
   - MQRO_EXCEPTION_WITH_FULL_DATA

   The tests can be performed in whatever order is most convenient for the application logic.

The following pseudocode illustrates this technique for exception report messages:

```
A = MQRO_EXCEPTION
B = Report/A
C = B/8
D = B - C*8
E = D*A
```

Use a similar method to test for the MQRO_PASS_MSG_ID or MQRO_PASS_CORREL_ID options; select as the value A whichever of these two constants is appropriate, and then proceed as described previously, but replacing the value 8 in the previous steps by the value 2.

Structure of the message-flags field

This information describes the structure of the message-flags field.

The *MsgFlags* field is a 32-bit integer that is divided into three separate subfields. These subfields identify:

- Message flags that are rejected if the local queue manager does not recognize them
- Message flags that are always accepted, even if the local queue manager does not recognize them
- Message flags that are accepted only if certain other conditions are satisfied

Note: All subfields in *MsgFlags* are reserved for use by the queue manager.

Each subfield is identified by a bit mask that has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined to identify the subfields:

MQMF_REJECT_UNSUP_MASK

This mask identifies the bit positions within the *MsgFlags* field where message flags that are not supported by the local queue manager cause the MQPUT or MQPUT1 call to fail with completion code MQCC_FAILED and reason code MQRC_MSG_FLAGS_ERROR.

This subfield occupies bit positions 20 through 31.

The following message flags are included in this subfield:

- MQMF_LAST_MSG_IN_GROUP
- MQMF_LAST_SEGMENT
- MQMF_MSG_IN_GROUP
- MQMF_SEGMENT
- MQMF_SEGMENTATION_ALLOWED
- MQMF_SEGMENTATION_INHIBITED

MQMF_ACCEPT_UNSUP_MASK

This mask identifies the bit positions within the *MsgFlags* field where message flags that are not supported by the local queue manager are nevertheless accepted on the MQPUT or MQPUT1 calls. The completion code is MQCC_OK.

This subfield occupies bit positions 0 through 11.

MQMF_ACCEPT_UNSUP_IF_XMIT_MASK

This mask identifies the bit positions within the *MsgFlags* field where message flags that are not supported by the local queue manager are nevertheless accepted on the MQPUT or MQPUT1 calls *provided* that both of the following conditions are satisfied:

- The message is destined for a remote queue manager.
- The application is not putting the message directly on a local transmission queue (that is, the queue identified by the *ObjectQMgrName* and *ObjectName* fields in the object descriptor specified on the MQOPEN or MQPUT1 call is not a local transmission queue).

Completion code MQCC_OK is returned if these conditions are satisfied, and MQCC_FAILED with reason code MQRC_MSG_FLAGS_ERROR if not.

This subfield occupies bit positions 12 through 19.

If there are flags specified in the *MsgFlags* field that the queue manager does not recognize, the queue manager checks each subfield in turn by using the bitwise AND operation to combine the *MsgFlags* field with the mask for that subfield. If the result of that operation is not zero, the completion code and reason codes described previously are returned.

Data-conversion exit

This collection of topics describes the interface to the data-conversion exit, and the processing performed by the queue manager when data conversion is required.

For more information about data conversion, see *Data Conversion under IBM MQ* at https://www.ibm.com/support/pages/node/317869.

The data-conversion exit is invoked as part of the processing of the MQGET call in order to convert the application message data to the representation required by the receiving application. Conversion of the application message data is optional; it requires the MQGMO_CONVERT option to be specified on the MQGET call.

The following subjects are described:

- The processing performed by the queue manager in response to the MQGMO_CONVERT option; see "Conversion processing" on page 894.
- Processing conventions used by the queue manager when processing a built-in format; these conventions are recommended for user-written exits too. See "Processing conventions" on page 895.
- Special considerations for converting report messages; see "Conversion of report messages" on page 899.
- The parameters passed to the data-conversion exit; see "MQ_DATA_CONV_EXIT - Data conversion exit" on page 912.
- A call that can be used from the exit to convert character data between different representations; see "MQXCNVC - Convert characters" on page 906.
- The data-structure parameter that is specific to the exit; see "MQDXP - Data-conversion exit parameter" on page 900.

Conversion processing

This information describes the processing performed by the queue manager in response to the MQGMO_CONVERT option.

The queue manager performs the following actions if the MQGMO_CONVERT option is specified on the MQGET call, and there is a message to be returned to the application:

1. If one or more of the following is true, no conversion is necessary:

   - The message data is already in the character set and encoding required by the application issuing the MQGET call. The application must set the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter of the MQGET call to the values required, before issuing the call.
   - The length of the message data is zero.
   - The length of the **Buffer** parameter of the MQGET call is zero.

   In these cases the message is returned without conversion to the application issuing the MQGET call; the *CodedCharSetId* and *Encoding* values in the **MsgDesc** parameter are set to the values in the control information in the message, and the call completes with one of the following combinations of completion code and reason code:

Table 632. Completion code and reason code combinations

Completion code	Reason code
MQCC_OK	MQRC_NONE
MQCC_WARNING	MQRC_TRUNCATED_MSG_ACCEPTED
MQCC_WARNING	MQRC_TRUNCATED_MSG_FAILED

   The following steps are performed only if the character set or encoding of the message data differs from the corresponding value in the **MsgDesc** parameter, and there is data to be converted:

2. If the *Format* field in the control information in the message has the value MQFMT_NONE, the message is returned unconverted, with completion code MQCC_WARNING and reason code MQRC_FORMAT_ERROR.

   In all other cases conversion processing continues.
3. The message is removed from the queue and placed in a temporary buffer that is the same size as the **Buffer** parameter. For browse operations, the message is copied into the temporary buffer, instead of being removed from the queue.
4. If the message has to be truncated to fit in the buffer, the following is done:
   - If the MQGMO_ACCEPT_TRUNCATED_MSG option was not specified, the message is returned unconverted, with completion code MQCC_WARNING and reason code MQRC_TRUNCATED_MSG_FAILED.
   - If the MQGMO_ACCEPT_TRUNCATED_MSG option *was* specified, the completion code is set to MQCC_WARNING, the reason code is set to MQRC_TRUNCATED_MSG_ACCEPTED, and conversion processing continues.
5. If the message can be accommodated in the buffer without truncation, or the MQGMO_ACCEPT_TRUNCATED_MSG option was specified, the following is done:
   - If the format is a built-in format, the buffer is passed to the queue manager's data-conversion service.
   - If the format is not a built-in format, the buffer is passed to a user-written exit with the same name as the format. If the exit cannot be found, the message is returned unconverted, with completion code MQCC_WARNING and reason code MQRC_FORMAT_ERROR.

   If no error occurs, the output from the data-conversion service or from the user-written exit is the converted message, plus the completion code and reason code to be returned to the application issuing the MQGET call.
6. If the conversion is successful, the queue manager returns the converted message to the application. In this case, the completion code and reason code returned by the MQGET call are one of the following combinations:

Table 633. Completion code and reason code combinations

Completion code	Reason code
MQCC_OK	MQRC_NONE
MQCC_WARNING	MQRC_TRUNCATED_MSG_ACCEPTED

However, if the conversion is performed by a user-written exit, other reason codes can be returned, even when the conversion is successful.

If the conversion fails, the queue manager returns the unconverted message to the application, with the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter set to the values in the control information in the message, and with completion code MQCC_WARNING.

Processing conventions

When converting a built-in format, the queue manager follows the processing conventions described.

User-written exits should also follow these conventions, although this is not enforced by the queue manager. The built-in formats converted by the queue manager are:

- MQFMT_ADMIN
- MQFMT_CICS (z/OS only)
- MQFMT_COMMAND_1
- MQFMT_COMMAND_2
- MQFMT_DEAD_LETTER_HEADER

- MQFMT_DIST_HEADER
- MQFMT_EVENT version 1
- MQFMT_EVENT version 2
- MQFMT_IMS
- MQFMT_IMS_VAR_STRING
- MQFMT_MD_EXTENSION
- MQFMT_PCF
- MQFMT_REF_MSG_HEADER
- MQFMT_RF_HEADER
- MQFMT_RF_HEADER_2
- MQFMT_STRING
- MQFMT_TRIGGER
- MQFMT_WORK_INFO_HEADER (z/OS only)
- MQFMT_XMIT_Q_HEADER

1. If the message expands during conversion, and exceeds the size of the **Buffer** parameter, the following is done:
   - If the MQGMO_ACCEPT_TRUNCATED_MSG option was not specified, the message is returned unconverted, with completion code MQCC_WARNING and reason code MQRC_CONVERTED_MSG_TOO_BIG.
   - If the MQGMO_ACCEPT_TRUNCATED_MSG option *was* specified, the message is truncated, the completion code is set to MQCC_WARNING, the reason code is set to MQRC_TRUNCATED_MSG_ACCEPTED, and conversion processing continues.
2. If truncation occurs (either before or during conversion), the number of valid bytes returned in the **Buffer** parameter can be less than the length of the buffer.

   This can occur, for example, if a 4-byte integer or a DBCS character straddles the end of the buffer. The incomplete element of information is not converted, and those bytes in the returned message do not contain valid information. This can also occur if a message that was truncated before conversion shrinks during conversion.

   If the number of valid bytes returned is less than the length of the buffer, the unused bytes at the end of the buffer are set to nulls.
3. If an array or string straddles the end of the buffer, as much of the data as possible is converted; only the particular array element or DBCS character which is incomplete is not converted; preceding array elements or characters are converted.
4. If truncation occurs (either before or during conversion), the length returned for the **DataLength** parameter is the length of the unconverted message before truncation.
5. When strings are converted between single-byte character sets (SBCS), double-byte character sets (DBCS), or multi-byte character sets (MBCS), the strings can expand or contract.
   - In the PCF formats MQFMT_ADMIN, MQFMT_EVENT, and MQFMT_PCF, the strings in the MQCFST and MQCFSL structures expand or contract as necessary to accommodate the string after conversion.

     For the string-list structure MQCFSL, the strings in the list might expand or contract by different amounts. If this happens, the queue manager pads the shorter strings with blanks to make them the same length as the longest string after conversion.
   - In the format MQFMT_REF_MSG_HEADER, the strings addressed by the `SrcEnvOffset`, `SrcNameOffset`, `DestEnvOffset`, and `DestNameOffset` fields expand or contract as necessary to accommodate the strings after conversion.
   - In the format MQFMT_RF_HEADER, the `NameValueString` field expands or contracts as necessary to accommodate the name-value pairs after conversion.

- In structures with fixed field sizes, the queue manager allows strings to expand or contract within their fixed fields, provided that no significant information is lost. In this regard, trailing blanks and characters following the first null character in the field are treated as insignificant.
  - If the string expands, but only insignificant characters need to be discarded to accommodate the converted string in the field, the conversion succeeds and the call completes with MQCC_OK and reason code MQRC_NONE (assuming no other errors).
  - If the string expands, but the converted string requires significant characters to be discarded in order to fit in the field, the message is returned unconverted and the call completes with MQCC_WARNING and reason code MQRC_CONVERTED_STRING_TOO_BIG.

    Note: Reason code MQRC_CONVERTED_STRING_TOO_BIG results in this case whether or not the MQGMO_ACCEPT_TRUNCATED_MSG option was specified.
  - If the string contracts, the queue manager pads the string with blanks to the length of the field.

6. For messages consisting of one or more MQ header structures followed by user data, one or more of the header structures might be converted, while the remainder of the message is not. However, (with two exceptions) the *CodedCharSetId* and *Encoding* fields in each header structure always correctly indicate the character set and encoding of the data that follows the header structure.

   The two exceptions are the MQCIH and MQIIH structures, where the values in the *CodedCharSetId* and *Encoding* fields in those structures are not significant. For those structures, the data following the structure is in the same character set and encoding as the MQCIH or MQIIH structure itself.
7. If the *CodedCharSetId* or *Encoding* fields in the control information of the message being retrieved, or in the **MsgDesc** parameter, specify values that are undefined or not supported, the queue manager might ignore the error if the undefined or unsupported value does not need to be used in converting the message.

   For example, if the *Encoding* field in the message specifies an unsupported float encoding, but the message contains only integer data, or contains floating-point data that does not require conversion (because the source and target float encodings are identical), the error might not be diagnosed.

   If the error is diagnosed, the message is returned unconverted, with completion code MQCC_WARNING and one of the MQRC_SOURCE_*_ERROR or MQRC_TARGET_*_ERROR reason codes (as appropriate); the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter are set to the values in the control information in the message.

   If the error is not diagnosed and the conversion completes successfully, the values returned in the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter are those specified by the application issuing the MQGET call.
8. In all cases, if the message is returned to the application unconverted the completion code is set to MQCC_WARNING, and the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter are set to the values appropriate to the unconverted data. This is done for MQFMT_NONE also.

   The **Reason** parameter is set to a code that indicates why the conversion could not be carried out, unless the message also had to be truncated; reason codes related to truncation take precedence over reason codes related to conversion. (To determine if a truncated message was converted, check the values returned in the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter.)

   When an error is diagnosed, either a specific reason code is returned, or the general reason code MQRC_NOT_CONVERTED. The reason code returned depends on the diagnostic capabilities of the underlying data-conversion service.
9. If completion code MQCC_WARNING is returned, and more than one reason code is relevant, the order of precedence is as follows:
   a. The following reasons take precedence over all others; only one of the reasons in this group can arise:
      - MQRC_SIGNAL_REQUEST_ACCEPTED
      - MQRC_TRUNCATED_MSG_ACCEPTED

   b. The order of precedence within the remaining reason codes is not defined.

10. On completion of the MQGET call:
    - The following reason code indicates that the message was converted successfully:
      - MQRC_NONE
    - The following reason codes indicate that the message *might* have been converted successfully (check the *CodedCharSetId* and *Encoding* fields in the **MsgDesc** parameter to find out):
      - MQRC_MSG_MARKED_BROWSE_CO_OP
      - MQRC_TRUNCATED_MSG_ACCEPTED
    - All other reason codes indicate that the message was not converted.

    The following processing is specific to the built-in formats; it does not apply to user-defined formats:
11. With the exception of the following formats:
    - MQFMT_ADMIN
    - MQFMT_COMMAND_1
    - MQFMT_COMMAND_2
    - MQFMT_EVENT
    - MQFMT_IMS_VAR_STRING
    - MQFMT_PCF
    - MQFMT_STRING

    none of the built-in formats can be converted from or to character sets that do not have SBCS characters for the characters that are valid in queue names. If an attempt is made to perform such a conversion, the message is returned unconverted, with completion code MQCC_WARNING and reason code MQRC_SOURCE_CCSID_ERROR or MQRC_TARGET_CCSID_ERROR, as appropriate.

    The Unicode character set UTF-16 is an example of a character set that does not have SBCS characters for the characters that are valid in queue names.
12. If the message data for a built-in format is truncated, fields within the message that contain lengths of strings, or counts of elements or structures, are not adjusted to reflect the length of the data actually returned to the application; the values returned for such fields within the message data are the values applicable to the message *before truncation*.

    When processing messages such as a truncated MQFMT_ADMIN message, ensure that the application does not attempt to access data beyond the end of the data returned.
13. If the format name is MQFMT_DEAD_LETTER_HEADER, the message data begins with an MQDLH structure, possibly followed by zero or more bytes of application message data. The format, character set, and encoding of the application message data are defined by the `Format`, `CodedCharSetId`, and `Encoding` fields in the MQDLH structure at the start of the message. Because the MQDLH structure and application message data can have different character sets and encodings, one, other, or both of the MQDLH structure and application message data might require conversion.

    The queue manager converts the MQDLH structure first, as necessary. If conversion is successful, or the MQDLH structure does not require conversion, the queue manager checks the `CodedCharSetId` and `Encoding` fields in the MQDLH structure to see if conversion of the application message data is required. If conversion is required, the queue manager invokes the user-written exit with the name given by the `Format` field in the MQDLH structure, or performs the conversion itself (if `Format` is the name of a built-in format).

    If the MQGET call returns a completion code of MQCC_WARNING, and the reason code is one of those indicating that conversion was not successful, one of the following applies:
    - The MQDLH structure could not be converted. In this case the application message data will not have been converted either.
    - The MQDLH structure was converted, but the application message data was not.

The application can examine the values returned in the CodedCharSetId and Encoding fields in the **MsgDesc** parameter, and those in the MQDLH structure, in order to determine which of the previously applies.

14. If the format name is MQFMT_XMIT_Q_HEADER, the message data begins with an MQXQH structure, possibly followed by zero or more bytes of additional data. This additional data is usually the application message data (which may be of zero length), but there can also be one or more further MQ header structures present, at the start of the additional data.

    The MQXQH structure must be in the character set and encoding of the queue manager. The format, character set, and encoding of the data following the MQXQH structure are given by the Format, CodedCharSetId, and Encoding fields in the MQMD structure contained within the MQXQH. For each subsequent MQ header structure present, the Format, CodedCharSetId, and Encoding fields in the structure describe the data that follows that structure; that data is either another MQ header structure, or the application message data.

    If the MQGMO_CONVERT option is specified for an MQFMT_XMIT_Q_HEADER message, the application message data and certain of the MQ header structures are converted, *but the data in the MQXQH structure is not*. On return from the MQGET call, therefore:

    - The values of the Format, CodedCharSetId, and Encoding fields in the **MsgDesc** parameter describe the data in the MQXQH structure, and not the application message data; the values are therefore not the same as those specified by the application that issued the MQGET call.

      The effect of this is that an application that repeatedly gets messages from a transmission queue with the MQGMO_CONVERT option specified must reset the CodedCharSetId and Encoding fields in the **MsgDesc** parameter to the values required for the application message data, before each MQGET call.

    - The values of the Format, CodedCharSetId, and Encoding fields in the last MQ header structure present describe the application message data. If there are no other MQ header structures present, the application message data is described by these fields in the MQMD structure within the MQXQH structure. If conversion is successful, the values will be the same as those specified in the **MsgDesc** parameter by the application that issued the MQGET call.

    If the message is a distribution-list message, the MQXQH structure is followed by an MQDH structure (plus its arrays of MQOR and MQPMR records), which in turn might be followed by zero or more further MQ header structures and zero or more bytes of application message data. Like the MQXQH structure, the MQDH structure must be in the character set and encoding of the queue manager, and it is not converted on the MQGET call, even if the MQGMO_CONVERT option is specified.

    The processing of the MQXQH and MQDH structures described previously is primarily intended for use by message channel agents when they get messages from transmission queues.

Conversion of report messages

In general a report message can contain varying amounts of application message data, according to the report options specified by the sender of the original message. However, an activity report can contain data but without the report option mentioning *_WITH_DATA in the constant.

In particular, a report message can contain either:

1. No application message data
2. Some of the application message data from the original message

   This occurs when the sender of the original message specifies MQRO_*_WITH_DATA and the message is longer than 100 bytes.
3. All the application message data from the original message

   This occurs when the sender of the original message specifies MQRO_*_WITH_FULL_DATA, or specifies MQRO_*_WITH_DATA and the message is 100 bytes or shorter.

When the queue manager or message channel agent generates a report message, it copies the format name from the original message into the *Format* field in the control information in the report message.

The format name in the report message might therefore imply a length of data that is different from the length actually present in the report message (cases 1 and 2 previously).

If the MQGMO_CONVERT option is specified when the report message is retrieved:

- For case 1 previously, the data-conversion exit is not invoked (because the report message has no data).
- For case 3 previously, the format name correctly implies the length of the message data.
- But for case 2 previously, the data-conversion exit is invoked to convert a message that is *shorter* than the length implied by the format name.

  In addition, the reason code passed to the exit is usually MQRC_NONE (that is, the reason code does not indicate that the message has been truncated). This happens because the message data was truncated by the *sender* of the report message, and not by the receiver's queue manager in response to the MQGET call.

Because of these possibilities, the data-conversion exit must not use the format name to deduce the length of data passed to it; instead the exit must check the length of data provided, and be prepared to convert less data than the length implied by the format name. If the data can be converted successfully, completion code MQCC_OK and reason code MQRC_NONE must be returned by the exit. The length of the message data to be converted is passed to the exit as the **InBufferLength** parameter.

Product-sensitive programming interface

MQDXP - Data-conversion exit parameter

The MQDXP structure is a parameter that the queue manager passes to the data-conversion exit when the exit is invoked to convert the message data as part of the processing of the MQGET call. See the description of the MQ_DATA_CONV_EXIT call for details of the data conversion exit.

Character data in MQDXP is in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute. Numeric data in MQDXP is in the native machine encoding; this is given by MQENC_NATIVE.

Only the *DataLength*, *CompCode*, *Reason*, and *ExitResponse* fields in MQDXP can be changed by the exit; changes to other fields are ignored. However, the *DataLength* field cannot be changed if the message being converted is a segment that contains only part of a logical message.

When control returns to the queue manager from the exit, the queue manager checks the values returned in MQDXP. If the values returned are not valid, the queue manager continues processing as though the exit had returned MQXDR_CONVERSION_FAILED in *ExitResponse* ; however, the queue manager ignores the values of the *CompCode* and *Reason* fields returned by the exit in this case, and uses instead the values those fields had on *input* to the exit. The following values in MQDXP cause this processing to occur:

- *ExitResponse* field not MQXDR_OK and not MQXDR_CONVERSION_FAILED
- *CompCode* field not MQCC_OK and not MQCC_WARNING
- *DataLength* field less than zero, or *DataLength* field changed when the message being converted is a segment that contains only part of a logical message.

The following table summarizes the fields in the structure.

Table 634. Fields in MQDXP

Field	Description	Topic
StrucId	Structure identifier	StrucId
Version	Structure version number	Version
AppOptions	Application options	AppOptions

Table 634. Fields in MQDXP (continued)		
Field	**Description**	**Topic**
Encoding	Numeric encoding required by application	Encoding
CodedCharSetId	Character set required by application	CodedCharSetId
DataLength	Length in bytes of message data	DataLength
CompCode	Completion code	CompCode
Reason	Reason code qualifying *CompCode*	Reason
ExitResponse	Response from exit	ExitResponse
Hconn	Connection handle	Hconn
pEntryPoints	Address of the MQIEP structure	pEntryPoints

Fields

The MQDXP structure contains the following fields; the fields are described in alphabetical order.

AppOptions

Type: MQLONG

This is a copy of the *Options* field of the MQGMO structure specified by the application issuing the MQGET call. The exit might need to examine these to ascertain whether the MQGMO_ACCEPT_TRUNCATED_MSG option was specified.

This is an input field to the exit.

CodedCharSetId

Type: MQLONG

This is the coded character-set identifier of the character set required by the application issuing the MQGET call; see the *CodedCharSetId* field in the MQMD structure for more details. If the application specifies the special value MQCCSI_Q_MGR on the MQGET call, the queue manager changes this to the actual character-set identifier of the character set used by the queue manager, before invoking the exit.

If the conversion is successful, the exit must copy this to the *CodedCharSetId* field in the message descriptor.

This is an input field to the exit.

CompCode

Type: MQLONG

When the exit is invoked, this contains the completion code that is returned to the application that issued the MQGET call, if the exit does nothing. It is always MQCC_WARNING, because either the message was truncated, or the message requires conversion and this has not yet been done.

On output from the exit, this field contains the completion code to be returned to the application in the **CompCode** parameter of the MQGET call; only MQCC_OK and MQCC_WARNING are valid. See the description of the *Reason* field for suggestions on how the exit can set this field on output.

This is an input/output field to the exit.

DataLength

Type: MQLONG

When the exit is invoked, this field contains the original length of the application message data. If the message was truncated to fit into the buffer provided by the application, the size of the message provided to the exit is *smaller* than the value of *DataLength*. The size of the message provided to the exit is always given by the **InBufferLength** parameter of the exit, irrespective of any truncation that has occurred.

Truncation is indicated by the *Reason* field having the value MQRC_TRUNCATED_MSG_ACCEPTED on input to the exit.

Most conversions do not need to change this length, but an exit can do so if necessary; the value set by the exit is returned to the application in the **DataLength** parameter of the MQGET call. However, this length cannot be changed if the message being converted is a segment that contains only part of a logical message. This is because changing the length would cause the offsets of later segments in the logical message to be incorrect.

Note that, if the exit wants to change the length of the data, be aware that the queue manager has already decided whether the message data fits into the application's buffer, based on the length of the *unconverted* data. This decision determines whether the message is removed from the queue (or the browse cursor moved, for a browse request), and is not affected by any change to the data length caused by the conversion. For this reason it is recommended that conversion exits do not cause a change in the length of the application message data.

If character conversion does imply a change of length, a string can be converted into another string with the same length in bytes, truncating trailing blanks, or padding with blanks as necessary.

The exit is not invoked if the message contains no application message data; hence *DataLength* is always greater then zero.

This is an input/output field to the exit.

Encoding
Type: MQLONG

Numeric encoding required by application.

This is the numeric encoding required by the application issuing the MQGET call; see the *Encoding* field in the MQMD structure for more details.

If the conversion is successful, the exit copies this to the *Encoding* field in the message descriptor.

This is an input field to the exit.

ExitOptions
Type: MQLONG

This is a reserved field; its value is 0.

ExitResponse
Type: MQLONG

Response from exit. This is set by the exit to indicate the success or otherwise of the conversion. It must be one of the following:

MQXDR_OK
Conversion was successful.

If the exit specifies this value, the queue manager returns the following to the application that issued the MQGET call:

- The value of the *CompCode* field on output from the exit
- The value of the *Reason* field on output from the exit
- The value of the *DataLength* field on output from the exit
- The contents of the exit's output buffer *OutBuffer*. The number of bytes returned is the lesser of the exit's **OutBufferLength** parameter, and the value of the *DataLength* field on output from the exit.

If the *Encoding* and *CodedCharSetId* fields in the exit's message descriptor parameter are *both* unchanged, the queue manager returns:

- The value of the *Encoding* and *CodedCharSetId* fields in the MQDXP structure on *input* to the exit.

  If one or both of the *Encoding* and *CodedCharSetId* fields in the exit's message descriptor parameter has been changed, the queue manager returns:

- The value of the *Encoding* and *CodedCharSetId* fields in the exit's message descriptor parameter on output from the exit

MQXDR_CONVERSION_FAILED
Conversion was unsuccessful.

If the exit specifies this value, the queue manager returns the following to the application that issued the MQGET call:

- The value of the *CompCode* field on output from the exit
- The value of the *Reason* field on output from the exit
- The value of the *DataLength* field on *input* to the exit
- The contents of the exit's input buffer *InBuffer*. The number of bytes returned is given by the **InBufferLength** parameter

If the exit has altered *InBuffer*, the results are undefined.

ExitResponse is an output field from the exit.

Hconn
Type: MQHCONN

This is a connection handle which can be used on the MQXCNVC call. This handle is not necessarily the same as the handle specified by the application which issued the MQGET call.

pEntryPoints
Type: PMQIEP

The address of an MQIEP structure through which MQI and DCI calls can be made.

Reason
Type: MQLONG

Reason code qualifying *CompCode*.

When the exit is invoked, this contains the reason code that is returned to the application that issued the MQGET call, if the exit chooses to do nothing. Among possible values are MQRC_TRUNCATED_MSG_ACCEPTED, indicating that the message was truncated in order fit into the buffer provided by the application, and MQRC_NOT_CONVERTED, indicating that the message requires conversion but that this has not yet been done.

On output from the exit, this field contains the reason to be returned to the application in the **Reason** parameter of the MQGET call; the following is recommended:

- If *Reason* had the value MQRC_TRUNCATED_MSG_ACCEPTED on input to the exit, the *Reason* and *CompCode* fields must not be altered, irrespective of whether the conversion succeeds or fails.

  (If the *CompCode* field is not MQCC_OK, the application which retrieves the message can identify a conversion failure by comparing the returned *Encoding* and *CodedCharSetId* values in the message descriptor with the values requested; in contrast, the application cannot distinguish a truncated message from a message that fitted the buffer. For this reason, MQRC_TRUNCATED_MSG_ACCEPTED must be returned in preference to any of the reasons that indicate conversion failure.)

- If *Reason* had any other value on input to the exit:

  – If the conversion succeeds, *CompCode* must be set to MQCC_OK and *Reason* set to MQRC_NONE.

- If the conversion fails, or the message expands and has to be truncated to fit in the buffer, *CompCode* must be set to MQCC_WARNING (or left unchanged), and *Reason* set to one of the values listed, to indicate the nature of the failure.

  Note if the message after conversion is too large for the buffer, it must be truncated only if the application that issued the MQGET call specified the MQGMO_ACCEPT_TRUNCATED_MSG option:

  - If it did specify that option, reason MQRC_TRUNCATED_MSG_ACCEPTED is returned.
  - If it did not specify that option, the message is returned unconverted, with reason code MQRC_CONVERTED_MSG_TOO_BIG.

The reason codes listed are recommended for use by the exit to indicate the reason that conversion failed, but the exit can return other values from the set of MQRC_* codes if deemed appropriate. In addition, the range of values MQRC_APPL_FIRST through MQRC_APPL_LAST are allocated for use by the exit to indicate conditions that the exit wants to communicate to the application issuing the MQGET call.

Note: If the message cannot be converted successfully, the exit must return MQXDR_CONVERSION_FAILED in the *ExitResponse* field, in order to cause the queue manager to return the unconverted message. This is true regardless of the reason code returned in the *Reason* field.

MQRC_APPL_FIRST
(900, X'384') Lowest value for application-defined reason code.

MQRC_APPL_LAST
(999, X'3E7') Highest value for application-defined reason code.

MQRC_CONVERTED_MSG_TOO_BIG
(2120, X'848') Converted data too large for buffer.

MQRC_NOT_CONVERTED
(2119, X'847') Message data not converted.

MQRC_SOURCE_CCSID_ERROR
(2111, X'83F') Source coded character set identifier not valid.

MQRC_SOURCE_DECIMAL_ENC_ERROR
(2113, X'841') Packed-decimal encoding in message not recognized.

MQRC_SOURCE_FLOAT_ENC_ERROR
(2114, X'842') Floating-point encoding in message not recognized.

MQRC_SOURCE_INTEGER_ENC_ERROR
(2112, X'840') Source integer encoding not recognized.

MQRC_TARGET_CCSID_ERROR
(2115, X'843') Target coded character set identifier not valid.

MQRC_TARGET_DECIMAL_ENC_ERROR
(2117, X'845') Packed-decimal encoding specified by receiver not recognized.

MQRC_TARGET_FLOAT_ENC_ERROR
(2118, X'846') Floating-point encoding specified by receiver not recognized.

MQRC_TARGET_INTEGER_ENC_ERROR
(2116, X'844') Target integer encoding not recognized.

MQRC_TRUNCATED_MSG_ACCEPTED
(2079, X'81F') Truncated message returned (processing completed).

This is an input/output field to the exit.

StrucId
Type: MQCHAR4

Structure identifier. The value must be:

MQDXP_STRUC_ID
Identifier for data conversion exit parameter structure.

For the C programming language, the constant MQDXP_STRUC_ID_ARRAY is also defined; this has the same value as MQDXP_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the exit.

Version

Type: MQLONG

Structure version number. The value must be:

MQDXP_VERSION_1
Version number for data-conversion exit parameter structure.

The following constant specifies the version number of the current version:

MQDXP_CURRENT_VERSION
Current version of data-conversion exit parameter structure.

Note: When a new version of this structure is introduced, the layout of the existing part is not changed. The exit must therefore check that the *Version* field is equal to or greater than the lowest version which contains the fields that the exit needs to use.

This is an input field to the exit.

C declaration

```
typedef struct tagMQDXP MQDXP;
struct tagMQDXP {
  MQCHAR4  StrucId;         /* Structure identifier */
  MQLONG   Version;         /* Structure version number */
  MQLONG   ExitOptions;     /* Reserved */
  MQLONG   AppOptions;      /* Application options */
  MQLONG   Encoding;        /* Numeric encoding required by
                               application */
  MQLONG   CodedCharSetId;  /* Character set required by application */
  MQLONG   DataLength;      /* Length in bytes of message data */
  MQLONG   CompCode;        /* Completion code */
  MQLONG   Reason;          /* Reason code qualifying CompCode */
  MQLONG   ExitResponse;    /* Response from exit */
  MQHCONN  Hconn;           /* Connection handle */
  PMQIEP   pEntryPoints;    /* Address of the MQIEP structure */
};
```

COBOL declaration (IBM i only)

```
**   MQDXP structure
  10 MQDXP.
**    Structure identifier
   15 MQDXP-STRUCID        PIC X(4).
**    Structure version number
   15 MQDXP-VERSION        PIC S9(9) BINARY.
**    Reserved
   15 MQDXP-EXITOPTIONS    PIC S9(9) BINARY.
**    Application options
   15 MQDXP-APPOPTIONS     PIC S9(9) BINARY.
**    Numeric encoding required by application
   15 MQDXP-ENCODING       PIC S9(9) BINARY.
**    Character set required by application
   15 MQDXP-CODEDCHARSETID PIC S9(9) BINARY.
**    Length in bytes of message data
   15 MQDXP-DATALENGTH     PIC S9(9) BINARY.
**    Completion code
   15 MQDXP-COMPCODE       PIC S9(9) BINARY.
**    Reason code qualifying COMPCODE
   15 MQDXP-REASON         PIC S9(9) BINARY.
**    Response from exit
   15 MQDXP-EXITRESPONSE   PIC S9(9) BINARY.
**    Connection handle
   15 MQDXP-HCONN          PIC S9(9) BINARY.
```

System/390 assembler declaration

```
MQDXP                  DSECT
MQDXP_STRUCID          DS   CL4  Structure identifier
MQDXP_VERSION          DS   F    Structure version number
MQDXP_EXITOPTIONS      DS   F    Reserved
MQDXP_APPOPTIONS       DS   F    Application options
MQDXP_ENCODING         DS   F    Numeric encoding required by application
MQDXP_CODEDCHARSETID   DS   F    Character set required by application
MQDXP_DATALENGTH       DS   F    Length in bytes of message data
MQDXP_COMPCODE         DS   F    Completion code
MQDXP_REASON           DS   F    Reason code qualifying COMPCODE
MQDXP_EXITRESPONSE     DS   F    Response from exit
MQDXP_HCONN            DS   F    Connection handle
*
MQDXP_LENGTH           EQU  *-MQDXP
                       ORG  MQDXP
MQDXP_AREA             DS   CL(MQDXP_LENGTH)
```

MQXCNVC - Convert characters

The MQXCNVC call converts characters from one character set to another using the C programming language.

This call is part of the IBM MQ Data Conversion Interface (DCI), which is one of the IBM MQ framework interfaces.

Note: The call can be used from both application, and data-conversion exit environments.

Syntax

`MQXCNVC` (*Hconn*, *Options*, *SourceCCSID*, *SourceLength*, *SourceBuffer*, *TargetCCSID*, *TargetLength*, *TargetBuffer*, *DataLength*, *CompCode*, *Reason*)

Parameters

Hconn

Type: MQHCONN - input

This handle represents the connection to the queue manager.

In a data-conversion exit, `Hconn` is normally the handle that is passed to the data-conversion exit in the `Hconn` field of the MQDXP structure; this handle is not necessarily the same as the handle specified by the application which issued the MQGET call.

IBM i On IBM i, the following special value can be specified for `Hconn`:

MQHC_DEF_HCONN

Default connection handle.

If you run a CICS TS 3.2 or higher application, ensure that the character conversion exit program, which invokes the MQXCNVC call, is defined as OPENAPI. This definition prevents the 2018 MQRC_HCONN_ERROR error caused by from an incorrect connection, and allows the MQGET to complete.

Options

Type: MQLONG - input

Options that control the action of MQXCNVC.

Zero or more of the options described can be specified. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

Default-conversion option: The following option controls the use of default character conversion:

MQDCC_DEFAULT_CONVERSION
Default conversion.

This option specifies that default character conversion can be used if one or both of the character sets specified on the call is not supported. This allows the queue manager to use an installation-specified default character set that approximates the specified character set, when converting the string.

Note: The result of using an approximate character set to convert the string is that some characters can be converted incorrectly. This can be avoided by using in the string only characters which are common to both the specified character set and the default character set.

The default character sets are defined by a configuration option when the queue manager is installed or restarted.

If MQDCC_DEFAULT_CONVERSION is not specified, the queue manager uses only the specified character sets to convert the string, and the call fails if one or both of the character sets is not supported.

This option is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

Padding option: The following option allows the queue manager to pad the converted string with blanks or discard insignificant trailing characters, in order to make the converted string fit the target buffer:

MQDCC_FILL_TARGET_BUFFER
Fill target buffer.

This option requests that conversion take place in such a way that the target buffer is filled completely:

- If the string contracts when it is converted, trailing blanks are added in order to fill the target buffer.
- If the string expands when it is converted, trailing characters that are not significant are discarded to make the converted string fit the target buffer. If this can be done successfully, the call completes with MQCC_OK and reason code MQRC_NONE.

  If there are too few insignificant trailing characters, as much of the string as can fit is placed in the target buffer, and the call completes with MQCC_WARNING and reason code MQRC_CONVERTED_MSG_TOO_BIG.

  Insignificant characters are:

  - Trailing blanks
  - Characters following the first null character in the string (but excluding the first null character itself)
- If the string, `TargetCCSID`, and `TargetLength` are such that the target buffer cannot be set completely with valid characters, the call fails with MQCC_FAILED and reason code MQRC_TARGET_LENGTH_ERROR. This can occur when `TargetCCSID` is a pure DBCS character set (such as UTF-16), but `TargetLength` specifies a length that is an odd number of bytes.
- `TargetLength` can be less than or greater than `SourceLength`. On return from MQXCNVC, `DataLength` has the same value as `TargetLength`.

If this option is not specified:

- The string is allowed to contract or expand within the target buffer as required. Insignificant trailing characters are not added or discarded.

  If the converted string fits in the target buffer, the call completes with MQCC_OK and reason code MQRC_NONE.

  If the converted string is too large for the target buffer, as much of the string as fits is placed in the target buffer, and the call completes with MQCC_WARNING and reason code MQRC_CONVERTED_MSG_TOO_BIG. Note fewer than `TargetLength` bytes can be returned in this case.
- `TargetLength` can be less than or greater than `SourceLength`. On return from MQXCNVC, `DataLength` is less than or equal to `TargetLength`.

This option is supported in the following environments:

- AIX
- IBM i
- Linux
- Solaris
- Windows

Encoding options: The options described can be used to specify the integer encodings of the source and target strings. The relevant encoding is used only when the corresponding character set identifier indicates that the representation of the character set in main storage is dependent on the encoding used for binary integers. This affects only certain multibyte character sets (for example, UTF-16 character sets).

The encoding is ignored if the character set is a single-byte character set (SBCS), or a multibyte character set with representation in main storage that is not dependent on the integer encoding.

Only one of the MQDCC_SOURCE_* values must be specified, combined with one of the MQDCC_TARGET_* values:

MQDCC_SOURCE_ENC_NATIVE
Source encoding is the default for the environment and programming language.

MQDCC_SOURCE_ENC_NORMAL
Source encoding is normal.

MQDCC_SOURCE_ENC_REVERSED
Source encoding is reversed.

MQDCC_SOURCE_ENC_UNDEFINED
Source encoding is undefined.

MQDCC_TARGET_ENC_NATIVE
Target encoding is the default for the environment and programming language.

MQDCC_TARGET_ENC_NORMAL
Target encoding is normal.

MQDCC_TARGET_ENC_REVERSED
Target encoding is reversed.

MQDCC_TARGET_ENC_UNDEFINED
Target encoding is undefined.

The encoding values defined previously can be added directly to the `Options` field. However, if the source or target encoding is obtained from the `Encoding` field in the MQMD or other structure, the following processing must be done:

1. The integer encoding must be extracted from the `Encoding` field by eliminating the float and packed-decimal encodings; see “Analyzing encodings” on page 889 for details of how to do this.

2. The integer encoding resulting from step 1 must be multiplied by the appropriate factor before being added to the `Options` field. These factors are:
   - MQDCC_SOURCE_ENC_FACTOR for the source encoding
   - MQDCC_TARGET_ENC_FACTOR for the target encoding

The following example code illustrates how this might be coded in the C programming language:

```
Options = (MsgDesc.Encoding & MQENC_INTEGER_MASK)
           * MQDCC_SOURCE_ENC_FACTOR
        + (DataConvExitParms.Encoding & MQENC_INTEGER_MASK)
           * MQDCC_TARGET_ENC_FACTOR;
```

If not specified, the encoding options default to undefined (MQDCC_*_ENC_UNDEFINED). In most cases, this does not affect the successful completion of the MQXCNVC call. However, if the corresponding character set is a multibyte character set with representation that is dependent on the encoding (for example, a UTF-16 character set), the call fails with reason code MQRC_SOURCE_INTEGER_ENC_ERROR or MQRC_TARGET_INTEGER_ENC_ERROR as appropriate.

The encoding options are supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

Default option: If none of the options described previously is specified, the following option can be used:

MQDCC_NONE
No options specified.

MQDCC_NONE is defined to aid program documentation. It is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

SourceCCSID
Type: MQLONG - input

This is the coded character set identifier of the input string in `SourceBuffer`.

SourceLength
Type: MQLONG - input

This is the length in bytes of the input string in `SourceBuffer` ; it must be zero or greater.

SourceBuffer
Type: MQCHAR x SourceLength - input

This is the buffer containing the string to be converted from one character set to another.

TargetCCSID
Type: MQLONG - input

This is the coded character set identifier of the character set to which `SourceBuffer` is to be converted.

TargetLength
Type: MQLONG - input

This is the length in bytes of the output buffer `TargetBuffer` ; it must be zero or greater. It can be less than or greater than `SourceLength`.

TargetBuffer
Type: MQCHAR x TargetLength - output

This is the string after it has been converted to the character set defined by `TargetCCSID`. The converted string can be shorter or longer than the unconverted string. The **`DataLength`** parameter indicates the number of valid bytes returned.

DataLength
Type: MQLONG - output

This is the length of the string returned in the output buffer `TargetBuffer`. The converted string can be shorter or longer than the unconverted string.

CompCode
Type: MQLONG - output

It is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying `CompCode`.

If `CompCode` is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If `CompCode` is MQCC_WARNING:

MQRC_CONVERTED_MSG_TOO_BIG
(2120, X'848') Converted data too large for buffer.

If `CompCode` is MQCC_FAILED:

MQRC_DATA_LENGTH_ERROR
(2010, X'7DA') Data length parameter not valid.

MQRC_DBCS_ERROR
(2150, X'866') DBCS string not valid.

MQRC_HCONN_ERROR
(2018, X'7E2') Connection handle not valid.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_RESOURCE_PROBLEM
(2102, X'836') Insufficient system resources available.

MQRC_SOURCE_BUFFER_ERROR
(2145, X'861') Source buffer parameter not valid.

MQRC_SOURCE_CCSID_ERROR
(2111, X'83F') Source coded character set identifier not valid.

MQRC_SOURCE_INTEGER_ENC_ERROR
(2112, X'840') Source integer encoding not recognized.

MQRC_SOURCE_LENGTH_ERROR
(2143, X'85F') Source length parameter not valid.

MQRC_STORAGE_NOT_AVAILABLE
(2071, X'817') Insufficient storage available.

MQRC_TARGET_BUFFER_ERROR
(2146, X'862') Target buffer parameter not valid.

MQRC_TARGET_CCSID_ERROR
(2115, X'843') Target coded character set identifier not valid.

MQRC_TARGET_INTEGER_ENC_ERROR
(2116, X'844') Target integer encoding not recognized.

MQRC_TARGET_LENGTH_ERROR
(2144, X'860') Target length parameter not valid.

MQRC_UNEXPECTED_ERROR
(2195, X'893') Unexpected error occurred.

For detailed information about these codes, see Messages and reason codes.

C invocation

```
MQXCNVC (Hconn, Options, SourceCCSID, SourceLength, SourceBuffer,
        TargetCCSID, TargetLength, TargetBuffer, &DataLength,
        &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;            /* Connection handle */
MQLONG   Options;          /* Options that control the action of
                              MQXCNVC */
MQLONG   SourceCCSID;      /* Coded character set identifier of string
                              before conversion */
MQLONG   SourceLength;     /* Length of string before conversion */
MQCHAR   SourceBuffer[n];  /* String to be converted */
MQLONG   TargetCCSID;      /* Coded character set identifier of string
                              after conversion */
MQLONG   TargetLength;     /* Length of output buffer */
MQCHAR   TargetBuffer[n];  /* String after conversion */
MQLONG   DataLength;       /* Length of output string */
MQLONG   CompCode;         /* Completion code */
MQLONG   Reason;           /* Reason code qualifying CompCode */
```

COBOL declaration (IBM i only)

IBM i

```
     CALL 'MQXCNVC' USING HCONN, OPTIONS, SOURCECCSID, SOURCELENGTH,
                          SOURCEBUFFER, TARGETCCSID, TARGETLENGTH,
                          TARGETBUFFER, DATALENGTH, COMPCODE, REASON.
```

Declare the parameters as follows:

```
**   Connection handle
 01  HCONN         PIC S9(9) BINARY.
**   Options that control the action of MQXCNVC
 01  OPTIONS       PIC S9(9) BINARY.
**   Coded character set identifier of string before conversion
 01  SOURCECCSID   PIC S9(9) BINARY.
**   Length of string before conversion
 01  SOURCELENGTH  PIC S9(9) BINARY.
**   String to be converted
 01  SOURCEBUFFER  PIC X(n).
**   Coded character set identifier of string after conversion
 01  TARGETCCSID   PIC S9(9) BINARY.
```

```
**   Length of output buffer
 01  TARGETLENGTH  PIC S9(9) BINARY.
**   String after conversion
 01  TARGETBUFFER  PIC X(n).
**   Length of output string
 01  DATALENGTH    PIC S9(9) BINARY.
**   Completion code
 01  COMPCODE      PIC S9(9) BINARY.
**   Reason code qualifying COMPCODE
 01  REASON        PIC S9(9) BINARY.
```

S/390 assembler declaration

```
         CALL MQXCNVC,(HCONN,OPTIONS,SOURCECCSID,SOURCELENGTH,         X
               SOURCEBUFFER,TARGETCCSID,TARGETLENGTH,TARGETBUFFER,     X
               DATALENGTH,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN         DS  F      Connection handle
OPTIONS       DS  F      Options that control the action of MQXCNVC
SOURCECCSID   DS  F      Coded character set identifier of string before
*                        conversion
SOURCELENGTH  DS  F      Length of string before conversion
SOURCEBUFFER  DS  CL(n)  String to be converted
TARGETCCSID   DS  F      Coded character set identifier of string after
*                        conversion
TARGETLENGTH  DS  F      Length of output buffer
TARGETBUFFER  DS  CL(n)  String after conversion
DATALENGTH    DS  F      Length of output string
COMPCODE      DS  F      Completion code
REASON        DS  F      Reason code qualifying COMPCODE
```

MQ_DATA_CONV_EXIT - Data conversion exit

The MQ_DATA_CONV_EXIT call describes the parameters that are passed to the data-conversion exit.

No entry point called MQ_DATA_CONV_EXIT is provided by the queue manager (see usage note 11).

This definition is part of the IBM MQ Data Conversion Interface (DCI), which is one of the IBM MQ framework interfaces.

Syntax

`MQ_DATA_CONV_EXIT` (*DataConvExitParms*, *MsgDesc*, *InBufferLength*, *InBuffer*, *OutBufferLength*, *OutBuffer*)

Parameters

DataConvExitParms

Type: MQDXP - input/output

This structure contains information relating to the invocation of the exit. The exit sets information in this structure to indicate the outcome of the conversion. See "MQDXP - Data-conversion exit parameter" on page 900 for details of the fields in this structure.

MsgDesc

Type: MQMD - input/output

On input to the exit, this is the message descriptor associated with the message data passed to the exit in the **InBuffer** parameter.

Note: The **MsgDesc** parameter passed to the exit is always the most recent version of MQMD supported by the queue manager which invokes the exit. If the exit is intended to be portable between different environments, the exit will check the `Version` field in `MsgDesc` to verify that the fields that the exit needs to access are present in the structure.

In the following environments, the exit is passed a version-2 MQMD:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

In all other environments that support the data conversion exit, the exit is passed a version-1 MQMD.

On output, the exit will change the `Encoding` and `CodedCharSetId` fields to the values requested by the application, if conversion was successful; these changes are reflected back to the application. Any other changes that the exit makes to the structure are ignored; they are not reflected back to the application.

If the exit returns MQXDR_OK in the `ExitResponse` field of the MQDXP structure, but does not change the `Encoding` or `CodedCharSetId` fields in the message descriptor, the queue manager returns for those fields the values that the corresponding fields in the MQDXP structure had on input to the exit.

InBufferLength
Type: MQLONG - input

Length in bytes of `InBuffer`.

This is the length of the input buffer `InBuffer`, and specifies the number of bytes to be processed by the exit. `InBufferLength` is the lesser of the length of the message data before conversion, and the length of the buffer provided by the application on the MQGET call.

The value is always greater than zero.

InBuffer
Type: MQBYTExInBufferLength - input

Buffer containing the unconverted message.

This contains the message data before conversion. If the exit is unable to convert the data, the queue manager returns the contents of this buffer to the application after the exit has completed.

Note: The exit should not alter `InBuffer` ; if this parameter is altered, the results are undefined.

In the C programming language, this parameter is defined as a pointer-to-void.

OutBufferLength
Type: MQLONG - input

Length in bytes of `OutBuffer`.

This is the length of the output buffer `OutBuffer`, and is the same as the length of the buffer provided by the application on the MQGET call.

The value is always greater than zero.

OutBuffer
Type: MQBYTExOutBufferLength - output

Buffer containing the converted message.

On output from the exit, if the conversion was successful (as indicated by the value MQXDR_OK in the `ExitResponse` field of the **`DataConvExitParms`** parameter), `OutBuffer` contains the message data to be delivered to the application, in the requested representation. If the conversion was unsuccessful, any changes that the exit has made to this buffer are ignored.

In the C programming language, this parameter is defined as a pointer-to-void.

Usage notes

1. A data-conversion exit is a user-written exit which receives control during the processing of an MQGET call. The function performed by the data-conversion exit is defined by the provider of the exit; however, the exit must conform to the rules described here, and in the associated parameter structure MQDXP.

   The programming languages that can be used for a data-conversion exit are determined by the environment.

2. The exit is invoked only if all of the following statements are true:

   - The MQGMO_CONVERT option is specified on the MQGET call
   - The `Format` field in the message descriptor is not MQFMT_NONE
   - The message is not already in the required representation; that is, one or both of the message's `CodedCharSetId` and `Encoding` is different from the value specified by the application in the message descriptor supplied on the MQGET call
   - The queue manager has not already done the conversion successfully
   - The length of the application's buffer is greater than zero
   - The length of the message data is greater than zero
   - The reason code so far during the MQGET operation is MQRC_NONE or MQRC_TRUNCATED_MSG_ACCEPTED

3. When an exit is being written, consider coding the exit in a way that allows it to convert messages that have been truncated. Truncated messages can arise in the following ways:

   - The receiving application provides a buffer that is smaller than the message, but specifies the MQGMO_ACCEPT_TRUNCATED_MSG option on the MQGET call.

     In this case, the `Reason` field in the **DataConvExitParms** parameter on input to the exit has the value MQRC_TRUNCATED_MSG_ACCEPTED.

   - The sender of the message truncated it before sending it. This can happen with report messages, for example (see "Conversion of report messages" on page 899 for more details).

     In this case, the `Reason` field in the **DataConvExitParms** parameter on input to the exit has the value MQRC_NONE (if the receiving application provided a buffer that was large enough for the message).

   Thus the value of the `Reason` field on input to the exit cannot always be used to decide whether the message has been truncated.

   The distinguishing characteristic of a truncated message is that the length provided to the exit in the **InBufferLength** parameter is less than the length implied by the format name contained in the `Format` field in the message descriptor. The exit should therefore check the value of `InBufferLength` before attempting to convert any of the data; the exit should not assume that the full amount of data implied by the format name has been provided.

   If the exit has not been written to convert truncated messages, and `InBufferLength` is less than the value expected, the exit will return MQXDR_CONVERSION_FAILED in the `ExitResponse` field of the **DataConvExitParms** parameter, with the `CompCode` and `Reason` fields set to MQCC_WARNING and MQRC_FORMAT_ERROR.

   If the exit has been written to convert truncated messages, the exit will convert as much of the data as possible (see next usage note), taking care not to attempt to examine or convert data beyond the end of `InBuffer`. If the conversion completes successfully, the exit will leave the `Reason` field in the **DataConvExitParms** parameter unchanged. This returns MQRC_TRUNCATED_MSG_ACCEPTED if the message was truncated by the receiver's queue manager, and MQRC_NONE if the message was truncated by the sender of the message.

   It is also possible for a message to expand during conversion, to the point where it is bigger than `OutBuffer`. In this case the exit must decide whether to truncate the message; the `AppOptions`

field in the **DataConvExitParms** parameter indicates whether the receiving application specified the MQGMO_ACCEPT_TRUNCATED_MSG option.

4. Generally, all the data in the message provided to the exit in `InBuffer` is converted, or that none of it is. An exception to this, however, occurs if the message is truncated, either before conversion or during conversion; in this case there can be an incomplete item at the end of the buffer (for example: 1 byte of a double-byte character, or 3 bytes of a 4-byte integer). In this situation, consider omitting the incomplete item and set the unused bytes in the `OutBuffer` to nulls. However, complete elements or characters within an array or string should be converted.
5. When an exit is needed for the first time, the queue manager attempts to load an object that has the same name as the format (apart from extensions). The object loaded must contain the exit that processes messages with that format name. Consider making the exit name, and the name of the object that contains the exit identical, although not all environments require this.
6. A new copy of the exit is loaded when an application attempts to retrieve the first message that uses that `Format` since the application connected to the queue manager. For CICS or IMS applications, this means when the CICS or IMS subsystem connected to the queue manager. A new copy can also be loaded at other times, if the queue manager has discarded a previously loaded copy. For this reason, an exit must not attempt to use static storage to communicate information from one invocation of the exit to the next - the exit can be unloaded between the two invocations.
7. If there is a user-supplied exit with the same name as one of the built-in formats supported by the queue manager, the user-supplied exit does not replace the built-in conversion routine. The only circumstances in which such an exit is invoked are:

   - If the built-in conversion routine cannot handle conversions to or from either the `CodedCharSetId` or `Encoding` involved, or
   - If the built-in conversion routine has failed to convert the data (for example, because there is a field or character which cannot be converted).
8. The scope of the exit is environment-dependent. `Format` names must be chosen to minimize the risk of clashes with other formats. Consider starting with characters that identify the application defining the format name.
9. The data-conversion exit runs in an environment like that of the program which issued the MQGET call; environment includes address space and user profile (where applicable). The program could be a message channel agent sending messages to a destination queue manager that does not support message conversion. The exit cannot compromise the queue manager's integrity, since it does not run in the queue manager's environment.
10. The only MQI call which can be used by the exit is MQXCNVC; attempting to use other MQI calls fails with reason code MQRC_CALL_IN_PROGRESS, or other unpredictable errors.
11. No entry point called MQ_DATA_CONV_EXIT is provided by the queue manager. However, a `typedef` is provided for the name MQ_DATA_CONV_EXIT in the C programming language, and this can be used to declare the user-written exit, to ensure that the parameters are correct. The name of the exit must be the same as the format name (the name contained in the `Format` field in MQMD), although this is not required in all environments.

    The following example illustrates how the exit that processes the format `MYFORMAT` can be declared in the C programming language:

```
#include "cmqc.h"
#include "cmqxc.h"

MQ_DATA_CONV_EXIT MYFORMAT;

void MQENTRY MYFORMAT(
     PMQDXP   pDataConvExitParms, /* Data-conversion exit parameter
                                     block */
     PMQMD    pMsgDesc,           /* Message descriptor */
     MQLONG   InBufferLength,     /* Length in bytes of InBuffer */
     PMQVOID  pInBuffer,          /* Buffer containing the unconverted
                                     message */
     MQLONG   OutBufferLength,    /* Length in bytes of OutBuffer */
     PMQVOID  pOutBuffer)         /* Buffer containing the converted
```

```
                                       message */
{
  /* C language statements to convert message */
}
```

12. z/OS On z/OS, if an API-crossing exit is also in force, it is called after the data-conversion exit.

C invocation

```
exitname (&DataConvExitParms, &MsgDesc, InBufferLength,
         InBuffer, OutBufferLength, OutBuffer);
```

The parameters passed to the exit are declared as follows:

```
MQDXP   DataConvExitParms;  /* Data-conversion exit parameter block */
MQMD    MsgDesc;            /* Message descriptor */
MQLONG  InBufferLength;     /* Length in bytes of InBuffer */
MQBYTE  InBuffer[n];        /* Buffer containing the unconverted
                               message */
MQLONG  OutBufferLength;    /* Length in bytes of OutBuffer */
MQBYTE  OutBuffer[n];       /* Buffer containing the converted
                               message */
```

COBOL declaration (IBM i only)

IBM i

```
     CALL 'exitname' USING DATACONVEXITPARMS, MSGDESC, INBUFFERLENGTH,
                           INBUFFER, OUTBUFFERLENGTH, OUTBUFFER.
```

The parameters passed to the exit are declared as follows:

```
**   Data-conversion exit parameter block
 01  DATACONVEXITPARMS.
     COPY CMQDXPV.
**   Message descriptor
 01  MSGDESC.
     COPY CMQMDV.
**   Length in bytes of INBUFFER
 01  INBUFFERLENGTH     PIC S9(9) BINARY.
**   Buffer containing the unconverted message
 01  INBUFFER           PIC X(n).
**   Length in bytes of OUTBUFFER
 01  OUTBUFFERLENGTH    PIC S9(9) BINARY.
**   Buffer containing the converted message
 01  OUTBUFFER          PIC X(n).
```

System/390 assembler declaration

```
         CALL EXITNAME,(DATACONVEXITPARMS,MSGDESC,INBUFFERLENGTH,      X
               INBUFFER,OUTBUFFERLENGTH,OUTBUFFER)
```

The parameters passed to the exit are declared as follows:

```
DATACONVEXITPARMS  CMQDXPA  ,      Data-conversion exit parameter block
MSGDESC            CMQMDA   ,      Message descriptor
INBUFFERLENGTH     DS       F      Length in bytes of INBUFFER
INBUFFER           DS       CL(n)  Buffer containing the unconverted
*                                  message
OUTBUFFERLENGTH    DS       F      Length in bytes of OUTBUFFER
OUTBUFFER          DS       CL(n)  Buffer containing the converted
*                                  message
```

Properties specified as MQRFH2 elements

Non-message descriptor properties can be specified as elements in MQRFH2 header folders. Overview of MQRFH2 elements being specified as properties.

This retains compatibility with the previous versions of the IBM MQ JMS and XMS clients. This section describes how to specify properties in MQRFH2 headers.

To use MQRFH2 elements as properties, specify the elements as described in Using IBM MQ classes for Java . This information supplements the information described in “MQRFH2 - Rules and formatting header 2” on page 519.

Mapping property data types to MQRFH2 data types

This topic provides information on message property types mapped to their corresponding MQRFH2 data types.

Table 635. Supported MQRFH2 data types

Message property type	MQRFH2 data type
MQBYTE[]	bin.hex
MQBOOL	boolean
MQINT8	i1
MQINT16	i2
MQINT32	i4
MQINT64	i8
MQFLOAT32	r4
MQFLOAT64	r8
MQCHAR[]	string

Any element without a data type is assumed to be of type "string".

An MQRFH2 data type of `int`, meaning an integer of unspecified size, is treated as if it were an `i8`.

A null value is indicated by the element attribute `xsi:nil='true'`. Do not use the attribute `xsi:nil='false'` for non-null values.

For example, the following property has a null value:

```
<NullProperty xsi:nil='true'></NullProperty>
```

A byte or character string property can have an empty value. This is represented by an MQRFH2 element with a zero length element value.

For example, the following property has an empty value:

```
<EmptyProperty></EmptyProperty>
```

Supported MQRFH2 folders

Overview of the use of message descriptor fields as properties.

The folders `<jms>`, `<mcd>`, `<mqext>`, and `<usr>` are described in The MQRFH2 header and JMS. The `<usr>` folder is used to transport any JMS application-defined properties that are associated with a message. Groups are not allowed in the `<usr>` folder.

The MQRFH2 header and JMS supports the following additional folders:

- `<mq>`

  This folder is used and reserved for MQ-defined properties that are used by IBM MQ.
- `<mq_usr>`

  This folder can be used to transport any application-defined properties that are not exposed as JMS user-defined properties, as the properties might not meet the requirements of a JMS property. This folder can contain groups that the `<usr>` folder cannot.
- Any folder marked with the `content='properties'` attribute.

  Such a folder is equivalent to the `<mq_usr>` folder in content.
- `<mqps>`

  This folder is used for IBM MQ publish/subscribe properties.

IBM MQ also supports the following folders that are already in use by WAS/SIB:

- `<sib>`

  This folder is used and reserved for WAS/SIB system message properties that are not exposed as JMS properties, or are mapped to JMS_IBM_* properties, but are exposed to WAS/SIB applications; these include forward and reverse routing paths properties.

  At least some cannot be exposed as JMS properties, because they are byte arrays. If your application adds properties to this folder, the value is either ignored or removed.
- `<sib_usr>`

  This folder is used and reserved for WAS/SIB user message properties that cannot be exposed as JMS user properties because they are not of supported types; they are exposed to WAS/SIB applications.

  These are user properties, that you can get or set through the SIMessage interface, but the content of the byte array is mapped to the required property value.

  If your IBM MQ application writes an arbitrary `bin.hex` element to the folder, the application probably receives an `IOException`, as it is not of the format expected to restore. If you add anything other than a `bin.hex` element you receive a `ClassCastException`.

  Do not attempt to make properties available to WAS/SIB by using this folder; instead user the `<usr>` folder for that purpose.
- `<sib_context>`

  This folder is used for WAS/SIB system message properties that are not exposed to WAS/SIB user applications or as JMS properties. These include security and transactional properties that are used for web services and similar.

  Your application must not add properties to this folder.
- `<mqema>`

  This folder was used by WAS/SIB instead of the `<mqext>` folder.

MQRFH2 folder names are case-sensitive.

The following folders are reserved, in any mixture of lowercase or uppercase characters:

- Any folder prefixed by `mq` or `wmq` ; reserved for use by IBM MQ.
- Any folder prefixed by `sib` ; reserved for use by WAS/SIB.
- `<Root>` and `<Body>` folders; reserved but not used.

The following folders are not recognized as containing message properties:

- `<psc>`

  Used by IBM Integration Bus to convey publish/subscribe command messages to the broker.
- `<pscr>`

Used by IBM Integration Bus to contain information from the broker, in response to publish/subscribe command messages.

- Any folder not defined by IBM, that is not marked with the content='properties' attribute.

Do not specify content='properties' on the <psc> or <pscr> folders. If you do so, these folders are treated as properties and IBM Integration Bus is likely to stop functioning as expected.

If your application is building messages with properties, in MQRFH2 headers to be recognized as an MQRFH2 header containing properties, the header must be in the list of headers that can be chained at the head of the message.

The MQRFH2 can be preceded by any number of MQH standard headers, or an MQCIH, an MQDLH, an MQIIH, an MQTM, an MQTMC2, or an MQXQH. A string or an MQCFH ends parsing because they cannot be chained.

It is possible for a message to contain multiple MQRFH2 headers all carrying message properties. Folders with the same name can coexist in different headers unless otherwise restricted, for example by WAS/SIB. The folders are treated as one logical folder, if they are all in significant headers.

While folders from the significant headers cannot be merged with those folders in nonsignificant headers, folders with the same name within the significant headers can be merged, removing any conflicting properties. Your applications must not depend on the layout of properties within their message.

MQRFH2 groups are parsed for properties in user-defined folders, that is, not the <wmq>, <jms>, <mcd>, <usr>, <mqext>, <sib>, <sib_usr>, <sib_context>, and <mqema> folders.

Groups in the IBM-defined properties folders, except for the <wmq> and <mq> folders, are parsed for properties.

An MQRFH2 folder cannot contain mixed content; a folder or group can contain either groups or properties, or a value, but not both.

A segment of a message, either the first or a subsequent segment, cannot contain IBM MQ -defined properties other than those properties in the message descriptor. Therefore putting a message containing such properties with either MQMF_SEGMENT or MQMF_SEGMENTATION_ALLOWED set causes the put to fail with MQRC_SEGMENTATION_NOT_ALLOWED.

However, message groups can contain IBM MQ -defined properties.

Generation of MQRFH2 headers

If IBM MQ converts message properties to their MQRFH2 representation, it must add the MQRFH2 to the message. It adds the MQRFH2 either as a separate header, or merges it with an existing header.

Generation of new MQRFH2 headers by IBM MQ might disrupt existing headers in a message. Applications that parse a message buffer for headers must be aware that the number and position of headers in a buffer might change in some circumstances. IBM MQ attempts to minimize the impact of adding properties to a message by merging message properties into an existing MQRFH2 header, where it can. It also attempts to minimize the impact by inserting a generated MQRFH2 into a fixed position relative to other headers in the message buffer.

A generated MQRFH2 header is placed following the MQMD, and any number of MQXQH, MQRFH, and MQDLH headers, whatever order they are in. The generated MQRFH2 header is placed immediately before the first header that is not an MQMD, MQXQH, MQDLH, or MQRFH header.

z/OS On z/OS systems, the generated MQRFH2 header is created in the application's CCSID. This is defined as follows:

- For batch LE applications using the DLL interface, the CCSID is the CODESET associated with the current locale at the time **MQCONN** is issued (default value is 1047).
- For batch LE applications bound with one of the batch MQ stubs, the CCSID is the CODESET associated with the current locale at the time of the first MQI call issued after **MQCONN** (default value is 1047).

- For batch non-LE applications running on a USS thread, the CCSID is the value of THLICCSID at the time of the first MQI call issued after **MQCONN** (default value is 1047).
- For other batch applications, the CCSID is the CCSID of the queue manager.

For LE applications, the locale can be changed using the setlocale() / CEESETL LE callable service. For non-LE applications running on USS threads, the value of THLICCSID can be changed using USS mapping macro **BPXYTHLI**.

Rules for merging generated MQRFH2

The following rules apply to merging a generated MQRFH2 with an existing MQRFH2. The generated MQRFH2 header is merged with an existing MQRFH2 header, if:

1. The existing MQRFH2 is in the same position IBM MQ would place a generated MQRFH2, or earlier in the header chain.
2. The CCSID of the generated properties is the same as the NameValueCCSID of the existing MQRFH2.

Otherwise, the generated header is placed separately in the buffer, in the position described before.

Rules for merging folders in an existing MQRFH2

If message properties are merged into an existing MQRFH2, then the existing MQRFH2 is scanned for folders that match the message properties, and merges them. If a matching folder does not exist a new folder is added to the end of the existing folders. If a matching folder does exist, the folder is searched. Any matching properties are overwritten. Any new ones are added at the end of the folder.

MQRFH2 folder restrictions

Overview of folder restrictions in MQRFH2 headers

The MQRFH2 restrictions apply to the following folders:

- Element names in the <usr> folder must not begin with the prefix JMS ; such property names are reserved for use by JMS and are not valid for user-defined properties.

  Such an element name does not cause parsing of the MQRFH2 to fail, but is not accessible to the IBM MQ message property APIs.
- Element names in the <usr> folder must not be, in any mixture of lower or uppercase, NULL, TRUE, FALSE, NOT, AND, OR, BETWEEN, LIKE, IN, IS and ESCAPE. These names match SQL keywords and make parsing selectors harder, because <usr> is the default folder used when no folder is specified for a particular property in a selector.

  Such an element name does not cause parsing of the MQRFH2 to fail, but is not accessible to the IBM MQ message property APIs.
- The content model of the <usr> folder is as follows:
  - Any valid XML name can be used as an element name, providing that it does not contain a colon.
  - Only simple elements, not nested folders, are allowed.
  - All elements take the default type of string, unless modified by a dt="xxx" attribute.
  - All elements are optional, but should occur no more than once in a folder.
- Element names in any folder considered to contain message properties must not contain a period (.) (Unicode character U+002E), because this is used in property names to indicate the hierarchy.

  Such an element name does not cause parsing of the MQRFH2 to fail, but is not accessible to the IBM MQ message property APIs.

In general, MQRFH2 headers that contain valid XML-style data can be parsed by IBM MQ without failure, although certain elements of the MQRFH2 are not accessible through the IBM MQ message property APIs.

MQRFH2 element name conflicts

Overview of conflicts within MQRFH2 element names.

Only one value can be attached to a message property. If an attempt to access a property leads to a conflict of values, one is chosen in preference over another.

The IBM MQ syntax for accessing MQRFH2 elements allows unique identification of an element, if a folder contains no elements with the same name. If a folder contains more than one element with the same name, the value of the property used is the one closest to the head of the message.

This applies if two or more folders of the same name are contained in different significant MQRFH2 headers within the same message.

A conflict can result when the MQGET call is processed after a non-message descriptor property has been set twice: both through an MQSETMP call and directly in the raw MQRFH2 header.

If this happens, the property associated with the message by an API call takes preference over one in the message data, that is, the one in the raw MQRFH2 header. If a conflict occurs, it is considered to come logically before the message data.

Mapping from property names to MQRFH2 folder and element names

Overview of the differences between property names and element names in the MQRFH2 header.

When using any of the defined APIs that ultimately generate MQRFH2 headers, in order to specify message properties (for example, MQ JMS), the property name is not necessarily the element name in the MQRFH2 folder.

Therefore, a mapping occurs from the property name to the MQRFH2 element, and in the reverse way, taking into account both the folder name that contains the element, and the element name. Some examples from IBM MQ classes for JMS are already documented in Using IBM MQ classes for Java.

Table 636. Property names mapped to MQRFH2 folder and element names

Property name	MQRFH2 folder name	MQRFH2 element name
JMSDestination	jms	Dst
JMSType	mcd	Type, Set, Fmt
xxx (user defined, where xxx does not begin with JMS)	usr	xxx

Therefore, when a JMS application accesses the JMSDestination property this maps to the Dst element in the <jms> folder.

When specifying properties as MQRFH2 elements, IBM MQ defines its elements as follows:

Table 637. Property names mapped to MQRFH2 folder, group, and element names

Property name	MQRFH2 folder name	MQRFH2 group name	MQRFH2 element name
<Property>	<usr>	n/a	<Property>
<folder>. <Property>	<folder>	n/a	<Property>
<folder>. <group>. <Property>	<folder>	<group>	<Property>

For example, when an IBM MQ application attempts to access the Property1 property, this maps to the Property1 element in the <usr> folder. The wmq.Property2 property maps to the Property2 property in the <wmq> folder.

If the property name contains more than one . character, the MQRFH2 element name used is the one following the final . character, and MQRFH2 groups are used to form a hierarchy; nested MQRFH2 groups are permitted.

The JMS header and provider-specific properties that are contained in an MQRFH2 in the `<mcd>`, `<jms>`, and `<mqext>` folders are accessed by an IBM MQ application using the short names defined in Using IBM MQ classes for Java .

JMS user-defined properties are accessed from the `<usr>` folder. An IBM MQ application can use the `<usr>` folder for its application properties if it is acceptable for the property to appear to JMS applications as one of its user-defined properties.

If it is not acceptable, choose another folder; the `<wmq_usr>` folder is provided as a standard location for such non-JMS properties.

Your applications can specify and use any MQRFH2 folder with a well-defined use, not documented in "Properties specified as MQRFH2 elements" on page 917 if you note the following:

1. The folder might already be in use, or might be used in the future, by another application providing undefined access to properties contained inside it; see Property names for the suggested naming convention for property names.
2. The properties are not accessible to previous versions of the IBM MQ classes for JMS or XMS client that can only access the `<usr>` folder for user-defined properties
3. The folder must be marked with the attribute `content` with the value set to `properties`, for example, `content='properties'`.

   "MQSETMP - Set message property" on page 768 automatically adds this attribute as required. This attribute must not be added to any of the IBM-defined folders, for example, `<jms>` and `<usr>`. Doing so, causes the message to be rejected by the IBM MQ classes for JMS client before IBM WebSphere MQ 7.0. with a `MessageFormatException`.

Because the `<usr>` folder is the default location for properties of the `<Property>` syntax, an IBM MQ application and a JMS application to access the same user-defined property value using the same name.

Reserved folder names

There are several reserved folder names. You cannot use such names as your folder prefixes; for example, `Root.Property1` does not access a valid property because `Root` is reserved. The following list contains reserved folder names:

- Root
- Body
- Properties
- Environment
- LocalEnvironment
- DestinationList
- ExceptionList
- InputBody
- InputRoot
- InputProperties
- InputLocalEnvironment
- InputDestinationList
- InputExceptionList
- OutputRoot
- OutputLocalEnvironment
- OutputDestinationList
- OutputExceptionList

Mapping property descriptor fields into MQRFH2 headers

When a property is translated into an MQRFH2 element the following element attributes are used to specify the significant fields of the property descriptor: This describes how MQPD fields are translated to MQRFH2 element attributes.

Support

The Support property descriptor field is split into three element attributes

- The **sr** element attribute specifies values in the MQPD_REJECT_UNSUP_MASK bit mask.
- The **sa** element attribute specifies values in the MQPD_ACCEPT_UNSUP_MASK bit mask.
- The **sx** element attribute specifies values in the MQPD_ACCEPT_UNSUP_IF_XMIT_MASK bit mask.

These element attributes are only valid in the <mq> folder and are ignored if set on elements in the other folders containing properties.

Table 638. MQPD fields mapped to MQRFH2 element attributes

Support value	MQRFH2 element attribute	MQRFH2 attribute value
MQPD_SUPPORT_OPTIONAL	sa	optional This is the default value.
MQPD_SUPPORT_REQUIRED	sr	required
MQPD_SUPPORT_REQUIRED_IF_LOCAL	sx	local

Context

Use the **context** element attribute to indicate the message context to which a property belongs. Use one value only. This element attribute is valid on a property in any folder containing properties.

Table 639. Context values mapped to MQRFH2 attribute values

Context value	MQRFH2 attribute value
MQPD_NO_CONTEXT	none This is the default value.
MQPD_USER _CONTEXT	user

CopyOptions

Use the **copy** element attribute to indicate messages into which a property should be copied. More than one value is acceptable; separate multiple values with a comma. For example **copy='reply'** and **copy='publish,report'** are both valid. This element attribute is valid on a property in any folder containing properties.

Note: In the attribute definition, single quotation marks or double quotation marks are valid use, for example **copy='reply'** or **copy="report"**

Table 640. CopyOption values mapped to MQRFH2 attribute values

CopyOption value	MQRFH2 attribute value
MQPD_COPY_FORWARD	forward
MQPD_COPY_REPLY	reply
MQPD_COPY_REPORT	report

Table 640. CopyOption values mapped to MQRFH2 attribute values (continued)

CopyOption value	MQRFH2 attribute value
MQPD_COPY_PUBLISH	publish
MQPD_COPY_ALL	all Do not specify this with any other value. When used with another value, this takes precedence over any value except **none**.
MQPD_COPY_DEFAULT	default This is the default value. It is equivalent to specifying the three values MQCOPY_FORWARD, MQCOPY_REPORT and MQCOPY_PUBLISH. Do not specify this with any other value.
MQPD_COPY_NONE	none Do not specify this with any other value. When used with another value, this takes precedence.

Restrictions to the <mq> MQRFH2 folder

When a message is put on to a queue, it is searched for an <mq> folder so that the message can be processed according to its MQ-defined properties. To allow the efficient parsing of MQ-defined properties, the following restrictions apply to the folder:

- Only properties in the first significant <mq> folder in the message are acted upon by MQ; properties in any other <mq> folder in the message are ignored.
- If the folder is in UTF-8, only single-byte UTF-8 characters are allowed in the folder. A multi-byte character in the folder, can cause parsing to fail, and the message to be rejected.
- Do not include MQRFH2 groups in the <mq> folder. The presence of Unicode character U+003C in a property value will cause the message to be rejected.
- Do not use escape strings in the folder. An escape string is treated as the actual value of the element.
- Only Unicode character U+0020 is treated as white space within the folder. All other characters are treated as significant and can cause parsing of the folder to fail, and the message to be rejected.

If parsing of the <mq> folder fails, or if the folder does not observe these restrictions, the message is rejected with CompCode **MQCC_FAILED** and Reason **MQRC_RFH_RESTRICTED_FORMAT_ERR**.

MQRFH2 headers that are not valid

At the time an MQPUT, MQPUT1, or MQGET call processes, a partial parsing of any MQRFH2 headers in the message can occur to check what folders are included, and to determine if the folders contain properties. Overview of MQRFH2 headers that are not valid.

If the partial parsing of the message cannot complete successfully because the structure is not valid, for example, the `StrucLength` field is too small, then:

- The MQPUT or MQPUT1 call fails with reason code MQRC_RFH_ERROR, if it can be determined that the application includes some IBM WebSphere MQ 7 option, so that existing applications do not fail.
- The MQGET call returns successfully, and the MQRFH2 containing the error is returned in the buffer you provided.

If the partial parsing fails because it cannot be detected whether a particular folder contains properties or not, for example, the folder begins `<<jms`, so parsing fails before the folder name is determined, then:

- The MQPUT or MQPUT1 call fails with reason code MQRC_RFH_FORMAT_ERROR, if it can be determined that the application includes some IBM WebSphere MQ 7 option, so that existing applications do not fail.
- The MQGET call returns successfully, and the MQRFH2 containing the error is returned in the buffer you provided.
- While internally within the queue manager, the message is not rejected due to the badly formatted folder, but the folder is always treated as if no properties were contained inside it.

A message can flow through the queue manager network with a folder containing such a syntax error, but never being parsed and detected, while one or more folders in the message are:

- Valid
- Successfully parsed
- Used in the processing of the message

Therefore, detection is not guaranteed.

If one of your applications uses "MQSETMP - Set message property" on page 768, or MQINQMP to access a property, and in so doing this causes an MQRFH2 folder to be fully parsed, detecting an error such that parsing cannot complete, this is indicated by an appropriate return code to the API call. No properties in the folder are made available to the application.

If an attempt is made to fully parse an MQRFH2 folder and the parser finds unrecognized element attributes, or an unrecognized data type, parsing continues and complete successfully with no warnings being issued; this does not constitute a parsing error.

Code page conversion

This section describes codeset names and CCSIDs, national language, z/OS conversion, IBM i conversion, and Unicode conversion support.

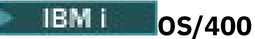
Each national language section lists the following information:

- The native CCSIDs supported
- The code page conversions that are not supported

The following terms are used in the information:

AIX
Indicates IBM MQ for AIX.

Linux
Indicates IBM MQ for Linux for Intel and IBM MQ for Linux for zSeries.



OS/400
Indicates IBM MQ for IBM i.

Solaris **Solaris**
Indicates IBM MQ for Solaris.

Windows **Windows**
Indicates IBM MQ for Windows.

z/OS **z/OS**
Indicates IBM MQ for z/OS.

The default for data conversion is for the conversion to be performed at the target (receiving) system.

If the source product supports the conversion a channel can be set up and data exchanged by setting the channel attribute CONVERT to YES at the source.

Note:

1. Conversion for IBM MQ MQI client information takes place in the server, so the server must support conversion from the client CCSID to the server CCSID.
2. The conversion might include support added by CSD/PTF to the latest version of IBM MQ. Check the content of the latest service level to see if you need to install a CSD/PTF to enable this conversion.
3. The IBM MQ queue manager CCSID must be Mixed or SBCS.
4. Some CCSIDs, for example 850 on AIX, that are not supported by the operating system can still be used by the application and also can be set as the IBM MQ queue manager CCSID. This is allowed for backward compatibility purpose only and the conversion will fail if the relevant conversion tables are not installed.

See Table 641 on page 926 for a cross-reference between some of the CCSID numbers and some industry codeset names.

Related reference

"National languages" on page 927
This information contains languages supported by IBM MQ.

Codeset names and CCSIDs

Codeset names and the corresponding CCSIDs for each codeset name.

z/OS IBM MQ for z/OS provides more conversion than is listed in the language specific tables. For a complete list of conversions, see Table 674 on page 954.

Table 641. Codeset names and CCSIDs

Codeset names	CCSIDs
ISO 8859-1	819
ISO 8859-2	912
ISO 8859-3	913
ISO 8859-5	915
ISO 8859-6	1089
ISO 8859-7	813
ISO 8859-8	916
ISO 8859-9	920
ISO 8859-13	921
ISO 8859-15 (euro)	923
big5	950
eucJP	954 5050 33722
eucKR	970
eucTW	964
eucCN	1383
PCK	943
GBK	1386
koi8-r	878

National languages

This information contains languages supported by IBM MQ.

The languages supported by IBM MQ are:

- US English - see topic "US English" on page 927
- German - see topic "German" on page 928
- Danish and Norwegian - see topic "Danish and Norwegian" on page 929
- Finnish and Swedish - see topic "Finnish and Swedish" on page 930
- Italian - see topic "Italian" on page 931
- Spanish - see topic "Spanish" on page 931
- UK English / Gaelic - see topic "UK English /Gaelic" on page 932
- French - see topic "French" on page 933
- Multilingual - see topic "Multilingual" on page 933
- Portuguese - see topic "Portuguese" on page 934
- Icelandic - see topic "Icelandic" on page 935
- Eastern European languages - see topic "Eastern European languages" on page 935
- Cyrillic - see topic "Cyrillic" on page 937
- Estonian - see topic "Estonian" on page 938
- Latvian and Lithuanian - see topic "Latvian and Lithuanian" on page 939
- Ukranian - see topic "Ukrainian" on page 940
- Greek - see topic "Greek" on page 941
- Turkish - see topic "Turkish" on page 941
- Hebrew - see topic "Hebrew" on page 942
- Farsi - see topic "Farsi" on page 944
- Urdu - see topic "Urdu" on page 944
- Thai - see topic "Thai" on page 945
- Lao - see topic "Lao" on page 945
- Vietnamese - see topic "Vietnamese" on page 946
- Japanese Latin SBCS - see topic "Japanese Latin SBCS" on page 946
- Japanese Katakana SBCS - see topic "Japanese Katakana SBCS" on page 948
- Japanese Kanji/ Latin Mixed - see topic "Japanese Kanji/ Latin Mixed" on page 949
- Japanese Kanji/ Katakana Mixed - see topic "Japanese Kanji/ Katakana Mixed" on page 950
- Korean - see topic "Korean" on page 952
- Simplified Chinese - see topic "Simplified Chinese" on page 952
- Traditional Chinese - see topic "Traditional Chinese" on page 953

US English

Details of CCSIDs and CCSID conversion for US English.

Table 642. Native CCSIDs for US English on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	37, 924, 1140

Platform	Native CCSIDs
AIX AIX	819, 923, 5348
Windows Windows	437, 850, 1252, 5348, 858
Linux Linux Solaris Solaris	819, 923
Apple client	1275

Table 642. Native CCSIDs for US English on supported platforms (continued)

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

37
Does not convert to code pages 923, 858

924
Does not convert to code pages 437, 858, 1051, 1140, 1252, 1275, 5348

1140
Does not convert to code pages 924, 1051, 1275

German

Details of CCSIDs and CCSID conversion for German.

Table 643. Native CCSIDs for German on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	273, 924, 1141
AIX AIX	819, 923, 5348
Windows Windows	437, 850, 858, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

273
: Does not convert to code pages 858, 923, 924, 1275

924
: Does not convert to code pages 273, 437, 858, 1051, 1141, 1252, 1275, 5348

1141
: Does not convert to code pages 924, 1051, 1275

Danish and Norwegian

Details of CCSIDs and CCSID conversion for Danish and Norwegian.

Table 644. native CCSIDs for Danish and Norwegian on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	277, 924, 1142
AIX AIX	819, 923, 5348
Windows Windows	850, 858, 865, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

277
: Does not convert to code pages 858, 923, 924, 1275

924
: Does not convert to code pages 277, 858, 865, 1051, 1142, 1252, 1275, 5348

1142
: Does not convert to code pages 924, 865, 1051, 1275

AIX

Code page:

819
: Does not convert to code page 865

Windows

Code page:

865
: Does not convert to code pages 1051, 1275

Finnish and Swedish

Details of CCSIDs and CCSID conversion for Finnish and Swedish.

Table 645. Native CCSIDs for Finnish and Swedish on supported platforms

Platform	Native CCSIDs
IBM i z/OS	278, 924, 1143
AIX	819, 923, 5348
Windows	437, 850, 858, 865, 1252, 5348
Linux Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

278
: Does not convert to code pages 858, 923, 924, 1275

924
: Does not convert to code pages 278, 437, 858, 865, 1051, 1143, 1252, 1275, 5348

1143
: Does not convert to code pages 865, 924, 1051, 1275

AIX

Code page:

819
: Does not convert to code page 865

850
: Does not convert to code page 865

Windows

Code page:

865
: Does not convert to code pages 1051, 1275

Italian

Details of CCSIDs and CCSID conversion for Italian.

Table 646. Native CCSIDs for Italian on supported platforms

Platform	Native CCSIDs
IBM i z/OS	280, 924, 1144
AIX	819, 923, 5348
Windows	437, 850, 858, 1252, 5348
Linux Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

280
: Does not convert to code pages 858, 923, 924, 1275

924
: Does not convert to code pages 280, 437, 858, 1051, 1144, 1252, 1275, 5348

1144
: Does not convert to code pages 924, 1051, 1275

Spanish

Details of CCSIDs and CCSID conversion for Spanish.

Table 647. Native CCSIDs for Spanish on supported platforms

Platform	Native CCSIDs
IBM i z/OS	284, 924, 1145
AIX	819, 923, 5348
Windows	437, 850, 858, 1252, 5348
Linux Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

284
Does not convert to code pages 858, 923, 924, 1275

924
Does not convert to code pages 284, 437, 858, 1051, 1145, 1252, 1275, 5348

1145
Does not convert to code pages 924, 1051, 1275

UK English /Gaelic

Details of CCSIDs and CCSID conversion for UK English/Gaelic.

Table 648. Native CCSIDs for UK English / Gaelic on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	285, 924, 1146
AIX AIX	819, 923, 5348
Windows Windows	437, 850, 858, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

285
Does not convert to code pages 858, 923, 924, 1275

924
Does not convert to code pages 285, 437, 858, 1051, 1146, 1252, 1275, 5348

1146
Does not convert to code pages 924, 1051, 1275

French

Details of CCSIDs and CCSID conversion for French.

Table 649. Native CCSIDs for French on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	297, 924, 1147
AIX AIX	819, 923, 5348
Windows Windows	437, 850, 858, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

297
Does not convert to code pages 858, 923, 924, 1275, 5348

924
Does not convert to code pages 297, 437, 858, 1051, 1147, 1252, 1275, 5348

1147
Does not convert to code pages 924, 1051, 1275

Multilingual

Details of CCSIDs and CCSID conversion for Multilingual.

Table 650. Native CCSIDs for multilingual conversion on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	500, 924, 1148
AIX AIX	819, 923, 5348
Windows Windows	437, 850, 858, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

500
: Does not convert to code pages 858, 923

924
: Does not convert to code pages 437, 858, 1051, 1148, 1252, 1275, 5348

1148
: Does not convert to code pages 924, 1051, 1275

Portuguese

Details of CCSIDs and CCSID conversion for Portuguese.

Table 651. Native CCSIDs for Portuguese on supported platforms

Platform	Native CCSIDs
IBM i IBM i	37, 500, 924, 1140
z/OS IBM i	500, 924, 1140
AIX AIX	819, 923, 5348
Windows Windows	850, 858, 860, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

37
: Does not convert to code pages 858, 923, 1275

500
: Does not convert to code pages 858, 923, 1275

924
: Does not convert to code pages 858, 860, 1051, 1140, 1252, 1275, 5348

1140
: Does not convert to code pages 860, 924, 1051, 1275

Windows

Code page:

860
: Does not convert to code pages 1051, 1275

Icelandic

Details of CCSIDs and CCSID conversion for Icelandic.

Table 652. Native CCSIDs for Icelandic on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	871, 924, 1149
AIX AIX	819, 923, 5348
Windows Windows	850, 858, 861, 1252, 5348
Linux Linux Solaris Solaris	819, 923
Apple client	1275

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

871
: Does not convert to code pages 858, 923, 924, 1275, 5348

924
: Does not convert to code pages 858, 861, 871, 1051, 1149, 1252, 1275, 5348

1149
: Does not convert to code pages 924, 1051, 1275

Windows

Code page:

861
: Does not convert to code pages 1051, 1275

Eastern European languages

Details of CCSIDs and CCSID conversion for Eastern European Languages. The typical languages using these CCSIDs include Albanian, Croatian, Czech, Hungarian, Polish, Romanian, Serbian, Slovak, and Slovenian.

Platform	Native CCSIDs
IBM i z/OS	870, 1153
Windows	852, 1250, 5346, 9044
AIX Linux Solaris	912
Eastern European Apple client	1282
Romanian Apple client	1285
Croatian Apple client	1284

Table 653. Native CCSIDs for Eastern European languages on supported platforms

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

z/OS

Code page:

870
Does not convert to code pages 1284, 1285

1153
Does not convert to code pages 1250, 1284, 1285

IBM i

Code page:

870
Does not convert to code pages 1284, 1285, 5346, 9044

1153
Does not convert to code pages 1282, 1284, 1285, 5346, 9044

Solaris, Linux

Code page:

912
Does not convert to code pages 1284, 1285

Windows

Code page:

852
: Does not convert to code pages 1284, 1285

1250
: Does not convert to code pages 1284, 1285

9044
: Does not convert to code pages 912, 1282, 1284, 1285

Cyrillic

Details of CCSIDs and CCSID conversion for Cyrillic. The typical languages using these CCSIDs include Belarussion, Bulgarian, Macedonian, Russian, and Serbian.

Table 654. Native CCSIDs for Cyrillic on supported platforms

Platform	Native CCSIDs
z/OS z/OS	1025
IBM i IBM i	880, 1025
Windows Windows	855, 866, 1131, 1251, 5347
Solaris Solaris	878, 915
AIX AIX Linux Linux	915
Apple client	1283

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

880
: Does not convert to code pages 855, 866, 878, 1131, 5347

1025
: Does not convert to code pages 878, 5347

Windows

Code page:

855
: Does not convert to code page 1131

866
: Does not convert to code page 1131

1131
: Does not convert to code pages 855, 866, 880, 1283

Estonian

Details of CCSIDs and CCSID conversion for Estonian.

Table 655. Native CCSIDs for Estonian on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	1122, 1157
Windows Windows	902, 922, 1257, 5353, 9449
AIX AIX Linux Linux Solaris Solaris	902, 922

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

1122
Does not convert to code pages 902, 1157, 9449

1157
Does not convert to code pages 922, 1122, 1257, 9449

IBM i

Code page:

1122
Does not convert to code pages 902, 5353, 9449

1157
Does not convert to code pages 922, 5353, 9449

Solaris, Linux

Code page:

902
Does not convert to code pages 922, 1122, 9449

922
Does not convert to code pages 902, 1157, 9449

Windows

Code page:

5353
: Does not convert to code page 9449

9449
: Does not convert to code pages 902, 922, 1122, 1157, 1257, 5353

902
: Does not convert to code pages 922, 1122, 9449

Latvian and Lithuanian

Details of CCSIDs and CCSID conversion for Latvian and Lithuanian.

Table 656. Native CCSIDs for Latvian and Lithuanian on supported platforms

Platform	Native CCSIDs
IBM i z/OS	1112, 1156
Windows	901, 921, 1257, 5353, 9449
AIX Linux Solaris	901, 921

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

1112
: Does not convert to code pages 901, 1156, 9449

1156
: Does not convert to code pages 901, 1156, 9449

IBM i

Code page:

1112
: Does not convert to code page 5353

1153
: Does not convert to code pages 921, 5353, 9449

Solaris, Linux

Code page:

902
: Does not convert to code pages 921, 1112, 1257, 9449

921
: Does not convert to code pages 901, 1156, 9449

Windows

Code page:

901
: Does not convert to code pages 921, 1112, 1257, 9449

5355
: Does not convert to code page 9449

9449
: Does not convert to code pages 901, 921, 1112, 1156, 1257

Ukrainian

Details of CCSIDs and CCSID conversion for Ukrainian.

Table 657. Native CCSIDs for Ukranian on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	1123
Windows Windows	1124, 1125, 1251, 5347
AIX AIX Linux Linux Solaris Solaris	1124

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

IBM i

Code page:

1123
: Does not convert to code page 5347

Windows

Code page:

1125
: Does not convert to code page 1123

Greek

Details of CCSIDs and CCSID conversion for Greek.

Table 658. Native CCSIDs for Greek on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	875
Windows Windows	869, 1253, 5349
AIX AIX Linux Linux NCR Solaris Solaris	813
Apple client	1280
DOS client	737

All non-client platforms support conversion between their native CCSIDs, the native CCSIDs of the other platforms with the following exceptions.

IBM i

Code page:

875
Does not convert to code page 5349

Windows

Code page:

1253
Does not convert to code page 737

5349
Does not convert to code page 737

Turkish

Details of CCSIDs and CCSID conversion for Turkish.

Table 659. Native CCSIDs for Turkish on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	1026
Windows Windows	857, 1254, 5350

Platform	Native CCSIDs
AIX AIX Linux Linux Solaris Solaris	920
Apple client	1281

Table 659. Native CCSIDs for Turkish on supported platforms (continued)

All non-client platforms support conversion between their native CCSIDs and the native CCSIDs of the other platforms, with the following exceptions.

IBM i

Code page:

1026
Does not convert to code page 5350

Hebrew

Details of CCSIDs and CCSID conversion for Hebrew.

Table 660. Native CCSIDs for Hebrew on supported platforms

Platform	Native CCSIDs
z/OS z/OS	424, 803, 4899, 12712
IBM i IBM i	424
AIX AIX	916, 9048
Windows Windows	1255, 5351
Linux Linux Solaris Solaris	916

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

424
Does not convert to code pages 867, 4899, 9048, 12712

803
Does not convert to code pages 867, 4899, 5351, 9048, 12712

4899
Does not convert to code pages 424, 803, 856, 862, 916, 1255

12712
Does not convert to code pages 424, 803, 856, 916, 1255

IBM i

Code page:

424
Does not convert to code pages 803, 867, 4899, 5351, 9048, 12712

Code page 424 also converts to and from CCSID 4952, which is a variant of 856.

AIX

Code page:

916
Does not convert to code pages 867, 4899, 9048, 12712

9048
Does not convert to code pages 424, 803, 856, 862, 916, 1255

Windows

Code page:

1255
Does not convert to code pages 867, 4899, 9048, 12712

5351
Does not convert to code page 803

Arabic

Details of CCSIDs and CCSID conversion for Arabic

Table 661. Native CCSIDs for Arabic on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	420
AIX AIX	1046, 1089
	1089 (see note)
Windows Windows	720, 864, 1256, 5352
Linux Linux Solaris Solaris	1089

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

IBM i

Code page:

420
Does not convert to code page 5352

Solaris, Linux, Tru64

Code page:

1089
Does not convert to code page 720

Windows

Code page:

720
Does not convert to code pages 1089, 5352

5352
Does not convert to code page 720

Farsi

Details of CCSIDs and CCSID conversion for Farsi.

Table 662. Native CCSIDs for Farsi on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	1097
AIX AIX Linux Linux Solaris Solaris Windows Windows	1098 (see note)

Note: The native CCSID for these platforms has not been standardized and might change.

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms.

Urdu

Details of CCSIDs and CCSID conversion for Urdu.

Table 663. Native CCSIDs for Urdu on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	918

Table 663. Native CCSIDs for Urdu on supported platforms (continued)	
Platform	**Native CCSIDs**
Windows	868
AIX Linux Solaris	1006

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

IBM i

Code page:

918
Does not convert to code page 1006

Thai

Details of CCSIDs and CCSID conversion for Thai.

Table 664. Native CCSIDs for Thai on supported platforms	
Platform	**Native CCSIDs**
IBM i z/OS	838
AIX Linux Solaris Windows	874 (see note)

Note: The native CCSID for these platforms has not been standardized and might change.

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms.

Lao

Details of CCSIDs and CCSID conversion for Lao.

Table 665. Native CCSIDs for Lao on supported platforms	
Platform	**Native CCSIDs**
IBM i z/OS	1132

Platform	Native CCSIDs
AIX Linux Solaris Windows	1133

Table 665. Native CCSIDs for Lao on supported platforms (continued)

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms.

Vietnamese

Details of CCSIDs and CCSID conversion for Vietnamese.

Table 666. Native CCSIDs for Vietnamese on supported platforms

Platform	Native CCSIDs
IBM i z/OS	1130
Windows	1258, 5354
AIX Linux Solaris	1129

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

IBM i

Code page:

1130
Does not convert to code pages 1129, 5354

Japanese Latin SBCS

Details of CCSIDs and CCSID conversion for Japanese Latin SBCS.

Table 667. Native CCSIDs for Japanese Latin SBCS on supported platforms

Platform	Native CCSIDs
IBM i z/OS	1027
AIX	932, 5050, 33722 (see Note 1)
Windows	932, 943 (see Note 2)

Table 667. Native CCSIDs for Japanese Latin SBCS on supported platforms (continued)	
Platform	**Native CCSIDs**
Linux Solaris	943, 5050

Note:

1. 5050 and 33722 are CCSIDs related to base code page 954 on AIX. The CCSID reported by the operating system is 33722.
2. Windows NT uses code page 932 but this is best represented by the CCSID of 943. However, not all platforms of IBM MQ support this CCSID.

   On IBM MQ for Windows CCSID 932 is used to represent code page 932, but a change to file `../conv/table/ccsid.tbl` can be made which changes the CCSID used to 943.

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

1027
    Does not convert to code pages 932, 942, 943, 954, 5050, 33722

IBM i

Code page:

1027
    Does not convert to code page 932

AIX

Code page:

932
    Does not convert to code page 1027

5050
    Does not convert to code page 1027

33722
    Does not convert to code page 1027

Linux

Code page:

943
    Does not convert to code page 1027

5050
Does not convert to code page 1027

Solaris

Code page:

943
Does not convert to code page 1027

5050
Does not convert to code page 1027

Japanese Katakana SBCS

Details of CCSIDs and CCSID conversion for Japanese Katakana SBCS.

Table 668. Native CCSIDs for Japanese Katakana SBCS on supported platforms

Platform	Native CCSIDs
IBM i z/OS	290
AIX	932, 5050, 33722 (see Note 1)
Windows	932, 943 (see Note 2)
Linux Solaris	943, 5050

Note:

1. 5050 and 33722 are CCSIDs related to base code page 954 on AIX. The CCSID reported by the operating system is 33722.
2. Windows NT uses code page 932 but this is best represented by the CCSID of 943. However, not all platforms of IBM MQ support this CCSID.

   On IBM MQ for Windows CCSID 932 is used to represent code page 932, but a change to file `../conv/table/ccsid.tbl` can be made which changes the CCSID used to 943.
3. In addition to the previous conversions, IBM MQ supports conversion from CCSID 897 to CCSIDs 37, 273, 277, 278, 280, 284, 285, 290, 297, 437, 500, 819, 850, 1027, and 1252 on the following platforms:
   - AIX
   - Linux
   - Solaris

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

290
Does not convert to code pages 932, 943, 954, 5050, 33722

IBM i

Code page:

290
Does not convert to code page 932

AIX

Code page:

932
Does not convert to code pages 290, 897

5050
Does not convert to code pages 290, 897

33722
Does not convert to code pages 290, 897

Linux

Code page:

943
Does not convert to code pages 290, 897

5050
Does not convert to code pages 290, 897

Solaris

Code page:

943
Does not convert to code pages 290, 897

5050
Does not convert to code pages 290, 897

Japanese Kanji/ Latin Mixed

Details of CCSIDs and CCSID conversion for Japanese Kanji/Latin Mixed.

Table 669. Native CCSIDs for Japanese Kanji/ Latin Mixed on supported platforms

Platform	Native CCSIDs
IBM i IBM i z/OS z/OS	1399, 5035 (see Note 1)
AIX AIX	932, 5050, 33722 (see Note 2)

Table 669. Native CCSIDs for Japanese Kanji/ Latin Mixed on supported platforms (continued)	
Platform	**Native CCSIDs**
Windows	932, 943 (see Note 4)
Linux Solaris	943, 5050

Note:

1. IBM i z/OS 5035 is a CCSID related to code page 939
2. AIX 5050 and 33722 are CCSIDs related to base code page 954 on AIX. The CCSID reported by the operating system is 33722.
3. Windows Windows NT uses code page 932 but this is best represented by the CCSID of 943. However, not all platforms of IBM MQ support this CCSID.

   On IBM MQ for Windows CCSID 932 is used to represent code page 932, but a change to file `../conv/table/ccsid.tbl` can be made which changes the CCSID used to 943.

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

1399
Does not convert to code pages 954, 5035, 5050, 33722

5035
Does not convert to code pages 954, 1399, 5050, 33722

IBM i

Code page:

1399
Does not convert to code page 5039

5035
Does not convert to code page 5039

Japanese Kanji/ Katakana Mixed

Details of CCSIDs and CCSID conversion for Japanese Kanji/Katakana Mixed.

Table 670. Native CCSIDs for Japanese Kanji/ Katakana Mixed on supported platforms	
Platform	**Native CCSIDs**
z/OS	1390, 5026 (see Note 1)
IBM i	5026 (see Note 1)
AIX	932, 5050, 33722 (see Note 2)

Table 670. Native CCSIDs for Japanese Kanji/ Katakana Mixed on supported platforms (continued)	
Platform	**Native CCSIDs**
Windows	932, 943 (see Note 4)
Linux Solaris	943, 5050

Note:

1. The single-byte mode of CCSIDs 1390 and 5026 in EBCDIC contain lower-case characters in different locations to the typical/invariant layout for basic Latin and care must be taken to ensure data is not lost when message data is being converted to other CCSIDs. In addition, the use of these CCSIDs as a queue manager's default CCSID may cause issues when communicating with other queue managers, for example, channel names using lower case characters may not be correctly interpreted on the remote system. 5026 is a CCSID related to code page 930. CCSID 5026 is the CCSID reported on IBM i when the Japanese Katakana (DBCS) feature is selected.
2. 5050 and 33722 are CCSIDs related to base code page 954 on AIX. The CCSID reported by the operating system is 33722.
3. Windows NT uses code page 932 but this is best represented by the CCSID of 943. However, not all platforms of IBM MQ support this CCSID.

   On IBM MQ for Windows, CCSID 932 is used to represent code page 932, but a change to file `../conv/table/ccsid.tbl` can be made that changes the CCSID used to 943.

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

1390
: Does not convert to code pages 954, 5026, 5050, 33722

  Does not accept lowercase characters.

5026
: Does not convert to code pages 954, 1390, 5050, 33722

IBM i

Code page:

5026
: Does not convert to code pages 1390, 5039

Korean

Details of CCSIDs and CCSID conversion for Korean.

Table 671. Native CCSIDs for Korean on supported platforms

Platform	Native CCSIDs
IBM i z/OS	933, 1364
AIX Linux Solaris	970
Windows	949, 1363

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

933
: Does not convert to code page 970

1364
: Does not convert to code page 970

Simplified Chinese

Details of CCSIDs and CCSID conversion for Simplified Chinese.

Table 672. Native CCSIDs for Simplified Chinese on supported platforms

Platform	Native CCSIDs
z/OS	935, 1388
IBM i	935, 1388
AIX	1383, 1386
Windows	1381, 1386(see Note 2)
Linux Solaris	1383

Note:

1. Windows uses code page 936 but this is best represented by the CCSID of 1386. However, not all platforms of IBM MQ support this CCSID.

   On IBM MQ for Windows CCSID 1381 is used to represent code page 936, but a change to file `../conv/table/ccsid.tbl` can be made which changes the CCSID used to 1386.

2. IBM MQ supports the Chinese GB18030 standard.

   On z/OS, Linux, Windows, and Solaris, conversion support is provided between Unicode (UTF-8 and UTF-16) and CCSID 1388 (EBCDIC with GB18030 extensions), Unicode (UTF-8 and UTF-16) and CCSID 5488 (GB18030), and between CCSID 1388 and CCSID 5488.

   Note:

   On IBM i, support is provided by the operating system for conversion between Unicode (UTF-8 and UTF-16) and CCSID 1388 (EBCDIC with GB18030 extensions).

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

935
: Does not convert to code page 1383

1388
: Does not convert to code page 1383

Traditional Chinese

Details of CCSIDs and CCSID conversion for Traditional Chinese.

Table 673. Native CCSIDs for Traditional Chinese on supported platforms

Platform	Native CCSIDs
IBM i z/OS	937
Windows	950
AIX Linux Solaris	950, 964

All platforms support conversion between their native CCSIDs and the native CCSIDs of other platforms, with the following exceptions.

z/OS

Code page:

937
: Does not convert to code page 964

1388
: Does not convert to code page 1383

Linux and Solaris

Code page:

964
Does not convert to code page 938

z/OS conversion support

A list of supported CCSID conversions.

Table 674. IBM MQ for z/OS CCSID conversion support

CCSID	Converts to and from CCSIDS
37	256, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 720, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-866, 869-871, 874-875, 880, 897, 903-905, 912, 914-916, 920-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1097, 1100, 1112, 1114-1115, 1122, 1124, 1126, 1130-1132, 1137, 1140-1149, 1200, 1208, 1250-1255, 1257-1258, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5210-5211, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25480, 25617, 25619, 25664, 28709
256	37, 273, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 737, 775, 819, 833, 836, 838, 850, 852, 857, 860-866, 869-871, 875, 880, 905, 1025-1027, 1112, 1122, 1200, 1208, 1251-1252, 1275, 4386, 4929, 4932, 4934, 4946, 4948, 4953, 4960, 4971, 5123, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 13121, 13488, 16804, 17248, 17584, 28709
259	437, 808, 850-852, 855-858, 860-865, 867, 869, 872, 874, 899, 901-902, 915, 1098, 1161-1162, 1200, 1208, 1250-1258, 4946, 4948, 4951-4953, 4960, 4970, 5346, 5348, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584
273	37, 256, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1250, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951-4953, 4960, 4970-4971, 5012, 5123, 5346, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
274	500, 1047
275	37, 437, 500, 819, 850, 1047, 1200, 1208, 1252, 4946, 5348, 8229, 13488, 17584, 28709
277	37, 256, 273, 278, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709

CCSID	Converts to and from CCSIDS
278	37, 256, 273, 277, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
280	37, 256, 273, 277-278, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
281	1047
282	500, 1047, 1200, 1208, 13488, 17584
284	37, 256, 273, 277-278, 280, 285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
285	37, 256, 273, 277-278, 280, 284, 290, 297, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
290	37, 256, 273, 277-278, 280, 284-285, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 895-897, 1009, 1025-1027, 1040-1043, 1047, 1088, 1112, 1122, 1139, 1200, 1208, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 4992, 5123, 8229, 8482, 9025, 9044, 9049, 9056, 13121, 13488, 17248, 17584, 25473, 25617, 25619, 25664, 28709
293	1200, 1208, 13488, 17584
297	37, 256, 273, 277-278, 280, 284-285, 290, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1100, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
300	301, 941, 1200, 1208, 1351, 4396, 8492, 13488, 16684, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

CCSID	Converts to and from CCSIDS
301	300, 941, 1200, 1208, 1351, 4396, 8492, 13488, 16684, 17584
367	37, 256, 273, 277-278, 280, 284, 290, 297, 500, 819, 833, 836, 850, 871, 875, 1009, 1026-1027, 1041, 1088, 1115, 1126, 1200, 1208, 4386, 4929, 4932, 4946, 4971, 5123, 5211, 8229, 8482, 9025, 13121, 13488, 17584, 25617, 25664, 28709
420	37, 256, 424, 437, 500, 720, 737, 775, 819, 850, 852, 857, 860-865, 1008, 1046, 1089, 1098, 1112, 1122, 1127, 1200, 1208, 1252, 1256, 4946, 4948, 4953, 4960, 5104, 5142, 5352, 8229, 8612, 9044, 9049, 9056, 9238, 13488, 16804, 17248, 17584, 28709
423	37, 256, 273, 277-278, 280, 284-285, 297, 437, 500, 737, 775, 813, 819, 838, 850-852, 857, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1009, 1025-1027, 1041-1043, 1112, 1122, 1200, 1208, 1252-1253, 1280, 4909, 4934, 4946, 4948, 4953, 4960, 4970-4971, 5012, 5123, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 28709
424	37, 256, 420, 437, 500, 737, 775, 803, 819, 836, 850, 852, 856-857, 860-865, 916, 1112, 1122, 1200, 1208, 1252, 1255, 4932, 4946, 4948, 4952-4953, 4960, 5012, 5351, 8229, 8612, 9044, 9049, 9056, 13488, 16804, 17248, 17584, 28709
437	37, 256, 259, 273, 275, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-863, 865-866, 869-871, 874-875, 880, 897, 903, 905, 912, 914-916, 920-924, 1025-1027, 1040-1043, 1047, 1051, 1097, 1098, 1114-1115, 1126, 1140-1149, 1200, 1208, 1252, 1257, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5210-5211, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 28709
500	37, 256, 273-275, 277-278, 280, 282, 284-285, 290, 297, 367, 420, 423-424, 437, 737, 775, 813, 819, 833, 836, 838, 850-852, 855-858, 860-866, 869-871, 874-875, 880, 891, 895, 897, 903-905, 912, 914-916, 920-924, 1004, 1009-1021, 1023, 1025-1027, 1040-1043, 1046-1047, 1051, 1088-1089, 1097, 1100-1107, 1112, 1114-1115, 1122, 1124-1126, 1129-1133, 1137, 1140-1149, 1200, 1208, 1250-1258, 1275, 1280-1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951-4953, 4960, 4970-4971, 5012, 5123, 5142, 5210-5211, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 9238, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25480, 25617, 25619, 25664, 28709
720	37, 420, 864, 1200, 1208, 1256, 4960, 8229, 8612, 9056, 13488, 16804, 17248, 17584, 28709
737	37, 256, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 833, 836, 838, 850, 869-871, 875, 880, 905, 1025-1027, 1097, 1200, 1208, 1252-1253, 1280, 4386, 4909, 4929, 4932, 4934, 4946, 4971, 5123, 8229, 8482, 8612, 9025, 9030, 9061, 13121, 13488, 16804, 17584, 28709
775	37, 256, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 833, 836, 838, 850, 870-871, 875, 880, 905, 1025-1027, 1097, 1112, 1122, 1200, 1208, 1252, 1257, 4386, 4929, 4932, 4934, 4946, 4971, 5123, 8229, 8482, 8612, 9025, 9030, 13121, 13488, 16804, 17584, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
803	424, 819, 850, 856, 862, 916, 1200, 1208, 1252, 1255, 4946, 4952, 5012, 13488, 17584
806	1200, 1208, 13488, 17584
808	259, 858-859, 872, 923-924, 1140, 1148, 1153-1154, 1200, 1208, 5347, 5348, 13488, 17584
813	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252-1253, 1280, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
819	37, 256, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 803, 813, 833, 836, 838, 850, 852, 855, 857-858, 860-861, 863-866, 869-871, 874-875, 880, 897, 903, 905, 912, 914-916, 920-924, 1004, 1025-1027, 1041-1043, 1047, 1051, 1088-1089, 1097, 1098, 1112, 1114, 1122-1123, 1126, 1130, 1132, 1137, 1140-1149, 1200, 1208, 1250-1255, 1257-1258, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5210, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
833	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 836, 850, 852, 855, 857, 860-865, 870-871, 891, 1009, 1025-1027, 1040-1043, 1088, 1112, 1122, 1126, 1200, 1208, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 5123, 8229, 8482, 9025, 9044, 9049, 9056, 13121, 13488, 17248, 17584, 25617, 25619, 25664, 28709
834	926, 951, 1200, 1208, 1362, 4930, 9026, 13488, 17584
835	927, 947, 1200, 1208, 4931, 9027, 13488, 17584, 21427
836	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 424, 437, 500, 737, 775, 819, 833, 850, 852, 855, 857, 870-871, 875, 903, 1009, 1025-1027, 1040-1043, 1088, 1112, 1114-1115, 1122, 1200, 1208, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4971, 5123, 5210-5211, 8229, 8482, 9025, 9044, 9049, 13121, 13488, 17584, 25479, 25617, 25619, 25664, 28709
837	928, 1200, 1208, 1380, 1385, 4933, 13488, 17584
838	37, 256, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 775, 813, 819, 850, 852, 857, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1112, 1122, 1200, 1208, 1252, 4909, 4934, 4946, 4948, 4953, 4960, 4970-4971, 5012, 5123, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 28709
848	924, 1148, 1158, 1200, 1208, 5347, 13488, 17584
849	924, 1148, 1154, 1200, 1208, 5347, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
850	37, 256, 259, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 737, 775, 803, 813, 819, 833, 836, 838, 852, 855-858, 860-866, 869-871, 874-875, 880, 897, 903, 905, 912, 914-916, 920-924, 1004, 1025-1027, 1040-1043, 1047, 1051, 1088-1089, 1097, 1098, 1100, 1112, 1114, 1122, 1126, 1130, 1132, 1140-1149, 1200, 1208, 1250-1257, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951-4953, 4960, 4970-4971, 5012, 5123, 5210, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
851	259, 423, 500, 875, 1200, 1208, 4971, 13488, 17584
852	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1047, 1088, 1097, 1200, 1208, 1250, 1252, 1282, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5346, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 25664, 28709
855	37, 259, 273, 277-278, 280, 284-285, 290, 297, 437, 500, 819, 833, 836, 850, 852, 857, 866, 870-871, 878, 880, 912, 915, 1025-1027, 1040-1043, 1088, 1200, 1208, 1250-1252, 1283, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 5123, 5346, 5347, 8229, 8482, 9025, 9044, 9049, 13121, 13488, 17584, 25617, 25619, 25664, 28709
856	259, 273, 424, 500, 803, 850, 862, 916, 1200, 1208, 1255, 4946, 4952, 5012, 5351, 13488, 17584
857	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1088, 1097, 1200, 1208, 1252, 1254, 1281, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5350, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 25664, 28709
858	37, 259, 273, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 850, 860-861, 865, 871-872, 901-902, 923-924, 1047, 1051, 1140-1149, 1153-1157, 1160-1162, 1164, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
859	808, 872, 901-902, 1153-1157, 1160-1162, 1164, 1200, 1208, 13488, 17584
860	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 838, 850, 852, 857-858, 861, 863, 865, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 923-924, 1025-1027, 1041-1043, 1097, 1140, 1145-1146, 1148, 1200, 1208, 1252, 4386, 4909, 4929, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 28709

CCSID	Converts to and from CCSIDS
861	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 838, 850, 852, 857-858, 860, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 923-924, 1025-1027, 1041-1043, 1097, 1148, 1149, 1200, 1208, 1252, 4386, 4909, 4929, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 28709
862	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 803, 833, 838, 850, 856, 870-871, 875, 880, 905, 916, 1025-1027, 1097, 1200, 1208, 1252, 1255, 4386, 4929, 4934, 4946, 4952, 4971, 5012, 5123, 5351, 8229, 8482, 8612, 9025, 9030, 12712, 13121, 13488, 16804, 17584, 28709
863	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 838, 850, 852, 857, 860-861, 865, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1041-1043, 1051, 1097, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 28709
864	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 720, 819, 833, 838, 850, 870-871, 875, 880, 905, 918, 1008, 1025-1027, 1046, 1089, 1097, 1127, 1200, 1208, 1252, 1256, 4386, 4929, 4934, 4946, 4960, 4971, 5104, 5123, 5142, 5352, 8229, 8482, 8612, 9025, 9030, 9056, 9238, 13121, 13488, 16804, 17248, 17584, 28709
865	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 819, 833, 838, 850, 858, 860, 863, 870-871, 875, 880, 905, 923-924, 1025-1027, 1097, 1142-1143, 1148, 1200, 1208, 1252, 4386, 4929, 4934, 4946, 4971, 5123, 5348, 8229, 8482, 8612, 9025, 9030, 13121, 13488, 16804, 17584, 28709
866	37, 256, 437, 500, 819, 850, 855, 870, 878, 880, 915, 1025, 1200, 1208, 1251-1252, 1283, 4946, 4951, 5347, 8229, 13488, 17584, 28709
867	259, 1153-1155, 1160, 1200, 1208, 4899, 5351, 9048, 12712, 13488, 17584
868	918, 1006, 1200, 1208, 13488, 17584
869	37, 256, 259, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 813, 819, 838, 850, 852, 857, 860-861, 863, 870-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252-1254, 1280, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
870	37, 256, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-866, 869, 871, 874-875, 880, 897, 903, 912, 915-916, 920, 1009, 1025-1027, 1040-1043, 1047, 1088, 1112, 1122, 1200, 1208, 1250, 1252, 1282, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5346, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
871	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-865, 869, 870, 874-875, 880, 897, 903, 912, 916, 920, 923-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1112, 1122, 1140-1149, 1200, 1208, 1252, 1275, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5348, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
872	259, 808, 858-859, 923-924, 1140-1149, 1153-1155, 1200, 1208, 5347, 5348, 13488, 17584
874	37, 259, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
875	37, 256, 273, 277-278, 280, 284-285, 297, 367, 423, 437, 500, 737, 775, 813, 819, 836, 838, 850-852, 857, 860-865, 869-871, 874, 880, 897, 903, 912, 916, 920, 1009, 1025-1027, 1041-1043, 1047, 1088, 1112, 1122, 1200, 1208, 1252-1253, 1280, 4909, 4932, 4934, 4946, 4948, 4953, 4960, 4970-4971, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
878	855, 866, 880, 915, 1025, 1131, 1200, 1208, 1251, 1283, 4951, 5347, 13488, 17584
880	37, 256, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 775, 813, 819, 838, 850, 852, 855, 857, 860-866, 869-871, 874-875, 878, 897, 903, 912, 915-916, 920, 1009, 1025-1027, 1041-1043, 1112, 1122, 1200, 1208, 1251-1252, 1283, 4909, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5347, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 28709
891	500, 833, 1088, 1200, 1208, 4929, 9025, 13121, 13488, 17584, 25664
895	290, 500, 1027, 1041, 1200, 1208, 4386, 5123, 8482, 13488, 17584, 25617
896	290, 1027, 1041, 1200, 1208, 4386, 4992, 5123, 8482, 13488, 17584, 25617
897	37, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252, 4386, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 8229, 8482, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
899	259
901	259, 858-859, 902, 923-924, 1140, 1148, 1156-1157, 1200, 1208, 5348, 5353, 13488, 17584
902	259, 858-859, 901, 923-924, 1140, 1148, 1156-1157, 1200, 1208, 5348, 5353, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
903	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 836, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 912, 916, 920, 1025-1027, 1041-1043, 1115, 1200, 1208, 1252, 4909, 4932, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5211, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
904	37, 500, 1114, 1200, 1208, 5210, 8229, 13488, 17584, 25480, 28709
905	37, 256, 437, 500, 737, 775, 819, 850, 852, 857, 860-865, 920, 1026, 1112, 1122, 1200, 1208, 1252, 1254, 1281, 4946, 4948, 4953, 4960, 8229, 9044, 9049, 9056, 13488, 17248, 17584, 28709
912	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 916, 920, 1025-1027, 1041-1043, 1047, 1200, 1208, 1250, 1252, 1282, 4909, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5346, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
914	37, 437, 500, 819, 850, 1200, 1208, 1252, 1257, 4946, 8229, 13488, 17584, 28709
915	37, 259, 437, 500, 819, 850, 855, 866, 870, 878, 880, 1025, 1131, 1200, 1208, 1251-1252, 1283, 4946, 4951, 5347, 8229, 13488, 17584, 28709
916	37, 273, 277-278, 280, 284-285, 297, 423-424, 437, 500, 803, 813, 819, 838, 850, 852, 856-857, 860-863, 869-871, 874-875, 880, 897, 903, 912, 920, 1025-1027, 1041-1043, 1200, 1208, 1252, 1255, 4909, 4934, 4946, 4948, 4952-4953, 4970-4971, 5012, 5123, 5351, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
918	864, 868, 1006, 1200, 1208, 4960, 9056, 13488, 17248, 17584
920	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 1025-1026, 1200, 1208, 1252, 1254, 1281, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5350, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 28709
921	37, 437, 500, 819, 850, 922, 1112, 1122, 1200, 1208, 1252, 1257, 4946, 5353, 8229, 13488, 17584, 28709
922	37, 437, 500, 819, 850, 921, 1112, 1122, 1200, 1208, 1252, 1257, 4946, 5353, 8229, 13488, 17584, 28709
923	37, 273, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 850, 858, 860-861, 865, 871-872, 901-902, 924, 1047, 1051, 1140-1149, 1153-1158, 1160-1162, 1164, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
924	37, 273, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 848-850, 858, 860-861, 865, 871-872, 901-902, 923, 1047, 1051, 1140-1149, 1153-1157, 1160-1164, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
926	834, 951, 9026
927	835, 947, 1200, 1208, 4931, 9027, 13488, 17584, 21427
928	837, 1200, 1208, 1380, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

CCSID	Converts to and from CCSIDS
930	931-932, 939, 942-943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
931	930, 932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
932	930-931, 939, 942-943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
933	934, 944, 949, 1200, 1208, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13488, 13651, 17317, 17584, 25510, 25520, 25525, 29616, 29621, 33717, 37813
934	933, 949, 5029, 5045, 5460, 9125, 13221, 17317, 25510, 25525, 29621, 33717, 37813
935	936, 946, 1200, 1208, 1381, 1386, 1388, 5031, 5477, 5482, 5484, 9127, 13223, 13488, 17584, 25512
936	935, 946, 1381, 5031, 5477, 5484, 9127, 13223, 25512
937	938, 948, 950, 1200, 1208, 1370, 5033, 5046, 9142, 13488, 17584, 25514, 25524, 29620
938	937, 950, 1370, 5033, 5046, 9142, 25514
939	930-932, 942-943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
941	300-301, 1200, 1208, 1351, 4396, 8492, 13488, 16684, 17584
942	930-932, 939, 943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
943	930-932, 939, 942, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
944	933, 949, 1200, 1208, 5029, 5045, 5460, 9125, 13221, 13488, 17317, 17584, 25520, 25525, 29616, 29621, 33717, 37813
946	935-936, 1200, 1208, 5031, 5484, 9127, 13223, 13488, 17584, 25512
947	835, 927, 1200, 1208, 4931, 9027, 13488, 17584, 21427
948	937, 950, 1200, 1208, 1370, 5033, 5046, 9142, 13488, 17584, 25524, 29620
949	933-934, 944, 1200, 1208, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13488, 13651, 17317, 17584, 25510, 25520, 25525, 29616, 29621, 33717, 37813
950	937-938, 948, 1200, 1208, 1370, 5033, 5046, 9142, 13488, 17584, 25514, 25524, 29620
951	834, 926, 1200, 1208, 1362, 4930, 9026, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
1004	500, 819, 850, 1200, 1208, 4946, 13488, 17584
1006	868, 918, 1200, 1208, 13488, 17584
1008	420, 864, 1200, 1208, 4960, 5104, 8612, 9056, 13488, 16804, 17248, 17584
1009	37, 273, 277-278, 280, 284, 290, 297, 367, 423, 500, 833, 836, 870-871, 875, 880, 1025-1026, 1200, 1208, 4386, 4929, 4932, 4971, 8229, 8482, 9025, 13121, 13488, 17584, 28709
1010	500, 1200, 1208, 13488, 17584
1011	500, 1200, 1208, 13488, 17584
1012	500, 1200, 1208, 13488, 17584
1013	500, 1140, 1200, 1208, 13488, 17584
1014	500, 1200, 1208, 13488, 17584
1015	500, 1200, 1208, 13488, 17584
1016	500, 1200, 1208, 13488, 17584
1017	500, 1200, 1208, 13488, 17584
1018	500, 1200, 1208, 13488, 17584
1019	500, 1200, 1208, 13488, 17584
1020	500
1021	500
1023	500
1025	37, 256, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-866, 869-871, 874-875, 878, 880, 897, 903, 912, 915-916, 920, 1009, 1026-1027, 1040-1043, 1051, 1088, 1112, 1122, 1131, 1200, 1208, 1251-1252, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5347, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
1026	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-865, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1009, 1025, 1027, 1040-1043, 1047, 1088, 1112, 1122, 1200, 1208, 1252, 1254, 1281, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5350, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
1027	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-865, 869-871, 874-875, 880, 895-897, 903, 912, 916, 1025-1026, 1040-1043, 1047, 1088, 1112, 1122, 1139, 1200, 1208, 1252, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 4992, 5012, 5123, 8229, 8482, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
1040	37, 273, 277-278, 280, 284-285, 290, 297, 437, 500, 833, 836, 850, 852, 855, 857, 870-871, 1025-1027, 1041-1043, 1088, 1200, 1208, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 5123, 8229, 8482, 9025, 9044, 9049, 13121, 13488, 17584, 25617, 25619, 25664, 28709
1041	37, 273, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 895-897, 903, 912, 916, 1025-1027, 1040, 1042-1043, 1088, 1200, 1208, 1252, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 4992, 5012, 5123, 8229, 8482, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 17584, 25473, 25479, 25617, 25619, 25664, 28709
1042	37, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 1025-1027, 1040, 1041, 1043, 1088, 1200, 1208, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 8229, 8482, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 17584, 25473, 25479, 25617, 25619, 25664, 28709
1043	37, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 1025-1027, 1040, 1041, 1042, 1088, 1114, 1200, 1208, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5210, 8229, 8482, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 17584, 25473, 25479, 25617, 25619, 25664, 28709
1046	420, 500, 864, 1089, 1127, 1200, 1208, 1256, 4960, 5142, 5352, 8612, 9056, 9238, 13488, 16804, 17248, 17584
1047	37, 273-275, 277-278, 280, 281, 282, 284-285, 290, 297, 437, 500, 819, 850, 852, 858, 870-871, 875, 912, 923-924, 1026-1027, 1140-1149, 1200, 1208, 1252, 1254, 4946, 4948, 5123, 8229, 8482, 13488, 17584, 28709
1051	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 871, 923-924, 1025, 1097, 1140-1149, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1088	37, 273, 277-278, 280, 284-285, 290, 297, 367, 500, 819, 833, 836, 850, 852, 855, 857, 870-871, 875, 891, 1025-1027, 1040-1043, 1126, 1200, 1208, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4971, 5123, 8229, 8482, 9025, 9044, 9049, 13121, 13488, 17584, 25617, 25619, 25664, 28709
1089	420, 500, 819, 850, 864, 1046, 1127, 1200, 1208, 1256, 4946, 4960, 5142, 5352, 8612, 9056, 9238, 13488, 16804, 17248, 17584
1097	37, 437, 500, 737, 775, 819, 850, 852, 857, 860-865, 1051, 1098, 1112, 1122, 1200, 1208, 1252, 4946, 4948, 4953, 4960, 8229, 9044, 9049, 9056, 13488, 17248, 17584, 28709
1098	259, 420, 437, 819, 850, 1097, 1200, 1208, 1252, 4946, 8612, 13488, 16804, 17584
1100	37, 273, 277-278, 280, 284-285, 297, 500, 850, 4946, 8229, 28709
1101	500
1102	500

CCSID	Converts to and from CCSIDS
1103	500
1104	500
1105	500
1106	500
1107	500
1112	37, 256, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 775, 819, 833, 836, 838, 850, 870-871, 875, 880, 905, 921-922, 1025-1027, 1097, 1122, 1200, 1208, 1252, 1257, 4386, 4929, 4932, 4934, 4946, 4971, 5123, 5353, 8229, 8482, 8612, 9025, 9030, 13121, 13488, 16804, 17584, 28709
1114	37, 437, 500, 819, 836, 850, 904, 1043, 1115, 1200, 1208, 4932, 4946, 5210-5211, 8229, 13488, 17584, 25480, 25619, 28709
1115	37, 367, 437, 500, 836, 903, 1114, 1200, 1208, 4932, 5210-5211, 8229, 13488, 17584, 25479, 28709
1122	37, 256, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 775, 819, 833, 836, 838, 850, 870-871, 875, 880, 905, 921-922, 1025-1027, 1097, 1112, 1200, 1208, 1252, 1257, 4386, 4929, 4932, 4934, 4946, 4971, 5123, 5353, 8229, 8482, 8612, 9025, 9030, 13121, 13488, 16804, 17584, 28709
1123	819, 1124-1125, 1148, 1200, 1208, 1251-1252, 1283, 5347, 13488, 17584
1124	37, 500, 1123, 1125, 1200, 1208, 1251, 1283, 5347, 8229, 13488, 17584, 28709
1125	500, 1123, 1124, 1200, 1208, 1251, 1283, 5347, 13488, 17584
1126	37, 367, 437, 500, 819, 833, 850, 1088, 1200, 1208, 1252, 4929, 4946, 8229, 9025, 13121, 13488, 17584, 25664, 28709
1127	420, 864, 1046, 1089, 1256, 4960, 5142, 8612, 9056, 9238, 16804, 17248
1129	500, 1130, 1200, 1208, 1258, 5354, 13488, 17584
1130	37, 500, 819, 850, 1129, 1200, 1208, 1252, 1258, 4946, 5354, 8229, 13488, 17584, 28709
1131	37, 500, 878, 915, 1025, 1200, 1208, 1251, 1283, 5347, 8229, 13488, 17584, 28709
1132	37, 500, 819, 850, 1133, 1200, 1208, 1252, 4946, 8229, 13488, 17584, 28709
1133	500, 1132, 1200, 1208, 13488, 17584
1137	37, 500, 819, 1200, 1208, 8229, 13488, 17584, 28709
1139	290, 1027, 4386, 5123, 8482
1140	37, 273, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 850, 858, 860, 863, 871-872, 901-902, 923-924, 1013, 1047, 1051, 1141-1149, 1153-1157, 1160-1162, 1164, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709

CCSID	Converts to and from CCSIDS
1141	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 871-872, 923-924, 1047, 1051, 1140, 1142-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1142	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 865, 871-872, 923-924, 1047, 1051, 1140-1141, 1143-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1143	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 865, 871-872, 923-924, 1047, 1051, 1140-1142, 1144-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1144	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 871-872, 923-924, 1047, 1051, 1140-1143, 1145-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1145	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 860, 863, 871-872, 923-924, 1047, 1051, 1140-1144, 1146-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1146	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 860, 863, 871-872, 923-924, 1047, 1051, 1140-1145, 1147-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1147	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 871-872, 923-924, 1047, 1051, 1140-1146, 1148-1149, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1148	37, 273, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 848-850, 858, 860-861, 863, 865, 871-872, 901-902, 923-924, 1047, 1051, 1123, 1140-1147, 1149, 1153-1164, 1200, 1208, 1252, 1275, 4899, 4946, 5348, 5349, 8229, 12712, 13488, 17584, 28709
1149	37, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 861, 863, 871-872, 923-924, 1047, 1051, 1140-1148, 1153-1157, 1160-1162, 1200, 1208, 1252, 1275, 4946, 5348, 8229, 13488, 17584, 28709
1153	808, 858-859, 867, 872, 923-924, 1140-1149, 1154-1157, 1160-1162, 1200, 1208, 5348, 9044, 13488, 17584
1154	808, 849, 858-859, 867, 872, 923-924, 1140-1149, 1153, 1155-1157, 1160-1162, 1200, 1208, 5347, 5348, 13488, 17584
1155	858-859, 867, 872, 923-924, 1140-1149, 1153-1154, 1156-1157, 1160-1162, 1200, 1208, 5348, 5350, 9049, 13488, 17584
1156	858-859, 901-902, 923-924, 1140-1149, 1153-1155, 1157, 1160, 1200, 1208, 5348, 5353, 12712, 13488, 17584
1157	858-859, 901-902, 923-924, 1140-1149, 1153-1156, 1160, 1200, 1208, 5348, 5353, 12712, 13488, 17584
1158	848, 923, 1148, 1200, 1208, 5347, 5348, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
1159	1148, 1200, 1208, 13488, 17584
1160	858-859, 867, 923-924, 1140-1149, 1153-1157, 1161-1162, 1200, 1208, 5348, 13488, 17584
1161	259, 858-859, 923-924, 1140-1149, 1153-1155, 1160, 5348, 17584
1162	259, 858-859, 923-924, 1140-1149, 1153-1155, 1160, 5348, 17584
1163	924, 1148, 1164, 5354, 17584
1164	858-859, 923-924, 1140, 1148, 1163, 1200, 1208, 5348, 5354, 13488, 17584
1166	1200,1208,13488,17584
1200	37, 256, 259, 273, 275, 277-278, 280, 282, 284-285, 290, 293, 297, 300-301, 367, 420, 423-424, 437, 500, 720, 737, 775, 803, 806, 808, 813, 819, 833-838, 848-852, 855-872, 874-875, 878, 880, 891, 895-897, 901-905, 912, 914-916, 918, 920-924, 927-928, 930, 932-933, 935, 937, 939, 941-944, 946-951, 1004, 1006, 1008-1019, 1025-1027, 1040-1043, 1046-1047, 1051, 1088-1089, 1097-1098, 1112, 1114-1115, 1122-1126, 1129-1133, 1137, 1140-1149, 1153-1160, 1164, 1166, 1208, 1250-1258, 1275-1277, 1280-1285, 1351, 1362-1364, 1370-1371, 1374-1379, 1380-1381, 1385-1386, 1388, 1390, 1399, 4899, 4909, 4930, 4933, 4948, 4951-4952, 4960, 4971, 5012, 5039, 5104, 5123, 5142, 5210, 5346-5354, 8482, 8612, 9027, 9030, 9044, 9048-9049, 9056, 9061, 9066, 9238, 12712, 13121, 13218, 13488, 16684, 16804, 17248, 17584, 21427, 28709
1208	37, 256, 259, 273, 275, 277-278, 280, 282, 284-285, 290, 293, 297, 300-301, 367, 420, 423-424, 437, 500, 720, 737, 775, 803, 806, 808, 813, 819, 833-838, 848-852, 855-872, 874-875, 878, 880, 891, 895-897, 901-905, 912, 914-916, 918, 920-924, 927-928, 930, 932-933, 935, 937, 939, 941-944, 946-951, 1004, 1006, 1008-1019, 1025-1027, 1040-1043, 1046-1047, 1051, 1088-1089, 1097-1098, 1112, 1114-1115, 1122-1126, 1129-1133, 1137, 1140-1149, 1153-1160, 1164, 1166, 1200, 1250-1258, 1275-1277, 1280-1285, 1351, 1362-1364, 1370-1371, 1374-1379, 1380-1381, 1385-1386, 1388, 1390, 1399, 4899, 4909, 4930, 4933, 4948, 4951-4952, 4960, 4971, 5012, 5026, 5035, 5039, 5104, 5123, 5142, 5210, 5346-5354, 8482, 8612, 9027, 9030, 9044, 9048-9049, 9056, 9061, 9066, 9238, 12712, 13121, 13218, 13488, 16684, 16804, 17248, 17584, 21427, 28709
1250	37, 259, 273, 500, 819, 850, 852, 855, 870, 912, 1200, 1208, 1252, 1282, 4946, 4948, 4951, 5346, 8229, 9044, 13488, 17584, 28709
1251	37, 256, 259, 500, 819, 850, 855, 866, 878, 880, 915, 1025, 1123-1125, 1131, 1200, 1208, 1252, 1283, 4946, 4951, 5347, 8229, 13488, 17584, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
1252	37, 256, 259, 273, 275, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 737, 775, 803, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-866, 869-871, 874-875, 880, 897, 903, 905, 912, 914-916, 920-924, 1025-1027, 1041, 1047, 1051, 1097-1098, 1112, 1122-1123, 1126, 1130, 1132, 1140-1149, 1200, 1208, 1250-1251, 1254-1255, 1257, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25617, 28709
1253	37, 259, 423, 500, 737, 813, 819, 850, 869, 875, 1200, 1208, 1280, 4909, 4946, 4971, 5349, 8229, 9061, 13488, 17584, 28709
1254	37, 259, 500, 819, 850, 857, 869, 905, 920, 1026, 1047, 1200, 1208, 1252, 1281, 4946, 4953, 5350, 8229, 9049, 9061, 13488, 17584, 28709
1255	37, 259, 424, 500, 803, 819, 850, 856, 862, 916, 1200, 1208, 1252, 1281, 4946, 4952, 5012, 5351, 8229, 13488, 17584, 28709
1256	259, 420, 500, 720, 850, 864, 1046, 1089, 1127, 1200, 1208, 4946, 4960, 5142, 5352, 8612, 9056, 9238, 13488, 16804, 17248, 17584
1257	37, 259, 437, 500, 775, 819, 850, 914, 921-922, 1112, 1122, 1200, 1208, 1252, 4946, 5353, 8229, 13488, 17584, 28709
1258	37, 259, 500, 819, 1129-1130, 1200, 1208, 5354, 8229, 13488, 17584, 28709
1275	37, 256, 273, 277-278, 280, 284-285, 297, 437, 500, 819, 850, 858, 863, 871, 923-924, 1051, 1140-1149, 1200, 1208, 1252, 4946, 5348, 8229, 13488, 17584, 28709
1276	1200, 1208, 13488, 17584
1277	1200, 1208, 13488, 17584
1280	37, 423, 437, 500, 737, 813, 819, 850, 869, 875, 1200, 1208, 1252-1253, 4909, 4946, 4971, 5349, 8229, 9061, 13488, 17584, 28709
1281	37, 437, 500, 819, 850, 857, 905, 920, 1026, 1200, 1208, 1252, 1254-1255, 4946, 4953, 5350, 8229, 9049, 13488, 17584, 28709
1282	500, 852, 870, 912, 1200, 1208, 1250, 4948, 5346, 9044, 13488, 17584
1283	37, 437, 500, 819, 850, 855, 866, 878, 880, 915, 1025, 1123-1125, 1131, 1200, 1208, 1251-1252, 4946, 4951, 5347, 8229, 13488, 17584, 28709
1284	1200, 1208, 13488, 17584
1285	1200, 1208, 13488, 17584
1351	300-301, 941, 1200, 1208, 4396, 8492, 13488, 16684, 17584
1362	834, 951, 1200, 1208, 4930, 9026, 13488, 17584
1363	933, 949, 1200, 1208, 1364, 5029, 5045, 5460, 9125, 9555, 13221, 13488, 13651, 17317, 17584, 25525, 29621, 33717, 37813
1364	933, 949, 1200, 1208, 1363, 5029, 5045, 5460, 9125, 9555, 13221, 13488, 13651, 17317, 17584, 25525, 29621, 33717, 37813

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

CCSID	Converts to and from CCSIDS
1370	937-938, 948, 950, 1200, 1208, 1371, 5033, 5046, 9142, 13488, 17584, 25514, 25524, 29620
1371	1200, 1208, 1370, 13488, 17584
1374	1200, 1208
1375	1200, 1208
1376	1200, 1208
1377	1200, 1208
1378	1200, 1208
1379	1200, 1208
1380	837, 928, 1200, 1208, 1385, 4933, 13488, 17584
1381	935-936, 1200, 1208, 1386, 1388, 5031, 5477, 5482, 5484, 9127, 13223, 13488, 17584, 25512
1385	837, 1200, 1208, 1380, 4933, 13488, 17584
1386	935, 1200, 1208, 1381, 1388, 5031, 5477, 5482, 5484, 9127, 13223, 13488, 17584
1388	935, 1200, 1208, 1381, 1386, 5031, 5477, 5482, 5484, 5488, 9127, 13223, 13488, 17584
1390	930-932, 939, 942-943, 1200, 1208, 1399, 5026, 5028, 5035, 5038-5039, 5055, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
1399	930-932, 939, 942-943, 1200, 1208, 1390, 5026, 5028, 5035, 5038-5039, 5050, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
4386	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 895-897, 1009, 1025-1027, 1040-1043, 1088, 1112, 1122, 1139, 1252, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 4992, 5123, 8229, 8482, 9025, 9044, 9049, 9056, 13121, 17248, 25473, 25617, 25619, 25664, 28709
4396	300-301, 941, 1351, 8492, 16684
4899	867, 1148, 1200, 1208, 5351, 9048, 12712, 13488, 17584
4909	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252-1253, 1280, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
4929	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 891, 1009, 1025-1027, 1040-1043, 1088, 1112, 1122, 1126, 1252, 4386, 4932, 4946, 4948, 4951, 4953, 4960, 5123, 8229, 8482, 9025, 9044, 9049, 9056, 13121, 17248, 25617, 25619, 25664, 28709
4930	834, 951, 1200, 1208, 1362, 9026, 13488, 17584
4931	835, 927, 947, 9027, 21427

CCSID	Converts to and from CCSIDS
4932	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 424, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 870-871, 875, 903, 1009, 1025-1027, 1040-1043, 1088, 1112, 1114-1115, 1122, 1252, 4386, 4929, 4946, 4948, 4951, 4953, 4971, 5123, 5210-5211, 8229, 8482, 9025, 9044, 9049, 13121, 25479, 25617, 25619, 25664, 28709
4933	837, 1200, 1208, 1380, 1385, 13488, 17584
4934	37, 256, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 775, 813, 819, 838, 850, 852, 857, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1112, 1122, 1252, 4909, 4946, 4948, 4953, 4960, 4970-4971, 5012, 5123, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 17248, 25473, 25479, 25617, 25619, 28709
4946	37, 256, 259, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 737, 775, 803, 813, 819, 833, 836, 838, 850, 852, 855-858, 860-866, 869-871, 874-875, 880, 897, 903, 905, 912, 914-916, 920-924, 1004, 1025-1027, 1040-1043, 1047, 1051, 1088-1089, 1097-1098, 1100, 1112, 1114, 1122, 1126, 1130, 1132, 1140-1149, 1250-1257, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4948, 4951-4953, 4960, 4970-4971, 5012, 5123, 5210, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 16804, 17248, 25473, 25479, 25617, 25619, 25664, 28709
4948	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1047, 1088, 1097, 1200, 1208, 1250, 1252, 1282, 4386, 4909, 4929, 4932, 4934, 4946, 4951, 4953, 4970-4971, 5012, 5123, 5346, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 25664, 28709
4951	37, 259, 273, 277-278, 280, 284-285, 290, 297, 437, 500, 819, 833, 836, 850, 852, 855, 857, 866, 870-871, 878, 880, 912, 915, 1025-1027, 1040-1043, 1088, 1200, 1208, 1250-1252, 1283, 4386, 4929, 4932, 4946, 4948, 4953, 5123, 5346, 5347, 8229, 8482, 9025, 9044, 9049, 13121, 13488, 17584, 25617, 25619, 25664, 28709
4952	259, 273, 424, 500, 803, 850, 856, 862, 916, 1200, 1208, 1255, 4946, 5012, 5351, 13488, 17584
4953	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1088, 1097, 1252, 1254, 1281, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4970-4971, 5012, 5123, 5350, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 16804, 25473, 25479, 25617, 25619, 25664, 28709
4960	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 720, 819, 833, 838, 850, 864, 870-871, 875, 880, 905, 918, 1008, 1025-1027, 1046, 1089, 1097, 1127, 1200, 1208, 1252, 1256, 4386, 4929, 4934, 4946, 4971, 5104, 5123, 5142, 5352, 8229, 8482, 8612, 9025, 9030, 9056, 9238, 13121, 13488, 16804, 17248, 17584, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
4970	37, 259, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1252, 4909, 4934, 4946, 4948, 4953, 4971, 5012, 5123, 8229, 9030, 9044, 9049, 9061, 9066, 25473, 25479, 25617, 25619, 28709
4971	37, 256, 273, 277-278, 280, 284-285, 297, 367, 423, 437, 500, 737, 775, 813, 819, 836, 838, 850-852, 857, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1009, 1025-1027, 1041-1043, 1047, 1088, 1112, 1122, 1200, 1208, 1252-1253, 1280, 4909, 4932, 4934, 4946, 4948, 4953, 4960, 4970, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 25664, 28709
4992	290, 896, 1027, 1041, 4386, 5123, 8482, 25617
5012	37, 273, 277-278, 280, 284-285, 297, 423-424, 437, 500, 803, 813, 819, 838, 850, 852, 856-857, 860-863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252, 1255, 4909, 4934, 4946, 4948, 4952-4953, 4970-4971, 5123, 5351, 8229, 9030, 9044, 9049, 9061, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
5026	930-932, 939, 942-943, 1390, 1399, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 1208, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
5028	930-932, 939, 942-943, 1390, 1399, 5026, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
5029	933-934, 944, 949, 1363-1364, 5045, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717, 37813
5031	935-936, 946, 1381, 1386, 1388, 5477, 5482, 5484, 9127, 13223, 25512
5033	937-938, 948, 950, 1370, 5046, 9142, 25514, 25524, 29620
5035	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5038-5039, 9122, 9124, 9131, 9135, 1208, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
5038	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
5039	930-932, 939, 942-943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038, 9122, 9124, 9131, 9135, 13218-13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
5045	933-934, 944, 949, 1363-1364, 5029, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717, 37813
5046	937-938, 948, 950, 1370, 5033, 9142, 25514, 25524, 29620
5104	420, 864, 1008, 1200, 1208, 4960, 8612, 9056, 13488, 16804, 17248, 17584
5123	290, 367, 423, 437, 819, 1027, 1041, 1047, 1140-1149, 1156, 1157, 1160, 1200, 1208, 1252, 4948, 5348, 8482, 13488

CCSID	Converts to and from CCSIDS
5142	420, 500, 864, 1046, 1089, 1127, 1200, 1208, 1256, 4960, 5352, 8612, 9056, 9238, 13488, 16804, 17248, 17584
5210	37, 437, 500, 819, 836, 850, 904, 1043, 1114-1115, 1200, 1208, 4932, 4946, 5211, 8229, 13488, 17584, 25480, 25619, 28709
5211	37, 367, 437, 500, 836, 903, 1114-1115, 4932, 5210, 8229, 25479, 28709
5346	37, 259, 273, 500, 819, 850, 852, 855, 870, 912, 1200, 1208, 1250, 1252, 1282, 4946, 4948, 4951, 8229, 9044, 13488, 17584, 28709
5347	808, 848-849, 855, 866, 872, 878, 880, 915, 1025, 1123-1125, 1131, 1154, 1158, 1200, 1208, 1251, 1283, 4951, 13488, 17584
5348	37, 259, 273, 275, 277-278, 280, 284-285, 297, 437, 500, 808, 819, 850, 858, 860-861, 863, 865, 871-872, 901-902, 923-924, 1051, 1140-1149, 1153-1158, 1160-1162, 1164, 1200, 1208, 1252, 1275, 4946, 8229, 13488, 17584, 28709
5349	813, 869, 875, 1148, 1200, 1208, 1253, 1280, 4909, 4971, 9061, 13488, 17584
5350	857, 920, 1026, 1155, 1200, 1208, 1254, 1281, 4953, 9049, 13488, 17584
5351	424, 856, 862, 867, 916, 1200, 1208, 1255, 4899, 4952, 5012, 9048, 12712, 13488, 17584
5352	420, 864, 1046, 1089, 1200, 1208, 1256, 4960, 5142, 8612, 9056, 9238, 13488, 16804, 17248, 17584
5353	901-902, 921-922, 1112, 1122, 1156-1157, 1200, 1208, 1257, 13488, 17584
5354	1129-1130, 1163, 1164, 1200, 1208, 1258, 13488, 17584
5460	933-934, 944, 949, 1363-1364, 5029, 5045, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717, 37813
5477	935-936, 1381, 1386, 1388, 5031, 5482, 5484, 9127, 13223, 25512
5482	935, 1381, 1386, 1388, 5031, 5477, 5484, 9127, 13223
5484	935-936, 946, 1381, 1386, 1388, 5031, 5477, 5482, 9127, 13223, 25512
5488	1388
8229	37, 256, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 720, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-866, 869-871, 874-875, 880, 897, 903-905, 912, 914-916, 920-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1097, 1100, 1112, 1114-1115, 1122, 1124, 1126, 1130-1132, 1137, 1140-1149, 1250-1255, 1257-1258, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5210-5211, 5346, 5348, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 16804, 17248, 25473, 25479, 25480, 25617, 25619, 25664, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
8482	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 895-897, 1009, 1025-1027, 1040-1043, 1047, 1088, 1112, 1122, 1139, 1200, 1208, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 4992, 5123, 8229, 9025, 9044, 9049, 9056, 13121, 13488, 17248, 17584, 25473, 25617, 25619, 25664, 28709
8492	300-301, 941, 1351, 4396, 16684
8612	37, 256, 420, 424, 437, 500, 720, 737, 775, 819, 850, 852, 857, 860-865, 1008, 1046, 1089, 1098, 1112, 1122, 1127, 1200, 1208, 1252, 1256, 4946, 4948, 4953, 4960, 5104, 5142, 5352, 8229, 9044, 9049, 9056, 9238, 13488, 16804, 17248, 17584, 28709
9025	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 891, 1009, 1025-1027, 1040-1043, 1088, 1112, 1122, 1126, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 5123, 8229, 8482, 9044, 9049, 9056, 13121, 17248, 25617, 25619, 25664, 28709
9026	834, 926, 951, 1362, 4930
9027	835, 927, 947, 1200, 1208, 4931, 13488, 17584, 21427
9030	37, 256, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 775, 813, 819, 838, 850, 852, 857, 860-865, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1112, 1122, 1200, 1208, 1252, 4909, 4934, 4946, 4948, 4953, 4960, 4970-4971, 5012, 5123, 8229, 9044, 9049, 9056, 9061, 9066, 13488, 17248, 17584, 25473, 25479, 25617, 25619, 28709
9044	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1047, 1088, 1097, 1153, 1200, 1208, 1250, 1252, 1282, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5346, 8229, 8482, 8612, 9025, 9030, 9049, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 25664, 28709
9048	867, 1200, 1208, 4899, 5351, 12712, 13488, 17584
9049	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 905, 912, 916, 920, 1025-1027, 1040-1043, 1088, 1097, 1155, 1200, 1208, 1252, 1254, 1281, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5350, 8229, 8482, 8612, 9025, 9030, 9044, 9061, 9066, 13121, 13488, 16804, 17584, 25473, 25479, 25617, 25619, 25664, 28709
9056	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 720, 819, 833, 838, 850, 864, 870-871, 875, 880, 905, 918, 1008, 1025-1027, 1046, 1089, 1097, 1127, 1200, 1208, 1252, 1256, 4386, 4929, 4934, 4946, 4960, 4971, 5104, 5123, 5142, 5352, 8229, 8482, 8612, 9025, 9030, 9238, 13121, 13488, 16804, 17248, 17584, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
9061	37, 256, 259, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 737, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252-1254, 1280, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5349, 8229, 9030, 9044, 9049, 9066, 13488, 17584, 25473, 25479, 25617, 25619, 28709
9066	37, 259, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1200, 1208, 1252, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 8229, 9030, 9044, 9049, 9061, 13488, 17584, 25473, 25479, 25617, 25619, 28709
9122	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
9124	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
9125	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717, 37813
9127	935-936, 946, 1381, 1386, 1388, 5031, 5477, 5482, 5484, 13223, 25512
9131	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
9135	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
9142	937-938, 948, 950, 1370, 5033, 5046, 25514, 25524, 29620
9238	420, 500, 864, 1046, 1089, 1127, 1200, 1208, 1256, 4960, 5142, 5352, 8612, 9056, 13488, 16804, 17248, 17584
9555	933, 949, 1363-1364, 5029, 5045, 5460, 9125, 13221, 13651, 17317, 25525, 29621, 33717, 37813
12712	862, 867, 1148, 1156-1157, 1200, 1208, 4899, 5351, 9048, 13488, 17584
13121	37, 256, 273, 277-278, 280, 284-285, 290, 297, 367, 437, 500, 737, 775, 819, 833, 836, 850, 852, 855, 857, 860-865, 870-871, 891, 1009, 1025-1027, 1040-1043, 1088, 1112, 1122, 1126, 1200, 1208, 1252, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4960, 5123, 8229, 8482, 9025, 9044, 9049, 9056, 13488, 17248, 17584, 25617, 25619, 25664, 28709
13218	930-932, 939, 942-943, 1200, 1208, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13219, 13231, 13488, 17314, 17584, 25508, 25518, 29614, 33698-33700, 37796
13219	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218, 13231, 17314, 25508, 25518, 29614, 33698-33700, 37796
13221	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717, 37813

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
13223	935-936, 946, 1381, 1386, 1388, 5031, 5477, 5482, 5484, 9127, 25512
13231	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 17314, 25508, 25518, 29614, 33698-33700, 37796
13488	37, 256, 259, 273, 275, 277-278, 280, 282, 284-285, 290, 293, 297, 300-301, 367, 420, 423-424, 437, 500, 720, 737, 775, 803, 806, 808, 813, 819, 833-838, 848-852, 855-872, 874-875, 878, 880, 891, 895-897, 901-905, 912, 914-916, 918, 920-924, 927-928, 930, 932-933, 935, 937, 939, 941-944, 946-951, 1004, 1006, 1008-1019, 1025-1027, 1040-1043, 1046-1047, 1051, 1088-1089, 1097-1098, 1112, 1114-1115, 1122-1126, 1129-1133, 1137, 1140-1149, 1153-1160, 1164, 1166, 1200, 1208, 1250-1258, 1275-1277, 1280-1285, 1351, 1362-1364, 1370-1371, 1380-1381, 1385-1386, 1388, 1390, 1399, 4899, 4909, 4930, 4933, 4948, 4951-4952, 4960, 4971, 5012, 5039, 5104, 5123, 5142, 5210, 5346-5354, 8482, 8612, 9027, 9030, 9044, 9048-9049, 9056, 9061, 9066, 9238, 12712, 13121, 13218, 16684, 16804, 17248, 17584, 21427, 28709
13651	933, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 17317, 25525, 29621, 33717, 37813
16684	300-301, 941, 1200, 1208, 1351, 4396, 8492, 13488, 17584
16804	37, 256, 420, 424, 437, 500, 720, 737, 775, 819, 850, 852, 857, 860-865, 1008, 1046, 1089, 1098, 1112, 1122, 1127, 1200, 1208, 1252, 1256, 4946, 4948, 4953, 4960, 5104, 5142, 5352, 8229, 8612, 9044, 9049, 9056, 9238, 13488, 17248, 17584, 28709
17248	37, 256, 259, 273, 277-278, 280, 284-285, 290, 297, 420, 423-424, 500, 720, 819, 833, 838, 850, 864, 870-871, 875, 880, 905, 918, 1008, 1025-1027, 1046, 1089, 1097, 1127, 1200, 1208, 1252, 1256, 4386, 4929, 4934, 4946, 4960, 4971, 5104, 5123, 5142, 5352, 8229, 8482, 8612, 9025, 9030, 9056, 9238, 13121, 13488, 16804, 17584, 28709
17314	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 25508, 25518, 29614, 33698-33700, 37796
17317	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13651, 25510, 25520, 25525, 29616, 29621, 33717, 37813
17584	37, 256, 259, 273, 275, 277-278, 280, 282, 284-285, 290, 293, 297, 300-301, 367, 420, 423-424, 437, 500, 720, 737, 775, 803, 806, 808, 813, 819, 833-838, 848-852, 855-872, 874-875, 878, 880, 891, 895-897, 901-905, 912, 914-916, 918, 920-924, 927-928, 930, 932-933, 935, 937, 939, 941-944, 946-951, 1004, 1006, 1008-1019, 1025-1027, 1040-1043, 1046-1047, 1051, 1088-1089, 1097-1098, 1112, 1114-1115, 1122-1126, 1129-1133, 1137, 1140-1149, 1153-1160, 1164, 1166, 1200, 1208, 1250-1258, 1275-1277, 1280-1285, 1351, 1362-1364, 1370-1371, 1380-1381, 1385-1386, 1388, 1390, 1399, 4899, 4909, 4930, 4933, 4948, 4951-4952, 4960, 4971, 5012, 5039, 5104, 5123, 5142, 5210, 5346-5354, 8482, 8612, 9027, 9030, 9044, 9048-9049, 9056, 9061, 9066, 9238, 12712, 13121, 13218, 13488, 16684, 16804, 17248, 21427, 28709
21427	835, 927, 947, 1200, 1208, 4931, 9027, 13488, 17584

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
25473	37, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 813, 819, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1252, 4386, 4909, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 8229, 8482, 9030, 9044, 9049, 9061, 9066, 25479, 25617, 25619, 28709
25479	37, 273, 277-278, 280, 284-285, 297, 423, 437, 500, 813, 819, 836, 838, 850, 852, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 920, 1025-1027, 1041-1043, 1115, 1252, 4909, 4932, 4934, 4946, 4948, 4953, 4970-4971, 5012, 5123, 5211, 8229, 9030, 9044, 9049, 9061, 9066, 25473, 25617, 25619, 28709
25480	37, 500, 904, 1114, 5210, 8229, 28709
25508	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25518, 29614, 33698-33700, 37796
25510	933-934, 949, 5029, 5045, 5460, 9125, 13221, 17317, 25525, 29621, 33717, 37813
25512	935-936, 946, 1381, 5031, 5477, 5484, 9127, 13223
25514	937-938, 950, 1370, 5033, 5046, 9142
25518	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 29614, 33698-33700, 37796
25520	933, 944, 949, 5029, 5045, 5460, 9125, 13221, 17317, 25525, 29616, 29621, 33717, 37813
25524	937, 948, 950, 1370, 5033, 5046, 9142, 29620
25525	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 29616, 29621, 33717, 37813
25617	37, 273, 277-278, 280, 284-285, 290, 297, 367, 423, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 895-897, 903, 912, 916, 1025-1027, 1040-1043, 1088, 1252, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 4992, 5012, 5123, 8229, 8482, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 25473, 25479, 25619, 25664, 28709
25619	37, 273, 277-278, 280, 284-285, 290, 297, 423, 437, 500, 813, 819, 833, 836, 838, 850, 852, 855, 857, 860-861, 863, 869-871, 874-875, 880, 897, 903, 912, 916, 1025-1027, 1040-1043, 1088, 1114, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4970-4971, 5012, 5123, 5210, 8229, 8482, 9025, 9030, 9044, 9049, 9061, 9066, 13121, 25473, 25479, 25617, 25664, 28709
25664	37, 273, 277-278, 280, 284-285, 290, 297, 367, 500, 819, 833, 836, 850, 852, 855, 857, 870-871, 875, 891, 1025-1027, 1040-1043, 1088, 1126, 4386, 4929, 4932, 4946, 4948, 4951, 4953, 4971, 5123, 8229, 8482, 9025, 9044, 9049, 13121, 25617, 25619, 28709

Table 674. IBM MQ for z/OS CCSID conversion support (continued)	
CCSID	**Converts to and from CCSIDS**
28709	37, 256, 273, 275, 277-278, 280, 284-285, 290, 297, 367, 420, 423-424, 437, 500, 720, 737, 775, 813, 819, 833, 836, 838, 850, 852, 855, 857-858, 860-866, 869-871, 874-875, 880, 897, 903-905, 912, 914-916, 920-924, 1009, 1025-1027, 1040-1043, 1047, 1051, 1088, 1097, 1100, 1112, 1114-1115, 1122, 1124, 1126, 1130-1132, 1137, 1140-1149, 1200, 1208, 1250-1255, 1257-1258, 1275, 1280-1281, 1283, 4386, 4909, 4929, 4932, 4934, 4946, 4948, 4951, 4953, 4960, 4970-4971, 5012, 5123, 5210-5211, 5346, 5348, 8229, 8482, 8612, 9025, 9030, 9044, 9049, 9056, 9061, 9066, 13121, 13488, 16804, 17248, 17584, 25473, 25479, 25480, 25617, 25619, 25664
29614	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 33698-33700, 37796
29616	933, 944, 949, 5029, 5045, 5460, 9125, 13221, 17317, 25520, 25525, 29621, 33717, 37813
29620	937, 948, 950, 1370, 5033, 5046, 9142, 25524
29621	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 33717, 37813
33698	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33699-33700, 37796
33699	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698, 33700, 37796
33700	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33699, 37796
33717	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 37813
37796	930-932, 939, 942-943, 1390, 1399, 5026, 5028, 5035, 5038-5039, 9122, 9124, 9131, 9135, 13218-13219, 13231, 17314, 25508, 25518, 29614, 33698-33700
37813	933-934, 944, 949, 1363-1364, 5029, 5045, 5460, 9125, 9555, 13221, 13651, 17317, 25510, 25520, 25525, 29616, 29621, 33717

IBM i IBM i conversion support

A full list of CCSIDs, and conversions supported by IBM i, can be found in the appropriate IBM i publication.

The supported code pages are listed in Supported CCSID mappings.

Unicode conversion support

Some platforms support the conversion of user data to or from Unicode encoding. The two forms of Unicode encoding supported are UTF-16 (CCSIDs 1200, 13488, and 17584) and UTF-8 (CCSID 1208). You should use CCSIDs 1200 or 1208, as they represent the most recent Unicode version supported.

UTF-16 surrogate pairs (a pair of 2-byte UTF-16 characters in the range X'D800' through to X'DFFF' that represent a Unicode code point above U+FFFF) are supported. If a target CCSID does not contain a mapping for a code point represented by a UTF-16 surrogate pair, the pair of characters convert to a single substitution character.

Combining character sequences are supported by IBM MQ. This means that, in some cases, a precomposed character in the source CCSID will be converted to a combining character sequence in the target CCSID, or the other way round.

Note: IBM MQ does not support UTF-16 queue manager CCSIDs so message header data cannot be encoded in UTF-16.

IBM MQ AIX support for Unicode

On IBM MQ for AIX conversion to, and from, the supported Unicode CCSIDs (preferably 1200 or 1208) is supported for the non-Unicode CCSIDs in the following list:

037
273, 278, 280, 284, 285, 297
423, 437
500
813, 819, 850, 852, 856, 857, 858, 860, 861, 865, 867, 869, 875, 878, 880
901, 902, 912, 915, 916, 920, 923, 924, 932, 933, 935, 937, 938, 939, 942, 943, 948, 949, 950, 954, 964, 970
1026, 1046, 1089
1129, 1130, 1131, 1132, 1133, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1153, 1156, 1157
1200, 1208, 1250, 1251, 1253, 1254, 1258, 1280, 1281, 1282, 1283, 1284, 1285
1363, 1364, 1381, 1383, 1386, 1388
4899
5026, 5035, 5050, 5346, 5347, 5348, 5349, 5350, 5351, 5352, 5353, 5354, 5488
9044, 9048, 9449
12712
13488
17584
33722

IBM MQ for Windows, Solaris, and Linux support for Unicode

On IBM MQ for Windows Solaris, IBM MQ for Solaris, and IBM MQ for Linux conversion to, and from, the supported Unicode CCSIDs (preferably 1200 or 1208) is supported for the non-Unicode CCSIDs in the following list:

037,
277, 278, 280, 284, 285, 290, 297
300, 301
420, 424, 437
500

813, 819, 833, 835, 836, 837, 838, 850, 852, 855, 856, 857, 858, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 874, 875, 878, 880, 891, 897

901, 902, 903, 904, 912, 913"5" on page 979, 915, 916, 918, 920, 921, 922, 923, 924, 927, 928, 930, 931"1" on page 979, 932"2" on page 979, 933, 935, 937, 938"3" on page 979, 939, 941, 942, 943 ,947, 948, 949, 950, 951, 954"4" on page 979, 964, 970

1006, 1025, 1026, 1027, 1040, 1041, 1042, 1043, 1046, 1047, 1051, 1088, 1089, 1097, 1098

1112, 1114, 1115, 1122, 1123, 1124, 1129, 1130, 1132, 1133, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1153, 1156, 1157

1200, 1208, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1275, 1280, 1281, 1282, 1283

1363, 1364, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1383, 1386, 1388

4899

5050, 5346, 5347, 5348, 5349, 5350, 5351, 5352, 5353, 5354, 5488"5" on page 979

9044, 9048, 9449

12712

13488

17584

33722"4" on page 979

Notes:

1. 931 uses 939 for conversion.
2. 932 uses 942 for conversion.
3. 938 uses 948 for conversion.
4. 954 and 33722 use 5050 for conversion.
5. On Windows and Linux, and Solaris only.

IBM i support for Unicode

IBM i

For details on UNICODE support refer to the appropriate IBM i publication relating to your operating system.

IBM MQ for z/OS support for Unicode

z/OS

On IBM MQ for z/OS conversion to, and from, the supported Unicode CCSIDs (preferably 1200 or 1208) is supported for the non-Unicode CCSIDs in the following list:

37

256, 259, 273, 275, 277, 278, 280, 282, 284, 285, 290, 293, 297

300, 301, 367

420, 423, 424, 437

500

720, 737, 775

803, 806, 808, 813, 819, 833, 834, 835, 836, 837, 838, 848, 849, 850, 851, 852, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 874, 875, 878, 880, 891, 895, 896, 897

901, 902, 903, 904, 905, 912, 914, 915, 916, 918, 920, 921, 922, 923, 924, 927, 928, 930, 932, 933, 935, 937, 939, 941, 942, 943, 944, 946, 947, 948, 949, 950, 951

1004, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1025, 1026, 1027, 1040, 1041, 1042, 1043, 1046, 1047, 1051, 1088, 1089, 1097, 1098

1112, 1114, 1115, 1122, 1123, 1124, 1125, 1126, 1129, 1130, 1131, 1132, 1133, 1137, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1164

1200, 1208, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1275, 1276, 1277, 1280, 1281, 1282, 1283, 1284, 1285

1351, 1362, 1363, 1364, 1370, 1371, 1380, 1381, 1385, 1386, 1388, 1390, 1399

4899, 4909, 4930, 4933, 4948, 4951, 4952, 4960, 4971

5012 5039 5104 5123 5142 5210 5346 5347 5348 5349 5350 5351 5352 5353 5354 5488

8482 8612

9027 9030 9044 9048 9049 9056 9061 9066 9238 9449

1166

12712

13121, 13218, 13488, 1374, 1375, 1376, 1377, 1378, 1379

16684, 16804

17248, 17584

21427

28709

Coding standards on 64-bit platforms

Use this information to learn about coding standards on 64-bit platforms and the preferred data types.

Preferred data types

These types never change size and are available on both 32-bit and 64-bit IBM MQ platforms:

Table 675. Data type names and lengths

Name	Length
MQLONG	4 bytes
MQULONG	4 bytes
MQINT32	4 bytes
MQUINT32	4 bytes
MQINT64	8 bytes
MQUINT64	8 bytes

ULW Standard data types on UNIX, Linux, and Windows

Learn about standard data types on 32-bit UNIX and Linux, 64-bit UNIX and Linux, and 64-bit Windows applications.

32-bit UNIX and Linux applications

This section is included for comparison and is based on Solaris. Any differences with other UNIX platforms are noted:

Table 676. Data type names and lengths

Name	Length
char	1 byte
short	2 bytes

Table 676. Data type names and lengths (continued)

Name	Length
int	4 bytes
long	4 bytes
float	4 bytes
double	8 bytes
long double	16 bytes
	Note that on AIX and Linux PPC a long double is 8 bytes.
pointer	4 bytes
ptrdiff_t	4 bytes
size_t	4 bytes
time_t	4 bytes
clock_t	4 bytes
wchar_t	4 bytes
	Note that on AIX a wchar_t is 2 bytes.

64-bit UNIX and Linux applications

This section is based on Solaris. Any differences with other UNIX platforms are noted:

Table 677. Data type names and lengths

Name	Length
char	1 byte
short	2 bytes
int	4 bytes
long	8 bytes
float	4 bytes
double	8 bytes
long double	16 bytes
	Note that on AIX and Linux PPC a long double is 8 bytes.
pointer	8 bytes
ptrdiff_t	8 bytes
size_t	8 bytes
time_t	8 bytes
clock_t	8 bytes
	Note that on the other UNIX platform a clock_t is 4 bytes.

Table 677. Data type names and lengths (continued)

Name	Length
wchar_t	4 bytes Note that on AIX a wchar_t is 2 bytes.

Windows 64-bit applications

Table 678. Data type names and lengths

Name	Length
char	1 byte
short	2 bytes
int	4 bytes
long	4 bytes
float	4 bytes
double	8 bytes
long double	8 bytes
pointer	8 bytes Note that all pointers are 8 bytes.
ptrdiff_t	8 bytes
size_t	8 bytes
time_t	8 bytes
clock_t	4 bytes
wchar_t	2 bytes
WORD	2 bytes
DWORD	4 bytes
HANDLE	8 bytes
HFILE	4 bytes

Coding considerations on Windows

HANDLE hf;

Use

```
hf = CreateFile((LPCTSTR) FileName,
                Access,
                ShareMode,
                xihSecAttsNTRestrict,
                Create,
                AttrAndFlags,
                NULL);
```

Do not use

```
HFILE hf;
hf = (HFILE) CreateFile((LPCTSTR) FileName,
                        Access,
                        ShareMode,
                        xihSecAttsNTRestrict,
                        Create,
                        AttrAndFlags,
                        NULL);
```

as this produces an error.

size_t len fgets

Use

```
size_t len
while (fgets(string1, (int) len, fp) != NULL)
len = strlen(buffer);
```

Do not use

```
int len;

while (fgets(string1, len, fp) != NULL)
len = strlen(buffer);
```

printf

Use

```
printf("My struc pointer: %p", pMyStruc);
```

Do not use

```
printf("My struc pointer: %x", pMyStruc);
```

If you need hexadecimal output, you have to print the upper and lower 4 bytes separately.

char *ptr

Use

```
char * ptr1;
char * ptr2;
size_t bufLen;

bufLen = ptr2 - ptr1;
```

Do not use

```
char *ptr1;
char *ptr2;
UINT32 bufLen;

bufLen = ptr2 - ptr1;
```

alignBytes

Use

```
alignBytes = (unsigned short) ((size_t) address % 16);
```

Do not use

```
void *address;
unsigned short alignBytes;

alignBytes = (unsigned short) ((UINT32) address % 16);
```

len

Use

```
len = (UINT32) ((char *) address2 - (char *) address1);
```

Do not use

```
void *address1;
void *address2;
UINT32 len;

len = (UINT32) ((char *) address2 - (char *) address1);
```

sscanf

Use

```
MQLONG SBCSprt;

sscanf(line, "%d", &SBCSprt);
```

Do not use

```
MQLONG SBCSprt;

sscanf(line, "%1d", &SBCSprt);
```

`%ld` tries to put an 8-byte type into a 4-byte type; only use `%l` if you are dealing with an actual `long` data type. MQLONG, UINT32 and INT32 are defined to be four bytes, the same as an `int` on all IBM MQ platforms:

IBM i IBM i Application Programming Reference (ILE/RPG)

Application programming for IBM i.

Use this information to help you develop applications for IBM i.

- “Data type descriptions on IBM i” on page 986
- “Function calls on IBM i” on page 1236
- “Attributes of objects on IBM i” on page 1353
- “Applications” on page 1398
- “Return codes for IBM i (ILE RPG)” on page 1411
- “Rules for validating MQI options for IBM i (ILE RPG)” on page 1412
- “Machine encodings on IBM i” on page 1415
- “Report options and message flags on IBM i” on page 1418

Deprecation of compatibility mode for RPG and COBOL applications on IBM i

IBM i

From IBM MQ 9.0, IBM MQ no longer provides support for RPG or COBOL applications that use dynamic linkage known as compatibility mode. This mode of operation was needed for applications that are written before MQSeries 5.1, and subsequent versions of the product provided a compatible runtime environment

for these applications, even though the copybooks needed for compiling them were removed in IBM WebSphere MQ 6.0. Dynamic linkage (compatibility mode) was provided by the following programs in library QMQM, which are removed at IBM MQ 9.0:

- AMQVSTUB
- AMQZSTUB
- QMQM
- MQCLOSE
- MQCONN
- MQDISC
- MQGET
- MQINQ
- MQOPEN
- MQPUT
- MQPUT1
- MQSET

From IBM MQ 9.0, applications that use this compatibility mode of operation need to be recompiled to use the static bound MQ calls that are provided by the LIBMQM and LIBMQM_R service programs. Sample programs, such as AMQ3PUT4 and AMQ3GET4, show you how to use this programming model. For more information about using these MQ calls, see IBM i Application Programming Reference (ILE/RPG).

Notes:

- You need to recode applications, currently using the CALL 'QMQM' interface, to use the LIBMQM service program instead.

  The program objects and service programs in the preceding list, for example, QMQM, MQCONN, MQPUT, AMQVSTUB, and AMQZSTUB, are removed in IBM MQ 9.0, and applications that were coded to use compatibility mode cease to work.
- If applications are bound to the LIBMQM service program at IBM MQ 8.0, you should not need to recompile or relink those applications at IBM MQ 9.0 or later.
- It is not possible to install more than one version of IBM MQ for IBM i on the same partition.

To find out whether your RPG or COBOL program uses compatibility mode, use the **DSPPGMREF** (Display Program References) command to display the external programs called by the application program. If there are references to the programs listed in this section, the program will not run at IBM MQ 9.0 or later. The following example of **DSPPGMREF** output shows three program objects that are deprecated, MQCONN, MQOPEN, MQCLOSE:

```
Program . . . . . . . . . . . . . . . . . . . . :  MYAPPPGM
Library . . . . . . . . . . . . . . . . . . . . :    MYLIB
Text 'description'. . . . . . . . . . . . . . . :     ILE/COBOL SAMPLE PUT TO QUEUE (MQPUT)
Number of objects referenced  . . . . . . . . . :        5
Object  . . . . . . . . . . . . . . . . . . . . :    MQCONN
Library . . . . . . . . . . . . . . . . . . . :      *LIBL
Object type . . . . . . . . . . . . . . . . . :        *PGM
Object  . . . . . . . . . . . . . . . . . . . . :    MQOPEN
Library . . . . . . . . . . . . . . . . . . . :      *LIBL
Object type . . . . . . . . . . . . . . . . . :        *PGM
Object  . . . . . . . . . . . . . . . . . . . . :    MQCLOSE
Library . . . . . . . . . . . . . . . . . . . :      *LIBL
Object type . . . . . . . . . . . . . . . . . :        *PGM
```

Such programs must be recompiled using the Bound Procedural Call method described in Preparing COBOL programs in IBM i.

If you attempt to run an application program at IBM MQ 9.0 or later that uses compatibility mode, the most commonly seen first error is an MCH3401 trying to call program MQCONN or QMQM.

Related tasks

Developing applications

IBM i Data type descriptions on IBM i

This collection of topics provides descriptions of data types used in IBM i programming.

Conventions used in the description of data types

For each elementary data type, this information gives a description of its usage, in a form that is independent of the programming language. This is followed by typical declarations in the ILE version of the RPG programming language. The definitions of elementary data types are included here to provide consistency. RPG uses 'D' specifications where working fields can be declared using whatever attributes you need. You can, however, do this in the calculation specifications where the field is used.

To use the elementary data types, you create:

- A /COPY member containing all the data types, or
- An external data structure (PF) containing all the data types. You then need to specify your working fields with attributes 'LIKE' the appropriate data type field.

The benefits of the second option are that the definitions can be used as a 'FIELD REFERENCE FILE' for other IBM i objects. If an IBM MQ data type definition changes, it is a relatively simple matter to re-create these objects.

Elementary data types

All of the other data types described in this section equate either directly to these elementary data types, or to aggregates of these elementary data types (arrays or structures).

Table 679. Elementary data types

Data type	Representation
MQBOOL	10-digit signed integer
MQBYTE	1-byte alphanumeric field
MQBYTE16	16-byte alphanumeric field
MQBYTE24	24-byte alphanumeric field
MQBYTE32	32-byte alphanumeric field
MQBYTE64	64-byte alphanumeric field
MQCHAR	1-byte alphanumeric field
MQCHAR4	4-byte alphanumeric field
MQCHAR8	8-byte alphanumeric field
MQCHAR12	12-byte alphanumeric field
MQCHAR16	16-byte alphanumeric field
MQCHAR20	20-byte alphanumeric field
MQCHAR28	28-byte alphanumeric field
MQCHAR32	32-byte alphanumeric field
MQCHAR48	48-byte alphanumeric field
MQCHAR64	64-byte alphanumeric field

Table 679. Elementary data types (continued)

Data type	Representation
MQCHAR128	128-byte alphanumeric field
MQCHAR256	256-byte alphanumeric field
MQFLOAT32	4-byte floating-point number
MQFLOAT64	8-byte floating-point number
MQHCONFIG	Configuration handle
MQHCONN	10-digit signed integer
MQHMSG	Message handle that gives access to a message
MQHOBJ	10-digit signed integer
MQINT8	8-bit signed integer
MQINT16	16-bit signed integer
MQINT32	32-bit signed integer
MQINT64	64-bit signed integer
MQLONG	32-bit signed integer
MQPID	Process identifier
MQPTR	Pointer
MQTID	Thread identifier
MQUINT8	8-bit unsigned integer
MQUINT16	16-bit unsigned integer
MQUINT32	32-bit unsigned integer
MQUINT64	64-bit unsigned integer
MQULONG	32-bit unsigned integer
PMQACH	Pointer to a data structure of type MQACH
PMQAIR	Pointer to a data structure of type MQAIR
PMQAXC	Pointer to a data structure of type MQAXC
PMAXP	Pointer to a data structure of type MAXP
PMQBMHO	Pointer to a data structure of type MQBMHO
PMQBO	Pointer to a data structure of type MQBO
PMQBOOL	Pointer to data of type MQBOOL
PMQBYTE	Pointer to data of type MQBYTE
PMQBYTEn	Pointer to data of type MQBYTEn
PMQCBC	Pointer to a data structure of type MQCBC
PMQCBD	Pointer to a data structure of type MQCBD
PMQCHAR	Pointer to a data structure of type MQCHAR
PMQCHARV	Pointer to a data structure of type MQCHARV

Table 679. Elementary data types (continued)	
Data type	**Representation**
PMQCHARn	Pointer to data of type MQCHARn
PMQCIH	Pointer to a data structure of type MQCIH
PMQCMHO	Pointer to a data structure of type MQCMHO
PMQCNO	Pointer to a data structure of type MQCNO
PMQCSP	Pointer to a data structure of type MQCSP
PMQCTLO	Pointer to a data structure of type MQCTLO
PMQDH	Pointer to a data structure of type MQDH
PMQDHO	Pointer to a data structure of type MQDHO
PMQDLH	Pointer to a data structure of type MQDLH
PMQDMHO	Pointer to a data structure of type MQDMHO
PMQDMPO	Pointer to a data structure of type MQDMPO
PMQEPH	Pointer to a data structure of type MQEPH
PMQFLOAT32	Pointer to data of type MQFLOAT32
PMQFLOAT64	Pointer to data of type MQFLOAT64
PMQFUNC	Pointer to a function
PMQGMO	Pointer to a data structure of type MQGMO
PMQHCONFIG	Pointer to data of type MQHCONFIG
PMQHCONN	Pointer to data of type MQHCONN
PMQHMSG	Pointer to data of type MQHMSG
PMQHOBJ	Pointer to data of type MQHOBJ
PMQIIH	Pointer to a data structure of type MQIIH
PMQIMPO	Pointer to a data structure of type MQIMPO
PMQINT8	Pointer to data of type MQINT8
PMQINT16	Pointer to data of type MQINT16
PMQINT32	Pointer to data of type MQINT32
PMQINT64	Pointer to data of type MQINT64
PMQLONG	Pointer to data of type MQLONG
PMQMD	Pointer to a data structure of type MQMD
PMQMDE	Pointer to a data structure of type MQMDE
PMQMD1	Pointer to a data structure of type MQMD1
PMQMD2	Pointer to a data structure of type MQMD2
PMQMHBO	Pointer to a data structure of type MQMHBO
PMQOD	Pointer to a data structure of type MQOD
PMQOR	Pointer to a data structure of type MQOR

Table 679. Elementary data types (continued)	
Data type	**Representation**
PMQPD	Pointer to a data structure of type MQPD
PMQPID	Pointer to a process identifier MQPID
PMQPMO	Pointer to a data structure of type MQPMO
PMQPTR	Pointer to data of type MQPTR
PMQRFH	Pointer to a data structure of type MQRFH
PMQRFH2	Pointer to a data structure of type MQRFH2
PMQRMH	Pointer to a data structure of type MQRMH
PMQRR	Pointer to a data structure of type MQRR
PMQSCO	Pointer to a data structure of type MQSCO
PMQSD	Pointer to a data structure of type MQSD
PMQSMPO	Pointer to a data structure of type MQSMPO
PMQSRO	Pointer to a data structure of type MQSRO
PMQSTS	Pointer to a data structure of type MQSTS
PMQTID	Pointer to a thread identifier MQTID
PMQTM	Pointer to a data structure of type MQTM
PMQTMC2	Pointer to a data structure of type MQTMC2
PMQUINT8	Pointer to data of type MQUINT8
PMQUINT16	Pointer to data of type MQUINT16
PMQUINT32	Pointer to data of type MQUINT32
PMQUINT64	Pointer to data of type MQUINT64
PMQULONG	Pointer to data of type MQULONG
PMQVOID	Pointer
PMQWIH	Pointer to a data structure of type MQWIH
PMQXQH	Pointer to a data structure of type MQXQH

IBM i *MQBOOL on IBM i*

The MQBOOL data type represents a boolean value. The value 0 represents false. Any other value represents true.

An MQBOOL must be aligned as for the MQLONG data type.

IBM i *MQBYTE on IBM i*

The MQBYTE data type represents a single byte of data.

No particular interpretation is placed on the byte-it is treated as a string of bits, and not as a binary number or character. No special alignment is required.

An array of MQBYTE is sometimes used to represent an area of main storage with a nature that is not known to the queue manager. For example, the area might contain application message data or a

structure. The boundary alignment of this area must be compatible with the nature of the data contained within it.

IBM i MQBYTEn (String of n bytes) on IBM i

Each MQBYTEn data type represents a string of *n* bytes.

Where *n* can take one of the following values:

- 16, 24, 32, or 64.

Each byte is described by the MQBYTE data type. No special alignment is required.

If the data in the string is shorter than the defined length of the string, the data must be padded with nulls to fill the string.

When the queue manager returns byte strings to the application (for example, on the MQGET call), the queue manager always pads with nulls to the defined length of the string.

Constants are available that define the lengths of byte string fields.

IBM i MQCHAR (character) on IBM i

The MQCHAR data type represents a single character.

The coded character set identifier of the character is that of the queue manager (see the **CodedCharSetId** attribute in topic CodedCharSetId). No special alignment is required.

Note: Application message data specified on the MQGET, MQPUT, and MQPUT1 calls is described by the MQBYTE data type, not the MQCHAR data type.

IBM i MQCHARn (String of n characters) on IBM i

Each MQCHARn data type represents a string of *n* characters.

Where *n* can take one of the following values:

- 4, 8, 12, 16, 20, 28, 32, 48, 64, 128, or 256

Each character is described by the MQCHAR data type. No special alignment is required.

If the data in the string is shorter than the defined length of the string, the data must be padded with blanks to fill the string. In some cases a null character can be used to end the string prematurely, instead of padding with blanks; the null character and characters following it are treated as blanks, up to the defined length of the string. The places where a null can be used are identified in the call and data type descriptions.

When the queue manager returns character strings to the application (for example, on the MQGET call), the queue manager always pads with blanks to the defined length of the string; the queue manager does not use the null character to delimit the string.

Constants are available that define the lengths of character string fields.

IBM i MQFLOAT32 on IBM i

The MQFLOAT32 data type is a 32-bit floating-point number represented using the standard IEEE floating-point format.

An MQFLOAT32 must be aligned on a 4-byte boundary.

IBM i MQFLOAT64 on IBM i

The MQFLOAT64 data type is a 64-bit floating-point number represented using the standard IEEE floating-point format.

An MQFLOAT64 must be aligned on an 8-byte boundary.

MQHCONFIG - configuration handle

The MQHCONFIG data type represents a configuration handle, that is, the component that is being configured for a particular installable service. A configuration handle must be aligned on its natural boundary.

Note: Applications must test variables of this type for equality only.

IBM i MQHCONN (Connection handle) on IBM i

The MQHCONN data type represents a connection handle, that is, the connection to a particular queue manager.

A connection handle must be aligned on its natural boundary.

Note: Applications must test variables of this type for equality only.

IBM i MQHMSG (Message handle) on IBM i

The **MQHMSG** data type represents a message handle that gives access to a message.

A message handle must be aligned on an 8-byte boundary.

Note: Applications must test variables of this type for equality only.

IBM i MQHOBJ (Object handle) on IBM i

The MQHOBJ data type represents an object handle that gives access to an object.

An object handle must be aligned on its natural boundary.

Note: Applications must test variables of this type for equality only.

IBM i MQINT8 (8-bit signed integer) on IBM i

The MQINT8 data type is an 8-bit signed integer that can take any value in the range -128 to +127, unless otherwise restricted by the context.

IBM i MQINT16 (16-bit signed integer) on IBM i

The MQINT16 data type is a 16-bit signed integer that can take any value in the range -32 768 to +32 767, unless otherwise restricted by the context.

An MQINT16 must be aligned on a 2-byte boundary.

IBM i MQINT32 (32-bit integer) on IBM i

The MQINT32 data type is a 32-bit signed integer.

It is equivalent to MQLONG.

IBM i MQINT64 (64-bit integer) on IBM i

The MQINT64 data type is a 64-bit signed integer that can take any value in the range -9 223 372 036 854 775 808 through +9 223 372 036 854 775 807, unless otherwise restricted by the context.

For COBOL, the valid range is limited to -999 999 999 999 999 999 through +999 999 999 999 999 999. An MQINT64 should be aligned on an 8-byte boundary.

IBM i MQLONG (Long integer) on IBM i

The MQLONG data type is a 32-bit signed binary integer that can take any value in the range -2 147 483 648 through +2 147 483 647, unless otherwise restricted by the context, aligned on its natural boundary.

MQPID - process identifier

The IBM MQ process identifier.

This is the same identifier used in IBM MQ trace and FFST dumps, but might be different from the operating system process identifier.

MQPTR - pointer

The MQPTR data type is the address of data of any type. A pointer must be aligned on its natural boundary; this is a 16-byte boundary on IBM i.

Some programming languages support typed pointers; the MQI also uses these in a few cases.

MQTID - thread identifier

The MQ thread identifier.

This is the same identifier used in MQ trace and FFST dumps, but might be different from the operating system thread identifier.

IBM i *MQUINT8 (8-bit unsigned integer) on IBM i*

The MQUINT8 data type is an 8-bit unsigned integer that can take any value in the range 0 to +255, unless otherwise restricted by the context.

MQUINT16 - 16-bit unsigned integer

The MQUINT16 data type is a 16-bit unsigned integer that can take any value in the range 0 through +65 535, unless otherwise restricted by the context.

An MQUINT16 must be aligned on a 2-byte boundary.

IBM i *MQUINT32 (32-bit unsigned integer) on IBM i*

The MQUINT32 data type is a 32-bit unsigned integer. It is equivalent to MQULONG.

MQUINT64 - 64-bit unsigned integer

The MQUINT64 data type is a 64-bit unsigned integer that can take any value in the range 0 through +18 446 744 073 709 551 615 unless otherwise restricted by the context.

For COBOL, the valid range is limited to 0 through +999 999 999 999 999 999. An MQUINT64 should be aligned on a 8-byte boundary.

MQULONG - 32-bit unsigned integer

The MQULONG data type is a 32-bit unsigned binary integer that can take any value in the range 0 through +4 294 967 294, unless otherwise restricted by the context.

An MQULONG must be aligned on a 4-byte boundary.

PMQACH - pointer to a data structure of type MQACH

A pointer to a data structure of type MQACH.

PMQAIR - pointer to a data structure of type MQAIR

A pointer to a data structure of type MQAIR.

PMQAXC - pointer to a data structure of type MQAXC

A pointer to a data structure of type MQAXC.

PMQAXP - pointer to a data structure of type MQAXP

A pointer to a data structure of type MQAXP.

PMQBMHO - pointer to a data structure of type MQBMHO

A pointer to a data structure of type MQBMHO.

PMQBO - pointer to a data structure of type MQBO

A pointer to a data structure of type MQBO.

PMQBOOL - pointer to data of type MQBOOL

A pointer to data of type MQBOOL.

A pointer to data of type MQBOOL.

PMQBYTE - pointer to a data type of MQBYTE

A pointer to a data type of MQBYTE.

PMQBYTEn - pointer to a data structure of type MQBYTEn

A pointer to a data structure of type MQBYTEn, where n can be 8, 12, 16, 24, 32, 40, 48 or 128.

PMQCBC - pointer to a data structure of type MQCBC

A pointer to a data structure of type MQCBC.

PMQCBD - pointer to a data structure of type MQCBD

A pointer to a data structure of type MQCBD.

PMQCHAR - pointer to data of type MQCHAR

A pointer to data of type MQCHAR.

PMQCHARV - pointer to a data structure of type MQCHARV

A pointer to a data structure of type MQCHARV.

PMQCHARn - pointer to a data type of MQCHARn

A pointer to a data type of MQCHARn, where n can be 4, 8, 12, 20, 28, 32, 64, 128, 256, 264.

PMQCIH - pointer to a data structure of type of MQCIH

A pointer to a data structure of type of MQCIH.

PMQCMHO - pointer to a data structure of type MQCMHO

A pointer to a data structure of type MQCMHO.

PMQCNO - pointer to a data structure of type of MQCNO

A pointer to a data structure of type of MQCNO.

PMQCSP - pointer to a data structure of type MQCSP

A pointer to a data structure of type MQCSP.

PMQCTLO - pointer to a data structure of type MQCTLO

A pointer to a data structure of type MQCTLO.

PMQDH - pointer to a data structure of type MQDH

A pointer to a data structure of type MQDH.

PMQDHO - pointer to a data structure of type MQDHO

A pointer to a data structure of type MQDHO.

PMQDLH - pointer to a data structure of type of MQDLH

A pointer to a data structure of type of MQDLH.

PMQDMHO - pointer to a data structure of type MQDMHO

A pointer to a data structure of type MQDMHO.

PMQDMPO - pointer to a data structure of type MQDMPO

A pointer to a data structure of type MQDMPO.

A pointer to a data structure of type MQDMPO.

PMQEPH - pointer to a data structure of type MQEPH

A pointer to a data structure of type MQEPH.

PMQFLOAT32 - pointer to data of type MQFLOAT32

A pointer to data of type MQFLOAT32.

PMQFLOAT64 - pointer to data of type MQFLOAT64

A pointer to data of type MQFLOAT64.

PMQFUNC - pointer to a function

A pointer to a function.

PMQGMO - pointer to a data structure of type MQGMO

A pointer to a data structure of type MQGMO.

PMQHCONFIG - pointer to a data type of MQHCONFIG

A pointer to a data type of MQHCONFIG.

PMQHCONN - pointer to a data type of MQHCONN

A pointer to a data type of MQHCONN.

PMQHMSG - pointer to a data type of MQHMSG

A pointer to a data type of MQHMSG.

PMQHOBJ - pointer to data of type MQHOBJ

A pointer to data of type MQSMPO.

PMQIIH - pointer to a data structure of type MQIIH

A pointer to a data structure of type MQIIH.

PMQIMPO - pointer to a data structure of type MQIMPO

A pointer to a data structure of type MQIMPO.

PMQINT8 - pointer to data of type MQINT8

A pointer to data of type MQINT8.

PMQINT16 - pointer to data of type MQINT16

A pointer to data of type MQINT16.

IBM i *PMQINT32 (Pointer to data of type MQINT32) on IBM i*

The PMQINT32 data type is a pointer to data of type MQINT32. It is equivalent to PMQLONG.

IBM i PMQINT64 (Pointer to data of type MQINT64) on IBM i

The PMQINT64 data type is a pointer to data of type MQINT64.

PMQLONG - pointer to data of type MQLONG

A pointer to data of type MQLONG.

PMQMD - pointer to structure of type MQMD

A pointer to structure of type MQMD.

PMQMDE - pointer to a data structure of type MQMDE

A pointer to a data structure of type MQMDE.

PMQMDI - pointer to a data structure of type MQMDI

A pointer to a data structure of type MQMDI.

PMQMD2 - pointer to a data structure of type MQMD2

A pointer to a data structure of type MQMD2

PMQMHBO - pointer to a data structure of type MQMHBO

A pointer to a data structure of type MQMHBO.

PMQOD - pointer to a data structure of type MQOD

A pointer to a data structure of type MQOD.

PMQOR - pointer to a data structure of type MQOR

A pointer to a data structure of type MQOR.

PMQPD - pointer to a data structure of type MQPD

A pointer to a data structure of type MQPD.

PMQPID - pointer to a process identifier

A pointer to a process identifier.

PMQPMO - pointer to a data structure of type MQPMO

A pointer to a data structure of type MQPMO.

PMQPTR - pointer to data of type MQPTR

A pointer to data of type MQPTR.

PMQRFH - pointer to a data structure of type MQRFH

A pointer to a data structure of type MQRFH.

PMQRFH2 - pointer to a data structure of type MQRFH2

A pointer to a data structure of type MQRFH2.

.

PMQRMH - pointer to a data structure of type MQRMH

A pointer to a data structure of type MQRMH.

PMQRR - pointer to a data structure of type MQRR

A pointer to a data structure of type MQRR.

PMQSCO - pointer to a data structure of type MQSCO

A pointer to a data structure of type MQSCO.

.

PMQSD - pointer to a data structure of type MQSD

A pointer to a data structure of type MQSD.

PMQSMPO - pointer to a data structure of type MQSMPO

A pointer to a data structure of type MQSMPO.

PMQSRO - pointer to a data structure of type MQSRO

A pointer to a data structure of type MQSRO.

PMQSTS - pointer to a data structure of type MQSTS

A pointer to a data structure of type MQSTS.

PMQTID - pointer to a data structure of type MQTID

A pointer to a data structure of type MQTID.

PMQTM - pointer to a data structure of type MQTM

A pointer to a data structure of type MQTM.

PMQTMC2 - pointer to a data structure of type MQTMC2

A pointer to a data structure of type MQTMC2.

PMQUINT8 - pointer to data of type MQUINT8

A pointer to data of type MQUINT8.

PMQUINT16 - pointer to data of type MQUINT16

A pointer to data of type MQUINT16.

IBM i PMQUINT32 (Pointer to data of type MQUINT32) on IBM i

The PMQUINT32 data type is a pointer to data of type MQUINT32. It is equivalent to PMQULONG.

IBM i PMQUINT64 (Pointer to data of type MQUINT64) on IBM i

The PMQUINT64 data type is a pointer to data of type MQUINT64.

PMQULONG - pointer to data of type MQULONG

A pointer to data of type MQULONG.

PMQVOID - pointer

A pointer.

PMQWIH - pointer to a data structure of type MQWIH

A pointer to a data structure of type MQWIH.

PMQXQH - pointer to a data structure of type MQXQH

A pointer to a data structure of type MQXQH.

Language considerations

This topic contains information to help you use the MQI from the RPG programming language.

Some of these language considerations are:

- "COPY files" on page 999
- "Calls" on page 1000
- "Call parameters" on page 1000
- "Structures" on page 1001
- "Named constants" on page 1001
- "MQI procedures" on page 1001
- "Threading considerations" on page 1001
- "Commitment control" on page 1002
- "Coding the bound calls" on page 1002

- “Notational conventions” on page 1003

COPY files

Various COPY files are provided to assist with the writing of RPG application programs that use message queuing. There are three sets of COPY files:

- COPY files with names ending with the letter *G* are for use with programs that use static linkage. These files are initialized with the exceptions stated in “Structures” on page 1001.
- COPY files with names ending with the letter *H* are for use with programs that use static linkage, but are **not** initialized.
- COPY files with names ending with the letter *R* are for use with programs that use dynamic linkage. These files are initialized with the exceptions stated in “Structures” on page 1001.

The COPY files reside in QRPGLESRC in the QMQM library.

For each set of COPY files, there are two files containing named constants, and one file for each of the structures. The COPY files are summarized in Table 680 on page 999.

Table 680. RPG COPY files

File name (static linkage, initialized, CMQ*G)	File name (static linkage, not initialized, CMQ*H)	File name (dynamic linkage, initialized, CMQ*R)	Contents
CMQBOG	CMQBOH	-	Begin options structure
CMQCDG	CMQCDH	CMQCDR	Channel definition structure
CMQCFBFG	CMQCFBFH	-	PCF bit filter parameter
CMQCFG	-	-	Constants for PCF and events
CMQCFBSG	CMQCFBSH	-	PCF byte string
CMQCFGRG	CMQCFGRH	-	PCF group parameter
CMQCFIFG	CMQCFIFH	-	PCF integer filter parameter
CMQCFHG	CMQCFHH	-	PCF header
CMQCFILG	CMQCFILH	-	PCF integer list parameter structure
CMQCFING	CMQCFINH	-	PCF integer parameter structure
CMQCFSFG	CMQCFSFH	-	PCF string filter parameter
CMQCFSLG	CMQCFSLH	-	PCF string list parameter structure
CMQCFSTG	CMQCFSTH	-	PCF string parameter structure
CMQCFXLG	CMQCFXLH	-	PCF short name for CFIL64
CMQCFXNG	CMQCFXNH	-	PCF short name for CFIN64
CMQCIHG	CMQCIHH	-	CICS information header structure
CMQCNOG	CMQCNOH	-	Connect options structure
CMQCSPG	CMQCSPH	-	Security parameters
CMQCXPG	CMQCXPH	CMQCXPR	Channel exit parameter structure
CMQDHG	CMQDHH	CMQDHR	Distribution header structure
CMQDLHG	CMQDLHH	CMQDLHR	Dead letter header structure

File name (static linkage, initialized, CMQ*G)	File name (static linkage, not initialized, CMQ*H)	File name (dynamic linkage, initialized, CMQ*R)	Contents
CMQDXPG	CMQDXPH	CMQDXPR	Data conversion exit parameter structure
CMQEPHG	CMQEPHH	-	Embedded PCF header structure
CMQG	-	CMQR	Named constants for main MQI
CMQGMOG	CMQGMOH	CMQGMOR	Get message options structure
CMQIIHG	CMQIIHH	CMQIIHR	IMS information header structure
CMQMDEG	CMQMDEH	CMQMDER	Message descriptor extension structure
CMQMDG	CMQMDH	CMQMDR	Message descriptor structure
CMQMD1G	CMQMD1H	CMQMD1R	Message descriptor structure version 1
CMQMD2G	CMQMD2H	-	Message descriptor structure version 2
CMQODG	CMQODH	CMQODR	Object descriptor structure
CMQORG	CMQORH	CMQORR	Object record structure
CMQPMOG	CMQPMOH	CMQPMOR	Put message options structure
CMQPSG	-	-	Constants for publish/subscribe
CMQRFHG	CMQRFHH	-	Rules and formatting header structure
CMQRFH2G	CMQRFH2H	-	Rules and formatting header 2 structure
CMQRMHG	CMQRMHH	CMQRMHR	Reference message header structure
CMQRRG	CMQRRH	CMQRRR	Response record structure
CMQTMCG	CMQTMCH	CMQTMCR	Trigger message structure (character format)
CMQTMC2G	CMQTMC2H	CMQTMC2R	Trigger message structure (character format) version 2
CMQTMG	CMQTMH	CMQTMR	Trigger message structure
CMQWIHG	CMQWIHH	-	Work information header structure
CMQXG	-	CMQXR	Named constants for data conversion exit
CMQXQHG	CMQXQHH	CMQXQHR	Transmission queue header structure

Table 680. RPG COPY files (continued)

Calls

Calls are described using their individual names.

Call parameters

Some parameters passed to the MQI can have more than one concurrent function. This is because the integer value passed is often tested on the setting of individual bits within the field, and not on its total value. This allows you to 'add' several functions together and pass them as a single parameter.

Structures

All IBM MQ structures are defined with initial values for the fields, with the following exceptions:

- Any structure with a suffix of H.
- MQTMC
- MQTMC2

These initial values are defined in the relevant table for each structure.

The structure declarations do not contain DS statements. This allows the application to declare either a single data structure or a multiple-occurrence data structure, by coding the DS statement and then using the /COPY statement to copy in the remainder of the declaration:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7
D* Declare an MQMD data structure with 5 occurrences
DMYMD        DS                          5
D/COPY CMQMDR
```

Named constants

There are many integer and character values that provide data interchange between your application program and the queue manager. To facilitate a more readable and consistent approach to using these values, named constants are defined for them. You can use these named constants and not the values they represent, as this improves the readability of the program source code.

When the COPY file CMQG is included in a program to define the constants, the RPG compiler will issue many severity-zero messages for the constants that are not used by the program; these messages are benign, and can safely be ignored.

MQI procedures

When using the ILE bound calls, you must bind to the MQI procedures when you create your program. These procedures are exported from the following service programs as appropriate:

QMQM/LIBMQM
: This service program contains the single-threaded bindings for version 5.1 and above. See the following section for special considerations when writing threaded applications.

QMQM/LIBMQM_R
: This service program contains the multi-threaded bindings for version 5.1 and above. See the following section for special considerations when writing threaded applications.

QMQM/LIBMQIC
: This service program is for binding non-threaded client applications.

QMQM/LIBMQIC_R
: This service program is for binding threaded client applications.

Use the CRTPGM command to create your programs. For example, the following command creates a single-threaded program that uses the ILE bound calls:

```
CRTPGM PGM(MYPROGRAM) BNDSRVPGM(QMQM/LIBMQM)
```

Threading considerations

The RPG compiler used for IBM i is part of the WebSphere Development Toolset and WebSphere Development Studio for IBM i and is known as the ILE RPG IV Compiler.

In general, RPG programs should not use the multi-threaded service programs. Exceptions are RPG programs created using the ILE RPG IV Compiler, and containing the THREAD(*SERIALIZE) keyword in the control specification. However, even though these programs are thread safe, careful consideration

must be given to the overall application design, as THREAD(*SERIALIZE) forces serialization of RPG procedures at the module level, and this might have an adverse affect on overall performance.

Where RPG programs are used as data-conversion exits, they must be made thread-safe, and should be recompiled using the version 4.4 ILE RPG compiler or above, with THREAD(*SERIALIZE) specified in the control specification.

For further information about threading, see the *IBM i IBM MQ Development Studio: ILE RPG Reference*, and the *IBM i IBM MQ Development Studio: ILE RPG Programmer's Guide*.

Commitment control

The MQI syncpoint functions MQCMIT and MQBACK are available to ILE RPG programs running in normal mode; these calls allow the program to commit and back out changes to MQ resources.

Coding the bound calls

MQI ILE procedures are listed in Table 681 on page 1002.

Table 681. ILE RPG bound calls supported by each service program

Name of call	LIBMQM and LIBMQM_R	LIBMQIC and LIBMQIC_R
MQBACK	Y	Y
MQBEGIN	Y	Y
MQCMIT	Y	Y
MQCLOSE	Y	Y
MQCONN	Y	Y
MQCONNX	Y	Y
MQDISC	Y	Y
MQGET	Y	Y
MQINQ	Y	Y
MQOPEN	Y	Y
MQPUT	Y	Y
MQPUT1	Y	Y
MQSET	Y	Y
MQXCNVC	Y	Y

To use these procedures you need to:

1. Define the external procedures in your 'D' specifications. These are all available within the COPY file member CMQG containing the named constants.
2. Use the CALLP operation code to call the procedure along with its parameters.

For example the MQOPEN call requires the inclusion of the following code:

```
D*******************************************************************
D**  MQOPEN Call -- Open Object  (From COPY file CMQG)           **
D*******************************************************************
D*
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQOPEN           PR                  EXTPROC('MQOPEN')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object descriptor
```

```
D OBJDSC                        224A
D* Options that control the action of MQOPEN
D OPTS                           10I 0 VALUE
D* Object handle
D HOBJ                           10I 0
D* Completion code
D CMPCOD                         10I 0
D* Reason code qualifying CMPCOD
D REASON                         10I 0
D*
```

To call the procedure, after initializing the various parameters, you need the following code:

```
...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ...+....8
  C                   CALLP     MQOPEN(HCONN : MQOD : OPTS : HOBJ :
  C                             CMPCOD : REASON)
```

Here, the structure MQOD is defined using the COPY member CMQODG which breaks it down into its components.

Notational conventions

The latter topics in this section show how the:

- Calls should be invoked
- Parameters should be declared
- Various data types should be declared

In a number of cases, parameters are arrays or character strings with a size that is not fixed. For these, a lowercase "n" is used to represent a numeric constant. When the declaration for that parameter is coded, the "n" must be replaced by the numeric value required.

IBM i MQAIR (Authentication information record) on IBM i

The MQAIR structure represents the authentication information record.

Overview

Purpose: The MQAIR structure allows an application running as an IBM MQ client to specify information about an authenticator that is to be used for the client connection. The structure is an input parameter on the MQCONNX call.

Character set and encoding: Data in MQAIR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

- "Fields" on page 1003
- "Initial values" on page 1005
- "RPG declaration" on page 1005

Fields

The MQAIR structure contains the following fields; the fields are described in **alphabetical order**:

AICN (10-digit signed integer)

This is either the host name or the network address of a host on which the LDAP server is running. This can be followed by an optional port number, enclosed in parentheses.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. If the value is not valid, the call fails with reason code RC2387.

The default port number is 389.

This is an input field. The length of this field is given by LNAICN. The initial value of this field is blank characters.

AITYP (10-digit signed integer)

This is the type of authentication information contained in the record.

The value must be:

AITLDP
Certificate revocation using LDAP server.

If the value is not valid, the call fails with reason code RC2386.

This is an input field. The initial value of this field is AITLDP.

AIPW (10-digit signed integer)

This is the password needed to access the LDAP CRL server.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. If the LDAP server does not require a password, or you omit the LDAP user name, *AIPW* must be null or blank. If you omit the LDAP user name and *AIPW* is not null or blank, the call fails with reason code RC2390.

This is an input field. The length of this field is given by LNLDPW. The initial value of this field blank characters.

AILUL (10-digit signed integer)

This is the length in bytes of the LDAP user name addressed by the *AILUP* or *AILUO* field. The value must be in the range zero through LNDISN. If the value is not valid, the call fails with reason code RC2389.

If the LDAP server involved does not require a user name, set this field to zero.

This is an input field. The initial value of this field is 0.

AILUO (10-digit signed integer)

This is the offset in bytes of the LDAP user name from the start of the MQAIR structure.

The offset can be positive or negative. The field is ignored if *LDAPUserNameLength* is zero.

You can use either *LDAPUserNamePtr* or *LDAPUserNameOffset* to specify the LDAP user name, but not both; see the description of the *LDAPUserNamePtr* field for details.

This is an input field. The initial value of this field is 0.

AILUP (10-digit signed integer)

This is the LDAP user name.

It consists of the Distinguished Name of the user who is attempting to access the LDAP CRL server. If the value is shorter than the length specified by *AILUL*, terminate the value with a null character, or pad it with blanks to the length *AILUL*. The field is ignored if *AILUL* is zero.

You can supply the LDAP user name in one of two ways:

- By using the pointer field *AILUP*

  In this case, the application can declare a string that is separate from the MQAIR structure, and set *AILUP* to the address of the string.

  Consider using *AILUP* for programming languages that support the pointer data type in a fashion that is portable to different environments (for example, the C programming language).

- By using the offset field *AILUO*

  In this case, the application must declare a compound structure containing the MQSCO structure followed by the array of MQAIR records followed by the LDAP user name strings, and set *AILUO* to the offset of the appropriate name string from the start of the MQAIR structure. Ensure that this

value is correct, and has a value that can be accommodated within an MQLONG (the most restrictive programming language is COBOL, for which the valid range is -999 999 999 through +999 999 999).

Consider using *AILUO* for programming languages that do not support the pointer data type, or that implement the pointer data type in a fashion that might not be portable to different environments (for example, the COBOL programming language).

Whichever technique is chosen, use only one of *AILUP* and *AILUO* ; the call fails with reason code RC2388.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

AISID (10-digit signed integer)

The value must be:

AISIDV
Identifier for the authentication information record.

This is always an input field. The initial value of this field is AISIDV.

AIVER (10-digit signed integer)

The value must be:

AIVER1
Version-1 authentication information record.

The following constant specifies the version number of the current version:

AIRVERC
Current version of authentication information record.

This is always an input field. The initial value of this field is AIVER1.

Initial values

Table 682. Initial values of fields in MQAIR for MQAIR

Field name	Name of constant	Value of constant
AISID	AISIDV	'AIR¬'
AIVER	AIVERC	1
AITYP	AITLDP	1
AICN	None	Null string or blanks
AILUP	None	Null pointer or null bytes
AILUO	None	0
AILUL	None	0
AIPW	None	Null string or blanks

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
```

```
     D* MQAIR Structure
     D*
     D* Structure identifier
     D  AISID                  1      4    INZ('AIR ')
     D* Structure version number
     D  AIVER                  5      8I 0 INZ(1)
     D* Type of authentication information
     D  AITYP                  9     12I 0 INZ(1)
     D* Connection name of CRL LDAP server
     D  AICN                  13    276    INZ
     D* Address of LDAP user name
     D  AILUP                277    292*   INZ(*NULL)
     D* Offset of LDAP user name from start of MQAIR structure
     D  AILUO                293    296I 0 INZ(0)
     D* Length of LDAP user name
     D  AILUL                297    300I 0 INZ(0)
     D* Password to access LDAP server
     D  AIPW                 301    332    INZ
```

IBM i MQBMHO (Buffer to message handle options) on IBM i

Structure defining the buffer to message handle options.

Overview

Purpose: The MQBMHO structure allows applications to specify options that control how message handles are produced from buffers. The structure is an input parameter on the MQBUFMH call.

Character set and encoding: Data in MQBMHO must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1006
- "Initial values" on page 1007
- "RPG declaration" on page 1007

Fields

The MQBMHO structure contains the following fields; the fields are described in **alphabetical order**:

BMSID (10-digit signed integer)

Buffer to message handle structure - StrucId field.

This is the structure identifier. The value must be:

BMSIDV
Identifier for buffer to message handle structure.

This is always an input field. The initial value of this field is BMSIDV.

BMVER (10-digit signed integer)

Buffer to message handle structure - Version field.

This is the structure version number. The value must be:

BMVER1
Version number for buffer to message handle structure.

The following constant specifies the version number of the current version:

BMVERVC
Current version of buffer to message handle structure.

This is always an input field. The initial value of this field is BMVER1.

BMOPT (10-digit signed integer)

Buffer to message handle structure - Options field.

The value can be:

BMDLPR
Properties that are added to the message handle are deleted from the buffer. If the call fails no properties are deleted.

Default options: If you do not need the option described, use the following option:

BMNONE
No options specified.

This is always an input field. The initial value of this field is BMDLPR.

Initial values

Table 683. Initial values of fields in MQBMHO

Field name	Name of constant	Value of constant
BMSID	BMSIDV	'BMHO'
BMVER	BMVER1	1
BMOPT	BMNONE	0

RPG declaration

```
     D* MQBMHO Structure
     D*
     D*
     D* Structure identifier
     D  BMSID                 1      4    INZ('BMHO')
     D*
     D* Structure version number
     D  BMVER                 5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQBUFMH
     D  BMOPT                 9     12I 0 INZ(1)
```

IBM i MQBO (Begin options) on IBM i

The MQBO structure allows the application to specify options relating to the creation of a unit of work.

Overview

Purpose: The structure is an input/output parameter on the MQBEGIN call.

Character set and encoding: Data in MQBO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

- "Fields" on page 1007
- "Initial values" on page 1008
- "RPG declaration" on page 1008

Fields

The MQBO structure contains the following fields; the fields are described in **alphabetical order**:

BOOPT (10-digit signed integer)

Options that control the action of MQBEGIN.

The value must be:

BONONE
No options specified.

This is always an input field. The initial value of this field is BONONE.

BOSID (4-byte character string)

Structure identifier.

The value must be:

BOSIDV
Identifier for begin-options structure.

This is always an input field. The initial value of this field is BOSIDV.

BOVER (10-digit signed integer)

Structure version number.

The value must be:

BOVER1
Version number for begin-options structure.

The following constant specifies the version number of the current version:

BOVERC
Current version of begin-options structure.

This is always an input field. The initial value of this field is BOVER1.

Initial values

Table 684. Initial values of fields in MQBO

Field name	Name of constant	Value of constant
BOSID	BOSIDV	'BO¬¬'
BOVER	BOVER1	1
BOOPT	BONONE	0

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQBO Structure
D*
D* Structure identifier
D  BOSID                  1      4    INZ('BO  ')
D* Structure version number
D  BOVER                  5      8I 0 INZ(1)
D* Options that control the action of MQBEGIN
D  BOOPT                  9     12I 0 INZ(0)
```

IBM i MQCBC (Callback context) on IBM i

Structure describing the callback routine.

Overview

Purpose
The MQCBC structure is used to specify context information that is passed to a callback function.

The structure is an input/output parameter on the call to a message consumer routine.

Version
The current version of MQCBC is CBCV2.

Character set and encoding
Data in MQCBC is in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure is in the character set and encoding of the client.

- "Fields" on page 1009
- "Initial values" on page 1014
- "RPG declaration" on page 1014

Fields

The MQCBC structure contains the following fields; the fields are described in alphabetical order:

CBCBUFFLEN (10 digit signed integer)

The buffer can be larger than both the MaxMsgLength value defined for the consumer and the ReturnedLength value in the MQGMO.

Callback context structure - BufferLength field.

This is the length in bytes of the message buffer that has been passed to this function.

The actual message length is supplied in DataLength field.

The application can use the entire buffer for its own purposes for the duration of the callback function.

This is an input field to the message consumer function; it is not relevant to an exception handler function.

CBCCALLBA (10 digit signed integer)

Callback context structure - CallbackArea field.

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the CBDCALLBA field in the MQCBD structure, which is a parameter on the MQCB call used to define the callback function.

Changes to the *CBCCALLBA* are preserved across the invocations of the callback function for an *CBCHOBJ*. This field is not shared with callback functions for other handles.

This is an input/output field to the callback function. The initial value of this field is a null pointer or null bytes.

CBCCALLT (10 digit signed integer)

Callback Context structure - CallType field.

Field containing information about why this function has been called. The following call types are defined.

Message delivery call types: These call types contain information about a message. The **CBCLEN** and **CBCBUFFLEN** parameters are valid for these call types.

CBCTMR
The message consumer function has been invoked with a message that has been destructively removed from the object handle.

If the value of *CBCCC* is CCWARN, the value of the *Reason* field is RC2079 or one of the codes indicating a data conversion problem.

CBCTMN

The message consumer function has been invoked with a message that has not yet been destructively removed from the object handle. The message can be destructively removed from the object handle using the *MsgToken*.

The message might not have been removed because:

- The MQGMO options requested a browse operation, GMBR*
- The message is larger than the available buffer and the MQGMO options do not specify `gmatm`

If the value of *CBCCC* is CCWARN, the value of the *Reason* field is `RC2080` or one of the codes indicating a data conversion problem.

Callback control call types: These call types contain information about the control of the callback and do not contain details about a message. These call types are requested using CBDOPT in the MQCBD structure.

The **CBCLEN** and **CBCBUFFLEN** parameters are not valid for these call types.

CBCTRC

The purpose of this call type is to allow the callback function to perform some initial setup.

The callback function is invoked is immediately after the callback is registered, that is, upon return from an MQCB call using a value for the *Operation* field of CBREG.

This call type is used both for message consumers and event handlers.

If requested, this is the first invocation of the callback function.

The value of the *CBCREA* field is RCNONE.

CBCTSC

The purpose of this call type is to allow the callback function to perform some setup when it is started, for example, reinstating resources that were cleaned up when it was previously stopped.

The callback function is invoked when the connection is started using either CTLSR or CTLSW.

If a callback function is registered within another callback function, this call type is invoked when the callback returns.

This call type is used for message consumers only.

The value of the *CBCREA* field is RCNONE.

CBCTTC

The purpose of this call type is to allow the callback function to perform some cleanup when it is stopped for a while, for example, cleaning up additional resources that have been acquired during the consuming of messages.

The callback function is invoked when an MQCTL call is issued using a value for the *Operation* field of CTLSP.

This call type is used for message consumers only.

The value of the *CBCREA* field is set to indicate the reason for stopping.

CBCTDC

The purpose of this call type is to allow the callback function to perform final cleanup at the end of the consume process. The callback function is invoked when the:

- Callback function is deregistered using an MQCB call with BCUNR.
- Queue is closed, causing an implicit deregister. In this instance the callback function is passed HOUNUH as the object handle.
- MQDISC call completes - causing an implicit close and, therefore, a deregister. In this case the connection is not disconnected immediately, and any ongoing transaction is not yet committed.

If any of these actions are taken inside the callback function itself, the action is invoked once the callback returns.

This call type is used both for message consumers and event handlers.

If requested, this is the last invocation of the callback function.

The value of the *CBCREA* field is set to indicate the reason for stopping.

CBCTEC

Event handler function

The event handler function has been invoked without a message when:

- An MQCTL call is issued with a value for the *Operation* field of CTLSP, or
- The queue manager or connection stops or quiesces.

This call can be used to take appropriate action for all callback functions.

- **Message consumer function**

  The message consumer function has been invoked without a message when an error (*CBCCC* = CCFAIL) has been detected that is specific to the object handle; for example *CBCREA* code = RC2016 .

The value of the *CBCREA* field is set to indicate the reason for the call.

This is an input field. CBCTMR and CMCTMN are applicable only to message consumer functions.

CBCCC (10 digit signed integer)

Callback context structure - CompCode field.

This is the completion code. It indicates whether there were any problems consuming the message; it is one of the following:

CCOK
Successful completion

CCWARN
Warning (partial completion)

CCFAIL
Call failed

This is an input field. The initial value of this field is CCOK.

CBCCONNAREA (10 digit signed integer)

Callback context structure - ConnectionArea field.

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the ConnectionArea field in the MQCTLO structure, which is a parameter on the MQCTL call used to control the callback function.

Any changes made to this field by the callback functions are preserved across the invocations of the callback function. This area can be used to pass information that is to be shared by all callback functions. Unlike *CallbackArea*, this area is common across all callbacks for a connection handle.

This is an input and output field. The initial value of this field is a null pointer or null bytes.

CBCLEN (10 digit signed integer)

This is the length in bytes of the application data in the message. If the value is zero, it means that the message contains no application data.

The CBCLEN field contains the length of the message but not necessarily the length of the message data passed to the consumer. It could be that the message was truncated. Use the GMRL field in the MQGMO to determine how much data has been passed to the consumer.

If the reason code indicates the message has been truncated, you can use the CBCLEN field to determine how large the actual message is. This allows you to determine the size of the buffer

required to accommodate the message data, and then issue an MQCB call to update the CBDMML in the MQCBD with an appropriate value.

If the GMCONV option is specified, the converted message could be larger than the value returned for DataLength. In such cases, the application probably needs to issue an MQCB call to update the CBDMML in the MQCBD to be greater than the value returned by the queue manager for DataLength.

To avoid message truncation problems, specify MaxMsgLength as CBDFM. This causes the queue manager to allocate a buffer for the full message length after data conversion. Be aware, however, that even if this option is specified, it is still possible that sufficient storage is not available to correctly process the request. Applications should always check the returned reason code. For example, if it is not possible to allocate sufficient storage to convert the message, the messages is returned to the application unconverted.

This is an input field to the message consumer function; it is not relevant to an event handler function.

CBCFLG (10 digit signed integer)

Flags containing information about this consumer.

The following option is defined:

CBCFBE

This flag can be returned if a previous MQCLOSE call using the COQSC option failed with a reason code of RC2458.

This code indicated that the last read ahead message is being returned and that the buffer is now empty. If the application issues another MQCLOSE call using the COQSC option, it succeeds.

Note, that an application is not guaranteed to be given a message with this flag set, as there might still be messages in the read-ahead buffer that do not match the current selection criteria. In this instance, the consumer function is invoked with the reason code RC2019 .

If the read ahead buffer is empty, the consumer is invoked with the CBCFBE flag and the reason code RC2518.

This is an input field to the message consumer function; it is not relevant to an event handler function.

CBCHOBJ (10 digit signed integer)

Callback context structure - CBCHOBJ field.

For a call to a message consumer, this is the handle for the object relating to the message consumer.

For an event handler, this value is HONONE

The application can use this handle and the message token in the Get Message Options block to get the message if a message has not been removed from the queue.

This is always an input field. The initial value of this field is HOUNUH

CBCRCD (10 digit signed integer)

CBCRCD indicates how long the queue manager waits before trying to reconnect. The field can be modified by an event handler to change the delay or stop reconnection altogether.

Use the **CBCRCD** field only if the value of the **Reason** field in the Callback Context is RC2545.

On entry to the event handler the value of **CBCRCD** is the number of milliseconds the queue manager is going to wait before making a reconnection attempt. Table 685 on page 1012 lists the values that you can set to modify the behavior of the queue manager on return from the event handler.

*Table 685. **CBCRCD** values*

Value	Description
-1	Make no more reconnection attempts. An error is returned to the application.
0	Try to reconnect immediately.

Table 685. **CBCRCD** values (continued)	
Value	**Description**
>0	Wait for this many milliseconds before trying the connection again.

CBCREA (10 digit signed integer)

Callback context structure - Reason field.

This is the reason code qualifying the *CBCCC*

This is an input field. The initial value of this field is RCNONE.

CBCSTATE (10 digit signed integer)

An indication of the state of the current consumer. This field is of most value to an application when a nonzero reason code is passed to the consumer function.

You can use this field to simplify application programming because you do not need to code behavior for each reason code.

This is an input field. The initial value of this field is CSNONE

Table 686. CBCSTATE values and resultant actions

State	Queue manager action	Value of constant
CSNONE This reason code represents a normal call with no additional reason information	None; this is the normal operation.	0
CSSUST These reason codes represent temporary conditions.	The callback routine is called to report the condition and then suspended. After a period the system might attempt the operation again, which can lead to the same condition being raised again.	1
CSSUSU These reason codes represent conditions where the callback needs to act to resolve the condition.	The consumer is suspended and the callback routine is called to report the condition. The callback routine should resolve the condition if possible and either RESUME or close down the connection.	2
CSSUS These reason codes represent failures that prevent further message callbacks.	The queue manager automatically suspends the callback function. If the callback function is resumed it is likely to receive the same reason code again.	3
CSSTOP These reason codes represent the end of message consumption.	Delivered to the exception handler and to callbacks that specified CBDTC. No further messages can be consumed.	4

CBCSID (10 digit signed integer)

Callback context structure - StrucId field.

This is the structure identifier; the value must be:

CBCSI
Identifier for callback context structure.

This is always an input field. The initial value of this field is CBCSI.

CBCVER (10 digit signed integer)

Callback context structure - Version field.

This is the structure version number; the value must be:

CBCV1
Version-1 callback context structure.

The following constant specifies the version number of the current version:

CBCCV
Current version of the callback context structure.

This is always an input field. The initial value of this field is CBCV1.

Initial values

Table 687. Initial values of fields in MQCBC

Field name	Name of constant	Value of constant
CBCSID	CBCSI	'CBC¬'
CBCVER	CBCV1	1
CBCCALLT	None	0
CBCHOBJ	HOUNUH	-1
CBCCALLBA	None	Null pointer or null bytes
CBCCONNAREA	None	Null pointer or null bytes
CBCCC	CCOK	0
CBCREA	RCNONE	0
CBCSTATE	CSNONE	0
CBCLEN	None	0
CBCBUFFLEN	None	0
CBCFLG	None	0
CBCRCD	none	0

Note:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D* MQCBC Structure
     D*
     D*
     D* Structure identifier
     D  CBCSID                 1      4    INZ('CBC ')
     D*
     D* Structure version number
     D  CBCVER                 5      8I 0 INZ(1)
     D*
     D* Why Function was called
     D  CBCCALLT               9     12I 0 INZ(0)
     D*
     D* Object Handle
     D  CBCHOBJ               13     16I 0 INZ(-1)
     D*
     D* Callback data passed to the function
     D  CBCCALLBA             17     32*   INZ(*NULL)
```

```
     D*
     D* MQCTL Data area passed to the function
     D  CBCCONNAREA           33     48*   INZ(*NULL)
     D*
     D* Completion Code
     D  CBCCC                 49     52I 0 INZ(0)
     D*
     D* Reason Code
     D  CBCREA                53     56I 0 INZ(0)
     D*
     D* Consumer State
     D  CBCSTATE              57     60I 0 INZ(0)
     D*
     D* Message Data Length
     D  CBCLEN                61     64I 0 INZ(0)
     D*
     D* Buffer Length
     D  CBCBUFFLEN            65     68I 0 INZ(0)
     D*
     ** Flags containing information about
     D* this consumer
     D  CBCFLG                69     72I 0 INZ(0)
     D* Ver:1 **
     D* Number of milliseconds before reconnect attempt
     D  CBCRCD                73     76I 0 INZ(0)
     D* Ver:2 **
     D*
```

IBM i MQCBD (Callback descriptor) on IBM i

Structure specifying the callback function.

Overview

Purpose: The MQCBD structure is used to specify a callback function and the options controlling its use by the queue manager.

The structure is an input parameter on the MQCB call.

Version: The current version of MQCBD is CBDV1.

Character set and encoding: Data in MQCBD must be in the character set and encoding of the local queue manager; these are given by the **CodedCharSetId** queue manager attribute and ENNAT. However, if the application is running as an IBM MQ MQI client, the structure must be in the character set and encoding of the client.

- “Fields” on page 1015
- “Initial values” on page 1019
- “RPG declaration” on page 1019

Fields

The MQCBD structure contains the following fields; the fields are described in **alphabetical order**:

CBDCALLBA (10-digit signed integer)

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the CBCCALLBA field in the MQCBD structure, which is a parameter on the callback function declaration.

The value is used only on an *Operation* having a value CBREG, with no currently defined callback, it does not replace a previous definition.

This is an input and output field to the callback function. The initial value of this field is a null pointer or null bytes.

CBDCALLBF (10-digit signed integer)

The callback function is invoked as a function call.

Use this field to specify a pointer to the callback function.

You must specify either *CallbackFunction* or *CallbackName*. If you specify both, the reason code RC2486 is returned.

If neither *CallbackName* nor *CallbackFunction* is not set, the call fails with the reason code RC2486.

This option is not supported in the following environments:

- CICS on z/OS
- Programming languages and compilers that do not support function-pointer references

In such situations, the call fails with the reason code RC2486.

This is an input field. The initial value of this field is a null pointer or null bytes.

CBDCALLBN (10-digit signed integer)

The callback function is invoked as a dynamically linked program.

You must specify either *CallbackFunction* or *CallbackName*. If you specify both, the reason code RC2486 is returned.

If either *CallbackName* or *CallbackFunction* is not true, the call fails with the reason code RC2486.

The module is loaded when the first callback routine to use is registered, and unloaded when the last callback routine to use it deregisters.

Except where noted in the following text, the name is left-aligned within the field, with no embedded blanks; the name itself is padded with blanks to the length of the field. In the descriptions that follow, square brackets ([]) denote optional information:

IBMi

The callback name can be one of the following formats:

- Library "/" Program
- Library "/" ServiceProgram "("FunctionName")"

For example, `MyLibrary/MyProgram(MyFunction)`.

The library name can be *LIBL. Both the library and program names are limited to a maximum of 10 characters.

UNIX

The callback name is the name of a dynamically loadable module or library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses. The library name can optionally be prefixed with a directory path:

```
[path]library(function)
```

If the path is not specified the system search path is used.

The name is limited to a maximum of 128 characters.

Windows

The callback name is the name of a dynamic-link library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses. The library name can optionally be prefixed with a directory path and drive:

```
[d:][path]library(function)
```

If the drive and path are not specified the system search path is used.

The name is limited to a maximum of 128 characters.

z/OS

The callback name is the name of a load module that is valid for specification on the EP parameter of the LINK or LOAD macro.

The name is limited to a maximum of 8 characters.

z/OS CICS

The callback name is the name of a load module that is valid for specification on the PROGRAM parameter of the EXEC CICS LINK command macro.

The name is limited to a maximum of 8 characters.

The program can be defined as remote using the REMOTESYTEM option of the installed PROGRAM definition or by the dynamic routing program.

The remote CICS region must be connected to IBM MQ if the program is to use IBM MQ API calls. Note, however, that the CBCHOBJ field in the MQCBC structure is not valid in a remote system.

If a failure occurs trying to load *CallbackName*, one of the following error codes is returned to the application:

- RC2495
- RC2496
- RC2497

A message is also written to the error log containing the name of the module for which the load was attempted, and the failing reason code from the operating system.

This is an input field. The initial value of this field is a null string or blanks.

CBDCALLBT (10-digit signed integer)

This is the type of the callback function. The value must be one of:

CBTMC

Defines this callback as a message consumer function.

A message consumer callback function is called when a message, meeting the selection criteria specified, is available on an object handle and the connection is started.

CBTEH

Defines this callback as the asynchronous event routine; it is not driven to consume messages for a handle.

Hobj is not required on the MQCB call defining the event handler and is ignored if specified.

The event handler is called for conditions that affect the whole message consumer environment. The consumer function is invoked without a message when an event, for example, a queue manager or connection stopping, or quiescing, occurs. It is not called for conditions that are specific to a single message consumer, for example, RC2016.

Events are delivered to the application, regardless of whether the connection is started or stopped, except in the following environments:

- CICS on z/OS environment
- nonthreaded applications

If the caller does not pass one of these values, the call fails with a reason code of RC2483

This is always an input field. The initial value of this field is CBTMC.

CBDMML (10-digit signed integer)

This is the length in bytes of the longest message that can be read from the handle and given to the callback routine. If a message has a longer length, the callback routine receives *MaxMsgLength* bytes of the message, and reason code:

- RC2080 or
- RC2079 if you specified GMATM.

The actual message length is supplied in the "CBCLEN (10 digit signed integer)" on page 1011 field of the MQCBC structure.

The following special value is defined:

CBDFM
The buffer length is adjusted by the system to return messages without truncation.

If insufficient memory is available to allocate a buffer to receive the message, the system calls the callback function with an RC2071 reason code.

If, for example, you request data conversion, and there is insufficient memory available to convert the message data, the unconverted message is passed to the callback function.

This is an input field. The initial value of the *MaxMsgLength* field is CBDFM.

CBDOPT (10-digit signed integer)

Callback descriptor structure - Options field.

Any one, or all, of the following can be specified. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations). Combinations that are not valid are noted; any other combinations are valid.

CBDFQ
The MQCB call fails if the queue manager is in the quiescing state.

On z/OS, this option also forces the MQCB call to fail if the connection (for a CICS or IMS application) is in the quiescing state.

Specify GMFIQ, in the MQGMO options passed on the MQCB call, to cause notification to message consumers when they are quiescing.

Control options: The following options control whether the callback function is called, without a message, when the state of the consumer changes:

CBDRC
The callback function is invoked with call type CBCTRC

.

CBDSC
The callback function is invoked with call type CBCTSC.

CBDTC
The callback function is invoked with call type CBCTTC.

CBDDC
The callback function is invoked with call type CBCTDC.

See "CBCCALLT (10 digit signed integer)" on page 1009 for further details about these call types.

Default option: If you do not need any of the options described, use the following option:

CBDNO
Use this value to indicate that no other options have been specified; all options assume their default values.

CBDNO is defined to aid program documentation; it is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of the *Options* field is CBDNO.

CBDSID (10-digit signed integer)

Callback descriptor structure - StrucId field.

This is the structure identifier; the value must be:

CBDSI
Identifier for callback descriptor structure.

This is always an input field. The initial value of this field is CBDSI.

CBDVER (10-digit signed integer)

Callback descriptor structure - Version field.

This is the structure version number; the value must be:

CBDV1
Version-1 callback descriptor structure.

The following constant specifies the version number of the current version:

CBDCV
Current version of callback descriptor structure.

This is always an input field. The initial value of this field is CBDV1.

Initial values

Table 688. Initial values of fields in MQCBD

Field name	Name of constant	Value of constant
StrucId	CBDSI	'CBD¬'
Version	CBDV1	1
CallBackType	CBTMC	1
Options	CBDNO	0
CallbackArea	None	Null bytes
CallbackFunction	None	Null bytes
CallbackName	None	Blanks
MaxMsgLength	CBDFM	-1

Note:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D* MQCBD Structure
D*
D*
D* Structure identifier
D  CBDSID                 1      4   INZ('CBD ')
D*
D* Structure version number
D  CBDVER                 5      8I 0 INZ(1)
D*
D* Callback function type
D  CBDCALLBT              9     12I 0 INZ(1)
D*
** Options controlling message
D* consumption
```

```
     D  CBDOPT                13     16I 0 INZ(0)
     D*
     D* User data passed to the function
     D  CBDCALLBA             17     32*
     D*
     D* FP: Callback function pointer
     D  CBDCALLBF             33     48*
     D*
     D* Callback name
     D  CBDCALLBN             49    176    INZ('\0')
     D*
     D* Maximum message length
     D  CBDMML               177    180I 0 INZ(-1)
```

IBM i MQCHARV (Variable Length String) on IBM i

Use the MQCHARV structure to describe a variable length string.

Overview

Character set and encoding: Data in the MQCHARV must be in the encoding of the local queue manager that is given by ENNAT and the character set of the VCHRC field within the structure. If the application is running as an IBM MQ MQI client, the structure must be in the encoding of the client. Some character sets have a representation that depends on the encoding. If VCHRC is one of these character sets, the encoding used is the same encoding as that of the other fields in the MQCHARV. The character set identified by VSCCSID can be a double-byte character set (DBCS).

Usage: The MQCHARV structure addresses data that might be discontiguous with the structure containing it. To address this data, fields declared with the pointer data type can be used.

- "Fields" on page 1020
- "Initial values" on page 1021
- "RPG declaration" on page 1022
- "Redefinition of CSAPL" on page 1022

Fields

The MQCHARV structure contains the following fields; the fields are described in **alphabetical order**:

VCHRC (10-digit signed integer)

This is the character set identifier of the variable length string addressed by the VCHRP or VCHRO field.

The initial value of this field is CSAPL. This is defined by IBM MQ to indicate that it should be changed by the queue manager to the true character set identifier of the queue manager. This is in the same way as CSQM behaves. As a result, the value CSAPL is never associated with a variable length string. The initial value of this field can be changed by defining a different value for the constant CSAPL for your compile unit by the appropriate means for your application's programming language.

VCHRL (10-digit signed integer)

The length in bytes of the variable length string addressed by the VCHRP or VCHRO field.

The initial value of this field is 0. The value must be either greater than or equal to zero or the following special value which is recognized:

VSNLT

If VSNLT is not specified, VCHRL bytes are included as part of the string. If null characters are present they do not delimit the string.

If VSNLT is specified, the string is delimited by the first null encountered in the string. The null itself is not included as part of that string.

Note: The null character used to terminate a string if VSNLT is specified is a null from the code set specified by VCHRC.

For example, in UTF-16 (CCSIDs 1200, 13488, and 17584), this is the 2-byte Unicode encoding where a null is represented by a 16 bit number of all zeros. In UTF-16 it is common to find single bytes set to all zero which are part of characters (7-bit ASCII characters for example), but the strings will only be null terminated when two 'zero' bytes are found on an even byte boundary. It is possible to get two 'zero' bytes on an odd boundary when they are each part of valid characters. For example, x'01' x'00' x'00' x'30' represents two valid Unicode characters and does not null terminate the string.

VCHRO (10-digit signed integer)

The offset in bytes of the variable length string from the start of the MQCHARV, or the structure containing it.

When the MQCHARV structure is embedded within another structure, this value is the offset in bytes of the variable length string from the start of the structure that contains this MQCHARV structure. When the MQCHARV structure is not embedded within another structure, for example, if it is specified as a parameter on a function call, the offset is relative to the start of the MQCHARV structure.

The offset can be positive or negative. You can use either the VCHRP or VCHRO field to specify the variable length string, but not both.

The initial value of this field is 0.

VCHRP (pointer)

This is a pointer to the variable length string.

You can use either the VCHRP or VCHRO field to specify the variable length string, but not both.

The initial value of this field is a null pointer or null bytes.

VCHRS (10-digit signed integer)

The size in bytes of the buffer addressed by the VCHRP or VCHRO field.

When the MQCHARV structure is used as an output field on a function call, this field must be initialized with the length of the buffer provided. If the value of VCHRL is greater than VCHRS then only VCHRS bytes of data will be returned to the caller in the buffer.

The value must be greater than or equal to zero or the following special value which is recognized:

VSUSL

If VSUSL is specified, the length of the buffer is taken from the VCHRL field in the MQCHARV structure. This special value is not appropriate when the structure is used as an output field and a buffer is provided. This is the initial value of this field.

Initial values

Table 689. MQCHARV initial values for constants

Field name	Name of constant	Value of constant
VCHRP	None	Null pointer or null bytes.
VCHRO	None	0
VCHRS	VSUSL	-1
VCHRL	None	0
VCHRC	CSAPL	-3

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQCHARV Structure
D*
D* Address of variable length string
D VCHRP                   1     16*
D* Offset of variable length string
D VCHRO                  17     20I 0
D* Size of buffer
D VCHRS                  21     24I 0
D* Length of variable length string
D VCHRL                  25     28I 0
D* CCSID of variable length string
D VCHRC                  29     32I 0
```

Redefinition of CSAPL

Unlike the programming languages supported on other platforms, RPG does not have a way of redefining a defined constant, so you must set each VCHRC specifically if you want to use a value other than CSAPL.

IBM i MQCIH (CICS bridge header) on IBM i

The MQCIH structure describes the information that can be present at the start of a message sent to the CICS bridge through IBM MQ for z/OS.

Overview

Format name: FMCICS.

Version: The current version of MQCIH is CIVER2. Fields that exist only in the more-recent version of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQCIH, with the initial value of the *CIVER* field set to CIVER2.

Character set and encoding: Special conditions apply to the character set and encoding used for the MQCIH structure and application message data:

- Applications that connect to the queue manager that owns the CICS bridge queue must provide an MQCIH structure that is in the character set and encoding of the queue manager. This is because data conversion of the MQCIH structure is not performed in this case.
- Applications that connect to other queue managers can provide an MQCIH structure that is in any of the supported character sets and encodings; conversion of the MQCIH is performed by the receiving message channel agent connected to the queue manager that owns the CICS bridge queue.

  Note: There is one exception to this. If the queue manager that owns the CICS bridge queue is using CICS for distributed queuing, the MQCIH must be in the character set and encoding of the queue manager that owns the CICS bridge queue.
- The application message data following the MQCIH structure must be in the same character set and encoding as the MQCIH structure. The *CICSI* and *CIENC* fields in the MQCIH structure cannot be used to specify the character set and encoding of the application message data.

  A data-conversion exit must be provided by the user to convert the application message data if the data is not one of the built-in formats supported by the queue manager.

Usage: If the values required by the application are the same as the initial values shown in Table 691 on page 1031, and the bridge is running with AUTH=LOCAL or AUTH=IDENTIFY, the MQCIH structure can be omitted from the message. In all other cases, the structure must be present.

The bridge accepts either a version-1 or a version-2 MQCIH structure, but for 3270 transactions a version-2 structure must be used.

The application must ensure that fields documented as "request" fields have appropriate values in the message sent to the bridge; these fields are input to the bridge.

Fields documented as "response" fields are set by the CICS bridge in the reply message that the bridge sends to the application. Error information is returned in the *CIRET*, *CIFNC*, *CICC*, *CIREA*, and *CIAC* fields, but not all of them are set in all cases. Table 690 on page 1023 shows which fields are set for different values of *CIRET*.

Table 690. Contents of error information fields in MQCIH structure

CIRET	***CIFNC***	***CICC***	***CIREA***	***CIAC***
CRC000	-	-	-	-
CRC003	-	-	FBC*	-
CRC002 CRC008	IBM MQ call name	IBM MQ *CMPCOD*	IBM MQ *REASON*	-
CRC001 CRC006 CRC007 CRC009	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	-
CRC004 CRC005	-	-	-	CICS ABCODE

- “Fields” on page 1023
- “Initial values” on page 1031
- “RPG declaration” on page 1033

Fields

The MQCIH structure contains the following fields; the fields are described in **alphabetical order**:

CIAC (4-byte character string)

Abend code.

The value returned in this field is significant only if the *CIRET* field has the value CRC005 or CRC004. If it does, *CIAC* contains the CICS ABCODE value.

This is a response field. The length of this field is given by LNABNC. The initial value of this field is 4 blank characters.

This is an indicator specifying whether ADS descriptors should be sent on SEND and RECEIVE BMS requests. The following values are defined:

ADNONE
Do not send or receive ADS descriptor.

ADSEND
Send ADS descriptor.

ADRECV
Receive ADS descriptor.

ADMSGF
Use message format for the ADS descriptor.

This causes the ADS descriptor to be sent or received using the long form of the ADS descriptor. The long form has fields that are aligned on 4-byte boundaries.

The *CIADS* field should be set as follows:

- If ADS descriptors are not being used, set the field to ADNONE.
- If ADS descriptors *are* being used, and with the *same* CCSID in each environment, set the field to the sum of ADSEND and ADRECV.
- If ADS descriptors *are* being used, but with *different* CCSIDs in each environment, set the field to the sum of ADSEND, ADRECV, and ADMSGF.

This is a request field used only for 3270 transactions. The initial value of this field is ADNONE.

CIADS (10-digit signed integer)

Send/receive ADS descriptor.

This is an indicator specifying whether ADS descriptors should be sent on SEND and RECEIVE BMS requests. The following values are defined:

ADNONE
Do not send or receive ADS descriptor.

ADSEND
Send ADS descriptor.

ADRECV
Receive ADS descriptor.

ADMSGF
Use message format for the ADS descriptor.

This causes the ADS descriptor to be sent or received using the long form of the ADS descriptor. The long form has fields that are aligned on 4-byte boundaries.

The *CIADS* field should be set as follows:

- If ADS descriptors are not being used, set the field to ADNONE.
- If ADS descriptors *are* being used, and with the *same* CCSID in each environment, set the field to the sum of ADSEND and ADRECV.
- If ADS descriptors *are* being used, but with *different* CCSIDs in each environment, set the field to the sum of ADSEND, ADRECV, and ADMSGF.

This is a request field used only for 3270 transactions. The initial value of this field is ADNONE.

CIAI (4-byte character string)

AID key.

This is the initial value of the AID key when the transaction is started. It is a 1-byte value, left-aligned.

This is a request field used only for 3270 transactions. The length of this field is given by LNATID. The initial value of this field is 4 blanks.

CIAUT (8-byte character string)

Password or passticket.

This is a password or passticket. If user-identifier authentication is active for the CICS bridge, *CIAUT* is used with the user identifier in the MQMD identity context to authenticate the sender of the message.

This is a request field. The length of this field is given by LNAUTH. The initial value of this field is 8 blanks.

CICC (10-digit signed integer)

IBM MQ completion code or CICS EIBRESP.

The value returned in this field is dependent on *CIRET* ; see Table 690 on page 1023.

This is a response field. The initial value of this field is CCOK.

CICNC (4-byte character string)

Abend transaction code.

This is the abend code to be used to terminate the transaction (normally a conversational transaction that is requesting more data). Otherwise this field is set to blanks.

This is a request field used only for 3270 transactions. The length of this field is given by LNCNCL. The initial value of this field is 4 blanks.

CICP (10-digit signed integer)

Cursor position.

This is the initial cursor position when the transaction is started. Later, for conversational transactions, the cursor position is in the RECEIVE vector.

This is a request field used only for 3270 transactions. The initial value of this field is 0. This field is not present if *CIVER* is less than CIVER2.

CICSI (10-digit signed integer)

Reserved.

This is a reserved field; its value is not significant. The initial value of this field is 0.

CICT (10-digit signed integer)

Whether task can be conversational.

This is an indicator specifying whether the task should be allowed to issue requests for more information, or should abend. The value must be one of the following:

CTYES
Task is conversational.

CTNO
Task is not conversational.

This is a request field used only for 3270 transactions. The initial value of this field is CTNO.

CIENC (10-digit signed integer)

Reserved.

This is a reserved field; its value is not significant. The initial value of this field is 0.

CIEO (10-digit signed integer)

Offset of error in message.

This is the position of invalid data detected by the bridge exit. This field provides the offset from the start of the message to the location of the invalid data.

This is a response field used only for 3270 transactions. The initial value of this field is 0. This field is not present if *CIVER* is less than CIVER2.

CIFAC (8-byte bit string)

Bridge facility token.

This is an 8-byte bridge facility token. The purpose of a bridge facility token is to allow multiple transactions in a pseudoconversation to use the same bridge facility (virtual 3270 terminal). In the first, or only, message in a pseudoconversation, a value of FCNONE should be set; this tells CICS to allocate a new bridge facility for this message. A bridge facility token is returned in response messages when a nonzero *CIFKT* is specified on the input message. Subsequent input messages can then use the same bridge facility token.

The following special value is defined:

FCNONE
No BVT token specified.

This is both a request and a response field used only for 3270 transactions. The length of this field is given by LNFAC. The initial value of this field is FCNONE.

CIFKT (10-digit signed integer)

Bridge facility release time.

This is the length of time in seconds that the bridge facility will be kept after the user transaction has ended. For nonconversational transactions, the value should be zero.

This is a request field used only for 3270 transactions. The initial value of this field is 0.

CIFL (4-byte character string)

Terminal emulated attributes.

This is the name of an installed terminal that is to be used as a model for the bridge facility. A value of blanks means that *CIFL* is taken from the bridge transaction profile definition, or a default value is used.

This is a request field used only for 3270 transactions. The length of this field is given by LNFACL. The initial value of this field is 4 blanks.

CIFLG (10-digit signed integer)

Flags.

The value must be:

CIFNON
No flags.

This is a request field. The initial value of this field is CIFNON.

CIFMT (8-byte character string)

IBM MQ format name of data that follows MQCIH.

This specifies the IBM MQ format name of the data that follows the MQCIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

This format name is also used for the reply message, if the *CIRFM* field has the value FMNONE.

- For DPL requests, *CIFMT* must be the format name of the COMMAREA.
- For 3270 requests, *CIFMT* must be CSQCBDCI, and *CIRFM* must be CSQCBDCO.

The data-conversion exits for these formats must be installed on the queue manager where they are to run.

If the request message results in the generation of an error reply message, the error reply message has a format name of FMSTR.

This is a request field. The length of this field is given by LNFMT. The initial value of this field is FMNONE.

CIFNC (4-byte character string)

IBM MQ call name or CICS EIBFN function.

The value returned in this field is dependent on *CIRET* ; see Table 690 on page 1023. The following values are possible when *CIFNC* contains an IBM MQ call name:

CFCONN
MQCONN call.

CFGET
MQGET call.

CFINQ
MQINQ call.

CFOPEN
MQOPEN call.

CFPUT
MQPUT call.

CFPUT1
MQPUT1 call.

CFNONE
No call.

This is a response field. The length of this field is given by LNFUNC. The initial value of this field is CFNONE.

CIGWI (10-digit signed integer)

Wait interval for MQGET call issued by bridge task.

This field is applicable only when *CIUOW* has the value CUFRST. It allows the sending application to specify the approximate time in milliseconds that the MQGET calls issued by the bridge should wait for second and subsequent request messages for the unit of work started by this message. This overrides the default wait interval used by the bridge. The following special values may be used:

WIDFLT
Default wait interval.

This causes the CICS bridge to wait for the period specified when the bridge was started.

WIULIM
Unlimited wait interval.

This is a request field. The initial value of this field is WIDFLT.

CIII (10-digit signed integer)

Reserved.

This is a reserved field. The value must be 0. This field is not present if *CIVER* is less than CIVER2.

CILEN (10-digit signed integer)

Length of MQCIH structure.

The value must be one of the following:

CILEN1
Length of version-1 CICS information header structure.

CILEN2
Length of version-2 CICS information header structure.

The following constant specifies the length of the current version:

CILENC
Length of current version of CICS information header structure.

This is a request field. The initial value of this field is CILEN2.

CILT (10-digit signed integer)

Link type.

This indicates the type of object that the bridge should try to link. The value must be one of the following:

LTPROG
DPL program.

LTTRAN
3270 transaction.

This is a request field. The initial value of this field is LTPROG.

CINTI (4-byte character string)

Next transaction to attach.

This is the name of the next transaction returned by the user transaction (typically by EXEC CICS RETURN TRANSID). If there is no next transaction, this field is set to blanks.

This is a response field used only for 3270 transactions. The length of this field is given by LNTRID. The initial value of this field is 4 blanks.

CIODL (10-digit signed integer)

Output COMMAREA data length.

This is the length of the user data to be returned to the client in a reply message. This length includes the 8-byte program name. The length of the COMMAREA passed to the linked program is the maximum of this field and the length of the user data in the request message, minus 8.

Note: The length of the user data in a message is the length of the message *excluding* the MQCIH structure.

If the length of the user data in the request message is smaller than *CIODL*, the DATALENGTH option of the LINK command is used; this allows the LINK to be function-shipped efficiently to another CICS region.

The following special value can be used:

OLINPT
Output length is same as input length.

This value might be needed even if no reply is requested, in order to ensure that the COMMAREA passed to the linked program is of sufficient size.

This is a request field used only for DPL programs. The initial value of this field OLINPT.

CIREA (10-digit signed integer)

IBM MQ reason or feedback code, or CICS EIBRESP2.

The value returned in this field is dependent on *CIRET* ; see Table 690 on page 1023.

This is a response field. The initial value of this field is RCNONE.

CIRET (10-digit signed integer)

Return code from bridge.

This is the return code from the CICS bridge describing the outcome of the processing performed by the bridge. The *CIFNC*, *CICC*, *CIREA*, and *CIAC* fields may contain additional information (see Table 690 on page 1023). The value is one of the following:

CRC000
(0, X'000') No error.

CRC001
(1, X'001') EXEC CICS statement detected an error.

CRC002
(2, X'002') IBM MQ call detected an error.

CRC003
(3, X'003') CICS bridge detected an error.

CRC004
(4, X'004') CICS bridge ended abnormally.

CRC005
(5, X'005') Application ended abnormally.

CRC006
(6, X'006') Security error occurred.

CRC007
(7, X'007') Program not available.

CRC008
(8, X'008') Second or later message within current unit of work not received within specified time.

CRC009
(9, X'009') Transaction not available.

This is a response field. The initial value of this field is CRC000.

CIRFM (8-byte character string)

IBM MQ format name of reply message.

This is the IBM MQ format name of the reply message that will be sent in response to the current message. The rules for coding this are the same as those for the *MDFMT* field in MQMD.

This is a request field used only for DPL programs. The length of this field is given by LNFMT. The initial value of this field is FMNONE.

CIRSI (4-byte character string)

Reserved.

This is a reserved field. The value must be 4 blanks. The length of this field is given by LNRSID.

CIRS1 (8-byte character string)

Reserved.

This is a reserved field. The value must be 8 blanks.

CIRS2 (8-byte character string)

Reserved.

This is a reserved field. The value must be 8 blanks.

CIRS3 (8-byte character string)

Reserved.

This is a reserved field. The value must be 8 blanks.

CIRS4 (10-digit signed integer)

Reserved.

This is a reserved field. The value must be 0. This field is not present if *CIVER* is less than CIVER2.

CIRTI (4-byte character string)

Reserved.

This is a reserved field. The value must be 4 blanks. The length of this field is given by LNTRID.

CISC (4-byte character string)

Transaction start code.

This is an indicator specifying whether the bridge emulates a terminal transaction or a START transaction. The value must be one of the following:

SCSTRT
Start.

SCDATA
Start data.

SCTERM
Terminate input.

SCNONE
None.

In the response from the bridge, this field is set to the start code appropriate to the next transaction ID contained in the *CINTI* field. The following start codes are possible in the response:

- SCSTRT

- SCDATA
- SCTERM

For CICS Transaction Server 1.2, this field is a request field only; its value in the response is undefined.

For CICS Transaction Server 1.3 and subsequent releases, this is both a request and a response field.

This field is used only for 3270 transactions. The length of this field is given by LNSTCO. The initial value of this field is SCNONE.

CISID (4-byte character string)

Structure identifier.

The value must be:

CISIDV
Identifier for CICS information header structure.

This is a request field. The initial value of this field is CISIDV.

CITES (10-digit signed integer)

Status at end of task.

This field shows the status of the user transaction at end of task. One of the following values is returned:

TENOSY
Not synchronized.

The user transaction has not yet completed and has not syncpointed. The *MDMT* field in MQMD is MTRQST in this case.

TECMIT
Commit unit of work.

The user transaction has not yet completed, but has syncpointed the first unit of work. The *MDMT* field in MQMD is MTDGRM in this case.

TEBACK
Back out unit of work.

The user transaction has not yet completed. The current unit of work will be backed out. The *MDMT* field in MQMD is MTDGRM in this case.

TEENDT
End task.

The user transaction has ended (or abended). The *MDMT* field in MQMD is MTRPLY in this case.

This is a response field used only for 3270 transactions. The initial value of this field is TENOSY.

CITI (4-byte character string)

Transaction to attach.

If *CILT* has the value LTTRAN, *CITI* is the transaction identifier of the user transaction to be run; a nonblank value must be specified in this case.

If *CILT* has the value LTPROG, *CITI* is the transaction code under which all programs within the unit of work are to be run. If the value specified is blank, the CICS DPL bridge default transaction code (CKBP) is used. If the value is nonblank, it must have been defined to CICS as a local TRANSACTION with an initial program of CSQCBP00. This field is applicable only when *CIUOW* has the value CUFRST or CUONLY.

This is a request field. The length of this field is given by LNTRID. The initial value of this field is 4 blanks.

CIUOW (10-digit signed integer)

Unit-of-work control.

This controls the unit-of-work processing performed by the CICS bridge. You can request the bridge to run a single transaction, or one or more programs within a unit of work. The field indicates whether the CICS bridge should start a unit of work, perform the requested function within the current unit of work, or end the unit of work by committing it or backing it out. Various combinations are supported, to optimize the data transmission flows.

The value must be one of the following:

CUONLY
Start unit of work, perform function, then commit the unit of work (DPL and 3270).

CUCONT
Additional data for the current unit of work (3270 only).

CUFRST
Start unit of work and perform function (DPL only).

CUMIDL
Perform function within current unit of work (DPL only).

CULAST
Perform function, then commit the unit of work (DPL only).

CUCMIT
Commit the unit of work (DPL only).

CUBACK
Back out the unit of work (DPL only).

This is a request field. The initial value of this field is CUONLY.

CIVER (10-digit signed integer)

Structure version number.

The value must be one of the following:

CIVER1
Version-1 CICS information header structure.

CIVER2
Version-2 CICS information header structure.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

CIVERC
Current version of CICS information header structure.

This is a request field. The initial value of this field is CIVER2.

Initial values

Table 691. Initial values of fields in MQCIH

Field name	Name of constant	Value of constant
CISID	CISIDV	'CIH¬'
CIVER	CIVER2	2
CILEN	CILEN2	180
CIENC	None	0
CICSI	None	0

Field name	Name of constant	Value of constant
CIFMT	FMNONE	Blanks
CIFLG	CIFNON	0
CIRET	CRC000	0
CICC	CCOK	0
CIREA	RCNONE	0
CIUOW	CUONLY	273
CIGWI	WIDFLT	-2
CILT	LTPROG	1
CIODL	OLINPT	-1
CIFKT	None	0
CIADS	ADNONE	0
CICT	CTNO	0
CITES	TENOSY	0
CIFAC	FCNONE	Nulls
CIFNC	CFNONE	Blanks
CIAC	None	Blanks
CIAUT	None	Blanks
CIRS1	None	Blanks
CIRFM	FMNONE	Blanks
CIRSI	None	Blanks
CIRTI	None	Blanks
CITI	None	Blanks
CIFL	None	Blanks
CIAI	None	Blanks
CISC	SCNONE	Blanks
CICNC	None	Blanks
CINTI	None	Blanks
CIRS2	None	Blanks
CIRS3	None	Blanks
CICP	None	0
CIEO	None	0
CIII	None	0
CIRS4	None	0

Table 691. Initial values of fields in MQCIH (continued)

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D* MQCIH Structure
     D*
     D* Structure identifier
     D  CISID                  1      4    INZ('CIH ')
     D* Structure version number
     D  CIVER                  5      8I 0 INZ(2)
     D* Length of MQCIH structure
     D  CILEN                  9     12I 0 INZ(180)
     D* Reserved
     D  CIENC                 13     16I 0 INZ(0)
     D* Reserved
     D  CICSI                 17     20I 0 INZ(0)
     D* MQ format name of data that followsMQCIH
     D  CIFMT                 21     28    INZ('        ')
     D* Flags
     D  CIFLG                 29     32I 0 INZ(0)
     D* Return code from bridge
     D  CIRET                 33     36I 0 INZ(0)
     D* MQ completion code or CICSEIBRESP
     D  CICC                  37     40I 0 INZ(0)
     D* MQ reason or feedback code, or CICSEIBRESP2
     D  CIREA                 41     44I 0 INZ(0)
     D* Unit-of-work control
     D  CIUOW                 45     48I 0 INZ(273)
     D* Wait interval for MQGET call issuedby bridge task
     D  CIGWI                 49     52I 0 INZ(-2)
     D* Link type
     D  CILT                  53     56I 0 INZ(1)
     D* Output COMMAREA data length
     D  CIODL                 57     60I 0 INZ(-1)
     D* Bridge facility release time
     D  CIFKT                 61     64I 0 INZ(0)
     D* Send/receive ADS descriptor
     D  CIADS                 65     68I 0 INZ(0)
     D* Whether task can beconversational
     D  CICT                  69     72I 0 INZ(0)
     D* Status at end of task
     D  CITES                 73     76I 0 INZ(0)
     D* Bridge facility token
     D  CIFAC                 77     84    INZ(X'00000000000000-
     D                                     00')
     D* MQ call name or CICS EIBFNfunction
     D  CIFNC                 85     88    INZ('    ')
     D* Abend code
     D  CIAC                  89     92    INZ
     D* Password or passticket
     D  CIAUT                 93    100    INZ
     D* Reserved
     D  CIRS1                101    108    INZ
     D* MQ format name of reply message
     D  CIRFM                109    116    INZ('        ')
     D* Remote CICS system ID to use
     D  CIRSI                117    120    INZ
     D* CICS RTRANSID to use
     D  CIRTI                121    124    INZ
     D* Transaction to attach
     D  CITI                 125    128    INZ
     D* Terminal emulated attributes
     D  CIFL                 129    132    INZ
     D* AID key
     D  CIAI                 133    136    INZ
     D* Transaction start code
     D  CISC                 137    140    INZ('    ')
     D* Abend transaction code
     D  CICNC                141    144    INZ
     D* Next transaction to attach
     D  CINTI                145    148    INZ
     D* Reserved
     D  CIRS2                149    156    INZ
     D* Reserved
     D  CIRS3                157    164    INZ
     D* Cursor position
     D  CICP                 165    168I 0 INZ(0)
```

```
D* Offset of error in message
D  CIEO                 169    172I 0 INZ(0)
D* Reserved
D  CIII                 173    176I 0 INZ(0)
D* Reserved
D  CIRS4                177    180I 0 INZ(0)
D*
```

IBM i MQCMHO (Create message handle options) on IBM i

The **MQCMHO** structure allows applications to specify options that control how message handles are created.

Overview

Purpose
: The structure is an input parameter on the **MQCRTMH** call.

Character set and encoding
: Data in **MQCMHO** must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1034
- "Initial values" on page 1036
- "RPG declaration" on page 1036

Fields

The MQCMHO structure contains the following fields; the fields are described in alphabetical order:

CMOPT (10 digit signed integer)

One of the following options can be specified:

CMVAL

When **MQSETMP** is called to set a property in this message handle, the property name is validated to ensure that it:

- contains no invalid characters.
- does not begin "JMS" or "usr.JMS" except for the following:
  - JMSCorrelationID
  - JMSReplyTo
  - JMSType
  - JMSXGroupID
  - JMSXGroupSeq

  These names are reserved for JMS properties.
- is not one of the following keywords, in any mixture of upper or lowercase:
  - "AND"
  - "BETWEEN"
  - "ESCAPE"
  - "FALSE"
  - "IN"
  - "IS"
  - "LIKE"
  - "NOT"

- "NULL"
- "OR"
- "TRUE"

- does not begin "Body." or "Root." (except for "Root.MQMD.").

If the property is MQ-defined ("mq.*") and the name is recognized, the property descriptor fields are set to the correct values for the property. If the property is not recognized, the *Support* field of the property descriptor is set to **PDSUPO** (for more information, see PDSUP).

CMDEFV

This specifies that the default level of validation of property names occurs.

The default level of validation is equivalent to that specified by **CMVAL**.

In a future release an administrative option might be defined which will change the level of validation that will occur when **CMDEFV** is defined.

This is the default value.

CMNOVA

No validation on the property name occurs. See the description of **CMVAL**.

Default option: If none of the options previously described in this section is required, the following option can be used:

CMNONE

All options assume their default values. Use this value to indicate that no other options have been specified. **CMNONE** aids program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

This is always an input field. The initial value of this field is **CMDEFV**.

CMSID (10 digit signed integer)

This is the structure identifier; the value must be:

CMSIDV
Identifier for create message handle options structure.

This is always an input field. The initial value of this field is **CMSIDV**.

CMVER (10 digit signed integer)

This is the structure version number; the value must be:

CMVER1
Version-1 create message handle options structure.

The following constant specifies the version number of the current version:

CMVERC
Current version of create message handle options structure.

This is always an input field. The initial value of this field is **CMVER1**.

Initial values

Table 692. Initial values of fields in MQCMHO

Field name	Name of constant	Value of constant
CMSID	CMSIDV	'CMHO'
CMVER	CMVER1	1
CMOPT	CMDEFV	0

RPG declaration

```
     D* MQCMHO Structure
     D*
     D*
     D* Structure identifier
     D  CMSID                  1      4    INZ('CMHO')
     D*
     D* Structure version number
     D  CMVER                  5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQCRTMH
     D  CMOPT                  9     12I 0 INZ(0)
```

IBM i MQCNO (Connect options) on IBM i

The MQCNO structure allows the application to specify options relating to the connection to the local queue manager.

Overview

Purpose: The structure is an input/output parameter on the MQCONNX call.

Version: The current version of MQCNO is CNVER6. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQCNO that is supported by the environment, but with the initial value of the CNVER field set to CNVER1. To use fields that are not present in the version-1 structure, the application must set the CNVER field to the version number of the version required.

Character set and encoding: Data in MQCNO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

- "Fields" on page 1036
- "Initial values" on page 1041
- "RPG declaration" on page 1042

Fields

The MQCNO structure contains the following fields; the fields are described in **alphabetical order**:

CCDTUL (10-digit signed integer)

CCDTUL is the length of the string identified by either CCDTUP or CCDTUO which contains a URL that identifies the location of the client connection channel table to use for the connection.

Use CCDTUL only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, CCDTUL is ignored.

This field is ignored if CNVER is less than CNVER6.

CCDTUO (10-digit signed integer)

CCDTUO is the offset in bytes, from the start of the MQCNO structure, to a string which contains a URL that identifies the location of the client connection channel table to use for the connection. The offset can be positive or negative.

Use CCDTUL only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

Important: You can use only one of CCDTUP and CCDTUO. The call fails with reason code RC2600 if both fields are nonzero.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, CCDTUO is ignored.

This field is ignored if CNVER is less than CNVER6.

CCDTUP (pointer)

CCDTUP is an optional pointer to a string which contains a URL, to identify the location of the client connection channel table to use for the connection..

Use CCDTUP only when the application issuing the MQCONNX call is running as an IBM MQ MQI client.

Important: You can use only one of CCDTUP and CCDTUO. The call fails with reason code RC2600 if both fields are nonzero.

This is a programmatic alternative to setting the MQCHLLIB and MQCHLTAB environment variables.

If the application is not running as an client, CCDTUP is ignored.

This field is ignored if CNVER is less than CNVER6.

CNCCO (10-digit signed integer)

This is the offset in bytes of an MQCD channel definition structure from the start of the MQCNO structure.

CNCCP (pointer)

This is a pointer to an MQCD channel definition structure.

CNCONID (24-byte character string)

Unique connection identifier. This field allows the queue manager to reliably identify an application process by assigning it a unique identifier when it first connects to the queue manager.

Applications use the connection identifier for correlation purposes when making PUT and GET calls. All connections are assigned an identifier by the queue manager, no matter how the connection was established.

It is possible to use the connection identifier to force the end of a long running unit of work. To do this, specifying the connection identifier using the PCF command 'Stop Connection', or the MQSC command STOP CONN. For more information about using these commands, see the related links.

The initial value of the field is 24 null bytes.

CNCT (128-byte bit string)

This is a tag that the queue manager associates with the resources that are affected by the application during this connection.

Queue manager connection tag.

Each application or application instance must use a different value for the tag, so that the queue manager can correctly serialize access to the affected resources. See the descriptions of the CN*CT* options for further details. The tag ceases to be valid when the application terminates, or issues the MQDISC call.

Use the following special value if no tag is required:

CTNONE

No connection tag specified.

The value is binary zero for the length of the field.

This is an input field. The length of this field is given by LNCTAG. The initial value of this field is CTNONE. This field is ignored if CNVER is less than CNVER3.

Use the field ConnTag when connecting to a z/OS queue manager.

CNOPT (10 digit signed integer)

Options that control the action of MQCONNX.

Binding options

The binding options control the type of IBM MQ binding that is used; specify only one of these options:

CNSBND

Standard binding.

The standard binding option causes the application and the local queue manager agent to run in separate units of execution, typically in separate processes. The arrangement maintains the integrity of the queue manager; that is, it protects the queue manager from errant programs.

Use CNSBND in situations where the application might not have been fully tested, or might be unreliable or untrustworthy. CNSBND is the default.

CNSBND is defined to aid program documentation. Do not use this option with any other option controlling the type of binding used; but because its value is zero, such use cannot be detected.

This option is supported in all environments.

CNFBND

Fast path binding.

The fast path binding option causes the application and the local queue manager agent to be part of the same unit of execution. Fast path is in contrast to the standard binding, where the application and the local queue manager agent run in separate units of execution.

CNFBND is ignored if the queue manager does not support this type of binding; processing continues as though the option had not been specified.

CNFBND can be of advantage in situations where multiple processes consume more resources than the overall resource used by the application. An application that uses the fast path binding is known as a *trusted application*.

Consider the following important points when deciding whether to use the fast path binding:

- **Using the CNFBND option does not prevent an application altering or corrupting messages and other data areas belonging to the queue manager. Use this option only in situations where you have fully evaluated these issues.**
- The application must not use asynchronous signals or timer interrupts (such as sigkill) with CNFBND. There are also restrictions on the use of shared memory segments.
- The application must not have more than one thread connected to the queue manager at any one time.
- The application must use the MQDISC call to disconnect from the queue manager.
- The application must finish before ending the queue manager with the endmqm command.

The following points apply to the use of CNFBND in the environments indicated:

- On IBM i, the job must run under user profile QMQM that belongs to the QMQMADM group. Also, the program must not terminate abnormally, otherwise unpredictable results might occur.

For more information about the implications of using trusted applications, see Connecting to a queue manager using the MQCONNX call and Restrictions for trusted applications.

CNSHBD
Shared Bindings.

The shared bindings option causes the application and the local queue manager agent to run in separate units of execution, typically in separate processes. The arrangement maintains the integrity of the queue manager; that is, it protects the queue manager from errant programs. However some resources are shared between the application and the local queue manager agent. CNSHBD is ignored if the queue manager does not support this type of binding. Processing continues as though the option had not been specified.

CNIBND
Isolated Bindings.

The isolated bindings option causes the application and the local queue manager agent to run in separate units of execution, typically in separate processes. The arrangement maintains the integrity of the queue manager; that is, it protects the queue manager from errant programs. The application process and the local queue manager agent are isolated from each other in that they do not share resources. CNIBND is ignored if the queue manager does not support this type of binding. Processing continues as though the option had not been specified.

Handle-sharing options

The following options control the sharing of handles between different threads (units of parallel processing) within the same process. Only one of these options can be specified.

CNHSN
No handle sharing between threads.

The no handle sharing between threads option indicates that connection and object handles can be used only by the thread that caused the handle to be allocated; that is, the thread that issued the MQCONN, MQCONNX, or MQOPEN call. The handles cannot be used by other threads belonging to the same process.

CNHSB
Serial handle sharing between threads, with call blocking.

The serial handle sharing between threads, with call blocking, option indicates that connection and object handles allocated by one thread of a process can be used by other threads belonging to the same process. However, only one thread at a time can use any particular handle, that is, only serial use of a handle is permitted. If a thread tries to use a handle that is already in use by another thread, the call blocks (waits) until the handle becomes available.

CNHSNB
Serial handle sharing between threads, without call blocking.

The serial handle sharing between threads, without call blocking, option is the same as the " *with* blocking" option, except that, if the handle is in use by another thread, the call completes immediately with CCFAIL and RC2219 instead of blocking until the handle becomes available.

A thread can have zero or one nonshared handles, plus zero or more shared handles:

- Each MQCONN or MQCONNX call that specifies CNHSN returns a new nonshared handle on the first call, and the same nonshared handle on subsequent calls (assuming no intervening MQDISC call). The reason code is RC2002 for the second and later calls.
- Each MQCONNX call that specifies CNHSB or CNHSNB returns a new shared handle on each call.

Object handles inherit the same sharing properties as the connection handle specified on the MQOPEN call that created the object handle. Also, units of work inherit the same sharing properties as the connection handle used to start the unit of work; if the unit of work is started

in one thread using a shared handle, the unit of work can be updated in another thread using the same handle.

If you do not specify a handle-sharing option, the default is determined by the environment:

- In the Microsoft Transaction Server (MTS) environment, the default is the same as CNHSB.
- In other environments, the default is the same as CNHSN.

Reconnection options

Reconnection options determine if a connection is reconnectable. Only client connections are reconnectable.

CNRCDF
The reconnection option is resolved to its default value. If no default is set, the value of this option resolves to DISABLED. The value of the option is passed to the server, and can be queried by **PCF** and **MQSC**.

CNRC
The application can be reconnected to any queue manager consistent with the value of the MQCONNX **QMNAME** parameter. Use the CNRC option only if there is no affinity between the client application and the queue manager with which it initially established a connection. The value of the option is passed to the server, and can be queried by **PCF** and **MQSC**.

CNRCD
The application cannot be reconnected. The value of the option is not passed to the server.

CNRCQM
The application can only be reconnected to the queue manager with which it originally connected. Use this value if a client can be reconnected, but there is an affinity between the client application, and the queue manager with which it originally established a connection. Choose this value if you want a client to automatically reconnect to the standby instance of a highly available queue manager. The value of the option is passed to the server, and can be queried by **PCF** and **MQSC**.

Use the options CNRC, CNRCD, and CNRCQM only for client connections. If the options are used for a binding connection, MQCONNX fails with completion code, MQCC_FAILED and reason code, MQRC_OPTIONS_ERROR.

Default option: If none of the options described is required, the following option can be used:

CNNONE
No options are specified.

CNNONE is defined to aid program documentation. It is not intended that this option is used with any other CN* option, but because its value is zero, such use cannot be detected.

CNSCO (10-digit signed integer)

This is the offset in bytes of an MQSCO structure from the start of the MQCNO structure.

This field is ignored if CNVER is less than CNVER4.

CNSCP (pointer)

This is the address of an MQSCO structure.

This field is ignored if CNVER is less than CNVER4.

CNSECPO (10-digit signed integer)

Security parameters offset. The offset of the MQCSP structure used for specifying a user ID and password.

The value may be positive or negative. The initial value of this field is 0.

This field is ignored if CNVER is less than CNVER5.

CNSECPP (pointer)

Security parameters pointer. Address of the MQCSP structure used for specifying a user ID and a password.

The initial value of this field is a null pointer or null bytes.

This field is ignored if CNVER is less than CNVER5.

CNSID (4-byte character string)

The structure identifier for the MQCNO structure.

The value must be:

CNSIDV
Identifier for connect-options structure.

This is always an input field. The initial value of this field is CNSIDV.

CNVER (10-digit signed integer)

The structure version number for the MQCNO structure.

The value must be:

CNVER6
Version-6 connect-options structure.

This version is supported in all environments.

V 9.1.2 **CNVER7**
Version-7 connect-options structure.

This version is supported in all environments.

The following constant specifies the version number of the current version:

CNVERC
Current version of connect-options structure.

V 9.1.2 This is always an input field. The initial value of this field is CNVER7.

Initial values

Table 693. Initial values of fields in MQCNO

Field name	Name of constant	Value of constant
CNSID	CNSIDV	'CNO¬
CNVER	CNVER5	1
CNOPT	CNNONE	0
CNCCO	None	0
CNCCP	None	Null pointer or null bytes
CNCT	CTNONE	Nulls
CNSCP	None	Null pointer or null bytes
CNSCO	None	0
CNCONID	None	Nulls
CNSECPO	None	0
CNSECPP	None	Null pointer or null bytes

Table 693. Initial values of fields in MQCNO (continued)		
Field name	**Name of constant**	**Value of constant**
CCDTUL	None	0
CCDTUO	None	0
CCDTUP	None	Null pointer or null bytes

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*****************************************************************
     D**                                                              **
     D**                  IBM MQ for IBM i                            **
     D**                                                              **
     D**  FILE NAME:      CMQCNOG                                     **
     D**                                                              **
     D**  DESCRIPTION:    MQCNO Structure -- Connect Options          **
     D**                                                              **
     D*****************************************************************
     D**  <N_OCO_COPYRIGHT>                                           **
     D**  Licensed Materials - Property of IBM                        **
     D**                                                              **
     D**  5724-H72                                                    **
     D**  (c) Copyright IBM Corp. 1993, 2024. All Rights Reserved.    **
     D**                                                              **
     D**  US Government Users Restricted Rights - Use, duplication or **
     D**  disclosure restricted by GSA ADP Schedule Contract with     **
     D**  IBM Corp.                                                   **
     D**  <NOC_COPYRIGHT>                                             **
     D*****************************************************************
     D**                                                              **
     D**  FUNCTION:       This file declares the structure MQCNO,     **
     D**                  which is used by the main MQI.              **
     D**                                                              **
     D**  PROCESSOR:      RPG (ILE)                                   **
     D**                                                              **
     D*****************************************************************
     D*
     D*
     D*****************************************************************
     D** <BEGIN_BUILDINFO>                                            **
     D** Generated on:  08/02/16 13:50                                **
     D** Build Level:   L000000                                       **
     D** Build Type:    Production                                    **
     D** Pointer Size:  128 Bit                                       **
     D** Source File:                                                 **
     D** CMQCNOG                                                      **
     D** <END_BUILDINFO>                                              **
     D*****************************************************************
     D*
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D*
     D* MQCNO Structure
     D*
     D* Structure identifier
     D  CNSID                  1      4    INZ('CNO ')
     D* Structure version number
     D  CNVER                  5      8I 0 INZ(1)
     D* Options that control the action of MQCONNX
     D  CNOPT                  9     12I 0 INZ(0)
     D* Ver:1 **
     D* Offset of MQCD structure for client connection
     D  CNCCO                 13     16I 0 INZ(0)
     D* Address of MQCD structure for client connection
     D  CNCCP                 17     32*   INZ(*NULL)
     D* Ver:2 **
     D* Queue managerconnection tag
     D  CNCT                  33    160    INZ(X'0000000000000000-
     D                                     000000000000000000000000-
     D                                     000000000000000000000000-
```

```
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     0000000000000000000000000-
     D                                     00000000000000')
     D* Ver:3 **
     D* Address of MQSCO structure for client connection
     D  CNSCP                161    176*   INZ(*NULL)
     D* Offset of MQSCO structure for client connection
     D  CNSCO                177    180I 0 INZ(0)
     D* Ver:4 **
     D* Unique Connection Identifier
     D  CNCONID              181    204    INZ(X'00000000000000000-
     D                                     0000000000000000000000000-
     D                                     000000')
     D* Offset of MQCSP structure
     D  CNSECPO              205    208I 0 INZ(0)
     D* Address of MQCSP structure
     D  CNSECPP              209    224*   INZ(*NULL)
     D* Ver:5 **
     D* Address of CCDT URL string
     D  CNCCDTUP             225    240*   INZ(*NULL)
     D* Offset of CCDT URL string
     D  CNCCDTUO             241    244I 0 INZ(0)
     D* Length of CCDT URL
     D  CNCCDTUL             245    248I 0 INZ(0)
     D* Ver:6 **
     D*
     D*****************************************************************
     D**  End of CMQCNOG                                             **
     D*****************************************************************
```

IBM i MQCSP (Security parameters) on IBM i

Summary of the MQCSP structure for IBM i.

Overview

Purpose: The MQCSP structure enables the authorization service to authenticate a user ID and password. You specify the MQCSP connection security parameters structure on an MQCONNX call.

Character set and encoding: Data in MQCSP must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

- "Fields" on page 1043
- "Initial values" on page 1045
- "RPG declaration" on page 1045

Fields

The MQCSP structure contains the following fields; the fields are described in **alphabetical order**:

CSAUTHT (10-digit signed integer)

This is the type of authentication to perform.

Valid values are:

CSAN
Do not use user ID and password fields.

CSAUIAP
Authenticate user ID and password fields.

This is an input field. The initial value of this field is CSAN.

CSCPPL (10-digit signed integer)

This is the length of the password to be used in authentication.

The maximum length of the password is not dependent on the platform. If the length of the password is greater than that allowed, the authentication request fails with an RC2035.

This is an input field. The initial value of this field is 0.

CSCPPO (10-digit signed integer)

This is the offset in bytes of the password to be used in authentication.

The offset can be positive or negative.

This is an input field. The initial value of this field is 0.

CSCPPP (pointer)

This is the address of the password to be used in authentication.

This is an input field. The initial value of this field is the null pointer.

CSCSPUIL (10-digit signed integer)

This is the length of the user ID to be used in authentication.

The maximum length of the user ID is not dependent on the platform. If the length of the user ID is greater than that allowed, the authentication request fails with an RC2035.

This is an input field. The initial value of this field is 0.

CSCSPUIO (10-digit signed integer)

This is the offset in bytes of the user ID to be used in authentication.

The offset can be positive or negative.

This is an input field. The initial value of this field is 0.

CSCSPUIP (pointer)

This is the address of the user ID to be used in authentication.

This is an input field. The initial value of this field is the null pointer. This field is ignored if CSVER is less than CSVER5.

CSRE1 (4-byte character string)

A reserved field, required for pointer alignment on IBM i.

This is an input field. The initial value of this field is all null.

CSRS2 (8-byte character string)

A reserved field, required for pointer alignment on IBM i.

This is an input field. The initial value of this field is all null.

CSSID (4-byte character string)

Structure identifier.

The value must be:

CSSIDV
Identifier for the security parameters structure.

CSVER (10-digit signed integer)

Structure version number.

The value must be:

CSVER1
Version-1 security parameters structure.

The following constant specifies the version number of the current version:

CSVERC
Current version of security parameters structure.

This is always an input field. The initial value of this field is CSVER1.

Initial values

Table 694. Initial values of fields in MQCNO

Field name	Name of constant	Value of constant
CSSID	CSSIDV	'CSP¬'
CSVER	CSVER1	1
CSAUTHT	None	0
CSRE1	None	Nulls
CSCSPUIP	None	Null pointer
CSCSPUIO	None	0
CSCSPUIL	None	0
CSRS2	None	Nulls
CSCPPP	None	Null pointer
CSCPPO	None	0
CSCPPL	None	0

Note:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
      D*
      D* MQCSP Structure
      D*
      D* Structure identifier
      D  CSSID                  1      4    INZ('CSP ')
      D* Structure version number
      D  CSVER                  5      8I 0 INZ(1)
      D* Type of authentication
      D  CSAUTHT                9     12I 0 INZ(0)
      D* Reserved
      D  CSRE1                 13     16    INZ(X'00000000')
      D* Address of user ID
      D  CSCSPUIP              17     32*   INZ(*NULL)
      D* Offset of user ID
      D  CSCSPUIO              33     36I 0 INZ(0)
      D* Length of user ID
      D  CSCSPUIL              37     40I 0 INZ(0)
      D* Reserved
      D  CSRS2                 41     48    INZ(X'0000000000000000')
      D* Address of password
      D  CSCPPP                49     64*   INZ(*NULL)
      D* Offset of password
      D  CSCPPO                65     68I 0 INZ(0)
      D* Length of password
      D  CSCPPL                69     72I 0 INZ(0)
```

IBM i MQCTLO (Control callback options structure) on IBM i

Structure specifying the control callback function.

Overview

Purpose
The MQCTLO structure is used to specify options relating to a control callbacks function.

The structure is an input and output parameter on the MQCTL call.

Version
The current version of MQCTLO is CTLV1.

Character set and encoding
Data in MQCTLO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

- "Fields" on page 1046
- "Initial values" on page 1047
- "RPG declaration" on page 1047

Fields

The MQCTLO structure contains the following fields; the fields are described in alphabetical order:

COCONNAREA (10 digit signed integer)

Control options structure - ConnectionArea field.

This is a field that is available for the callback function to use.

The queue manager makes no decisions based on the contents of this field and it is passed unchanged from the CBCCONNAREA field in the MQCBC structure, which is a parameter on the MQCB call.

This field is ignored for all operations other than CTLSR and CTLSW.

This is an input and output field to the callback function. The initial value of this field is a null pointer or null bytes.

COOPT (10 digit signed integer)

Options that control the action of MQCTLO.

CTLFQ
Force the MQCTLO call to fail if the queue manager or connection is in the quiescing state.

Specify GMFIQ, in the MQGMO options passed on the MQCB call, to cause notification to message consumers when they are quiescing.

CTLTHR
This option informs the system that the application requires that all message consumers, for the same connection, are called on the same thread.

Default option: If you do not need any of the options described, use the following option:

CTLNO
Use this value to indicate that no other options have been specified; all options assume their default values. CTLNO is defined to aid program documentation; it is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of the *COOPT* field is CTLNO.

CORSV (10 digit signed integer)

This is a reserved field. The initial value of this field is a blank character.

COSID (10 digit signed integer)

Control options structure - StrucId field.

This is the structure identifier; the value must be:

CTLSI
Identifier for Control Options structure.

This is always an input field. The initial value of this field is CTLSI.

COVER (10 digit signed integer)

Control options structure - Version field.

This is the structure version number; the value must be:

CTLV1
Version-1 Control options structure.

The following constant specifies the version number of the current version:

CTLCV
Current version of Control options structure.

This is always an input field. The initial value of this field is CTLV1.

Initial values

Table 695. Initial values of fields in MQCTLO

Field name	Name of constant	Value of constant
COSID	CTLSI	'CTLO'
COVER	CTLV1	1
COOPT	CTLNO	Nulls
CORSV	Reserved field	
COCONNAREA	None	Null pointer or null bytes

RPG declaration

```
     D* MQCTLO Structure
     D*
     D*
     D* Structure identifier
     D  COSID                  1      4    INZ('CTLO')
     D*
     D* Structure version number
     D  COVER                  5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQCTL
     D  COOPT                  9     12I 0 INZ(0)
     D*
     D* Reserved
     D  CORSV                 13     16I 0 INZ(-1)
     D*
     D* MQCTL Data area passed to the function
     D  COCONNAREA            17     32*   INZ(*NULL)
```

IBM i MQDH (Distribution header) on IBM i

The MQDH structure describes the additional data that is present in a message when that message is a distribution-list message stored on a transmission queue.

Overview

Purpose: A distribution-list message is a message that is sent to multiple destination queues. The additional data consists of the MQDH structure followed by an array of MQOR records and an array of MQPMR records.

This structure is for use by specialized applications that put messages directly on transmission queues, or which remove messages from transmission queues (for example: message channel agents).

This structure should not be used by normal applications which simply want to put messages to distribution lists. Those applications should use the MQOD structure to define the destinations in the distribution list, and the MQPMO structure to specify message properties or receive information about the messages sent to the individual destinations.

Character set and encoding: Data in MQDH must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT for the C programming language.

The character set and encoding of the MQDH must be set into the *MDCSI* and *MDENC* fields in:

- The MQMD (if the MQDH structure is at the start of the message data), or
- The header structure that precedes the MQDH structure (all other cases).

Usage: When an application puts a message to a distribution list, and some or all of the destinations are remote, the queue manager prefixes the application message data with the MQXQH and MQDH structures, and places the message on the relevant transmission queue. The data therefore occurs in the following sequence when the message is on a transmission queue:

- MQXQH structure
- MQDH structure plus arrays of MQOR and MQPMR records
- Application message data

Depending on the destinations, more than one such message might be generated by the queue manager, and placed on different transmission queues. In this case, the MQDH structures in those messages identify different subsets of the destinations defined by the distribution list opened by the application.

An application that puts a distribution-list message directly on a transmission queue must conform to the sequence described previously, and must ensure that the MQDH structure is correct. If the MQDH structure is not valid, the queue manager may choose to fail the MQPUT or MQPUT1 call with reason code RC2135.

Messages can be stored on a queue in distribution-list form only if the queue is defined as being able to support distribution list messages (see the **DistLists** queue attribute described in "Attributes for queues" on page 1353). If an application puts a distribution-list message directly on a queue that does not support distribution lists, the queue manager splits the distribution list message into individual messages, and places those on the queue instead.

- "Fields" on page 1048
- "Initial values" on page 1051
- "RPG declaration" on page 1052

Fields

The MQDH structure contains the following fields; the fields are described in **alphabetical order**:

DHCNT (10-digit signed integer)

Number of MQOR records present.

This defines the number of destinations. A distribution list must always contain at least one destination, so *DHCNT* must always be greater than zero.

The initial value of this field is 0.

DHCSI (10-digit signed integer)

Character set identifier of data that follows the MQOR and MQPMR records.

This specifies the character set identifier of the data that follows the arrays of MQOR and MQPMR records; it does not apply to character data in the MQDH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT
Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

DHENC (10-digit signed integer)

Numeric encoding of data that follows the MQOR and MQPMR records.

This specifies the numeric encoding of the data that follows the arrays of MQOR and MQPMR records; it does not apply to numeric data in the MQDH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is 0.

DHFLG (10-digit signed integer)

General flags.

The following flag can be specified:

DHFNEW
Generate new message identifiers.

This flag indicates that a new message identifier is to be generated for each destination in the distribution list. This can be set only when there are no put-message records present, or when the records are present but they do not contain the *PRMID* field.

Using this flag defers generation of the message identifiers until the last possible moment, namely the moment when the distribution-list message is finally split into individual messages. This minimizes the amount of control information that must flow with the distribution-list message.

When an application puts a message to a distribution list, the queue manager sets DHFNEW in the MQDH it generates when both of the following statements are true:

- There are no put-message records provided by the application, or the records provided do not contain the *PRMID* field.
- The *MDMID* field in MQMD is MINONE, or the *PMOPT* field in MQPMO includes PMNMID

If no flags are needed, the following can be specified:

DHFNON
No flags.

This constant indicates that no flags have been specified. DHFNON is defined to aid program documentation. It is not intended that this constant is used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is DHFNON.

DHFMT (8-byte character string)

Format name of data that follows the MQOR and MQPMR records.

This specifies the format name of the data that follows the arrays of MQOD and MQPMR records (whichever occurs last).

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The initial value of this field is FMNONE.

DHLEN (10-digit signed integer)

Length of MQDH structure plus following MQOR and MQPMR records.

This is the number of bytes from the start of the MQDH structure to the start of the message data following the arrays of MQOR and MQPMR records. The data occurs in the following sequence:

- MQDH structure
- Array of MQOR records
- Array of MQPMR records
- Message data

The arrays of MQOR and MQPMR records are addressed by offsets contained within the MQDH structure. If these offsets result in unused bytes between one or more of the MQDH structure, the arrays of records, and the message data, those unused bytes must be included in the value of *DHLEN*, but the content of those bytes is not preserved by the queue manager. It is valid for the array of MQPMR records to precede the array of MQOR records.

The initial value of this field is 0.

DHORO (10-digit signed integer)

Offset of first MQOR record from start of MQDH.

This field gives the offset in bytes of the first record in the array of MQOR object records containing the names of the destination queues. There are *DHCNT* records in this array. These records (plus any bytes skipped between the first object record and the previous field) are included in the length given by the *DHLEN* field.

A distribution list must always contain at least one destination, so *DHORO* must always be greater than zero.

The initial value of this field is 0.

DHPRF (10-digit signed integer)

Flags indicating which MQPMR fields are present.

Zero or more of the following flags can be specified:

PFMID
Message-identifier field is present.

PFCID
Correlation-identifier field is present.

PFGID
Group-identifier field is present.

PFFB
Feedback field is present.

PFACC
Accounting-token field is present.

If no MQPMR fields are present, the following can be specified:

PFNONE
No put-message record fields are present.

PFNONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is PFNONE.

DHPRO (10-digit signed integer)

Offset of first MQPMR record from start of MQDH.

This field gives the offset in bytes of the first record in the array of MQPMR put message records containing the message properties. If present, there are *DHCNT* records in this array. These records (plus any bytes skipped between the first put message record and the previous field) are included in the length given by the *DHLEN* field.

Put message records are optional; if no records are provided, *DHPRO* is zero, and *DHPRF* has the value PFNONE.

The initial value of this field is 0.

DHSID (4-byte character string)

Structure identifier.

The value must be:

DHSIDV
Identifier for distribution header structure.

The initial value of this field is DHSIDV.

DHVER (10-digit signed integer)

Structure version number.

The value must be:

DHVER1
Version number for distribution header structure.

The following constant specifies the version number of the current version:

DHVERC
Current version of distribution header structure.

The initial value of this field is DHVER1.

Initial values

Table 696. Initial values of fields in MQDH

Field name	Name of constant	Value of constant
DHSID	DHSIDV	'DH¬¬'
DHVER	DHVER1	1
DHLEN	None	0
DHENC	None	0
DHCSI	CSUNDF	0
DHFMT	FMNONE	Blanks

Field name	Name of constant	Value of constant
DHFLG	DHFNON	0
DHPRF	PFNONE	0
DHCNT	None	0
DHORO	None	0
DHPRO	None	0

Table 696. Initial values of fields in MQDH (continued)

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D* MQDH Structure
     D*
     D* Structure identifier
     D  DHSID                  1      4    INZ('DH  ')
     D* Structure version number
     D  DHVER                  5      8I 0 INZ(1)
     D* Length of MQDH structure plusfollowing MQOR and MQPMR records
     D  DHLEN                  9     12I 0 INZ(0)
     D* Numeric encoding of data that followsthe MQOR and MQPMR records
     D  DHENC                 13     16I 0 INZ(0)
     D* Character set identifier of data thatfollows the MQOR and MQPMR
     D* records
     D  DHCSI                 17     20I 0 INZ(0)
     D* Format name of data that follows theMQOR and MQPMR records
     D  DHFMT                 21     28    INZ('        ')
     D* General flags
     D  DHFLG                 29     32I 0 INZ(0)
     D* Flags indicating which MQPMR fieldsare present
     D  DHPRF                 33     36I 0 INZ(0)
     D* Number of MQOR records present
     D  DHCNT                 37     40I 0 INZ(0)
     D* Offset of first MQOR record from startof MQDH
     D  DHORO                 41     44I 0 INZ(0)
     D* Offset of first MQPMR record fromstart of MQDH
     D  DHPRO                 45     48I 0 INZ(0)
```

IBM i MQDLH (Dead-letter header) on IBM i

Overview

Purpose

The MQDLH structure describes the information that prefixes the application message data of messages on the dead-letter (undelivered-message) queue. A message can arrive on the dead-letter queue because the queue manager or message channel agent redirected it to the queue. An application might put the message directly on the queue.

Format name

FMDLH

Character set and encoding

The MQDLH might be at the start of the application message data. If so, the fields in the MQDLH structure are in the character set and encoding given by the MDCSI and MDENC fields. If not, the character set and encoding are set by the MDCSI and MDENC fields in the header structure that precedes the MQDLH.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

Usage

Applications that put messages directly on the dead-letter queue must prefix the message data with an MQDLH structure, and initialize the fields with appropriate values. However, the queue manager does not require that an MQDLH structure is present, or that valid values are specified for the fields.

If a message is too long to put on the dead-letter queue, the application must consider doing one of the following things:

- Truncate the message data to fit on the dead-letter queue.
- Record the message on auxiliary storage and place an exception report message on the dead-letter queue indicating the message is too long.
- Discard the message and return an error to its originator. If the message is a critical message. Discard the message only if it is known that the originator still has a copy of the message. For example, a message received by a message channel agent from a communication channel.

Which of the choices is appropriate depends on the design of the application.

The queue manager performs special processing when a message which is a segment is put with an MQDLH structure at the front. See the description of the MQMDE structure for further details.

- “Putting messages on the dead-letter queue” on page 1053
- “Getting messages from the dead-letter queue” on page 1054
- “Fields” on page 1054
- “Initial values” on page 1057
- “RPG declaration” on page 1058

Putting messages on the dead-letter queue

If a message is put on the dead-letter queue, the MQMD structure used for the MQPUT or MQPUT1 call must be identical to the MQMD associated with the message. The MQMD is typically the one returned by the MQGET call, except for the following cases:

- The MDCSI and MDENC fields must be set to whatever character set and encoding are used for fields in the MQDLH structure.
- The MDFMT field must be set to FMDLH to indicate that the data begins with an MQDLH structure.
- The context fields, MDACC, MDAID, MDAOD, MDPAN, MDPAT, MDPD, MDPT, and MDUID must be set by using a context option appropriate to the circumstances:
  - An application putting on the dead-letter queue a message that is not related to any preceding message must use the PMDEFC option. The PMDEFC option causes the queue manager to set all of the context fields in the message descriptor to their default values.
  - A server application putting on the dead-letter queue a message it received must use the PMPASA option, in order to preserve the original context information.
  - A server application putting on the dead-letter queue a reply to message it received must use the PMPASI option. The PMPASI option preserves the identity information but sets the origin information to be that of the server application.
  - A message channel agent putting on the dead-letter queue a message it received from its communication channel must use the PMSETA option. The PMSETA option preserves the original context information.

In the MQDLH structure itself, the fields must be set as follows:

- The DLCSI, DLENC, and *DLFMT* fields must be set to the values that describe the data that follows the MQDLH structure. These values are typically the values from the original message descriptor.

- The context fields DLPAT, DLPAN, DLPD, and DLPT must be set to values appropriate to the application that is putting the message on the dead-letter queue. These values are not related to the original message.
- Other fields must be set as appropriate.

The application must ensure that all fields have valid values, and that character fields are padded with blanks to the defined length of the field. The character data must not be terminated prematurely by using a null character. The queue manager does not convert the null and subsequent characters to blanks in the MQDLH structure.

Getting messages from the dead-letter queue

Applications that get messages from the dead-letter queue must verify that the messages begin with an MQDLH structure. The application can determine whether an MQDLH structure is present by examining the MDFMT field in the message descriptor MQMD. If the field has the value FMDLH, the message data begins with an MQDLH structure. Messages on the dead-letter queue might be truncated if they were originally too long for the queue they were intended for.

Fields

The MQDLH structure contains the following fields; the fields are described in alphabetical order:

DLCSI (10-digit signed integer)

Character set identifier of data that follows MQDLH.

DLCSI specifies the character set identifier of the data that follows the MQDLH structure. The data is typically from the original message. It does not apply to character data in the MQDLH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT

Inherit character-set identifier of this structure.

Character data in the data following this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the MDPAT field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

DLDM (48-byte character string)

Name of original destination queue manager.

This is the name of the queue manager that was the original destination for the message.

The length of this field is given by LNQMN. The initial value of this field is 48 blank characters.

DLDQ (48-byte character string)

Name of original destination queue.

This is the name of the message queue that was the original destination for the message.

The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

DLENC (10-digit signed integer)

Numeric encoding of data that follows MQDLH.

DLENC specifies the numeric encoding of the data that follows the MQDLH structure. The data is typically from the original message. It does not apply to numeric data in the MQDLH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is 0.

DLFMT (8-byte character string)

Format name of data that follows MQDLH.

This specifies the format name of the data that follows the MQDLH structure (typically the data from the original message).

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as the rules for the MDFMT field in MQMD.

The length of this field is given by LNFMT. The initial value of this field is FMNONE.

DLPAN (28-byte character string)

Name of application that put message on dead-letter (undelivered-message) queue.

The format of the name depends on the DLPAT field. See the description of the MDPAN field in "MQMD (Message descriptor) on IBM i" on page 1097.

If it is the queue manager that redirects the message to the dead-letter queue, DLPAN contains the first 28 characters of the queue manager name. The name is padded with blanks if necessary.

The length of this field is given by LNPAN. The initial value of this field is 28 blank characters.

DLPAT (10-digit signed integer)

Type of application that put message on dead-letter (undelivered-message) queue.

This field has the same meaning as the MDPAT field in the message descriptor MQMD (see "MQMD (Message descriptor) on IBM i" on page 1097 for details).

If it is the queue manager that redirects the message to the dead-letter queue, DLPAT has the value ATQM.

The initial value of this field is 0.

DLPD (8-byte character string)

Date when message was put on dead-letter (undelivered-message) queue.

The format used for the date when this field is generated by the queue manager is:

- YYYYMMDD

where the characters represent:

YYYY
year (four numeric digits)

MM
month of year (01 through 12)

DD
day of month (01 through 31)

Greenwich Mean Time (GMT) is used for the DLPD and DLPT fields, subject to the system clock being set accurately to GMT.

The length of this field is given by LNPDAT. The initial value of this field is eight blank characters.

DLPT (8-byte character string)

Time when message was put on the dead-letter (undelivered-message) queue.

The format used for the time when this field is generated by the queue manager is:

- HHMMSSTH

where the characters represent (in order):

HH
hours (00 through 23)

MM
minutes (00 through 59)

SS
seconds (00 through 59; see note later in this topic)

T
tenths of a second (0 through 9)

H
hundredths of a second (0 through 9)

Note: If the system clock is synchronized to an accurate time standard, it is possible for 60 or 61 to be returned for the seconds in DLPT. The extra second occurs when leap seconds are inserted into the global time standard.

Greenwich Mean Time (GMT) is used for the DLPD and DLPT fields, subject to the system clock being set accurately to GMT.

The length of this field is given by LNPTIM. The initial value of this field is eight blank characters.

DLREA (10-digit signed integer)

Reason message arrived on dead-letter (undelivered-message) queue.

This identifies the reason why the message was placed on the dead-letter queue instead of on the original destination queue. It must be one of the FB* or RC* values (for example, RC2053). See the description of the *MDFB* field in “MQMD (Message descriptor) on IBM i” on page 1097 for details of the common FB* values that can occur.

If the value is in the range FBIFST through FBILST, the actual IMS error code can be determined by subtracting FBIERR from the value of the *DLREA* field.

Some FB* values occur only in this field. They relate to repository messages, trigger messages, or transmission-queue messages that are transferred to the dead-letter queue. These values are:

FBABEG
Application cannot be started.

An application processing a trigger message was unable to start the application named in the TMAI field of the trigger message; see “MQTM - Trigger message” on page 1221.

FBATYP
Application type error.

An application processing a trigger message was unable to start the application because the TMAT field of the trigger message is not valid; see “MQTM - Trigger message” on page 1221.

FBBOCD
Cluster-receiver channel deleted.

The message was on a cluster transmission queue intended for a cluster queue that was opened with the FBIERR option. The remote cluster-receiver channel to be used to transmit the message to the destination queue was deleted before the message could be sent. Because FBIERR was specified, only the channel selected when the queue was opened can be used to transmit the message. As this channel is not longer available, the message was placed on the dead-letter queue.

FBNARM
Message is not a repository message.

FBSBCX
Message stopped by channel auto-definition exit.

FBSBMX
Message stopped by channel message exit.

FBTM

MQTM structure not valid or missing.

The MDFMT field in MQMD specifies FMTM, but the message does not begin with a valid MQTM structure. For example, the *TMSID* mnemonic eye-catcher might not be valid. The *TMVER* might not be recognized. The length of the trigger message might be insufficient to contain the MQTM structure.

FBXQME

Message on transmission queue not in correct format.

A message channel agent found that a message on the transmission queue is not in the correct format. The message channel agent puts the message on the dead-letter queue using this feedback code.

The initial value of this field is RCNONE.

DLSID (4-byte character string)

Structure identifier.

The value must be:

DLSIDV

Identifier for dead-letter header structure.

The initial value of this field is DLSIDV.

DLVER (10-digit signed integer)

Structure version number.

The value must be:

DLVER1

Version number for dead-letter header structure.

The following constant specifies the version number of the current version:

DLVERC

Current version of dead-letter header structure.

The initial value of this field is DLVER1.

Initial values

Table 697. Initial values of fields in MQDLH

Field name	Name of constant	Value of constant
DLSID	DLSIDV	'DLH¬'
DLVER	DLVER1	1
DLREA	RCNONE	0
DLDQ	None	Blanks
DLDM	None	Blanks
DLENC	None	0
DLCSI	CSUNDF	0
DLFMT	FMNONE	Blanks
DLPAT	None	0
DLPAN	None	Blanks

Table 697. Initial values of fields in MQDLH (continued)		
Field name	**Name of constant**	**Value of constant**
DLPD	None	Blanks
DLPT	None	Blanks

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQDLH Structure
D*
D* Structure identifier
D  DLSID                  1      4    INZ('DLH ')
D* Structure version number
D  DLVER                  5      8I 0 INZ(1)
D* Reason message arrived on dead-letter(undelivered-message) queue
D  DLREA                  9     12I 0 INZ(0)
D* Name of original destination queue
D  DLDQ                  13     60    INZ
D* Name of original destination queue manager
D  DLDM                  61    108    INZ
D* Numeric encoding of data that followsMQDLH
D  DLENC                109    112I 0 INZ(0)
D* Character set identifier of data thatfollows MQDLH
D  DLCSI                113    116I 0 INZ(0)
D* Format name of data that followsMQDLH
D  DLFMT                117    124    INZ('        ')
D* Type of application that put messageon dead-letter
D* (undelivered-message)queue
D  DLPAT                125    128I 0 INZ(0)
D* Name of application that put messageon dead-letter
D* (undelivered-message)queue
D  DLPAN                129    156    INZ
D* Date when message was put ondead-letter (undelivered-message)queue
D  DLPD                 157    164    INZ
D* Time when message was put on thedead-letter (undelivered-message)queue
D  DLPT                 165    172    INZ
```

IBM i MQDMHO (Delete message handle options) on IBM i

The **MQDMHO** structure allows applications to specify options that control how message handles are deleted.

Overview

Purpose: The structure is an input parameter on the **MQDLTMH** call.

Character set and encoding: Data in **MQDMHO** must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1058
- "Initial values" on page 1059
- "RPG declaration" on page 1059

Fields

The MQDMHO structure contains the following fields; the fields are described in **alphabetical order**:

DMOPT (10-digit signed integer)

The value must be:

DMNONE

No options specified.

This is always an input field. The initial value of this field is **DMNONE**.

DMSID (10-digit signed integer)

This is the structure identifier; the value must be:

DMSIDV

Identifier for delete message handle options structure.

This is always an input field. The initial value of this field is **DMSIDV**.

DMVER (10-digit signed integer)

This is the structure version number; the value must be:

DMVER1

Version-1 delete message handle options structure.

The following constant specifies the version number of the current version:

DMVERC

Current version of delete message handle options structure.

This is always an input field. The initial value of this field is **DMVER1**.

Initial values

Table 698. Initial values of fields in MQDMHO

Field name	Name of constant	Value of constant
DMSID	DMSIDV	'DMHO'
DMVER	DMVER1	1
DMOPT	DMNONE	0

RPG declaration

```
     D* MQDMHO Structure
     D*
     D*
     D* Structure identifier
     D  DMSID                  1      4    INZ('DMHO')
     D*
     D* Structure version number
     D  DMVER                  5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQDLTMH
     D  DMOPT                  9     12I 0 INZ(0)
```

IBM i MQDMPO (Delete message property options) on IBM i

Structure defining the delete message property options.

Overview

Purpose: The MQDMPO structure allows applications to specify options that control how properties of messages are deleted. The structure is an input parameter on the MQDLTMP call.

Character set and encoding: Data in MQDMPO must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1060
- "Initial values" on page 1061
- "RPG declaration" on page 1061

Fields

The MQDMPO structure contains the following fields; the fields are described in alphabetic order:

DPOPT (10-digit signed integer)

Delete message property options structure - DPOPT field.

Location options: The following options relate to the relative location of the property compared to the property cursor.

DPDELF
Deletes the first property that matches the specified name.

DPDELC
Deletes the property pointed to by the property cursor; that is the property that was last inquired by using either the IPINQF or the IPINQN option.

The property cursor is reset when the message handle is reused. It is also reset when the message handle is specified in the *HMSG* field of the MQGMO on an MQGET call, or MQPMO structure on an MQPUT call.

The property cursor is reset when the message handle is reused, or when the message handle is specified in the *HMSG* field of the MQGMO structure on an MQGET structure on an MQGET call or MQPMO structure on an MQPUT call.

The call fails with completion code CCFAIL and reason RC2471 if this option is used when the property cursor has not yet been established. It also fails with these codes if the property pointed to by the property cursor has already been deleted..

If neither of these options is required, the following option can be used:

DPNONE
No options specified.

The initial value of this input field is DPDELF.

DPSID (10-digit signed integer)

Delete message property options structure - DPSID field.

This is the structure identifier. The value must be:

DPSIDV
Identifier for delete message property options structure.

This field is always an input field. The initial value of this field is DPSIDV.

DPVER (10-digit signed integer)

Delete message property options structure - DPVER field.

This is the structure version number. The value must be:

DPVER1
Version number for delete message property options structure.

The following constant specifies the version number of the current version:

DPVERC
Current version of delete message property options structure.

This field is always an input field. The initial value of this field is DPVER1.

Initial values

Table 699. Initial values of fields in MQDPMO

Field name	Name of constant	Value of constant
DPSID	DPSIDV	'DMPO'
DPVER	DPVER1	1
DPOPT	Options that control the action of MQDLTMP	DPNONE

RPG declaration

```
     D* MQDMPO Structure
     D*
     D*
     D* Structure identifier
     D  DPSID                 1      4    INZ('DMPO')
     D*
     D* Structure version number
     D  DPVER                 5      8I 0 INZ(1)
     D*
     ** Options that control the action of
     D* MQDLTMP
     D  DPOPT                 9     12I 0 INZ(0)
```

IBM i MQEPH (Embedded PCF header) on IBM i

Overview

Purpose
The MQEPH structure describes the additional data that is present in a message when that message is a programmable command format (PCF) message. The *EPPFH* field defines the PCF parameters that follow this structure and this allows you to follow the PCF message data with other headers.

Format name
EPFMT

Character set and encoding
Data in MQEPH must be in the character set and encoding of the local queue manager; this is given by the **CCSID** queue manager attribute.

Set the character set and encoding of the MQEPH into the *MDCSI* and *MDENC* fields in:

- The MQMD (if the MQEPH structure is at the start of the message data), or
- The header structure that precedes the MQEPH structure (all other cases).

Usage
You cannot use MQEPH structures to send commands to the command server or any other queue manager PCF-accepting server.

Similarly, the command server or any other queue manager PCF-accepting server do not generate responses or events containing MQEPH structures.

- "Fields" on page 1062
- "Initial values" on page 1063
- "RPG declaration" on page 1064

Fields

The MQEPH structure contains the following fields; the fields are described in **alphabetical order**:

EPCSI (10-digit signed integer)

This is the character set identifier of the data that follows the MQEPH structure and the associated PCF parameters; it does not apply to character data in the MQEPH structure itself.

The initial value of this field is EPCUND.

EPENC (10-digit signed integer)

This is the numeric encoding of the data that follows the MQEPH structure and the associated PCF parameters; it does not apply to character data in the MQEPH structure itself.

The initial value of this field is 0.

EPFLG (10-digit signed integer)

The following values are available:

EPNONE
No flags have been specified. *MDCSI* EPNONE is defined to aid program documentation. It is not intended that this constant be used with any other, but as its value is zero, such use cannot be detected.

EPCSEM
The character set of the parameters containing character data is specified individually within the *CCSID* field in each structure. The character set of the *EPSID* and *EPFMT* fields are defined by the *CCSID* in the header structure that precedes the MQEPH structure, or by the *MDCSI* field in the MQMD if the MQEPH is at the start of the message.

The initial value of this field is EPNONE.

EPFMT (8-byte character string)

This is the format name of the data that follows the MQEPH structure and the associated PCF parameters.

The initial value of this field is EPFMNO.

EPLEN (10-digit signed integer)

This is the amount of data preceding the next header structure. It includes:

- The length of the MQEPH header
- The length of all PCF parameters following the header
- Any blank padding following those parameters

EPLEN must be a multiple of 4.

The fixed-length part of the structure is defined by EPSTLF.

The initial value of this field is 68.

EPPCFH (MQCFH)

This is the programmable command format (PCF) header, defining the PCF parameters that follow the MQEPH structure. This enables you to follow the PCF message data with other headers.

The PCF header is initially defined with the following values:

Table 700. Initial values of fields in EPPCFH

Field name	Name of constant	Value of constant
EP3TYP	CFTNON	0
EP3LEN	FHLENV	36

Table 700. Initial values of fields in EPPCFH (continued)		
Field name	**Name of constant**	**Value of constant**
EP3VER	FHVER3	3
EP3CMD	CMNONE	0
EP3SEQ	None	1
EP3CTL	CFCLST	1
EEP3CC	CCOK	0
EP3REA	RCNONE	0
EP3CNT	None	0

The application must change EP3TYP from CFTNON to a valid structure type for the use it is making of the embedded PCF header.

EPSID (4-byte character string)

The value must be:

EPSTID
Identifier for the Embedded PCF header structure.

The initial value of this field is EPSTID.

EPVER (10-digit signed integer)

The value can be:

EPVER1
Version number for embedded PCF header structure.

The following constant specifies the version number of the current version:

EPVER3
Current version of embedded PCF header structure.

The initial value of this field is EPVER3.

Initial values

Table 701. Initial values of fields in MQEPH		
Field name	**Name of constant**	**Value of constant**
EPSID	EPSTID	'EP¬¬'
EPVER	EPVER1	1
EPLEN	EPSTLF	68
EPENC	None	0
EPCSI	EPCUND	0
EPFMT	EPFMNO	Blanks
EPFLG	EPNONE	0
EPPCFH	Names and values as defined in Table 700 on page 1062	0

Note:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQEPH Structure
D*
D* Structure identifier
D  EPSID                  1      4
D* Structure version number
D  EPVER                  5      8I 0
D* Total lenght of MQEPH including MQCFHand parameter structures
D* that follow
D  EPLEN                  9     12I 0
D* Numeric encoding of data that follows last PCF parameter structure
D  EPENC                 13     16I 0
D* Character set identifier of data that follows last PCF parameter
D* structure
D  EPCSI                 17     20I 0
D* Format name of data that follows last PCF parameter structure
D  EPFMT                 21     28
D* Flags
D  EPFLG                 29     32I 0
D* Programmable Command Format Header
D  EP3TYP                33     36I 0
D  EP3LEN                37     40I 0
D  EP3VER                41     44I 0
D  EP3CMD                45     48I 0
D  EP3SEQ                49     52I 0
D  EP3CTL                53     56I 0
D  EP3CC                 57     60I 0
D  EP3REA                61     64I 0
D  EP3CNT                65     68I 0
```

IBM i MQGMO (Get-message options) on IBM i

The MQGMO structure allows the application to specify options that control how messages are removed from queues.

Overview

Purpose
: The structure is an input/output parameter on the MQGET call.

Version
: The current version of MQGMO is GMVER4. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQGMO that is supported by the environment, but with the initial value of the *GMVER* field set to GMVER1. To use fields that are not present in the version-1 structure, the application must set the *GMVER* field to the version number of the version required.

Character set and encoding
: Data in MQGMO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

- "Fields" on page 1064
- "Initial values" on page 1084
- "RPG declaration" on page 1084

Fields

The MQGMO structure contains the following fields; the fields are described in alphabetical order:

GMGST (1 byte character string)

Flag indicating whether message retrieved is in a group.

It has one of the following values:

GSNIG
Message is not in a group.

GSMIG
Message is in a group, but is not the last in the group.

GSLMIG
Message is the last in the group.

This value is also the value returned if the group consists of only one message.

This field is an output field. The initial value of this field is GSNIG. This field is ignored if *GMVER* is less than GMVER2.

GMMH (10 digit signed integer)

Message Handle

If the GMPRAQ option is specified and the PRPCTL queue attribute is not set to PRPRFH then this is the handle to a message which is populated with the properties of the message being retrieved from the queue. The handle is created by an MQCRTMH call. Any properties already associated with the handle are cleared before retrieving a message.

The following value can also be specified:
MQHM_NONE
No message handle supplied.

No message descriptor is required on the MQGET call if a valid message handle is supplied and used on output to contain the message properties, the message descriptor associated with the message handle is used for input fields.

If a message descriptor is specified on the MQGET call, it always takes precedence over the message descriptor associated with a message handle.

If GMPRRF is specified, or the GMPRAQ is specified and the PRPCTL queue attribute is PRPRFH then the call fails with reason code RC2026 when no message descriptor parameter is specified.

On return from the MQGET call, the properties and message descriptor associated with this message handle are updated to reflect the state of the message retrieved (as well as the message descriptor if one was supplied on the MQGET call). The properties of the message can then be inquired using the MQINQMP call.

Except for message descriptor extensions, when present, a property that can be inquired with the MQINQMP call is not contained in the message data; if the message on the queue contained properties in the message data these are removed from the message data before the data is returned to the application.

If no message handle is provided or Version is less than GMVER4 then you must supply a valid message descriptor on the MQGET call. Any message properties (except those properties contained in the message descriptor) are returned in the message data subject to the value of the property options in the MQGMO structure and the PRPCTL queue attribute.

This field is an always an input field. The initial value of this field is HMNONE. This field is ignored if *GMVER* is less than GMVER4.

GMMO (10 digit signed integer)

Options controlling selection criteria used for MQGET.

These options allow the application to choose which fields in the **MSGDSC** parameter is used to select the message returned by the MQGET call. The application sets the required options in this field, and then sets the corresponding fields in the **MSGDSC** parameter to the values required for those fields. Only messages that have those values in the MQMD for the message are candidates for retrieval using that **MSGDSC** parameter on the MQGET call. Fields for which the corresponding match option is not

specified are ignored when selecting the message to be returned. If no selection criteria are to be used on the MQGET call (that is, any message is acceptable), *GMMO* should be set to MONONE.

If GMLOGO is specified, only certain messages are eligible for return by the next MQGET call:

- If there is no current group or logical message, only messages that have *MDSEQ* equal to 1 and *MDOFF* equal to 0 are eligible for return. In this situation, one or more of the following options can be used to select which of the eligible messages is the one returned:
  - MOMSGI
  - MOCORI
  - MOGRPI
- If there is a current group or logical message, only the next message in the group or next segment in the logical message is eligible for return, and this cannot be altered by specifying MO* options.

In both cases, match options which are not applicable can still be specified, but the value of the relevant field in the **MSGDSC** parameter must match the value of the corresponding field in the message to be returned; the call fails with reason code RC2247 is this condition is not satisfied.

GMMO is ignored if either GMMUC or GMBRWC is specified.

One or more of the following options can be specified:

MOMSGI

Retrieve message with specified message identifier.

This option specifies that the message to be retrieved must have a message identifier that matches the value of the *MDMID* field in the **MSGDSC** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the correlation identifier).

If this option is not specified, the *MDMID* field in the **MSGDSC** parameter is ignored, and any message identifier matches.

Note: The message identifier MINONE is a special value that matches any message identifier in the MQMD for the message. Therefore, specifying MOMSGI with MINONE is the same as not specifying MOMSGI.

MOCORI

Retrieve message with specified correlation identifier.

This option specifies that the message to be retrieved must have a correlation identifier that matches the value of the *MDCID* field in the **MSGDSC** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the message identifier).

If this option is not specified, the *MDCID* field in the **MSGDSC** parameter is ignored, and any correlation identifier matches.

Note: The correlation identifier CINONE is a special value that matches any correlation identifier in the MQMD for the message. Therefore, specifying MOCORI with CINONE is the same as not specifying MOCORI.

MOGRPI

Retrieve message with specified group identifier.

This option specifies that the message to be retrieved must have a group identifier that matches the value of the *MDGID* field in the **MSGDSC** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the correlation identifier).

If this option is not specified, the *MDGID* field in the **MSGDSC** parameter is ignored, and any group identifier matches.

Note: The group identifier GINONE is a special value that matches any group identifier in the MQMD for the message. Therefore, specifying MOGRPI with GINONE is the same as not specifying MOGRPI.

MOSEQN
Retrieve message with specified message sequence number.

This option specifies that the message to be retrieved must have a message sequence number that matches the value of the *MDSEQ* field in the **MSGDSC** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the group identifier).

If this option is not specified, the *MDSEQ* field in the **MSGDSC** parameter is ignored, and any message sequence number matches.

MOOFFS
Retrieve message with specified offset.

This option specifies that the message to be retrieved must have an offset that matches the value of the *MDOFF* field in the **MSGDSC** parameter of the MQGET call. This match is in addition to any other matches that might apply (for example, the message sequence number).

If this option is not specified, the *MDOFF* field in the **MSGDSC** parameter is ignored, and any offset matches.

If none of the options described is specified, the following option can be used:

MONONE
No matches.

This option specifies that no matches are to be used in selecting the message to be returned; therefore, all messages on the queue are eligible for retrieval (but subject to control by the GMAMSA, GMASGA, and GMCMPM options).

MONONE is defined to aid program documentation. It is not intended that this option in used with any other MO* option, but as its value is zero, such use cannot be detected.

This field is an input field. The initial value of this field is MOMSGI with MOCORI. This field is ignored if *GMVER* is less than GMVER2.

Note: The initial value of the *GMMO* field is defined for compatibility with earlier version queue managers. However, when reading a series of messages from a queue without using selection criteria, this initial value requires the application to reset the *MDMID* and *MDCID* fields to MINONE and CINONE before each MQGET call. The need to reset *MDMID* and *MDCID* can be avoided by setting *GMVER* to GMVER2, and *GMMO* to MONONE.

GMOPT (10 digit signed integer)

Options that control the action of MQGET.

Zero or more of the following described options can be specified. If more than one is required the values can be added (do not add the same constant more than once). Combinations of options that are not valid are noted; all other combinations are valid.

Wait options: The following options relate to waiting for messages to arrive on the queue:

GMWT
Wait for message to arrive.

The application is to wait until a suitable message arrives. The maximum time the application waits is specified in *GMWI*.

If MQGET requests are inhibited, or MQGET requests become inhibited while waiting, the wait is canceled and the call completes with CCFAIL and reason code RC2016, regardless of whether there are suitable messages on the queue.

This option can be used with the GMBRWF or GMBRWN options.

If several applications are waiting on the same shared queue, the application, or applications, that are activated when a suitable message arrives are described later in this section.

Note: In the following description, a browse MQGET call is one which specifies one of the browse options, but not GMLK; an MQGET call specifying the GMLK option is treated as a nonbrowse call.

- If one or more nonbrowse MQGET calls is waiting, but no browse MQGET calls are waiting, one is activated.
- If one or more browse MQGET calls is waiting, but no nonbrowse MQGET calls are waiting, all are activated.
- If one or more nonbrowse MQGET calls, and one or more browse MQGET calls are waiting, one nonbrowse MQGET call is activated, and none, some, or all the browse MQGET calls. (The number of browse MQGET calls activated cannot be predicted, because it depends on the scheduling considerations of the operating system, and other factors.)

If more than one nonbrowse MQGET call is waiting on the same queue, only one is activated; in this situation the queue manager attempts to give priority to waiting nonbrowse calls in the following order:

1. Specific get-wait requests that can be satisfied only by certain messages, for example, ones with a specific *MDMID* or *MDCID* (or both).
2. General get-wait requests that can be satisfied by any message.

The following points must be noted:

- Within the first category, no additional priority is given to more specific get-wait requests, for example those that specify both *MDMID* and *MDCID*.
- Within either category, it cannot be predicted which application is selected. In particular, the application waiting longest is not necessarily the one selected.
- Path length, and priority-scheduling considerations of the operating system, can mean that a waiting application of lower operating system priority than expected retrieves the message.
- It might also happen that an application that is not waiting retrieves the message in preference to one that is.

GMWT is ignored if specified with GMBRWC or GMMUC; no error is raised.

GMNWT

Return immediately if no suitable message.

The application is not to wait if no suitable message is available. This is the opposite of the GMWT option, and is defined to aid program documentation. It is the default if neither is specified.

GMFIQ

Fail if queue manager is quiescing.

This option forces the MQGET call to fail if the queue manager is in the quiescing state.

If this option is specified together with GMWT, and the wait is outstanding at the time the queue manager enters the quiescing state:

- The wait is canceled and the call returns completion code CCFAIL with reason code RC2161 .

If GMFIQ is not specified and the queue manager enters the quiescing state, the wait is not canceled.

Syncpoint options: The following options relate to the participation of the MQGET call within a unit of work:

GMSYP

Get message with syncpoint control.

The request is to operate within the normal unit-of-work protocols. The message is marked as being unavailable to other applications, but it is deleted from the queue only when the unit of work is committed. The message is made available again if the unit of work is backed out.

If this option or GMNSYP is not specified, the get request is not within a unit of work.

This option is not valid with any of the following options:

- GMBRWF

- GMBRWC
- GMBRWN
- GMLK
- GMNSYP
- GMPSYP
- GMUNLK

GMPSYP
Get message with syncpoint control if message is persistent.

The request is to operate within the normal unit-of-work protocols, but only if the message retrieved is persistent. A persistent message has the value PEPER in the *MDPER* field in MQMD.

- If the message is persistent, the queue manager processes the call as though the application had specified GMSYP.
- If the message is not persistent, the queue manager processes the call as though the application had specified GMNSYP (see the following section for details).

This option is not valid with any of the following options:

- GMBRWF
- GMBRWC
- GMBRWN
- GMCMPM
- GMNSYP
- GMSYP
- GMUNLK

GMNSYP
Get message without syncpoint control.

The request is to operate outside the normal unit-of-work protocols. The message is deleted from the queue immediately (unless this is a browse request). The message cannot be made available again by backing out the unit of work.

This option is assumed if GMBRWF or GMBRWN is specified.

If this option and GMSYP are not specified, the get request is not within a unit of work.

This option is not valid with any of the following options:

- GMSYP
- GMPSYP

Browse options: The following options relate to browsing messages on the queue:

GMBRWF
Browse from start of queue.

When a queue is opened with the OOBRW option, a browse cursor is established, positioned logically before the first message on the queue. Subsequent MQGET calls specifying the GMBRWF, GMBRWN, or GMBRWC option can be used to retrieve messages from the queue nondestructively. The browse cursor marks the position, within the messages on the queue, from which the next MQGET call with GMBRWN searches for a suitable message.

An MQGET call with GMBRWF causes the previous position of the browse cursor to be ignored. The first message on the queue that satisfies the conditions specified in the message descriptor is retrieved. The message remains on the queue, and the browse cursor is positioned on this message.

After this call, the browse cursor is positioned on the message that has been returned. If the message is removed from the queue before the next MQGET call with GMBRWN is issued, the browse cursor remains at the position in the queue that the message occupied, even though that position is now empty.

The GMMUC option can then be used with a nonbrowse MQGET call if required, to remove the message from the queue.

The browse cursor is not moved by a nonbrowse MQGET call using the same *HOBJ* handle. Nor is it moved by a browse MQGET call that returns a completion code of CCFAIL, or a reason code of RC2080 .

The GMLK option can be specified together with this option, to cause the message that is browsed to be locked.

GMBRWF can be specified with any valid combination of the GM* and MO* options that control the processing of messages in groups and segments of logical messages.

If GMLOGO is specified, the messages are browsed in logical order. If that option is omitted, the messages are browsed in physical order. When GMBRWF is specified, it is possible to switch between logical order and physical order, but subsequent MQGET calls using GMBRWN must browse the queue in the same order as the most recent call that specified GMBRWF for the queue handle.

The group and segment information that the queue manager retains for MQGET calls that browse messages on the queue, is separate from the group and segment information that the queue manager retains for MQGET calls that remove messages from the queue. When GMBRWF is specified, the queue manager ignores the group and segment information for browsing, and scans the queue as though there were no current group and no current logical message. If the MQGET call is successful (completion code CCOK or CCWARN), the group and segment information for browsing is set to that of the message returned; if the call fails, the group and segment information remains the same as it was before the call.

This option is not valid with any of the following options:

- GMBRWC
- GMBRWN
- GMMUC
- GMSYP
- GMPSYP
- GMUNLK

It is also an error if the queue was not opened for browse.

GMBRWN

Browse from current position in queue.

The browse cursor is advanced to the next message on the queue that satisfies the selection criteria specified on the MQGET call. The message is returned to the application, but remains on the queue.

After a queue has been opened for browse, the first browse call using the handle has the same effect whether it specifies the GMBRWF or GMBRWN option.

If the message is removed from the queue before the next MQGET call with GMBRWN is issued, the browse cursor logically remains at the position in the queue that the message occupied, even though that position is now empty.

Messages are stored on the queue in one of two ways:

- FIFO within priority (MSPRIO), or
- FIFO regardless of priority (MSFIFO)

The **MsgDeliverySequence** queue attribute indicates which method applies (see “Attributes for queues” on page 1353 for details).

If the queue has a *MsgDeliverySequence* of MSPRIO, and a message arrives on the queue that is of a higher priority than the one currently pointed to by the browse cursor, that message is not found during the current sweep of the queue using GMBRWN. It can only be found after the browse cursor has been reset with GMBRWF (or by reopening the queue).

The GMMUC option can later be used with a nonbrowse MQGET call if required, to remove the message from the queue.

The browse cursor is not moved by nonbrowse MQGET calls using the same *HOBJ* handle.

The GMLK option can be specified together with this option, to cause the message that is browsed to be locked.

GMBRWN can be specified with any valid combination of the GM* and MO* options that control the processing of messages in groups and segments of logical messages.

If GMLOGO is specified, the messages are browsed in logical order. If that option is omitted, the messages are browsed in physical order. When GMBRWF is specified, it is possible to switch between logical order and physical order, but subsequent MQGET calls using GMBRWN must browse the queue in the same order as the most recent call that specified GMBRWF for the queue handle. The call fails with reason code RC2259 if this condition is not satisfied.

Note: Special care is needed if an MQGET call is used to browse beyond the end of a message group (or logical message not in a group) when GMLOGO is not specified. For example, if the last message in the group happens to precede the first message in the group on the queue, using GMBRWN to browse beyond the end of the group, specifying MOSEQN with *MDSEQ* set to 1 (to find the first message of the next group) would return again the first message in the group already browsed. This could happen immediately, or a number of MQGET calls later (if there are intervening groups).

The possibility of an infinite loop can be avoided by opening the queue twice for browse:

- Use the first handle to browse only the first message in each group.
- Use the second handle to browse only the messages within a specific group.
- Use the MO* options to move the second browse cursor to the position of the first browse cursor, before browsing the messages in the group.
- Do not use GMBRWN to browse beyond the end of a group.

The group and segment information that the queue manager retains for MQGET calls that browse messages on the queue, is separate from the group and segment information that it retains for MQGET calls that remove messages from the queue.

This option is not valid with any of the following options:

- GMBRWF
- GMBRWC
- GMMUC
- GMSYP
- GMPSYP
- GMUNLK

It is also an error if the queue was not opened for browse.

GMBRWC

Browse message under browse cursor.

This option causes the message pointed to by the browse cursor to be retrieved nondestructively, regardless of the MO* options specified in the *GMMO* field in MQGMO.

The message pointed to by the browse cursor is the one that was last retrieved using either the GMBRWF or the GMBRWN option. The call fails if neither of these calls has been issued for this queue since it was opened, or if the message that was under the browse cursor has since been retrieved destructively.

The position of the browse cursor is not changed by this call.

The GMMUC option can then be used with a nonbrowse MQGET call if required, to remove the message from the queue.

The browse cursor is not moved by a nonbrowse MQGET call using the same *HOBJ* handle. Nor is it moved by a browse MQGET call that returns a completion code of CCFAIL, or a reason code of RC2080.

If GMBRWC is specified with GMLK:

- If there is already a message locked, it must be the one under the cursor, so that is returned without unlocking and relocking it; the message remains locked.
- If there is no locked message, the message under the browse cursor (if there is one) is locked and returned to the application; if there is no message under the browse cursor the call fails.

If GMBRWC is specified without GMLK:

- If there is already a message locked, it must be the one under the cursor. This message is returned to the application and then unlocked. Because the message is now unlocked, there is no guarantee that it can be browsed again, or retrieved destructively (it might be retrieved destructively by another application getting messages from the queue).
- If there is no locked message, the message under the browse cursor (if there is one) is returned to the application; if there is no message under the browse cursor the call fails.

If GMCMPM is specified with GMBRWC, the browse cursor must identify a message with a *MDOFF* field in MQMD that is zero. If this condition is not satisfied, the call fails with reason code RC2246 .

The group and segment information that the queue manager retains for MQGET calls that browse messages on the queue, is separate from the group and segment information that it retains for MQGET calls that remove messages from the queue.

This option is not valid with any of the following options:

- GMBRWF
- GMBRWN
- GMMUC
- GMSYP
- GMPSYP
- GMUNLK

It is also an error if the queue was not opened for browse.

GMMUC

Get message under browse cursor.

This option causes the message pointed to by the browse cursor to be retrieved, regardless of the MO* options specified in the *GMMO* field in MQGMO. The message is removed from the queue.

The message pointed to by the browse cursor is the one that was last retrieved using either the GMBRWF or the GMBRWN option.

If GMCMPM is specified with GMMUC, the browse cursor must identify a message with a *MDOFF* field in MQMD that is zero. If this condition is not satisfied, the call fails with reason code RC2246 .

This option is not valid with any of the following options:

- GMBRWF
- GMBRWC

- GMBRWN
- GMUNLK

It is also an error if the queue was not opened both for browse and for input. If the browse cursor is not currently pointing to a retrievable message, an error is returned by the MQGET call.

Lock options: The following options relate to locking messages on the queue:

GMLK

Lock message.

This option locks the message that is browsed, so that the message becomes invisible to any other handle open for the queue. The option can be specified only if one of the following options is also specified:

- GMBRWF
- GMBRWN
- GMBRWC

Only one message can be locked per queue handle, but this can be a logical message or a physical message:

- If GMCMPM is specified, all the message segments that make up the logical message are locked to the queue handle (if they are all present on the queue and available for retrieval).
- If GMCMPM is not specified, only a single physical message is locked to the queue handle. If this message happens to be a segment of a logical message, the locked segment prevents other applications using GMCMPM to retrieve or browse the logical message.

The locked message is always the one under the browse cursor, and the message can be removed from the queue by a later MQGET call that specifies the GMMUC option. Other MQGET calls using the queue handle can also remove the message (for example, a call that specifies the message identifier of the locked message).

If the call returns completion code CCFAIL, or CCWARN with reason code RC2080, no message is locked.

If the application decides not to remove the message from the queue, the lock is released by:

- Issuing another MQGET call for this handle, with either GMBRWF or GMBRWN specified (with or without GMLK); the message is unlocked if the call completes with CCOK or CCWARN, but remains locked if the call completes with CCFAIL. However, the following exceptions apply:
  - The message is not unlocked if CCWARN is returned with RC2080.
  - The message is unlocked if CCFAIL is returned with RC2033.

  If GMLK is also specified, the message returned is locked. If GMLK is not specified, there is no locked message after the call.

  If GMWT is specified, and no message is immediately available, the unlock on the original message occurs before the start of the wait (providing the call is otherwise free from error).
- Issuing another MQGET call for this handle, with GMBRWC (without GMLK); the message is unlocked if the call completes with CCOK or CCWARN, but remains locked if the call completes with CCFAIL. However, the following exception applies:
  - The message is not unlocked if CCWARN is returned with RC2080.
- Issuing another MQGET call for this handle with GMUNLK.
- Issuing an MQCLOSE call for this handle (either explicitly, or implicitly by the application ending).

No special open option is required to specify this option, other than OOBRW, which is needed in order to specify the accompanying browse option.

This option is not valid with any of the following options:

- GMSYP

- GMPSYP
- GMUNLK

GMUNLK

Unlock message.

The message to be unlocked must have been previously locked by an MQGET call with the GMLK option. If there is no message locked for this handle, the call completes with CCWARN and RC2209 .

The **MSGDSC**, **BUFLEN**, **BUFFER**, and **DATLEN** parameters are not checked or altered if GMUNLK is specified. No message is returned in *BUFFER*.

No special open option is required to specify this option (although OOBRW is needed to issue the lock request in the first place).

This option is not valid with any options except the following:

- GMNWT
- GMNSYP

Both of these options are assumed whether specified or not.

Message-data options: The following options relate to the processing of the message data when the message is read from the queue:

GMATM

Allow truncation of message data.

If the message buffer is too small to hold the complete message, this option allows the MQGET call to fill the buffer with as much of the message as the buffer can hold, issue a warning completion code, and complete its processing. This means:

- When browsing messages, the browse cursor is advanced to the returned message.
- When removing messages, the returned message is removed from the queue.
- Reason code RC2079 is returned if no other error occurs.

Without this option, the buffer is still filled with as much of the message as it can hold, a warning completion code is issued, but processing is not completed. This means:

- When browsing messages, the browse cursor is not advanced.
- When removing messages, the message is not removed from the queue.
- Reason code RC2080 is returned if no other error occurs.

GMCONV

Convert message data.

This option requests that the application data in the message is converted, to conform to the *MDCSI* and *MDENC* values specified in the **MSGDSC** parameter on the MQGET call, before the data is copied to the **BUFFER** parameter.

The *MDFMT* field specified when the message was put is assumed by the conversion process to identify the nature of the data in the message. Conversion of the message data is by the queue manager for built-in formats, and by a user-written exit for other formats.

- If conversion is performed successfully, the *MDCSI* and *MDENC* fields specified in the **MSGDSC** parameter are unchanged on return from the MQGET call.
- If conversion cannot be performed successfully (but the MQGET call otherwise completes without error), the message data is returned unconverted, and the *MDCSI* and *MDENC* fields in *MSGDSC* are set to the values for the unconverted message. The completion code is CCWARN in this case.

In either case, therefore, these fields describe the character-set identifier and encoding of the message data that is returned in the **BUFFER** parameter.

See the *MDFMT* field described in “MQMD (Message descriptor) on IBM i” on page 1097 for a list of format names for which the queue manager performs the conversion.

Group and segment options: The following options relate to the processing of messages in groups and segments of logical messages. These definitions might be of help in understanding the options:

Physical message
This is the smallest unit of information that can be placed on or removed from a queue; it often corresponds to the information specified or retrieved on a single MQPUT, MQPUT1, or MQGET call. Every physical message has its own message descriptor (MQMD). Generally, physical messages are distinguished by differing values for the message identifier (*MDMID* field in MQMD), although this is not enforced by the queue manager.

Logical message
This is a single unit of application information. In the absence of system constraints, a logical message would be the same as a physical message. But where logical messages are large, system constraints might make it advisable or necessary to split a logical message into two or more physical messages, called segments.

A logical message that has been segmented consists of two or more physical messages that have the same nonnull group identifier (*MDGID* field in MQMD), and the same message sequence number (*MDSEQ* field in MQMD). The segments are distinguished by differing values for the segment offset (*MDOFF* field in MQMD), which gives the offset of the data in the physical message from the start of the data in the logical message. Because each segment is a physical message, the segments in a logical message typically have differing message identifiers.

A logical message that has not been segmented, but for which segmentation has been permitted by the sending application, also has a nonnull group identifier, although in this case there is only one physical message with that group identifier if the logical message does not belong to a message group. Logical messages for which segmentation has been inhibited by the sending application have a null group identifier (GINONE), unless the logical message belongs to a message group.

Message group
This is a set of one or more logical messages that have the same nonnull group identifier. The logical messages in the group are distinguished by differing values for the message sequence number, which is an integer in the range 1 through n, where n is the number of logical messages in the group. If one or more of the logical messages is segmented, there are more than n physical messages in the group.

GMLOGO
Messages in groups and segments of logical messages are returned in logical order.

This option controls the order in which messages are returned by successive MQGET calls for the queue handle. The option must be specified on each of those calls in order to have an effect.

If GMLOGO is specified for successive MQGET calls for the queue handle, messages in groups are returned in the order given by their message sequence numbers, and segments of logical messages are returned in the order given by their segment offsets. This order might be different from the order in which those messages and segments occur on the queue.

Note: Specifying GMLOGO has no adverse consequences on messages that do not belong to groups and that are not segments. In effect, such messages are treated as though each belonged to a message group consisting of only one message. Thus it is perfectly safe to specify GMLOGO when retrieving messages from queues that might contain a mixture of messages in groups, message segments, and unsegmented messages not in groups.

To return the messages in the required order, the queue manager retains the group and segment information between successive MQGET calls. This information identifies the current message group and current logical message for the queue handle, the current position within the group and logical message, and whether the messages are being retrieved within a unit of work. Because the queue manager retains this information, the application does not need to set the group and segment information before each MQGET call. Specifically, it means that the application does not

need to set the *MDGID*, *MDSEQ*, and *MDOFF* fields in MQMD. However, the application does need to set the GMSYP or GMNSYP option correctly on each call.

When the queue is opened, there is no current message group and no current logical message. A message group becomes the current message group when a message that has the MFMIG flag is returned by the MQGET call. With GMLOGO specified on successive calls, that group remains the current group until a message is returned that has:

- MFLMIG without MFSEG (that is, the last logical message in the group is not segmented), or
- MFLMIG with MFLSEG (that is, the message returned is the last segment of the last logical message in the group).

When such a message is returned, the message group is terminated, and on successful completion of that MQGET call there is no longer a current group. In a similar way, a logical message becomes the current logical message when a message that has the MFSEG flag is returned by the MQGET call, and that logical message is terminated when the message that has the MFLSEG flag is returned.

If no selection criteria are specified, successive MQGET calls return (in the correct order) the messages for the first message group on the queue, then the messages for the second message group, and so on, until there are no more messages available. It is possible to select the particular message groups returned by specifying one or more of the following options in the *GMMO* field:

- MOMSGI
- MOCORI
- MOGRPI

However, these options are effective only when there is no current message group or logical message; see the *GMMO* field described in this topic.

Table 702 on page 1076 shows the values of the *MDMID*, *MDCID*, *MDGID*, *MDSEQ*, and *MDOFF* fields that the queue manager looks for when attempting to find a message to return on the MQGET call. This applies both to removing messages from the queue, and browsing messages on the queue. The columns in the table have the following meanings:

LOG ORD
Indicates whether the GMLOGO option is specified on the call.

Cur grp
Indicates whether a current message group exists before the call.

Cur log msg
Indicates whether a current logical message exists before the call.

Other columns
Show the values that the queue manager looks for. "Previous" denotes the value returned for the field in the previous message for the queue handle.

Table 702. MQGET options relating to messages in groups and segments of logical messages

Options you specify	**Group and log-msg status before call**		**Values the queue manager looks for**				
LOG ORD	**Cur grp**	**Cur log msg**	*MDMID*	*MDCID*	*MDGID*	*MDSEQ*	*MDOFF*
Yes	No	No	Controlled by *GMMO*	Controlled by *GMMO*	Controlled by *GMMO*	1	0
Yes	No	Yes	Any message identifier	Any correlation identifier	Previous group identifier	1	Previous offset + previous segment length

Table 702. MQGET options relating to messages in groups and segments of logical messages (continued)							
Options you specify	**Group and log-msg status before call**		**Values the queue manager looks for**				
Yes	Yes	No	Any message identifier	Any correlation identifier	Previous group identifier	Previous sequence number + 1	0
Yes	Yes	Yes	Any message identifier	Any correlation identifier	Previous group identifier	Previous sequence number	Previous offset + previous segment length
No	Either	Either	Controlled by *GMMO*	Controlled by *GMMO*	Controlled by *GMMO*	Controlled by *GMMO*	Controlled by *GMMO*

When multiple message groups are present on the queue and eligible for return, the groups are returned in the order determined by the position on the queue of the first segment of the first logical message in each group (that is, the physical messages that have message sequence numbers of 1, and offsets of 0, determine the order in which eligible groups are returned).

The GMLOGO option affects units of work as follows:

- If the first logical message or segment in a group is retrieved within a unit of work, all the other logical messages and segments in the group must be retrieved within a unit of work, if the same queue handle is used. However, they need not be retrieved within the same unit of work. This allows a message group consisting of many physical messages to be split across two or more consecutive units of work for the queue handle.
- If the first logical message or segment in a group is not retrieved within a unit of work, none of the other logical messages and segments in the group can be retrieved within a unit of work, if the same queue handle is used.

If these conditions are not satisfied, the MQGET call fails with reason code RC2245 .

When GMLOGO is specified, the MQGMO supplied on the MQGET call must not be less than GMVER2, and the MQMD must not be less than MDVER2. If this condition is not satisfied, the call fails with reason code RC2256 or RC2257 , as appropriate.

If GMLOGO is not specified for successive MQGET calls for the queue handle, messages are returned without regard for whether they belong to message groups, or whether they are segments of logical messages. This means that messages or segments from a particular group or logical message might be returned out of order, or they might be intermingled with messages or segments from other groups or logical messages, or with messages that are not in groups and are not segments. In this situation, the particular messages that are returned by successive MQGET calls is controlled by the MO* options specified on those calls (see the *GMMO* field described in “MQGMO (Get-message options) on IBM i” on page 1064 for details of these options).

This is the technique that can be used to restart a message group or logical message in the middle, after a system failure has occurred. When the system restarts, the application can set the *MDGID*, *MDSEQ*, *MDOFF*, and *GMMO* fields to the appropriate values, and then issue the MQGET call with GMSYP or GMNSYP set as needed, but without specifying GMLOGO. If this call is successful, the queue manager retains the group and segment information, and subsequent MQGET calls using that queue handle can specify GMLOGO as normal.

The group and segment information that the queue manager retains for the MQGET call is separate from the group and segment information that it retains for the MQPUT call. In addition, the queue manager retains separate information for:

- MQGET calls that remove messages from the queue.
- MQGET calls that browse messages on the queue.

For any given queue handle, the application is free to mix MQGET calls that specify GMLOGO with MQGET calls that do not, but the following points must be noted:

- If GMLOGO is not specified, each successful MQGET call causes the queue manager to set the saved group and segment information to the values corresponding to the message returned; this replaces the existing group and segment information retained by the queue manager for the queue handle. Only the information appropriate to the action of the call (browse or remove) is modified.
- If GMLOGO is not specified, the call does not fail if there is a current message group or logical message; the call might however succeed with a CCWARN completion code. Table 703 on page 1078 shows the various cases that can arise. In these cases, if the completion code is not CCOK, the reason code is one of the following:
  - RC2241
  - RC2242
  - RC2245

  Note: The queue manager does not check the group and segment information when browsing a queue, or when closing a queue that was opened for browse but not input; in those cases the completion code is always CCOK (assuming no other errors).

Table 703. Outcome when MQGET or MQCLOSE call is not consistent with group and segment information

Current call is	Previous call was MQGET with GMLOGO	Previous call was MQGET without GMLOGO
MQGET with GMLOGO	CCFAIL	CCFAIL
MQGET without GMLOGO	CCWARN	CCOK
MQCLOSE with an unterminated group or logical message	CCWARN	CCOK

Applications that simply want to retrieve messages and segments in logical order are recommended to specify GMLOGO, as this is the simplest option to use. This option relieves the application of the need to manage the group and segment information, because the queue manager manages that information. However, specialized applications might need more control than provided by the GMLOGO option, and this can be achieved by not specifying that option. If this is done, the application must ensure that the *MDMID*, *MDCID*, *MDGID*, *MDSEQ*, and *MDOFF* fields in MQMD, and the MO* options in *GMMO* in MQGMO, are set correctly, before each MQGET call.

For example, an application that wants to forward physical messages that it receives, without regard for whether those messages are in groups or segments of logical messages, should not specify GMLOGO. This is because in a complex network with multiple paths between sending and receiving queue managers, the physical messages might arrive out of order. By not specifying GMLOGO and the corresponding PMLOGO on the MQPUT call, the forwarding application can retrieve and forward each physical message as soon as it arrives, without having to wait for the next one in logical order to arrive.

GMLOGO can be specified with any of the other GM* options, and with various of the MO* options in appropriate circumstances.

GMCMPM

Only complete logical messages are retrievable.

This option specifies that only a complete logical message can be returned by the MQGET call. If the logical message is segmented, the queue manager reassembles the segments and returns the complete logical message to the application; the fact that the logical message was segmented is not apparent to the application retrieving it.

Note: This is the only option that causes the queue manager to reassemble message segments. If not specified, segments are returned individually to the application if they are present on the queue (and they satisfy the other selection criteria specified on the MQGET call). Applications that do not want to receive individual segments should therefore always specify GMCMPM.

To use this option, the application must provide a buffer which is large enough to accommodate the complete message, or specify the GMATM option.

If the queue contains segmented messages with some of the segments missing (perhaps because they have been delayed in the network and have not yet arrived), specifying GMCMPM prevents the retrieval of segments belonging to incomplete logical messages. However, those message segments still contribute to the value of the **CurrentQDepth** queue attribute; this means that there might be no retrievable logical messages, even though *CurrentQDepth* is greater than zero.

For persistent messages, the queue manager can reassemble the segments only within a unit of work:

- If the MQGET call is operating within a user-defined unit of work, that unit of work is used. If the call fails part way through the reassembly process, the queue manager reinstates on the queue any segments that were removed during reassembly. However, the failure does not prevent the unit of work being committed successfully.
- If the call is operating outside a user-defined unit of work, and there is no user-defined unit of work in existence, the queue manager creates a unit of work just for the duration of the call. If the call is successful, the queue manager commits the unit of work automatically (the application does not need to do this). If the call fails, the queue manager backs out the unit of work.
- If the call is operating outside a user-defined unit of work, but a user-defined unit of work does exist, the queue manager is unable to perform reassembly. If the message does not require reassembly, the call can still succeed. But if the message does require reassembly, the call fails with reason code RC2255 .

For nonpersistent messages, the queue manager does not require a unit of work to be available in order to perform reassembly.

Each physical message that is a segment has its own message descriptor. For the segments constituting a single logical message, most of the fields in the message descriptor is the same for all segments in the logical message - typically it is only the *MDMID*, *MDOFF*, and *MDMFL* fields that differ between segments in the logical message. However, if a segment is placed on a dead-letter queue at an intermediate queue manager, the DLQ handler retrieves the message specifying the GMCONV option, and this might result in the character set or encoding of the segment being changed. If the DLQ handler successfully sends the segment on its way, the segment might have a character set or encoding that differs from the other segments in the logical message when the segment finally arrives at the destination queue manager.

A logical message consisting of segments in which the *MDCSI*, *MDENC*, or both fields differ cannot be reassembled by the queue manager into a single logical message. Instead, the queue manager reassembles and returns the first few consecutive segments at the start of the logical message that have the same character-set identifiers and encodings, and the MQGET call completes with completion code CCWARN and reason code RC2243 or RC2244 , as appropriate. This happens regardless of whether GMCONV is specified. To retrieve the remaining segments, the application must reissue the MQGET call without the GMCMPM option, retrieving the segments one by one. GMLOGO can be used to retrieve the remaining segments in order.

It is also possible for an application which puts segments to set other fields in the message descriptor to values that differ between segments. However, there is no advantage in doing this if the receiving application uses GMCMPM to retrieve the logical message. When the queue manager reassembles a logical message, it returns in the message descriptor the values from the message descriptor for the first segment; the only exception is the *MDMFL* field, which the queue manager sets to indicate that the reassembled message is the only segment.

If GMCMPM is specified for a report message, the queue manager performs special processing. The queue manager checks the queue to see if all the report messages of that report type relating to the different segments in the logical message are present on the queue. If they are, they can be retrieved as a single message by specifying GMCMPM. For this to be possible, either the report messages must be generated by a queue manager or MCA which supports segmentation, or the originating application must request at least 100 bytes of message data (that is, the appropriate RO*D or RO*F options must be specified). If less than the full amount of application data is present for a segment, the missing bytes are replaced by nulls in the report message returned.

If GMCMPM is specified with GMMUC or GMBRWC, the browse cursor must be positioned on a message with a *MDOFF* field in MQMD that has a value of 0. If this condition is not satisfied, the call fails with reason code RC2246 .

GMCMPM implies GMASGA, which need not therefore be specified.

GMCMPM can be specified with any of the other GM* options apart from GMPSYP, and with any of the MO* options apart from MOOFFS.

GMAMSA
All messages in group must be available.

This option specifies that messages in a group become available for retrieval only when all messages in the group are available. If the queue contains message groups with some of the messages missing (perhaps because they have been delayed in the network and have not yet arrived), specifying GMAMSA prevents retrieval of messages belonging to incomplete groups. However, those messages still contribute to the value of the **CurrentQDepth** queue attribute; this means that there might be no retrievable message groups, even though **CurrentQDepth** is greater than zero. If there are no other messages that are retrievable, reason code RC2033 is returned after the specified wait interval (if any) has expired.

The processing of GMAMSA depends on whether GMLOGO is also specified:

- If both options are specified, GMAMSA affects only when there is no current group or logical message. If there is a current group or logical message, GMAMSA is ignored. This means that GMAMSA can remain on when processing messages in logical order.
- If GMAMSA is specified without GMLOGO, GMAMSA always has an effect. This means that the option must be turned off after the first message in the group has been removed from the queue, in order to be able to remove the remaining messages in the group.

Successful completion of an MQGET call specifying GMAMSA means that at the time that the MQGET call was issued, all the messages in the group were on the queue. However, be aware that other applications are still able to remove messages from the group (the group is not locked to the application that retrieves the first message in the group).

If this option is not specified, messages belonging to groups can be retrieved even when the group is incomplete.

GMAMSA implies GMASGA, which need not therefore be specified.

GMAMSA can be specified with any of the other GM* options, and with any of the MO* options.

GMASGA
All segments in a logical message must be available.

This option specifies that segments in a logical message become available for retrieval only when all segments in the logical message are available. If the queue contains segmented messages with some of the segments missing (perhaps because they have been delayed in the network and have not yet arrived), specifying GMASGA prevents retrieval of segments belonging to incomplete logical messages. However those segments still contribute to the value of the **CurrentQDepth** queue attribute; this means that there might be no retrievable logical messages, even though **CurrentQDepth** is greater than zero. If there are no other messages that are retrievable, reason code RC2033 is returned after the specified wait interval (if any) has expired.

The processing of GMASGA depends on whether GMLOGO is also specified:

- If both options are specified, GMASGA has an effect only when there is no current logical message. If there is a current logical message, GMASGA is ignored. This means that GMASGA can remain on when processing messages in logical order.
- If GMASGA is specified without GMLOGO, GMASGA always has an effect. This means that the option must be turned off after the first segment in the logical message has been removed from the queue, in order to be able to remove the remaining segments in the logical message.

If this option is not specified, message segments can be retrieved even when the logical message is incomplete.

While both GMCMPM and GMASGA require all segments to be available before any of them can be retrieved, the former returns the complete message, whereas the latter allows the segments to be retrieved one by one.

If GMASGA is specified for a report message, the queue manager performs special processing. The queue manager checks the queue to see if there is at least one report message for each of the segments that make up the complete logical message. If there is, the GMASGA condition is satisfied. However, the queue manager does not check the type of the report messages present, and so there might be a mixture of report types in the report messages relating to the segments of the logical message. As a result, the success of GMASGA does not imply that GMCMPM succeeds. If there is a mixture of report types present for the segments of a particular logical message, those report messages must be retrieved one by one.

GMASGA can be specified with any of the other GM* options, and with any of the MO* options.

Default option: If none of the options described are required, the following option can be used:

GMNONE
No options specified.

This value can be used to indicate that no other options have been specified; all options assume their default values. GMNONE is defined to aid program documentation; it is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

The initial value of the *GMOPT* field is GMNWT.

GMRE1 (1 byte character string)

Reserved.

This is a reserved field. The initial value of this field is a blank character. This field is ignored if *GMVER* is less than GMVER2.

GMRL (10 digit signed integer)

Length of message data returned (bytes).

This is an output field that is set by the queue manager to the length in bytes of the message data returned by the MQGET call in the **BUFFER** parameter. If the queue manager does not support this capability, *GMRL* is set to the value RLUNDF.

When messages are converted between encodings or character sets, the message data can sometimes change size. On return from the MQGET call:

- If *GMRL* is not RLUNDF, the number of bytes of message data returned is given by *GMRL*.
- If *GMRL* has the value RLUNDF, the number of bytes of message data returned is typically given by the smaller of *BUFLEN* and *DATLEN*, but can be less than this if the MQGET call completes with reason code RC2079 . If this happens, the insignificant bytes in the **BUFFER** parameter are set to nulls.

The following special value is defined:

RLUNDF
Length of returned data not defined.

The initial value of this field is RLUNDF. This field is ignored if *GMVER* is less than GMVER3.

GMRQN (48 byte character string)

Resolved name of destination queue.

This is an output field which is set by the queue manager to the local name of the queue from which the message was retrieved, as defined to the local queue manager. This is different from the name used to open the queue if:

- An alias queue was opened (in which case, the name of the local queue to which the alias resolved is returned), or
- A model queue was opened (in which case, the name of the dynamic local queue is returned).

The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

GMRS2 (1 byte character string)

Reserved.

This is a reserved field. The initial value of this field is a blank character. This field is ignored if *GMVER* is less than GMVER4.

GMSEG (1 byte character string)

Flag indicating whether further segmentation is allowed for the message retrieved.

It has one of the following values:

SEGIHB
Segmentation not allowed.

SEGALW
Segmentation allowed.

This is an output field. The initial value of this field is SEGIHB. This field is ignored if *GMVER* is less than GMVER2.

GMSG1 (10 digit signed integer)

Signal.

This is a reserved field; its value is not significant. The initial value of this field is 0.

GMSG2 (10 digit signed integer)

Signal identifier.

This is a reserved field; its value is not significant.

GMSID (4 byte character string)

Structure identifier.

The value must be:

GMSIDV
Identifier for get-message options structure.

This field is always an input field. The initial value of this field is GMSIDV.

GMSST (1 byte character string)

Flag indicating whether message retrieved is a segment of a logical message.

It has one of the following values:

SSNSEG
Message is not a segment.

SSSEG
Message is a segment, but is not the last segment of the logical message.

SSLSEG
Message is the last segment of the logical message.

This is also the value returned if the logical message consists of only one segment.

This field is an output field. The initial value of this field is SSNSEG. This field is ignored if *GMVER* is less than GMVER2.

GMTOK (16 byte bit string)

Message token.

This is a reserved field; its value is not significant. The following special value is defined:

MTKNON
No message token.

The value is binary zero for the length of the field.

The length of this field is given by LNMTOK. The initial value of this field is MTKNON. This field is ignored if *GMVER* is less than GMVER3.

GMVER (10 digit signed integer)

Structure version number.

The value must be one of the following:

GMVER1
Version-1 get-message options structure.

GMVER2
Version-2 get-message options structure.

GMVER3
Version-3 get-message options structure.

GMVER4
Version-4 get-message options structure.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

GMVERC
Current version of get-message options structure.

This field is always an input field. The initial value of this field is GMVER1.

GMVER (10 digit signed integer)

Structure version number.

The value must be one of the following:

GMVER1
Version-1 get-message options structure.

GMVER2
Version-2 get-message options structure.

GMVER3
Version-3 get-message options structure.

GMVER4
Version-4 get-message options structure.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

GMVERC
Current version of get-message options structure.

This field is always an input field. The initial value of this field is GMVER1.

GMWI (10 digit signed integer)

Wait interval.

This is the approximate time, expressed in milliseconds, that the MQGET call waits for a suitable message to arrive (that is, a message satisfying the selection criteria specified in the **MSGDSC** parameter of the MQGET call; see the *MDMID* field described in "MQMD (Message descriptor) on IBM i" on page 1097 for more details). If no suitable message has arrived after this time has elapsed, the call completes with CCFAIL and reason code RC2033.

GMWI is used with the GMWT option. It is ignored if this option is not specified. If it is specified, *GMWI* must be greater than or equal to zero, or the following special value:

WIULIM
Unlimited wait interval.

The initial value of this field is 0.

Initial values

Table 704. Initial values of fields in MQGMO

Field name	Name of constant	Value of constant
GMSID	GMSIDV	'GMO¬'
GMVER	GMVER1	1
GMOPT	GMNWT	0
GMWI	None	0
GMSG1	None	0
GMSG2	None	0
GMRQN	None	Blanks
GMMO	MOMSGI + MOCORI	3
GMGST	GSNIG	'¬'
GMSST	SSNSEG	'¬'
GMSEG	SEGIHB	'¬'
GMRE1	None	'¬'
GMTOK	MTKNON	Nulls
GMRL	RLUNDF	-1
GMRS2	None	'¬'
GMMH	HMNONE	0

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D*
D* MQGMO Structure
D*
D* Structure identifier
D  GMSID                  1      4    INZ('GMO ')
```

```
     D* Structure version number
     D  GMVER                  5      8I 0 INZ(1)
     D* Options that control the action ofMQGET
     D  GMOPT                  9     12I 0 INZ(0)
     D* Wait interval
     D  GMWI                  13     16I 0 INZ(0)
     D* Signal
     D  GMSG1                 17     20I 0 INZ(0)
     D* Signal identifier
     D  GMSG2                 21     24I 0 INZ(0)
     D* Resolved name of destination queue
     D  GMRQN                 25     72    INZ
     D* Options controlling selection criteriaused for MQGET
     D  GMMO                  73     76I 0 INZ(3)
     D* Flag indicating whether messageretrieved is in a group
     D  GMGST                 77     77    INZ(' ')
     D* Flag indicating whether messageretrieved is a segment of a
     D* logicalmessage
     D  GMSST                 78     78    INZ(' ')
     D* Flag indicating whether furthersegmentation is allowed for themessage
     D* retrieved
     D  GMSEG                 79     79    INZ(' ')
     D* Reserved
     D  GMRE1                 80     80    INZ
     D* Message token
     D  GMTOK                 81     96    INZ(X'00000000000000-
     D                                     000000000000000000')
     D* Length of message data returned(bytes)
     D  GMRL                  97    100I 0 INZ(-1)
     D* Reserved
     D  GMRS2                101    104I 0 INZ(0)
     D* Message handle
     D  GMMH                 105    112I 0 INZ(0)
```

IBM i MQIIH (IMS information header) on IBM i

The MQIIH structure describes the information that must be present at the start of a message sent to the IMS bridge through IBM MQ for z/OS.

Overview

Format name: FMIMS.

Character set and encoding: Special conditions apply to the character set and encoding used for the MQIIH structure and application message data:

- Applications that connect to the queue manager that owns the IMS bridge queue must provide an MQIIH structure that is in the character set and encoding of the queue manager. This is because data conversion of the MQIIH structure is not performed in this case.
- Applications that connect to other queue managers can provide an MQIIH structure that is in any of the supported character sets and encodings; conversion of the MQIIH is performed by the receiving message channel agent connected to the queue manager that owns the IMS bridge queue.

  Note: There is one exception to this. If the queue manager that owns the IMS bridge queue is using CICS for distributed queuing, the MQIIH must be in the character set and encoding of the queue manager that owns the IMS bridge queue.
- The application message data following the MQIIH structure must be in the same character set and encoding as the MQIIH structure. The *IICSI* and *IIENC* fields in the MQIIH structure cannot be used to specify the character set and encoding of the application message data.

  A data-conversion exit must be provided by the user to convert the application message data if the data is not one of the built-in formats supported by the queue manager.

- “Authenticating passtickets for IMS bridge applications” on page 1086
- “Fields” on page 1086
- “Initial values” on page 1089
- “RPG declaration” on page 1089

Authenticating passtickets for IMS bridge applications

It is now possible for IBM MQ administrators to specify the application name to be used for authenticating passtickets, for IMS bridge applications. To do this, the application name is specified as a new attribute PTKTAPPL for the STGCLASS object definition, as a 1 to 8 character alphanumeric string.

A blank value means that authentication occurs as with previous releases of IBM MQ, that is, no application name flows on the authentication request, and the MVSxxxx value to is used instead.

A value of 1 - 8 alphanumeric characters must follow the rules for passticket application names as described in the RACF publications.

IBM MQ Administrators and RACF administrators must both agree on the valid application names to be used. The RACF administrator must create a profile in the PTKTDATA class giving READ access to the user IDs of all applications that are to be granted access. The IBM MQ administrator must create or alter the required STGCLASS definitions that specify the application name to be used for passticket authentication.

For related information, see the *Script (MQSC) Command Reference*.

Fields

The MQIIH structure contains the following fields; the fields are described in **alphabetical order**:

IIAUT (8-byte character string)

RACF password or passticket.

This is optional; if specified, it is used with the user ID in the MQMD security context to build a UTOKEN that is sent to IMS to provide a security context. If it is not specified, the user ID is used without verification. This depends on the setting of the RACF switches, which may require an authenticator to be present.

This is ignored if the first byte is blank or null. The following special value may be used:

IAUNON
No authentication.

The length of this field is given by LNAUTH. The initial value of this field is IAUNON.

IICMT (1-byte character string)

Commit mode.

See the *OTMA Reference* for more information about IMS commit modes. The value must be one of the following:

ICMCTS
Commit then send.

This mode implies double queuing of output, but shorter region occupancy times. Fast-path and conversational transactions cannot run with this mode.

ICMSTC
Send then commit.

The initial value of this field is ICMCTS.

IICSI (10-digit signed integer)

Reserved.

This is a reserved field; its value is not significant. The initial value of this field is 0.

IIENC (10-digit signed integer)

Reserved.

This is a reserved field; its value is not significant. The initial value of this field is 0.

IIFLG (10-digit signed integer)

Flags.

The value must be:

IINONE
No flags.

The initial value of this field is IINONE.

IIFMT (8-byte character string)

IBM MQ format name of data that follows MQIIH.

This specifies the IBM MQ format name of the data that follows the MQIIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The length of this field is given by LNFMT. The initial value of this field is FMNONE.

IILEN (10-digit signed integer)

Length of MQIIH structure.

The value must be:

IILEN1
Length of IMS information header structure.

The initial value of this field is IILEN1.

IILTO (8-byte character string)

Logical terminal override.

This is placed in the IO PCB field. It is optional; if it is not specified the TPIPE name is used. It is ignored if the first byte is blank, or null.

The length of this field is given by LNLTOV. The initial value of this field is 8 blank characters.

IIMMN (8-byte character string)

Message format services map name.

This is placed in the IO PCB field. It is optional. On input it represents the MID, on output it represents the MOD. It is ignored if the first byte is blank or null.

The length of this field is given by LNMFMN. The initial value of this field is 8 blank characters.

IIRFM (8-byte character string)

IBM MQ format name of reply message.

This is the IBM MQ format name of the reply message that will be sent in response to the current message. The rules for coding this are the same as those for the *MDFMT* field in MQMD.

The length of this field is given by LNFMT. The initial value of this field is FMNONE.

IIRSV (1-byte character string)

Reserved.

This is a reserved field; it must be blank.

IISEC (1-byte character string)

Security scope.

This indicates the required IMS security processing. The following values are defined:

ISSCHK
Check security scope.

An ACEE is built in the control region, but not in the dependent region.

ISSFUL
Full security scope.

A cached ACEE is built in the control region and a non-cached ACEE is built in the dependent region. If you use ISSFUL, you must ensure that the user ID for which the ACEE is built has access to the resources used in the dependent region.

If ISSCHK and ISSFUL are not specified for this field, ISSCHK is assumed.

The initial value of this field is ISSCHK.

IISID (4-byte character string)

Structure identifier.

The value must be:

IISIDV
Identifier for IMS information header structure.

The initial value of this field is IISIDV.

IITID (16-byte bit string)

Transaction instance identifier.

This field is used by output messages from IMS so is ignored on first input. If *IITST* is set to ITSIC, this must be provided in the next input, and all subsequent inputs, to enable IMS to correlate the messages to the correct conversation. The following special value may be used:

ITINON
No transaction instance ID.

The length of this field is given by LNTIID. The initial value of this field is ITINON.

IITST (1-byte character string)

Transaction state.

This indicates the IMS conversation state. This is ignored on first input because no conversation exists. On subsequent inputs it indicates whether a conversation is active or not. On output it is set by IMS. The value must be one of the following:

ITSIC
In conversation.

ITSNIC
Not in conversation.

ITSARC
Return transaction state data in architected form.

This value is used only with the IMS `/DISPLAY TRAN` command. It causes the transaction state data to be returned in the IMS architected form instead of character form. See Writing IMS transaction programs through IBM MQ for further details.

The initial value of this field is ITSNIC.

IIVER (10-digit signed integer)

Structure version number.

The value must be:

IIVER1
Version number for IMS information header structure.

The following constant specifies the version number of the current version:

IIVERC
Current version of IMS information header structure.

The initial value of this field is IIVER1.

Initial values

Table 705. Initial values of fields in MQIIH

Field name	Name of constant	Value of constant
IISID	IISIDV	'IIH¬'
IIVER	IIVER1	1
IILEN	IILEN1	84
IIENC	None	0
IICSI	None	0
IIFMT	FMNONE	Blanks
IIFLG	IINONE	0
IILTO	None	Blanks
IIMMN	None	Blanks
IIRFM	FMNONE	Blanks
IIAUT	IAUNON	Blanks
IITID	ITINON	Nulls
IITST	ITSNIC	'¬'
IICMT	ICMCTS	'0'
IISEC	ISSCHK	'C'
IIRSV	None	'¬'

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQIIH Structure
     D*
     D* Structure identifier
     D  IISID                  1      4    INZ('IIH ')
     D* Structure version number
     D  IIVER                  5      8I 0 INZ(1)
     D* Length of MQIIH structure
     D  IILEN                  9     12I 0 INZ(84)
     D* Reserved
     D  IIENC                 13     16I 0 INZ(0)
     D* Reserved
     D  IICSI                 17     20I 0 INZ(0)
     D* MQ format name of data that followsMQIIH
     D  IIFMT                 21     28    INZ('        ')
     D* Flags
     D  IIFLG                 29     32I 0 INZ(0)
     D* Logical terminal override
     D  IILTO                 33     40    INZ
     D* Message format services map name
     D  IIMMN                 41     48    INZ
```

```
     D* MQ format name of reply message
     D  IIRFM                 49     56    INZ('        ')
     D* RACF password or passticket
     D  IIAUT                 57     64    INZ('        ')
     D* Transaction instance identifier
     D  IITID                 65     80    INZ(X'00000000000000-
     D                                     0000000000000000000')
     D* Transaction state
     D  IITST                 81     81    INZ(' ')
     D* Commit mode
     D  IICMT                 82     82    INZ('0')
     D* Security scope
     D  IISEC                 83     83    INZ('C')
     D* Reserved
     D  IIRSV                 84     84    INZ
```

IBM i MQIMPO (Inquire message property options) on IBM i

The MQIMPO structure allows applications to specify options that control how properties of messages are inquired.

Overview

Purpose: The structure is an input parameter on the MQINQMP call.

Character set and encoding: Data in MQIMPO must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1090
- "Initial values" on page 1096
- "RPG declaration" on page 1096

Fields

The MQIMPO structure contains the following fields; the fields are described in **alphabetical order**:

IPOPT (10-digit signed integer)

The following options control the action of MQINQMP. You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations). Combinations of options that are not valid are noted; all other combinations are valid.

Value data options: The following options relate to the processing of the value data when the property is retrieved from the message.

IPCVAL

This option requests that the value of the property be converted to conform to the *IPREQCSI* and *IPREQENC* values specified before the MQINQMP call returns the property value in the *Value* area.

- If conversion is successful, the *IPRETCSI* and *IPRETENC* fields are set to the same as *IPREQCSI* and *IPREQENC* on return from the MQINQMP call.
- If conversion fails, but the MQINQMP call otherwise completes without error, the property value is returned unconverted.

  If the property is a string, the *IPRETCSI* and *IPRETENC* fields are set to the character set and encoding of the unconverted string.

  The completion code is CCWARN in this case, with reason code RC2466. The property cursor is advanced to the returned property.

If the property value expands during conversion, and exceeds the size of the **Value** parameter, the value is returned unconverted, with completion code CCFAIL; the reason code is set to RC2469.

The **DataLength** parameter of the MQINQMP call returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

This option also requests that:

- If the property name contains a wildcard, and
- The *IPRETNAMECHRP* field is initialized with an address or offset for the returned name,

then the returned name is converted to conform to the *IPREQCSI* and *IPREQENC* values.

- If conversion is successful, the *VSCCSID* field of *IPRETNAMECHRP* and the encoding of the returned name are set to the input value of *IPREQCSI* and *IPREQENC*.
- If conversion fails, but the MQINQMP call otherwise completes without error or warning, the returned name is unconverted. The completion code is CCWARN in this case, with reason code RC2492.

  The property cursor is advanced to the returned property. RC2466 is returned if both the value and the name are not converted.

If the returned name expands during conversion, and exceeds the size of the *VSBufsize* field of the *RequestedName*, the returned string is left unconverted, with completion code CCFAIL and the reason code is set to RC2465.

The *VSLength* field of the MQCHARV structure returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

IPCTYP

This option requests that the value of the property be converted from its current data type, into the data type specified on the **Type** parameter of the MQINQMP call.

- If conversion is successful, the **Type** parameter is unchanged on return of the MQINQMP call.
- If conversion fails, but the MQINQMP call otherwise completes without error, the call fails with reason RC2470. The property cursor is unchanged.

If the conversion of the data type causes the value to expand during conversion, and the converted value exceeds the size of the **Value** parameter, the value is returned unconverted, with completion code CCFAIL and the reason code is set to RC2469.

The **DataLength** parameter of the MQINQMP call returns the length that the property value would have converted to, in order to allow the application to determine the size of the buffer required to accommodate the converted property value. The property cursor is unchanged.

If the value of the **Type** parameter of the MQINQMP call is not valid, the call fails with reason RC2473.

If the requested data type conversion is not supported, the call fails with reason RC2470. The following data type conversions are supported:

Table 706. Supported data type conversions

Property data type	Supported target data types
TYPBOL	TYPSTR, TYPI8, TYPI16, TYPI32, TYPI64
TYPBST	TYPSTR
TYPI8	TYPSTR, TYPI16, TYPI32, TYPI64
TYPI16	TYPSTR, TYPI32, TYPI64

Property data type	Supported target data types
TYPI32	TYPSTR, TYPI64
TYPI64	TYPSTR
TYPF32	TYPSTR, TYPF64
TYPF64	TYPSTR
TYPSTR	TYPBOL, TYPI8, TYPI16, TYPI32, TYPI64, TYPF32, TYPF64
TYPNUL	None

Table 706. Supported data type conversions (continued)

The general rules governing the supported conversions are as follows:

- Numeric property values can be converted from one data type to another, provided that no data is lost during the conversion.

  For example, the value of a property with data type TYPI32 can be converted into a value with data type TYPI64, but cannot be converted into a value with data type TYPI16.
- A property value of any data type can be converted into a string.
- A string property value can be converted to any other data type provided the string is formatted correctly for the conversion. If an application attempts to convert a string property value that is not formatted correctly, IBM MQ returns reason code RC2472.
- If an application attempts a conversion that is not supported, IBM MQ returns reason code RC2470.

The specific rules for converting a property value from one data type to another are as follows:

- When converting a TYPBOL property value to a string, the value TRUE is converted to the string "TRUE", and the value false is converted to the string "FALSE".
- When converting a TYPBOL property value to a numeric data type, the value TRUE is converted to one, and the value FALSE is converted to zero.
- When converting a string property value to a TYPBOL value, the string "TRUE" , or "1" , is converted to TRUE, and the string "FALSE", or "0", is converted to FALSE.

  Note that the terms "TRUE" and "FALSE" are not case sensitive.

  Any other string cannot be converted; IBM MQ returns reason code RC2472.
- When converting a string property value to a value with data type TYPI8, TYPI16, TYPI32 or TYPI64, the string must have the following format:

  ```
  [blanks][sign]digits
  ```

  The meanings of the components of the string are as follows:

  blanks
  Optional leading blank characters

  sign
  An optional plus sign (+) or minus sign (-) character.

  digits
  A contiguous sequence of digit characters (0-9). At least one digit character must be present.

  After the sequence of digit characters, the string can contain other characters that are not digit characters, but the conversion stops as soon as the first of these characters is reached. The string is assumed to represent a decimal integer.

  IBM MQ returns reason code RC2472 if the string is not formatted correctly.

- When converting a string property value to a value with data type TYPF32 or TYPF64, the string must have the following format:

  ```
  [blanks][sign]digits[.digits][e_char[e_sign]e_digits]
  ```

  The meanings of the components of the string are as follows:

  blanks
  : Optional leading blank characters

  sign
  : An optional plus sign (+) or minus sign (-) character.

  digits
  : A contiguous sequence of digit characters (0-9). At least one digit character must be present.

  e_char
  : An exponent character, which is either "E" or "e".

  e_sign
  : An optional plus sign (+) or minus sign (-) character for the exponent.

  e_digits
  : A contiguous sequence of digit characters (0-9) for the exponent. At least one digit character must be present if the string contains an exponent character.

  After the sequence of digit characters, or the optional characters representing an exponent, the string can contain other characters that are not digit characters, but the conversion stops as soon as the first of these characters is reached. The string is assumed to represent a decimal floating point number with an exponent that is a power of 10.

  IBM MQ returns reason code RC2472 if the string is not formatted correctly.
- When converting a numeric property value to a string, the value is converted to the string representation of the value as a decimal number, not the string containing the ASCII character for that value. For example, the integer 65 is converted to the string "65", not the string "A".
- When converting a byte string property value to a string, each byte is converted to the two hexadecimal characters that represent the byte. For example, the byte array {0xF1, 0x12, 0x00, 0xFF} is converted to the string "F11200FF".

IPQLEN

Query the type and length of the property value. The length is returned in the **DataLength** parameter of the MQINQMP call. The property value is not returned.

If a *ReturnedName* buffer is specified, the *VSLength* field of the MQCHARV structure is filled in with the length of the property name. The property name is not returned.

Iteration options: The following options relate to iterating over properties, using a name with a wildcard character

IPINQF

Inquire on the first property that matches the specified name. After this call, a cursor is established on the property that is returned.

This is the default value.

The IPINQC option can subsequently be used with an MQINQMP call, if required, to inquire on the same property again.

Note that there is only one property cursor; therefore, if the property name, specified in the MQINQMP call, changes the cursor is reset.

This option is not valid with either of the following options:

IPINQN
IPINQC

IPINQN

Inquires on the next property that matches the specified name, continuing the search from the property cursor. The cursor is advanced to the property that is returned.

If this is the first MQINQMP call for the specified name, then the first property that matches the specified name is returned.

The IPINQC option can subsequently be used with an MQINQMP call if required, to inquire on the same property again.

If the property under the cursor has been deleted, MQINQMP returns the next matching property following the one that has been deleted.

If a property is added that matches the wildcard, while an iteration is in progress, the property might or might not be returned during the completion of the iteration. The property is returned once the iteration restarts using IPINQF.

A property matching the wildcard that was deleted, while the iteration was in progress, is not returned subsequent to its deletion.

This option is not valid with either of the following options:

IPINQF
IPINQC

IPINQC

Retrieve the value of the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired, using either the IPINQF or the IPINQN option.

The property cursor is reset when the message handle is reused, when the message handle is specified in the *MsgHandle* field of the MQGMO on an MQGET call, or when the message handle is specified in *OriginalMsgHandle* or *NewMsgHandle* fields of the MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established, or if the property pointed to by the property cursor has been deleted, the call fails with completion code CCFAIL and reason RC2471.

This option is not valid with either of the following options:

IPINQF
IPINQN

If none of the options previously described is required, the following option can be used:

IPNONE

Use this value to indicate that no other options have been specified; all options assume their default values.

IPNONE aids program documentation; it is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

This is always an input field. The initial value of this field is IPINQF.

IPREQCSI (10-digit signed integer)

The character set that the inquired property value is to be converted into if the value is a character string. This is also the character set into which the *ReturnedName* is to be converted when IPCVAL or IPCTYP is specified.

The initial value of this field is CSAPL.

IPREQENC (10-digit signed integer)

This is the encoding into which the inquired property value is to be converted when IPCVAL or IPCTYP is specified.

The initial value of this field is ENNAT.

IPRE1 (10-digit signed integer)

This is a reserved field. The initial value of this field is a blank character.

IPRETCSI (10-digit signed integer)

On output, this is the character set of the value returned if the **Type** parameter of the MQINQMP call is TYPSTR.

If the IPCVAL option is specified and conversion was successful, the *ReturnedCCSID* field, on return, is the same value as the value passed in.

The initial value of this field is zero.

IPRETENC (10-digit signed integer)

On output, this is the encoding of the value returned.

If the IPCVAL option is specified and conversion was successful, the *ReturnedEncoding* field, on return, is the same value as the value passed in.

The initial value of this field is ENNAT.

IPRETNAMCHRP (10-digit signed integer)

The actual name of the inquired property.

On input a string buffer can be passed in using the *VSPtr* or *VSOffset* field of the MQCHARV structure. The length of the string buffer is specified using the *VSBufsize* field of the MQCHARV structure.

On return from the MQINQMP call, the string buffer is completed with the name of the property that was inquired, provided the string buffer was long enough to fully contain the name. The *VSLength* field of the MQCHARV structure is filled in with the length of the property name. The *VSCCSID* field of the MQCHARV structure is filled in to indicate the character set of the returned name, whether or not conversion of the name failed.

This is an input/output field. The initial value of this field is MQCHARV_DEFAULT.

IPSID (10-digit signed integer)

This is the structure identifier. The value must be:

IPSIDV
Identifier for inquire message property options structure.

This is always an input field. The initial value of this field is IPSIDV.

IPTYP (10-digit signed integer)

A string representation of the data type of the property.

If the property was specified in an MQRFH2 header and the MQRFH2 `dt` attribute is not recognized, this field can be used to determine the data type of the property. *TypeString* is returned in coded character set 1208 (UTF-8), and is the first eight bytes of the value of the `dt` attribute of the property that failed to be recognized

This is always an output field. The initial value of this field is the null string in the C programming language, and 8 blank characters in other programming languages.

IPVER (10-digit signed integer)

This is the structure version number. The value must be:

IPVER1
Version number for inquire message property options structure.

The following constant specifies the version number of the current version:

IPVERC
Current version of inquire message property options structure.

This is always an input field. The initial value of this field is IPVER1.

Initial values

Table 707. Initial values of fields in MQIPMO

Field name	Name of constant	Value of constant
IPSID	IPSIDV	'IMPO'
IPVER	IPVER1	1
IPOPT	IPINQF	
IPREQENC	ENNAT	
IPREQCSI	CSAPL	
IPRETENC	ENNAT	
IPRETCSI	0	
IPRE1	0	
IPRETNAMCHRP		
IPTYP		blanks

RPG declaration

```
D* MQIMPO Structure
D*
D*
D* Structure identifier
D IPSID         1   4  INZ('IMPO')
D*
D* Structure version number
D IPVER         5   8I 0 INZ(1)
D*
** Options that control the action of
D* MQINQMP
D IPOPT         9   12I 0 INZ(0)
D*
D* Requested encoding of Value
D IPREQENC       13   16I 0 INZ(273)
D*
** Requested character set identifier
D* of Value
D IPREQCSI       17   20I 0 INZ(-3)
D*
D* Returned encoding of Value
D IPRETENC       21   24I 0 INZ(273)
D*
** Returned character set identifier of
D* Value
D IPRETCSI       25   28I 0 INZ(0)
D*
D* Reserved
D IPRE1         29   32I 0 INZ(0)
D*
```

```
D* Returned property name
D* Address of variable length string
D IPRETNAMCHRP     33   48*  INZ(*NULL)
D* Offset of variable length string
D IPRETNAMCHRO     49   52I 0 INZ(0)
D* Size of buffer
D IPRETNAMVSBS     53   56I 0 INZ(-1)
D* Length of variable length string
D IPRETNAMCHRL     57   60I 0 INZ(0)
D* CCSID of variable length string
D IPRETNAMCHRC     61   64I 0 INZ(-3)
D*
D* Property data type as a string
D IPTYP         65   72  INZ
```

IBM i MQMD (Message descriptor) on IBM i

Overview

Purpose: The MQMD structure contains the control information that accompanies the application data when a message travels between the sending and receiving applications. The structure is an input/output parameter on the MQGET, MQPUT, and MQPUT1 calls.

Version: The current version of MQMD is MDVER2. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQMD that is supported by the environment, but with the initial value of the MDVER field set to MDVER1. To use fields that are not present in the version-1 structure, the application must set the MDVER field to the version number of the version required.

A declaration for the version-1 structure is available with the name MQMD1.

Character set and encoding: Data in MQMD must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ MQI client, the structure must be in the character set and encoding of the client.

If the sending and receiving queue managers use different character sets or encodings, the data in MQMD is converted automatically. It is not necessary for the application to convert the MQMD.

- “Using different versions of MQMD” on page 1097
- “Message context” on page 1098
- “Message expiry” on page 1098
- “Fields” on page 1098
- “Initial values” on page 1138
- “RPG declaration” on page 1139

Using different versions of MQMD

A version-2 MQMD is generally equivalent to using a version-1 MQMD and prefixing the message data with an MQMDE structure. However, if all of the fields in the MQMDE structure have their default values, the MQMDE can be omitted. A version-1 MQMD plus MQMDE are used as described later in this section.

- On the MQPUT and MQPUT1 calls, if the application provides a version-1 MQMD, the application can optionally prefix the message data with an MQMDE, setting the MDFMT field in MQMD to FMMDE to indicate that an MQMDE is present. If the application does not provide an MQMDE, the queue manager assumes default values for the fields in the MQMDE.

  Note: Several of the fields that exist in the version-2 MQMD but not the version-1 MQMD are input/output fields on the MQPUT and MQPUT1 calls. However, the queue manager does not return any values in the equivalent fields in the MQMDE on output from the MQPUT and MQPUT1 calls; if the application requires those output values, it must use a version-2 MQMD.

- On the MQGET call, if the application provides a version-1 MQMD, the queue manager prefixes the message returned with an MQMDE, but only if one or more of the fields in the MQMDE has a non-default value. The MDFMT field in MQMD will have the value FMMDE to indicate that an MQMDE is present.

The default values that the queue manager used for the fields in the MQMDE are the same as the initial values of those fields, shown in Table 709 on page 1138.

When a message is on a transmission queue, some of the fields in MQMD are set to particular values; see "MQXQH (Transmission-queue header) on IBM i" on page 1231 for details.

Message context

Certain fields in MQMD contain the message context. Typically:

- *Identity context* relates to the application that originally put the message
- *Origin context* relates to the application that most recently put the message
- *User context* relates to the application that originally put the message.

These two applications can be the same application, but they can also be different applications (for example, when a message is forwarded from one application to another).

Although identity and origin context usually have the meanings described previously, the content of both types of context fields in MQMD actually depends on the PM* options that are specified when the message is put. As a result, identity context does not necessarily relate to the application that originally put the message, and origin context does not necessarily relate to the application that most recently put the message - it depends on the design of the application suite.

There is one class of application that never alters message context, namely the message channel agent (MCA). MCAs that receive messages from remote queue managers use the context option PMSETA on the MQPUT or MQPUT1 call. This allows the receiving MCA to preserve exactly the message context that travelled with the message from the sending MCA. However, the result is that the origin context does not relate to the application that most recently put the message (the receiving MCA), but instead relates to an earlier application that put the message (possibly the originating application itself).

For more information see Message context.

Message expiry

Messages that have expired on a loaded queue (a queue that has been opened) are automatically removed from the queue within a reasonable period of time after their expiry. Some other new features of this release of IBM MQ can lead to loaded queues being scanned less frequently than in the previous product version, however expired messages on loaded queues are always removed within a reasonable period of their expiry.

Fields

The MQMD structure contains the following fields; the fields are described in alphabetical order:

MDACC (32-byte bit string)

Accounting token.

This is part of the *identity context* of the message. For more information about message context, see Message context and Controlling context information.

MDACC allows an application to cause work done as a result of the message to be appropriately charged. The queue manager treats this information as a string of bits and does not check its content.

When the queue manager generates this information, it is set as follows:

- The first byte of the field is set to the length of the accounting information present in the bytes that follow; this length is in the range zero through 30, and is stored in the first byte as a binary integer.

- The second and subsequent bytes (as specified by the length field) are set to the accounting information appropriate to the environment.
  - z/OS On z/OS the accounting information is set to:
    - For z/OS batch, the accounting information from the JES JOB card or from a JES ACCT statement in the EXEC card (comma separators are changed to X'FF'). This information is truncated, if necessary, to 31 bytes.
    - For TSO, the user's account number.
    - For CICS, the LU 6.2 unit of work identifier (UEPUOWDS) (26 bytes).
    - For IMS, the 8-character PSB name concatenated with the 16-character IMS recovery token.
  - IBM i On IBM i, the accounting information is set to the accounting code for the job.
  - UNIX On UNIX, the accounting information is set to the numeric user identifier, in ASCII characters.
  - Windows On Windows, the accounting information is set to a Windows NT security identifier (SID) in a compressed format. The SID uniquely identifies the user identifier stored in the *MDUID* field. When the SID is stored in the *MDACC* field, the 6-byte Identifier Authority (located in the third and subsequent bytes of the SID) is omitted. For example, if the Windows NT SID is 28 bytes long, 22 bytes of SID information are stored in the *MDACC* field.
- The last byte is set to the accounting-token type, one of the following values:

  ATTCIC
  CICS LUOW identifier.

  ATTDOS
  PC DOS default accounting token.

  ATTWNT
  Windows security identifier.

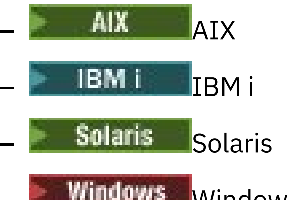
  ATT400
  IBM i accounting token.

  ATTUNX
  UNIX numeric identifier.

  ATTUSR
  User-defined accounting token.

  ATTUNK
  Unknown accounting-token type.

  The accounting-token type is set to an explicit value only in the following environments:

  - AIX
  - IBM i
  - Solaris
  - Windows Windows

  and for IBM MQ MQI clients connected to these systems.

  In other environments, the accounting-token type is set to the value ATTUNK. In these environments the MDPAT field can be used to deduce the type of accounting token received.
- All other bytes are set to binary zero.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETI or PMSETA is specified in the **PMO** parameter. If neither PMSETI nor PMSETA is specified, this field is ignored on input and is an output-only field. For more information on message context, see Message context and Controlling context information.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDACC that was transmitted with the message if it was put to a queue. This will be the value of MDACC that is kept with the message if it is retained (see description of PMRET in "MQPMO (Put-message options) on IBM i" on page 1160 for more details about retained publications) but is not used as the MDACC when the message is sent as a publication to subscribers since they provide a value to override MDACC in all publications sent to them. If the message has no context, the field is entirely binary zero.

This is an output field for the MQGET call.

This field is not subject to any translation based on the character set of the queue manager-the field is treated as a string of bits, and not as a string of characters.

The queue manager does nothing with the information in this field. The application must interpret the information if it wants to use the information for accounting purposes.

The following special value may be used for the *MDACC* field:

ACNONE

No accounting token is specified.

The value is binary zero for the length of the field.

The length of this field is given by LNACCT. The initial value of this field is ACNONE.

MDAID (32-byte character string)

Application data relating to identity.

This is part of the *identity context* of the message. For more information about message context, see Message context and Controlling context information.

MDAID is information that is defined by the application suite, and can be used to provide additional information about the message or its originator. The queue manager treats this information as character data, but does not define the format of it. When the queue manager generates this information, it is entirely blank.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETI or PMSETA is specified in the **PMO** parameter. If a null character is present, the null and any following characters are converted to blanks by the queue manager. If neither PMSETI nor PMSETA is specified, this field is ignored on input and is an output-only field. For more information on message context, see Message context and Controlling context information.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDAID that was transmitted with the message if it was put to a queue. This will be the value of MDAID that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDAID when the message is sent as a publication to subscribers since they provide a value to override MDAID in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by LNAIDD. The initial value of this field is 32 blank characters.

MDAOD (4-byte character string)

Application data relating to origin.

This is part of the *origin context* of the message. For more information about message context, see Message context and Controlling context information.

MDAOD is information that is defined by the application suite that can be used to provide additional information about the origin of the message. For example, it could be set by applications running with suitable user authority to indicate whether the identity data is trusted.

The queue manager treats this information as character data, but does not define the format of it. When the queue manager generates this information, it is entirely blank.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETA is specified in the **PMO** parameter. Any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If PMSETA is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDAOD that was transmitted with the message if it was put to a queue. This will be the value of MDAOD that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDAOD when the message is sent as a publication to subscribers since they provide a value to override MDAOD in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by LNAORD. The initial value of this field is 4 blank characters.

MDBOC (10-digit signed integer)

Backout counter.

This is a count of the number of times the message has been previously returned by the MQGET call as part of a unit of work, and subsequently backed out. It is provided as an aid to the application in detecting processing errors that are based on message content. The count excludes MQGET calls that specified any of the GMBRW* options.

The accuracy of this count is affected by the **HardenGetBackout** queue attribute; see "Attributes for queues" on page 1353.

This is an output field for the MQGET call. It is ignored for the MQPUT and MQPUT1 calls. The initial value of this field is 0.

MDCID (24-byte bit string)

Correlation identifier.

This is a byte string that the application can use to relate one message to another, or to relate the message to other work that the application is performing. The correlation identifier is a permanent property of the message, and persists across restarts of the queue manager. Because the correlation identifier is a byte string and not a character string, the correlation identifier is not converted between character sets when the message flows from one queue manager to another.

For the MQPUT and MQPUT1 calls, the application can specify any value. The queue manager transmits this value with the message and delivers it to the application that issues the get request for the message.

If the application specifies PMNCID, the queue manager generates a unique correlation identifier which is sent with the message, and also returned to the sending application on output from the MQPUT or MQPUT1 call.

This generated correlation identifier is kept with the message if it is retained and is used as the correlation identifier when the message is sent as a publication to subscribers who specify CINONE in the SDCID field in the MQSD passed on the MQSUB call.

See "MQPMO (Put-message options) on IBM i" on page 1160 for more details about retained publications

When the queue manager or a message channel agent generates a report message, it sets the MDCID field in the way specified by the MDREP field of the original message, either ROCMTC or ROPCI. Applications which generate report messages should also do this.

For the MQGET call, MDCID is one of the five fields that can be used to select a particular message to be retrieved from the queue. See the description of the MDMID field for details of how to specify values for this field.

Specifying CINONE as the correlation identifier has the same effect as not specifying MOCORI, that is, any correlation identifier will match.

If the GMMUC option is specified in the **GMO** parameter on the MQGET call, this field is ignored.

On return from an MQGET call, the `MDCID` field is set to the correlation identifier of the message returned (if any).

The following special values may be used:

CINONE
No correlation identifier is specified.

The value is binary zero for the length of the field.

CINEWS
Message is the start of a new session.

This value is recognized by the CICS bridge as indicating the start of a new session, that is, the start of a new sequence of messages.

For the MQGET call, this is an input/output field. For the MQPUT and MQPUT1 calls, this is an input field if PMNCID is not specified, and an output field if PMNCID is specified. The length of this field is given by LNCID. The initial value of this field is CINONE.

MDCSI (10-digit signed integer)

This specifies the character set identifier of character data in the message.

Note: Character data in MQMD and the other IBM MQ data structures that are parameters on calls must be in the character set of the queue manager. This is defined by the queue manager's **CodedCharSetId** attribute; see "Attributes for the queue manager on IBM i" on page 1384 for details of this attribute.

The following special values can be used:

CSQM
Queue manager's character set identifier.

Character data in the message is in the queue manager's character set.

On the MQPUT and MQPUT1 calls, the queue manager changes this value in the MQMD sent with the message to the true character-set identifier of the queue manager. As a result, the value CSQM is never returned by the MQGET call.

CSINHT
Inherit character-set identifier of this structure.

Character data in the message is in the same character set as this structure; this is the queue manager's character set. (For MQMD only, CSINHT has the same meaning as CSQM).

The queue manager changes this value in the MQMD sent with the message to the actual character-set identifier of MQMD. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the `MDPAT` field in MQMD is ATBRKR.

CSEMBD
Embedded character set identifier.

Character data in the message is in a character set with the identifier that is contained within the message data itself. There can be any number of character-set identifiers embedded within the message data, applying to different parts of the data. This value must be used for PCF messages that contain data in a mixture of character sets. PCF messages have a format name of FMPCF.

Specify this value only on the MQPUT and MQPUT1 calls. If it is specified on the MQGET call, it prevents conversion of the message.

On the MQPUT and MQPUT1 calls, the queue manager changes the values CSQM and CSINHT in the MQMD sent with the message as described previously, but does not change the MQMD specified on the MQPUT or MQPUT1 call. No other check is carried out on the value specified.

Applications that retrieve messages should compare this field against the value the application is expecting; if the values differ, the application may need to convert character data in the message.

If the GMCONV option is specified on the MQGET call, this field is an input/output field. The value specified by the application is the coded character-set identifier to which the message data should be converted if necessary. If conversion is successful or unnecessary, the value is unchanged (except that the value CSQM or CSINHT is converted to the actual value). If conversion is unsuccessful, the value after the MQGET call represents the coded character-set identifier of the unconverted message that is returned to the application.

Otherwise, this is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is CSQM.

MDENC (10-digit signed integer)

Numeric encoding of message data.

This specifies the numeric encoding of numeric data in the message; it does not apply to numeric data in the MQMD structure itself. The numeric encoding defines the representation used for binary integers, packed-decimal integers, and floating-point numbers.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that the field is valid. The following special value is defined:

ENNAT

Native machine encoding.

The encoding is the default for the programming language and machine on which the application is running.

Note: The value of this constant depends on the programming language and environment. For this reason, applications must be compiled using the header, macro, COPY, or INCLUDE files appropriate to the environment in which the application will run.

Applications that put messages should normally specify ENNAT. Applications that retrieve messages should compare this field against the value ENNAT; if the values differ, the application may need to convert numeric data in the message. The GMCONV option can be used to request the queue manager to convert the message as part of the processing of the MQGET call.

If the GMCONV option is specified on the MQGET call, this field is an input/output field. The value specified by the application is the encoding to which the message data should be converted if necessary. If conversion is successful or unnecessary, the value is unchanged. If conversion is unsuccessful, the value after the MQGET call represents the encoding of the unconverted message that is returned to the application.

In other cases, this is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is ENNAT.

MDEXP (10-digit signed integer)

Message lifetime.

This is a period of time expressed in tenths of a second, set by the application that puts the message. The message becomes eligible to be discarded if it has not been removed from the destination queue before this period of time elapses.

The value is decremented to reflect the time the message spends on the destination queue, and also on any intermediate transmission queues if the put is to a remote queue. It may also be decremented by message channel agents to reflect transmission times, if these are significant. Likewise, an application forwarding this message to another queue might decrement the value if necessary, if it has retained the message for a significant time. However, the expiration time is treated as approximate, and the value need not be decremented to reflect small time intervals.

When the message is retrieved by an application using the MQGET call, the MDEXP field represents the amount of the original expiry time that still remains.

After a message's expiry time has elapsed, it becomes eligible to be discarded by the queue manager. In the current implementations, the message is discarded when a browse or nonbrowse MQGET call occurs that would have returned the message had it not already expired. For example, a nonbrowse

MQGET call with the GMMO field in MQGMO set to MONONE reading from a FIFO ordered queue will cause all the expired messages to be discarded up to the first unexpired message. With a priority ordered queue, the same call will discard expired messages of higher priority and messages of an equal priority that arrived on the queue before the first unexpired message.

A message that has expired is never returned to an application (either by a browse or a non-browse MQGET call), so the value in the MDEXP field of the message descriptor after a successful MQGET call is either greater than zero, or the special value EIULIM.

If a message is put on a remote queue, the message may expire (and be discarded) while it is on an intermediate transmission queue, before the message reaches the destination queue.

A report is generated when an expired message is discarded, if the message specified one of the ROEXP* report options. If none of these options is specified, no such report is generated; the message is assumed to be no longer relevant after this time period (perhaps because a later message has superseded it).

Any other program that discards messages based on expiry time must also send an appropriate report message if one was requested.

Note:

1. If a message is put with an MDEXP time of zero, the MQPUT or MQPUT1 call fails with reason code RC2013; no report message is generated in this case.
2. Since a message with an expiry time that has elapsed may not actually be discarded until later, there may be messages on a queue that have passed their expiry time, and which are not therefore eligible for retrieval. These messages nevertheless count towards the number of messages on the queue for all purposes, including depth triggering.
3. An expiration report is generated, if requested, when the message is actually discarded, not when it becomes eligible for discarding.
4. Discarding of an expired message, and the generation of an expiration report if requested, are never part of the application's unit of work, even if the message was scheduled for discarding as a result of an MQGET call operating within a unit of work.
5. If a nearly-expired message is retrieved by an MQGET call within a unit of work, and the unit of work is subsequently backed out, the message may become eligible to be discarded before it can be retrieved again.
6. If a nearly-expired message is locked by an MQGET call with GMLK, the message may become eligible to be discarded before it can be retrieved by an MQGET call with GMMUC; reason code RC2034 is returned on this subsequent MQGET call if that happens.
7. When a request message with an expiry time greater than zero is retrieved, the application can take one of the following actions when it sends the reply message:

   - Copy the remaining expiry time from the request message to the reply message.
   - Set the expiry time in the reply message to an explicit value greater than zero.
   - Set the expiry time in the reply message to EIULIM.

   The action to take depends on the design of the application suite. However, the default action for putting messages to a dead-letter (undelivered-message) queue should be to preserve the remaining expiry time of the message, and to continue to decrement it.
8. Trigger messages are always generated with EIULIM.
9. A message (normally on a transmission queue) which has a MDFMT name of FMXQH has a second message descriptor within the MQXQH. It therefore has two MDEXP fields associated with it. The following additional points should be noted in this case:

   - When an application puts a message on a remote queue, the queue manager places the message initially on a local transmission queue, and prefixes the application message data with an MQXQH structure. The queue manager sets the values of the two MDEXP fields to be the same as that specified by the application.

If an application puts a message directly on a local transmission queue, the message data must already begin with an MQXQH structure, and the format name must be FMXQH (but the queue manager does not enforce this). In this case the application need not set the values of these two MDEXP fields to be the same. (The queue manager does not check that the MDEXP field within the MQXQH contains a valid value, or even that the message data is long enough to include it.)

- When a message with a MDFMT name of FMXQH is retrieved from a queue (whether this is a normal or a transmission queue), the queue manager decrements both these MDEXP fields with the time spent waiting on the queue. No error is raised if the message data is not long enough to include the MDEXP field in the MQXQH.
- The queue manager uses the MDEXP field in the separate message descriptor (that is, not the one in the message descriptor embedded within the MQXQH structure) to test whether the message is eligible for discarding.
- If the initial values of the two MDEXP fields were different, it is therefore possible for the MDEXP time in the separate message descriptor when the message is retrieved to be greater than zero (so the message is not eligible for discarding), while the time according to the MDEXP field in the MQXQH has elapsed. In this case the MDEXP field in the MQXQH is set to zero.

The following special value is recognized:

EIULIM
Unlimited lifetime.

The message has an unlimited expiration time.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is EIULIM.

MDFB (10-digit signed integer)

Feedback or reason code.

This is used with a message of type MTRPRT to indicate the nature of the report, and is only meaningful with that type of message. The field can contain one of the FB* values, or one of the RC* values. Feedback codes are grouped as follows:

FBNONE
No feedback provided.

FBSFST
Lowest value for system-generated feedback.

FBSLST
Highest value for system-generated feedback.

The range of system-generated feedback codes FBSFST through FBSLST includes the general feedback codes listed later in this section(FB*), and also the reason codes (RC*) that can occur when the message cannot be put on the destination queue.

FBAFST
Lowest value for application-generated feedback.

FBALST
Highest value for application-generated feedback.

Applications that generate report messages should not use feedback codes in the system range (other than FBQUIT), unless they want to simulate report messages generated by the queue manager or message channel agent.

On the MQPUT or MQPUT1 calls, the value specified must either be FBNONE, or be within the system range or application range. This is checked whatever the value of MDMT.

General feedback codes:

FBCOA
Confirmation of arrival on the destination queue (see ROCOA).

FBCOD
: Confirmation of delivery to the receiving application (see ROCOD).

FBEXP
: Message expired.

  Message was discarded because it had not been removed from the destination queue before its expiry time had elapsed.

FBPAN
: Positive action notification (see ROPAN).

FBNAN
: Negative action notification (see RONAN).

FBQUIT
: Application should end.

  This can be used by a workload scheduling program to control the number of instances of an application program that are running. Sending an MTRPRT message with this feedback code to an instance of the application program indicates to that instance that it should stop processing. However, adherence to this convention is a matter for the application; it is not enforced by the queue manager.

IMS-bridge feedback codes: When the IMS bridge receives a nonzero IMS-OTMA sense code, the IMS bridge converts the sense code from hexadecimal to decimal, adds the value FBIERR (300), and places the result in the `MDFB` field of the reply message. This results in the feedback code having a value in the range FBIFST (301) through FBILST (399) when an IMS-OTMA error has occurred.

The following feedback codes can be generated by the IMS bridge:

FBDLZ
: Data length zero.

  A segment length was zero in the application data of the message.

FBDLN
: Data length negative.

  A segment length was negative in the application data of the message.

FBDLTB
: Data length too big.

  A segment length was too big in the application data of the message.

FBBUFO
: Buffer overflow.

  The value of one of the length fields would cause the data to overflow the message buffer.

FBLOB1
: Length in error by one.

  The value of one of the length fields was one byte too short.

FBIIH
: MQIIH structure not valid or missing.

  The `MDFMT` field in MQMD specifies `FMIMS`, but the message does not begin with a valid MQIIH structure.

FBNAFI
: User ID not authorized for use in IMS.

  The user ID contained in the message descriptor MQMD, or the password contained in the `IIAUT` field in the MQIIH structure, failed the validation performed by the IMS bridge. As a result the message was not passed to IMS.

FBIERR
Unexpected error returned by IMS.

An unexpected error was returned by IMS. Consult the IBM MQ error log on the system on which the IMS bridge resides for more information about the error.

FBIFST
Lowest value for IMS-generated feedback.

IMS-generated feedback codes occupy the range FBIFST (300) through FBILST (399). The IMS-OTMA sense code itself is MDFB minus FBIERR.

FBILST
Highest value for IMS-generated feedback.

CICS-bridge feedback codes: The following feedback codes can be generated by the CICS bridge:

FBCAAB
Application abended.

The application program specified in the message abended. This feedback code occurs only in the DLREA field of the MQDLH structure.

FBCANS
Application cannot be started.

The EXEC CICS LINK for the application program specified in the message failed. This feedback code occurs only in the DLREA field of the MQDLH structure.

FBCBRF
CICS bridge terminated abnormally without completing normal error processing.

FBCCSE
Character set identifier not valid.

FBCIHE
CICS information header structure missing or not valid.

FBCCAE
Length of CICS commarea not valid.

FBCCIE
Correlation identifier not valid.

FBCDLQ
Dead-letter queue not available.

The CICS bridge task was unable to copy a reply to this request to the dead-letter queue. The request was backed out.

FBCENE
Encoding not valid.

FBCINE
CICS bridge encountered an unexpected error.

This feedback code occurs only in the DLREA field of the MQDLH structure.

FBCNTA
User identifier not authorized or password not valid.

This feedback code occurs only in the DLREA field of the MQDLH structure.

FBCUBO
Unit of work backed out.

The unit of work was backed out, for one of the following reasons:

- A failure was detected while processing another request within the same unit of work.
- A CICS abend occurred while the unit of work was in progress.

FBCUWE
Unit-of-work control field `CIUOW` not valid.

MQ reason codes: For exception report messages, `MDFB` contains an MQ reason code. Among possible reason codes are:

RC2051
(2051, X'803') Put calls inhibited for the queue.

RC2053
(2053, X'805') Queue already contains maximum number of messages.

RC2035
(2035, X'7F3') Not authorized for access.

RC2056
(2056, X'808') No space available on disk for queue.

RC2048
(2048, X'800') Queue does not support persistent messages.

RC2031
(2031, X'7EF') Message length greater than maximum for queue manager.

RC2030
(2030, X'7EE') Message length greater than maximum for queue.

This is an output field for the MQGET call, and an input field for MQPUT and MQPUT1 calls. The initial value of this field is FBNONE.

MDFMT (8-byte character string)

Format name of message data.

This is a name that the sender of the message may use to indicate to the receiver the nature of the data in the message. Any characters that are in the queue manager's character set may be specified for the name, but it is recommended that the name be restricted to the following:

- Uppercase A through Z
- Numeric digits 0 through 9

If other characters are used, it may not be possible to translate the name between the character sets of the sending and receiving queue managers.

The name should be padded with blanks to the length of the field, or a null character used to terminate the name before the end of the field; the null and any subsequent characters are treated as blanks. Do not specify a name with leading or embedded blanks. For the MQGET call, the queue manager returns the name padded with blanks to the length of the field.

The queue manager does not check that the name complies with the recommendations described previously.

Names beginning "MQ" in upper, lower, and mixed case have meanings that are defined by the queue manager; you should not use names beginning with these letters for your own formats. The queue manager built-in formats are:

FMNONE
No format name.

The nature of the data is undefined. This means that the data cannot be converted when the message is retrieved from a queue using the GMCONV option.

If GMCONV is specified on the MQGET call, and the character set or encoding of data in the message differs from that specified in the **MSGDSC** parameter, the message is returned with the following completion and reason codes (assuming no other errors):

- Completion code CCWARN and reason code RC2110 if the FMNONE data is at the beginning of the message.

- Completion code CCOK and reason code RCNONE if the FMNONE data is at the end of the message (that is, preceded by one or more MQ header structures). The MQ header structures are converted to the requested character set and encoding in this case.

FMADMN
Command server request/reply message.

The message is a command-server request or reply message in programmable command format (PCF). Messages of this format can be converted if the GMCONV option is specified on the MQGET call. For more information about using programmable command format messages, see Using Programmable Command Formats.

FMCICS
CICS information header.

The message data begins with the CICS information header MQCIH, which is followed by the application data. The format name of the application data is given by the `CIFMT` field in the MQCIH structure.

FMCMD1
Type 1 command reply message.

The message is an MQSC command-server reply message containing the object count, completion code, and reason code. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMCMD2
Type 2 command reply message.

The message is an MQSC command-server reply message containing information about the object(s) requested. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMDLH
Dead-letter header.

The message data begins with the dead-letter header MQDLH. The data from the original message immediately follows the MQDLH structure. The format name of the original message data is given by the `DLFMT` field in the MQDLH structure; see "MQDLH (Dead-letter header) on IBM i" on page 1052 for details of this structure. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

COA and COD reports are not generated for messages which have a `MDFMT` of FMDLH.

FMDH
Distribution-list header.

The message data begins with the distribution-list header MQDH; this includes the arrays of MQOR and MQPMR records. The distribution-list header may be followed by additional data. The format of the additional data (if any) is given by the `DHFMT` field in the MQDH structure; see "MQDH (Distribution header) on IBM i" on page 1048 for details of this structure. Messages with format FMDH can be converted if the GMCONV option is specified on the MQGET call.

FMEVNT
Event message.

The message is an MQ event message that reports an event that occurred. Event messages have the same structure as programmable commands; for more information about this structure, see Structures for commands and responses. For information about events, see Event monitoring.

Version-1 event messages can be converted if the GMCONV option is specified on the MQGET call.

FMIMS
IMS information header.

The message data begins with the IMS information header MQIIH, which is followed by the application data. The format name of the application data is given by the *`IIFMT`* field in the MQIIH

structure. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMIMVS
IMS variable string.

The message is an IMS variable string, which is a string of the form `llzzccc`, where:

`ll`
is a 2-byte length field specifying the total length of the IMS variable string item. This length is equal to the length of `ll` (2 bytes), plus the length of `zz` (2 bytes), plus the length of the character string itself. `ll` is a 2-byte binary integer in the encoding specified by the `MDENC` field.

`zz`
is a 2-byte field containing flags that are significant to IMS. `zz` is a byte string consisting of two 1-byte bit string fields, and is transmitted without change from sender to receiver (that is, `zz` is not subject to any conversion).

`ccc`
is a variable-length character string containing `ll-4` characters. `ccc` is in the character set specified by the `MDCSI` field.

Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMMDE
Message-descriptor extension.

The message data begins with the message-descriptor extension MQMDE, and is optionally followed by other data (usually the application message data). The format name, character set, and encoding of the data which follows the MQMDE is given by the `MEFMT`, `MECSI`, and `MEENC` fields in the MQMDE. See "MQMDE (Message descriptor extension) on IBM i" on page 1140 for details of this structure. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMPCF
User-defined message in programmable command format (PCF).

The message is a user-defined message that conforms to the structure of a programmable command format (PCF) message. Messages of this format can be converted if the GMCONV option is specified on the MQGET call. See Using Programmable Command Formats for more information about using programmable command format messages.

FMRMH
Reference message header.

The message data begins with the reference message header MQRMH, and is optionally followed by other data. The format name, character set, and encoding of the data is given by the `RMFMT`, `RMCSI`, and `RMENC` fields in the MQRMH. See "MQRMH (Reference message header) on IBM i" on page 1187 for details of this structure. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMRFH
Rules and formatting header.

The message data begins with the rules and formatting header MQRFH, and is optionally followed by other data. The format name, character set, and encoding of the data (if any) is given by the `RFFMT`, `RFCSI`, and `RFENC` fields in the MQRFH. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMRFH2
Rules and formatting header version 2.

The message data begins with the version-2 rules and formatting header MQRFH2, and is optionally followed by other data. The format name, character set, and encoding of the optional

data (if any) is given by the RF2FMT, RF2CSI, and RF2ENC fields in the MQRFH2. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMSTR
Message consisting entirely of characters.

The application message data can be either an SBCS string (single-byte character set), or a DBCS string (double-byte character set). Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMTM
Trigger message.

The message is a trigger message, described by the MQTM structure; see "MQTM - Trigger message" on page 1221 for details of this structure. Messages of this format can be converted if the GMCONV option is specified on the MQGET call.

FMWIH
Work information header.

The message data begins with the work information header MQWIH, which is followed by the application data. The format name of the application data is given by the WIFMT field in the MQWIH structure.

FMXQH
Transmission queue header.

The message data begins with the transmission queue header MQXQH. The data from the original message immediately follows the MQXQH structure. The format name of the original message data is given by the MDFMT field in the MQMD structure which is part of the transmission queue header MQXQH. See "MQXQH (Transmission-queue header) on IBM i" on page 1231 for details of this structure.

COA and COD reports are not generated for messages which have a MDFMT of FMXQH.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by LNFMT. The initial value of this field is FMNONE.

MDGID (24-byte bit string)

Group identifier.

This is a byte string that is used to identify the particular message group or logical message to which the physical message belongs. MDGID is also used if segmentation is allowed for the message. In all of these cases, MDGID has a non-null value, and one or more of the following flags is set in the MDMFL field:

- MFMIG
- MFLMIG
- MFSEG
- MFLSEG
- MFSEGA

If none of these flags is set, MDGID has the special null value GINONE.

This field need not be set by the application on the MQPUT or MQGET call if:

- On the MQPUT call, PMLOGO is specified.
- On the MQGET call, MOGRPI is not specified.

Consider using these calls for messages that are not report messages. However, if the application requires more control, or the call is MQPUT1, the application must ensure that MDGID is set to an appropriate value.

Message groups and segments can be processed correctly only if the group identifier is unique. For this reason, applications should not generate their own group identifiers ; instead, applications should do one of the following:

- If PMLOGO is specified, the queue manager automatically generates a unique group identifier for the first message in the group or segment of the logical message, and uses that group identifier for the remaining messages in the group or segments of the logical message, so the application does not need to take any special action. Consider using this procedure.
- If PMLOGO is not specified, the application should request the queue manager to generate the group identifier, by setting MDGID to GINONE on the first MQPUT or MQPUT1 call for a message in the group or segment of the logical message. The group identifier returned by the queue manager on output from that call should then be used for the remaining messages in the group or segments of the logical message. If a message group contains segmented messages, the same group identifier must be used for all segments and messages in the group.

  When PMLOGO is not specified, messages in groups and segments of logical messages can be put in any order (for example, in reverse order), but the group identifier must be allocated by the first MQPUT or MQPUT1 call that is issued for any of those messages.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value detailed in PMOPT. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message if the object opened is a single queue and not a distribution list, but leaves it unchanged if the object opened is a distribution list. In the latter case, if the application needs to know the group identifiers generated, the application must provide MQPMR records containing the PRGID field.

On input to the MQGET call, the queue manager uses the value detailed in Table 1. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The following special value is defined:

GINONE

No group identifier specified.

The value is binary zero for the length of the field. This is the value that is used for messages that are not in groups, not segments of logical messages, and for which segmentation is not allowed.

The length of this field is given by LNGID. The initial value of this field is GINONE. This field is ignored if MDVER is less than MDVER2.

MDMFL (10-digit signed integer)

Message flags.

These are flags that specify attributes of the message, or control its processing. The flags are divided into the following categories:

- Segmentation flag
- Status flags

These are described in turn.

Segmentation flags: When a message is too big for a queue, an attempt to put the message on the queue usually fails. Segmentation is a technique whereby the queue manager or application splits the message into smaller pieces called segments, and places each segment on the queue as a separate physical message. The application which retrieves the message can either retrieve the segments one by one, or request the queue manager to reassemble the segments into a single message which is returned by the MQGET call. The latter is achieved by specifying the GMCMPM option on the MQGET call, and supplying a buffer that is big enough to accommodate the complete message. (See “MQGMO (Get-message options) on IBM i” on page 1064 for details of the GMCMPM option.) Segmentation of a message can occur at the sending queue manager, at an intermediate queue manager, or at the destination queue manager.

You can specify one of the following to control the segmentation of a message:

MFSEGI

Segmentation inhibited.

This option prevents the message being broken into segments by the queue manager. If specified for a message that is already a segment, this option prevents the segment being broken into smaller segments.

The value of this flag is binary zero. This is the default.

MFSEGA

Segmentation allowed.

This option allows the message to be broken into segments by the queue manager. If specified for a message that is already a segment, this option allows the segment to be broken into smaller segments. MFSEGA can be set without either MFSEG or MFLSEG being set.

When the queue manager segments a message, the queue manager turns on the MFSEG flag in the copy of the MQMD that is sent with each segment, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call. For the last segment in the logical message, the queue manager also turns on the MFLSEG flag in the MQMD that is sent with the segment.

Note: Care is needed when messages are put with MFSEGA but without PMLOGO. If the message is:

- Not a segment, and
- Not in a group, and
- Not being forwarded,

the application must remember to reset the `MDGID` field to GINONE before each MQPUT or MQPUT1 call, in order to cause a unique group identifier to be generated by the queue manager for each message. If this is not done, unrelated messages could inadvertently end up with the same group identifier, which might lead to incorrect processing subsequently. See the descriptions of the `MDGID` field and the PMLOGO option for more information about when the `MDGID` field must be reset.

The queue manager splits messages into segments as necessary in order to ensure that the segments (plus any header data that may be required) fit on the queue. However, there is a lower limit for the size of a segment generated by the queue manager, and only the last segment created from a message can be smaller than this limit. (The lower limit for the size of an application-generated segment is one byte.) Segments generated by the queue manager may be of unequal length. The queue manager processes the message as follows:

- User-defined formats are split on boundaries which are multiples of 16 bytes. This means that the queue manager will not generate segments that are smaller than 16 bytes (other than the last segment).
- Built-in formats other than FMSTR are split at points appropriate to the nature of the data present. However, the queue manager never splits a message in the middle of an MQ header structure. This means that a segment containing a single MQ header structure cannot be split further by the queue manager, and as a result the minimum possible segment size for that message is greater than 16 bytes.

  The second or later segment generated by the queue manager will begin with one of the following:

  - An MQ header structure
  - The start of the application message data
  - Part-way through the application message data
- FMSTR is split without regard for the nature of the data present (SBCS, DBCS, or mixed SBCS/DBCS). When the string is DBCS or mixed SBCS/DBCS, this may result in segments which cannot be converted from one character set to another. The queue manager never splits FMSTR messages into segments that are smaller than 16 bytes (other than the last segment).

- The MDFMT, MDCSI, and MDENC fields in the MQMD of each segment are set by the queue manager to describe correctly the data present at the start of the segment; the format name will be either the name of a built-in format, or the name of a user-defined format.
- The MDREP field in the MQMD of segments with MDOFF greater than zero are modified as follows:
  - For each report type, if the report option is RO*D, but the segment cannot possibly contain any of the first 100 bytes of user data (that is, the data following any MQ header structures that may be present), the report option is changed to RO*.

The queue manager follows the previously rules, but otherwise splits messages unpredictably; do not make assumptions about where a message is split

For persistent messages, the queue manager can perform segmentation only within a unit of work:

- If the MQPUT or MQPUT1 call is operating within a user-defined unit of work, that unit of work is used. If the call fails partway through the segmentation process, the queue manager removes any segments that were placed on the queue as a result of the failing call. However, the failure does not prevent the unit of work being committed successfully.
- If the call is operating outside a user-defined unit of work, and there is no user-defined unit of work in existence, the queue manager creates a unit of work just for the duration of the call. If the call is successful, the queue manager commits the unit of work automatically (the application does not need to do this). If the call fails, the queue manager backs out the unit of work.
- If the call is operating outside a user-defined unit of work, but a user-defined unit of work does exist, the queue manager is unable to perform segmentation. If the message does not require segmentation, the call can still succeed. But if the message does require segmentation, the call fails with reason code RC2255.

For nonpersistent messages, the queue manager does not require a unit of work to be available in order to perform segmentation.

Special consideration must be given to data conversion of messages which may be segmented:

- If data conversion is performed only by the receiving application on the MQGET call, and the application specifies the GMCMPM option, the data-conversion exit will be passed the complete message for the exit to convert, and the fact that the message was segmented will not be apparent to the exit.
- If the receiving application retrieves one segment at a time, the data-conversion exit will be invoked to convert one segment at a time. The exit must therefore be capable of converting the data in a segment independently of the data in any of the other segments.

  If the nature of the data in the message is such that arbitrary segmentation of the data on 16-byte boundaries may result in segments which cannot be converted by the exit, or the format is FMSTR and the character set is DBCS or mixed SBCS/DBCS, the sending application should itself create and put the segments, specifying MFSEGI to suppress further segmentation. In this way, the sending application can ensure that each segment contains sufficient information to allow the data-conversion exit to convert the segment successfully.
- If sender conversion is specified for a sending message channel agent (MCA), the MCA converts only messages which are not segments of logical messages; the MCA never attempts to convert messages which are segments.

This flag is an input flag on the MQPUT and MQPUT1 calls, and an output flag on the MQGET call. On the latter call, the queue manager also echoes the value of the flag to the GMSEG field in MQGMO.

The initial value of this flag is MFSEGI.

Status flags: These are flags that indicate whether the physical message belongs to a message group, is a segment of a logical message, both, or neither. One or more of the following can be specified on the MQPUT or MQPUT1 call, or returned by the MQGET call:

MFMIG
: Message is a member of a group.

MFLMIG

Message is the last logical message in a group.

If this flag is set, the queue manager turns on MFMIG in the copy of MQMD that is sent with the message, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call.

It is valid for a group to consist of only one logical message. If this is the case, MFLMIG is set, but the MDSEQ field has the value one.

MFSEG

Message is a segment of a logical message.

When MFSEG is specified without MFLSEG, the length of the application message data in the segment (excluding the lengths of any MQ header structures that may be present) must be at least one. If the length is zero, the MQPUT or MQPUT1 call fails with reason code RC2253.

MFLSEG

Message is the last segment of a logical message.

If this flag is set, the queue manager turns on MFSEG in the copy of MQMD that is sent with the message, but does not alter the settings of these flags in the MQMD provided by the application on the MQPUT or MQPUT1 call.

It is valid for a logical message to consist of only one segment. If this is the case, MFLSEG is set, but the MDOFF field has the value zero.

When MFLSEG is specified, it is permissible for the length of the application message data in the segment (excluding the lengths of any header structures that may be present) to be zero.

The application must ensure that these flags are set correctly when putting messages. If PMLOGO is specified, or was specified on the preceding MQPUT call for the queue handle, the settings of the flags must be consistent with the group and segment information retained by the queue manager for the queue handle. The following conditions apply to successive MQPUT calls for the queue handle when PMLOGO is specified:

- If there is no current group or logical message, all of these flags (and combinations of them) are valid.
- Once MFMIG has been specified, it must remain on until MFLMIG is specified. The call fails with reason code RC2241 if this condition is not satisfied.
- Once MFSEG has been specified, it must remain on until MFLSEG is specified. The call fails with reason code RC2242 if this condition is not satisfied.
- Once MFSEG has been specified without MFMIG, MFMIG must remain off until after MFLSEG has been specified. The call fails with reason code RC2242 if this condition is not satisfied.

Table 1 shows the valid combinations of the flags, and the values used for various fields.

These flags are input flags on the MQPUT and MQPUT1 calls, and output flags on the MQGET call. On the latter call, the queue manager also echoes the values of the flags to the GMGST and GMSST fields in MQGMO.

Default flags: The following can be specified to indicate that the message has default attributes:

MFNONE

No message flags (default message attributes).

This inhibits segmentation, and indicates that the message is not in a group and is not a segment of a logical message. MFNONE is defined to aid program documentation. It is not intended that this flag be used with any other, but as its value is zero, such use cannot be detected.

The MDMFL field is partitioned into subfields; for details see “Report options and message flags on IBM i” on page 1418.

The initial value of this field is MFNONE. This field is ignored if MDVER is less than MDVER2.

MDMID (24-byte bit string)

Message identifier.

This is a byte string that is used to distinguish one message from another. Generally, no two messages should have the same message identifier, although this is not disallowed by the queue manager. The message identifier is a permanent property of the message, and persists across restarts of the queue manager. Because the message identifier is a byte string and not a character string, the message identifier is not converted between character sets when the message flows from one queue manager to another.

For the MQPUT and MQPUT1 calls, if MINONE or PMNMID is specified by the application, the queue manager generates a unique message identifier when the message is put, and places it in the message descriptor sent with the message. The queue manager also returns this message identifier in the message descriptor belonging to the sending application. The application can use this value to record information about particular messages, and to respond to queries from other parts of the application.

An `MDMID` generated by the queue manager consists of a 4-byte product identifier (`AMQ¬` or `CSQ¬` in either ASCII or EBCDIC, where ¬ represents a single blank character), followed by a product-specific implementation of a unique string. In IBM MQ this contains the first 12 characters of the queue manager name, and a value derived from the system clock. All queue managers that can intercommunicate must therefore have names that differ in the first 12 characters, to ensure that message identifiers are unique. The ability to generate a unique string also depends upon the system clock not being changed backward. To eliminate the possibility of a message identifier generated by the queue manager duplicating one generated by the application, the application should avoid generating identifiers with initial characters in the range A through I in ASCII or EBCDIC (X'41' through X'49' and X'C1' through X'C9'). However, the application is not prevented from generating identifiers with initial characters in these ranges.

If the message is being put to a topic, the queue manager generates unique message identifiers as necessary for each message published. If PMNMID is specified by the application, the queue manager generates a unique message identifier to return on output. If MINONE is specified by the application, the value of the `MDMID` field in the MQMD is unchanged on return from the call.

See the description of PMRET in PMOPT for more details about retained publications.

If the message is being put to a distribution list, the queue manager generates unique message identifiers as necessary, but the value of the `MDMID` field in MQMD is unchanged on return from the call, even if MINONE or PMNMID was specified. If the application needs to know the message identifiers generated by the queue manager, the application must provide MQPMR records containing the `PRMID` field.

The sending application can also specify a particular value for the message identifier, other than MINONE; this stops the queue manager generating a unique message identifier. An application that is forwarding a message can use this facility to propagate the message identifier of the original message.

The queue manager does not itself make any use of this field except to:

- Generate a unique value if requested, as described previously
- Deliver the value to the application that issues the get request for the message
- Copy the value to the `MDCID` field of any report message that it generates about this message (depending on the `MDREP` options)

When the queue manager or a message channel agent generates a report message, it sets the `MDMID` field in the way specified by the `MDREP` field of the original message, either RONMI or ROPMI. Applications that generate report messages should also do this.

For the MQGET call, `MDMID` is one of the five fields that can be used to select a particular message to be retrieved from the queue. Normally the MQGET call returns the next message on the queue, but if a particular message is required, this can be obtained by specifying one or more of the five selection criteria, in any combination; these fields are:

- MDMID
- MDCID
- MDGID
- MDSEQ
- MDOFF

The application sets one or more of these field to the values required, and then sets the corresponding MO* match options in the GMMO field in MQGMO to indicate that those fields should be used as selection criteria. Only messages that have the specified values in those fields are candidates for retrieval. The default for the GMMO field (if not altered by the application) is to match both the message identifier and the correlation identifier.

Normally, the message returned is the first message on the queue that satisfies the selection criteria. But if GMBRWN is specified, the message returned is the next message that satisfies the selection criteria; the scan for this message starts with the message following the current cursor position.

Note: The queue is scanned sequentially for a message that satisfies the selection criteria, so retrieval times will be slower than if no selection criteria are specified, especially if many messages have to be scanned before a suitable one is found.

See Table 1 for more information about how selection criteria are used in various situations.

Specifying MINONE as the message identifier has the same effect as not specifying MOMSGI, that is, any message identifier will match.

This field is ignored if the GMMUC option is specified in the **GMO** parameter on the MQGET call.

On return from an MQGET call, the MDMID field is set to the message identifier of the message returned (if any).

The following special value may be used:

MINONE
No message identifier is specified.

The value is binary zero for the length of the field.

This is an input/output field for the MQGET, MQPUT, and MQPUT1 calls. The length of this field is given by LNMID. The initial value of this field is MINONE.

MDMT (10-digit signed integer)

Message type.

This indicates the type of the message. Message types are grouped as follows:

MTSFST
Lowest value for system-defined message types.

MTSLST
Highest value for system-defined message types.

The following values are currently defined within the system range:

MTDGRM
Message not requiring a reply.

The message is one that does not require a reply.

MTRQST
Message requiring a reply.

The message is one that requires a reply.

The name of the queue to which the reply should be sent must be specified in the MDRQ field. The MDREP field indicates how the MDMID and MDCID of the reply are to be set.

MTRPLY
Reply to an earlier request message.

The message is the reply to an earlier request message (MTRQST). The message should be sent to the queue indicated by the MDRQ field of the request message. The MDREP field of the request should be used to control how the MDMID and MDCID of the reply are set.

Note: The queue manager does not enforce the request-reply relationship; this is an application responsibility.

MTRPRT
Report message.

The message is reporting on some expected or unexpected occurrence, usually related to some other message (for example, a request message was received which contained data that was not valid). The message should be sent to the queue indicated by the MDRQ field of the message descriptor of the original message. The MDFB field should be set to indicate the nature of the report. The MDREP field of the original message can be used to control how the MDMID and MDCID of the report message should be set.

Report messages generated by the queue manager or message channel agent are always sent to the MDRQ queue, with the MDFB and MDCID fields set as described previously.

Other values within the system range may be defined in future versions of the MQI, and are accepted by the MQPUT and MQPUT1 calls without error.

Application-defined values can also be used. They must be within the following range:

MTAFST
Lowest value for application-defined message types.

MTALST
Highest value for application-defined message types.

For the MQPUT and MQPUT1 calls, the MDMT value must be within either the system-defined range or the application-defined range; if it is not, the call fails with reason code RC2029.

This is an output field for the MQGET call, and an input field for MQPUT and MQPUT1 calls. The initial value of this field is MTDGRM.

MDOFF (10-digit signed integer)

Offset of data in physical message from start of logical message.

This is the offset in bytes of the data in the physical message from the start of the logical message of which the data forms part. This data is called a *segment*. The offset is in the range 0 through 999 999 999. A physical message which is not a segment of a logical message has an offset of zero.

This field need not be set by the application on the MQPUT or MQGET call if:

- On the MQPUT call, PMLOGO is specified.
- On the MQGET call, MOOFFS is not specified.

These are the recommended ways of using these calls for messages that are not report messages. However, if the application does not comply with these conditions, or the call is MQPUT1, the application must ensure that MDOFF is set to an appropriate value.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value detailed in Table 1. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message.

For a report message reporting on a segment of a logical message, the MDOLN field (provided it is not OLUNDF) is used to update the offset in the segment information retained by the queue manager.

On input to the MQGET call, the queue manager uses the value detailed in Table 1. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The initial value of this field is zero. This field is ignored if MDVER is less than MDVER2.

MDOLN (10-digit signed integer)

Length of original message.

This field is of relevance only for report messages that are segments. It specifies the length of the message segment to which the report message relates; it does not specify the length of the logical message of which the segment forms part, nor the length of the data in the report message.

Note: When generating a report message for a message that is a segment, the queue manager and message channel agent copy into the MQMD for the report message the MDGID, MDSEQ, MDOFF, and *MDMFL*, fields from the original message. As a result, the report message is also a segment. Applications that generate report messages are recommended to do the same, and to ensure that the MDOLN field is set correctly.

The following special value is defined:

OLUNDF
Original length of message not defined.

MDOLN is an input field on the MQPUT and MQPUT1 calls, but the value provided by the application is accepted only in particular circumstances:

- If the message being put is a segment and is also a report message, the queue manager accepts the value specified. The value must be:
  - Greater than zero if the segment is not the last segment
  - Not less than zero if the segment is the last segment
  - Not less than the length of data present in the message

  If these conditions are not satisfied, the call fails with reason code RC2252.
- If the message being put is a segment but not a report message, the queue manager ignores the field and uses the length of the application message data instead.
- In all other cases, the queue manager ignores the field and uses the value OLUNDF instead.

This is an output field on the MQGET call.

The initial value of this field is OLUNDF. This field is ignored if MDVER is less than MDVER2.

MDPAN (28-byte character string)

Name of application that put the message.

This is part of the *origin context* of the message. For more information about message context, see Message context and Controlling context information.

The format of the MDPAN depends on the value of MDPAT.

When this field is set by the queue manager (that is, for all options except PMSETA), it is set to value which is determined by the environment:

- z/OS On z/OS, the queue manager uses:
  - For z/OS batch, the 8-character job name from the JES JOB card
  - For TSO, the 7-character TSO user identifier
  - For CICS, the 8-character applid, followed by the 4-character tranid
  - For IMS, the 8-character IMS system identifier, followed by the 8-character PSB name
  - For XCF, the 8-character XCF group name, followed by the 16-character XCF member name
  - For a message generated by a queue manager, the first 28 characters of the queue manager name
  - For distributed queuing without CICS, the 8-character jobname of the channel initiator followed by the 8-character name of the module putting to the dead-letter queue followed by an 8-character task identifier.

- For MQSeries Java language bindings processing with IBM MQ for z/OS the 8-character jobname of the address space created for the UNIX System Services environment. Typically, this will be a TSO user identifier with a single numeric character appended.

  The name or names are each padded to the right with blanks, as is any space in the remainder of the field. Where there is more than one name, there is no separator between them.

- Windows On PC DOS, and Windows systems, the queue manager uses:
  - For a CICS application, the CICS transaction name
  - For a non-CICS application, the rightmost 28 characters of the fully-qualified name of the executable
- IBM i On IBM i, the queue manager uses the fully-qualified job name.
- UNIX On UNIX, the queue manager uses:
  - For a CICS application, the CICS transaction name
  - For a non-CICS application, the rightmost 14 characters of the fully-qualified name of the executable if this is available to the queue manager, and blanks otherwise (for example, on AIX)
- On VSE/ESA, the queue manager uses the 8-character applid, followed by the 4-character tranid.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETA is specified in the **PMO** parameter. Any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If PMSETA is not specified, this field is ignored on input and is an output-only field.

This is an output field for the MQGET call. The length of this field is given by LNPAN. The initial value of this field is 28 blank characters.

MDPAT (10-digit signed integer)

Type of application that put the message.

This is part of the **origin context** of the message. For more information about message context, see Message context and Controlling context information.

MDPAT may have one of the following standard types. User-defined types can also be used but should be restricted to values in the range ATUFST through ATULST.

ATAIX
AIX application (same value as ATUNIX).

ATBRKR
Broker.

ATCICS
CICS transaction.

ATCICB
CICS bridge.

ATVSE
CICS/VSE transaction.

ATDOS
IBM MQ MQI client application on PC DOS.

ATDQM
Distributed queue manager agent.

ATGUAR
Tandem Guardian application (same value as ATNSK).

ATIMS
IMS application.

ATIMSB
IMS bridge.

ATJAVA
Java.

ATMVS
MVS or TSO application (same value as ATZOS).

ATNOTE
Lotus Notes Agent application.

ATNSK
Tandem NonStop Kernel application.

AT390
OS/390 application (same value as ATZOS).

AT400
IBM i application.

ATQM
Queue manager.

ATUNIX
UNIX application.

ATVOS
Stratus VOS application.

ATWIN
16-bit Windows application.

ATWINT
32-bit Windows application.

ATXCF
XCF.

ATZOS
z/OS application.

ATDEF
Default application type.

This is the default application type for the platform on which the application is running.

Note: The value of this constant is environment-specific.

ATUNK
Unknown application type.

This value can be used to indicate that the application type is unknown, even though other context information is present.

ATUFST
Lowest value for user-defined application type.

ATULST
Highest value for user-defined application type.

The following special value can also occur:

ATNCON
No context information present in message.

This value is set by the queue manager when a message is put with no context (that is, the PMNOC context option is specified).

When a message is retrieved, MDPAT can be tested for this value to decide whether the message has context (it is recommended that MDPAT is never set to ATNCON, by an application using PMSETA, if any of the other context fields are nonblank).

ATSIB
: Indicates a message originated in another IBM MQ messaging product and arrived via the SIB (Service Integration Bus) bridge.

When the queue manager generates this information as a result of an application put, the field is set to a value that is determined by the environment.

IBM i Note that on IBM i, the field is set to AT400; the queue manager never uses ATCICS on IBM i.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETA is specified in the **PMO** parameter. If PMSETA is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDPAT that was transmitted with the message if it was put to a queue. This will be the value of MDPAT that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDPAT when the message is sent as a publication to subscribers since they provide a value to override MDPAT in all publications sent to them. If the message has no context, the field is set to ATNCON.

This is an output field for the MQGET call. The initial value of this field is ATNCON.

MDPD (8-byte character string)

Date when message was put.

This is part of the *origin context* of the message. For more information about message context, see Message context and Controlling context information.

The format used for the date when this field is generated by the queue manager is:

- YYYYMMDD

where the characters represent:

YYYY
: year (four numeric digits)

MM
: month of year (01 through 12)

DD
: day of month (01 through 31)

Greenwich Mean Time (GMT) is used for the MDPD and MDPT fields, subject to the system clock being set accurately to GMT.

If the message was put as part of a unit of work, the date is that when the message was put, and not the date when the unit of work was committed.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETA is specified in the **PMO** parameter. The contents of the field are not checked by the queue manager, except that any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If PMSETA is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDPD that was transmitted with the message if it was put to a queue. This will be the value of MDPD that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDPD when the message is sent as a publication to subscribers since they provide a value to override MDPD in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by LNPDAT. The initial value of this field is 8 blank characters.

MDPER (10-digit signed integer)

Message persistence.

This indicates whether the message survives system failures and restarts of the queue manager. For the MQPUT and MQPUT1 calls, the value must be one of the following:

PEPER
Message is persistent.

This means that the message survives system failures and restarts of the queue manager. Once the message has been put, and the putter's unit of work committed (if the message is put as part of a unit of work), the message is preserved on auxiliary storage. It remains there until the message is removed from the queue, and the getter's unit of work committed (if the message is retrieved as part of a unit of work).

When a persistent message is sent to a remote queue, a store-and-forward mechanism is used to hold the message at each queue manager along the route to the destination, until the message is known to have arrived at the next queue manager.

Persistent messages cannot be placed on:

- Temporary dynamic queues
- Shared queues where the coupling facility structure level is less than three, or the coupling facility structure is not recoverable.

Persistent messages can be placed on permanent dynamic queues, predefined queues, and shared queues where the coupling facility structure level is 3, and the coupling facility is recoverable.

PENPER
Message is not persistent.

This means that the message does not normally survive system failures or restarts of the queue manager. This applies even if an intact copy of the message is found on auxiliary storage during restart of the queue manager.

In the special case of shared queues, nonpersistent messages *do* survive restarts of queue managers in the queue sharing group, but do not survive failures of the coupling facility used to store messages on the shared queues.

PEQDEF
Message has default persistence.

- If the queue is a cluster queue, the persistence of the message is taken from the **DefPersistence** attribute defined at the destination queue manager that owns the particular instance of the queue on which the message is placed. Usually, all of the instances of a cluster queue have the same value for the **DefPersistence** attribute, although this is not mandated.

  The value of **DefPersistence** is copied into the *MDPER* field when the message is placed on the destination queue. If **DefPersistence** is changed subsequently, messages that have already been placed on the queue are not affected.
- If the queue is not a cluster queue, the persistence of the message is taken from the **DefPersistence** attribute defined at the local queue manager, even if the destination queue manager is remote.

  If there is more than one definition in the queue-name resolution path, the default persistence is taken from the value of this attribute in the first definition in the path. This could be:

  - An alias queue
  - A local queue
  - A local definition of a remote queue
  - A queue manager alias
  - A transmission queue (for example, the `DefXmitQName` queue)

The value of **DefPersistence** is copied into the MDPER field when the message is put. If **DefPersistence** is changed subsequently, messages that have already been put are not affected.

Both persistent and nonpersistent messages can exist on the same queue.

When replying to a message, applications should normally use for the reply message the persistence of the request message.

For an MQGET call, the value returned is either PEPER or PENPER.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is PEQDEF.

MDPRI (10-digit signed integer)

Message priority.

For the MQPUT and MQPUT1 calls, the value must be greater than or equal to zero; zero is the lowest priority. The following special value can also be used:

PRQDEF

Default priority for queue.

- If the queue is a cluster queue, the priority for the message is taken from the **DefPriority** attribute as defined at the destination queue manager that owns the particular instance of the queue on which the message is placed. Usually, all of the instances of a cluster queue have the same value for the **DefPriority** attribute, although this is not mandated.

  The value of **DefPriority** is copied into the MDPRI field when the message is placed on the destination queue. If **DefPriority** is changed subsequently, messages that have already been placed on the queue are not affected.
- If the queue is not a cluster queue, the priority for the message is taken from the **DefPriority** attribute as defined at the local queue manager, even if the destination queue manager is remote.

  If there is more than one definition in the queue-name resolution path, the default priority is taken from the value of this attribute in the first definition in the path. This could be:

  - An alias queue
  - A local queue
  - A local definition of a remote queue
  - A queue manager alias
  - A transmission queue (for example, the DefXmitQName queue)

  The value of **DefPriority** is copied into the MDPRI field when the message is put. If **DefPriority** is changed subsequently, messages that have already been put are not affected.

The value returned by the MQGET call is always greater than or equal to zero; the value PRQDEF is never returned.

If a message is put with a priority greater than the maximum supported by the local queue manager (this maximum is given by the **MaxPriority** queue manager attribute), the message is accepted by the queue manager, but placed on the queue at the queue manager's maximum priority; the MQPUT or MQPUT1 call completes with CCWARN and reason code RC2049. However, the MDPRI field retains the value specified by the application which put the message.

When replying to a message, applications should normally use for the reply message the priority of the request message. In other situations, specifying PRQDEF allows priority tuning to be carried out without changing the application.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is PRQDEF.

MDPT (8-byte character string)

Time when message was put.

This is part of the **origin context** of the message. For more information about message context, see Message context and Controlling context information.

The format used for the time when this field is generated by the queue manager is:

- HHMMSSTH

where the characters represent (in order):

HH
hours (00 through 23)

MM
minutes (00 through 59)

SS
seconds (00 through 59; see note)

T
tenths of a second (0 through 9)

H
hundredths of a second (0 through 9)

Note: If the system clock is synchronized to a very accurate time standard, it is possible on rare occasions for 60 or 61 to be returned for the seconds in MDPT. This happens when leap seconds are inserted into the global time standard.

Greenwich Mean Time (GMT) is used for the MDPD and MDPT fields, subject to the system clock being set accurately to GMT.

If the message was put as part of a unit of work, the time is that when the message was put, and not the time when the unit of work was committed.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETA is specified in the **PMO** parameter. The contents of the field are not checked by the queue manager, except that any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If PMSETA is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDPT value that was transmitted with the message if it was put to a queue. This will be the value of MDPT that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDPT when the message is sent as a publication to subscribers since they provide a value to override MDPT in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by LNPTIM. The initial value of this field is 8 blank characters.

MDREP (10-digit signed integer)

Options for report messages.

A report message is a message about another message, used to inform an application about expected or unexpected events that relate to the original message. The MDREP field enables the application sending the original message to specify which report messages are required, whether the application message data is to be included in them, and also (for both reports and replies) how the message and correlation identifiers in the report or reply message are to be set. Any or all (or none) of the following types of report message can be requested:

- Exception
- Expiration
- Confirm on arrival (COA)

- Confirm on delivery (COD)
- Positive action notification (PAN)
- Negative action notification (NAN)

If more than one type of report message is required, or other report options are needed, the values can be added together (do not add the same constant more than once).

The application that receives the report message can determine the reason the report was generated by examining the MDFB field in the MQMD; see the MDFB field for more details.

The use of report options when putting a message to a topic can cause zero, one or many report messages to be generated and sent to the application. This is because the publication message may be sent to zero, one or many subscribing applications.

Exception options: You can specify one of the following options to request an exception report message.

ROACTIVITY

Activity reports required

This report option enables an activity report to be generated, whenever a message with this report option set is processed by supporting applications.

Messages with this report option set must be accepted by any queue manager, even if they do not 'understand' the option. This allows the report option to be set on any user message, even if they are processed by previous queue managers. To achieve this, the report option is placed in the ROAUM subfield.

If a process (either a queue manager or a user process) performs an Activity on a message with ROACT set, it can choose to generate and put an activity report.

The activity report option allows the route of any message to be traced throughout a queue manager network. The report option can be specified on any current user message and instantly they can begin to calculate the route of the message through the network. If the application generating the message cannot enable activity report generation, it can be enabled by using an API crossing exit supplied by queue manager administrators.

Several conditions are applicable to activity reports:

1. The route will be less detailed if there are fewer queue managers in the network which are able to generate activity reports.
2. The activity reports may not be easily 'orderable' in order to determine the route taken.
3. The activity reports may not be able to find a route to their requested destination.

ROEXC

Exception reports required.

This type of report can be generated by a message channel agent when a message is sent to another queue manager and the message cannot be delivered to the specified destination queue. For example, the destination queue or an intermediate transmission queue might be full, or the message might be too big for the queue.

Generation of the exception report message depends on the persistence of the original message, and the speed of the message channel (normal or fast) through which the original message travels:

- For all persistent messages, and for nonpersistent messages traveling through normal message channels, the exception report is generated only if the action specified by the sending application for the error condition can be completed successfully. The sending application can specify one of the following actions to control the disposition of the original message when the error condition arises:
  - RODLQ (this causes the original message to be placed on the dead-letter queue).

- RODISC (this causes the original message to be discarded).

  If the action specified by the sending application cannot be completed successfully, the original message is left on the transmission queue, and no exception report message is generated.

- For nonpersistent messages traveling through fast message channels, the original message is removed from the transmission queue and the exception report generated even if the specified action for the error condition cannot be completed successfully. For example, if RODLQ is specified, but the original message cannot be placed on the dead-letter queue because (say) that queue is full, the exception report message is generated and the original message discarded.

  See Message persistence for more information about normal and fast message channels.

An exception report is not generated if the application that put the original message can be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call.

Applications can also send exception reports, to indicate that a message that it has received cannot be processed (for example, because it is a debit transaction that would cause the account to exceed its credit limit).

Message data from the original message is not included with the report message.

Do not specify more than one of ROEXC, ROEXCD, and ROEXCF.

ROEXCD
Exception reports with data required.

This is the same as ROEXC, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of ROEXC, ROEXCD, and ROEXCF.

ROEXCF
Exception reports with full data required.

This is the same as ROEXC, except that all of the application message data from the original message is included in the report message.

Do not specify more than one of ROEXC, ROEXCD, and ROEXCF.

Expiration options: You can specify one of the following options to request an expiration report message.

ROEXP
Expiration reports required.

This type of report is generated by the queue manager if the message is discarded before delivery to an application because its expiry time has passed (see the MDEXP field). If this option is not set, no report message is generated if a message is discarded for this reason (even if one of the ROEXC* options is specified).

Message data from the original message is not included with the report message.

Do not specify more than one of ROEXP, ROEXPD, and ROEXPF.

ROEXPD
Expiration reports with data required.

This is the same as ROEXP, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of ROEXP, ROEXPD, and ROEXPF.

ROEXPF
Expiration reports with full data required.

This is the same as ROEXP, except that all of the application message data from the original message is included in the report message.

Do not specify more than one of ROEXP, ROEXPD, and ROEXPF.

Confirm-on-arrival options: You can specify one of the following options to request a confirm-on-arrival report message.

ROCOA
Confirm-on-arrival reports required.

This type of report is generated by the queue manager that owns the destination queue, when the message is placed on the destination queue. Message data from the original message is not included with the report message.

If the message is put as part of a unit of work, and the destination queue is a local queue, the COA report message generated by the queue manager becomes available for retrieval only if and when the unit of work is committed.

A COA report is not generated if the `MDFMT` field in the message descriptor is FMXQH or FMDLH. This prevents a COA report being generated if the message is put on a transmission queue, or is undeliverable and put on a dead-letter queue.

Do not specify more than one of ROCOA, ROCOAD, and ROCOAF.

ROCOAD
Confirm-on-arrival reports with data required.

This is the same as ROCOA, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

Do not specify more than one of ROCOA, ROCOAD, and ROCOAF.

ROCOAF
Confirm-on-arrival reports with full data required.

This is the same as ROCOA, except that all of the application message data from the original message is included in the report message.

Do not specify more than one of ROCOA, ROCOAD, and ROCOAF.

Discard and expiry options: You can specify the following option to set the expiry time and discard flag for report messages.

ROPDAE
Set report message expiry time and discard flag.

This option ensures that report messages and reply messages inherit the expiry time and discard flag (whether to discard or not), from their original messages. With this option set, report and reply messages:

1. Inherit the RODISC flag (if it was set).
2. Inherit the remaining expiry time of the message, if the message is not an expiry report. If the message is an expiry report, the expiry time is set to 60 seconds.

With this option set, the following applies:

Note:

1. Report and reply messages are generated with a discard flag and an expiry value, and cannot remain within the system.
2. Trace route messages are prevented from reaching destination queues on non-trace route enabled queue managers.

3. Queues are prevented from being filled with reports that cannot be delivered, if communications links are broken.
4. Command server responses inherit the remaining expiry of the request.

Confirm-on-delivery options: You can specify one of the following options to request a confirm-on-delivery report message.

ROCOD
Confirm-on-delivery reports required.

This type of report is generated by the queue manager when an application retrieves the message from the destination queue in a way that causes the message to be deleted from the queue. Message data from the original message is not included with the report message.

If the message is retrieved as part of a unit of work, the report message is generated within the same unit of work, so that the report is not available until the unit of work is committed. If the unit of work is backed out, the report is not sent.

A COD report is not generated if the `MDFMT` field in the message descriptor is FMDLH. This prevents a COD report being generated if the message is undeliverable and put on a dead-letter queue.

ROCOD is not valid if the destination queue is an XCF queue.

Do not specify more than one of ROCOD, ROCODD, and ROCODF.

ROCODD
Confirm-on-delivery reports with data required.

This is the same as ROCOD, except that the first 100 bytes of the application message data from the original message are included in the report message. If the original message contains one or more MQ header structures, they are included in the report message, in addition to the 100 bytes of application data.

If GMATM is specified on the MQGET call for the original message, and the message retrieved is truncated, the amount of application message data placed in the report message is the minimum of:

- The length of the original message
- 100 bytes.

ROCODD is not valid if the destination queue is an XCF queue.

Do not specify more than one of ROCOD, ROCODD, and ROCODF.

ROCODF
Confirm-on-delivery reports with full data required.

This is the same as ROCOD, except that all of the application message data from the original message is included in the report message.

ROCODF is not valid if the destination queue is an XCF queue.

Do not specify more than one of ROCOD, ROCODD, and ROCODF.

Action-notification options: You can specify one or both of the following options to request that the receiving application send a positive-action or negative-action report message.

ROPAN
Positive action notification reports required.

This type of report is generated by the application that retrieves the message and acts upon it. It indicates that the action requested in the message has been performed successfully. The application generating the report determines whether any data is to be included with the report.

Other than conveying this request to the application retrieving the message, the queue manager takes no action based upon this option. It is the responsibility of the retrieving application to generate the report if appropriate.

RONAN

Negative action notification reports required.

This type of report is generated by the application that retrieves the message and acts upon it. It indicates that the action requested in the message has not been performed successfully. The application generating the report determines whether any data is to be included with the report. For example, it may be desirable to include some data indicating why the request could not be performed.

Other than conveying this request to the application retrieving the message, the queue manager takes no action based upon this option. It is the responsibility of the retrieving application to generate the report if appropriate.

Determination of which conditions correspond to a positive action and which correspond to a negative action is the responsibility of the application. However, it is recommended that if the request has been only partially performed, a NAN report rather than a PAN report should be generated if requested. It is also recommended that every possible condition should correspond to either a positive action, or a negative action, but not both.

Message-identifier options: You can specify one of the following options to control how the `MDMID` of the report message (or of the reply message) is to be set.

RONMI

New message identifier.

This is the default action, and indicates that if a report or reply is generated as a result of this message, a new `MDMID` is to be generated for the report or reply message.

ROPMI

Pass message identifier.

If a report or reply is generated as a result of this message, the `MDMID` of this message is to be copied to the `MDMID` of the report or reply message.

The `MsgId` of a publication message will be different for each subscriber that receives a copy of the publication and therefore the `MsgId` copied into the report or reply message will be different for each one.

If this option is not specified, RONMI is assumed.

Correlation-identifier options: You can specify one of the following options to control how the `MDCID` of the report message (or of the reply message) is to be set.

ROCMTC

Copy message identifier to correlation identifier.

This is the default action, and indicates that if a report or reply is generated as a result of this message, the `MDMID` of this message is to be copied to the `MDCID` of the report or reply message.

The `MsgId` of a publication message will be different for each subscriber that receives a copy of the publication and therefore the `MsgId` copied into the `CorrelId` of the report or reply message will be different for each one.

ROPCI

Pass correlation identifier.

If a report or reply is generated as a result of this message, the `MDCID` of this message is to be copied to the `MDCID` of the report or reply message.

The `MDCID` of a publication message will be specific to a subscriber unless it uses the SOSCID option and sets the `SCDIC` field in the MQSD to CINONE. Therefore it is possible that the `MDCID` copied into the `MDCID` of the report or reply message will be different for each one.

If this option is not specified, ROCMTC is assumed.

Servers replying to requests or generating report messages are recommended to check whether the ROPMI or ROPCI options were set in the original message. If they were, the servers should take the

action described for those options. If neither is set, the servers should take the corresponding default action.

: You can specify one of the following options to control the disposition of the original message when it cannot be delivered to the destination queue. These options apply only to those situations that would result in an exception report message being generated if one had been requested by the sending application. The application can set the disposition options independently of requesting exception reports.

RODLQ

Place message on dead-letter queue.

This is the default action, and indicates that the message should be placed on the dead-letter queue, if the message cannot be delivered to the destination queue. This happens in the following situations:

- When the application that put the original message cannot be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call. An exception report message is generated, if one was requested by the sender.
- When the application that put the original message was putting to a topic

An exception report message will be generated, if one was requested by the sender.

RODISC

Discard message.

This indicates that the message should be discarded if it cannot be delivered to the destination queue. This happens in the following situations:

- When the application that put the original message cannot be notified synchronously of the problem by means of the reason code returned by the MQPUT or MQPUT1 call. An exception report message is generated, if one was requested by the sender.
- When the application that put the original message was putting to a topic

An exception report message will be generated, if one was requested by the sender.

If it is required to return the original message to the sender, without the original message being placed on the dead-letter queue, the sender should specify RODISC with ROEXCF.

Default option: You can specify the following if no report options are required:

RONONE

No reports required.

This value can be used to indicate that no other options have been specified. RONONE is defined to aid program documentation. It is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

General information:

1. All report types required must be specifically requested by the application sending the original message. For example, if a COA report is requested but an exception report is not, a COA report is generated when the message is placed on the destination queue, but no exception report is generated if the destination queue is full when the message arrives there. If no MDREP options are set, no report messages are generated by the queue manager or message channel agent (MCA).

   Some report options can be specified even though the local queue manager does not recognize them; this is useful when the option is to be processed by the destination queue manager. See "Report options and message flags on IBM i" on page 1418 for more details.

   If a report message is requested, the name of the queue to which the report should be sent must be specified in the MDRQ field. When a report message is received, the nature of the report can be determined by examining the MDFB field in the message descriptor.
2. If the queue manager or MCA that generates a report message is unable to put the report message on the reply queue (for example, because the reply queue or transmission queue is full), the report

message is placed instead on the dead-letter queue. If that also fails, or there is no dead-letter queue, the action taken depends on the type of the report message:

- If the report message is an exception report, the message which caused the exception report to be generated is left on its transmission queue; this ensures that the message is not lost.
- For all other report types, the report message is discarded and processing continues normally. This is done because either the original message has already been delivered safely (for COA or COD report messages), or is no longer of any interest (for an expiration report message).

Once a report message has been placed successfully on a queue (either the destination queue or an intermediate transmission queue), the message is no longer subject to special processing; it is treated just like any other message.

3. When the report is generated, the `MDRQ` queue is opened and the report message put using the authority of the `MDUID` in the MQMD of the message causing the report, except in the following cases:

   - Exception reports generated by a receiving MCA are put with whatever authority the MCA used when it tried to put the message causing the report. The CDPA channel attribute determines the user identifier used.
   - COA reports generated by the queue manager are put with whatever authority was used when the message causing the report was put on the queue manager generating the report. For example, if the message was put by a receiving MCA using the MCA's user identifier, the queue manager puts the COA report using the MCA's user identifier.

   Applications generating reports should normally use the same authority as they would have used to generate a reply; this should normally be the authority of the user identifier in the original message.

   If the report has to travel to a remote destination, senders and receivers can decide whether to accept it, in the same way as they do for other messages.

4. If a report message with data is requested:

   - The report message is always generated with the amount of data requested by the sender of the original message. If the report message is too big for the reply queue, the processing described previously occurs; the report message is never truncated in order to fit on the reply queue.
   - If the `MDFMT` of the original message is FMXQH, the data included in the report does not include the MQXQH. The report data starts with the first byte of the data beyond the MQXQH in the original message. This occurs whether the queue is a transmission queue.

5. If a COA, COD, or expiration report message is received at the reply queue, it is guaranteed that the original message arrived, was delivered, or expired, as appropriate. However, if one or more of these report messages is requested and is not received, the reverse cannot be assumed, since one of the following may have occurred:

   a. The report message is held up because a link is down.
   b. The report message is held up because a blocking condition exists at an intermediate transmission queue or at the reply queue (for example, the queue is full or inhibited for puts).
   c. The report message is on a dead-letter queue.
   d. When the queue manager was attempting to generate the report message, it was unable to put it on the appropriate queue, and was also unable to put it on the dead-letter queue, so the report message could not be generated.
   e. A failure of the queue manager occurred between the action being reported (arrival, delivery or expiry), and generation of the corresponding report message. (This does not happen for COD report messages if the application retrieves the original message within a unit of work, as the COD report message is generated within the same unit of work.)

   Exception report messages may be held up in the same way for reasons 1, 2, and 3 previously. However, when an MCA is unable to generate an exception report message (the report message cannot be put either on the reply queue or the dead-letter queue), the original message remains

on the transmission queue at the sender, and the channel is closed. This occurs irrespective of whether the report message was to be generated at the sending or the receiving end of the channel.

6. If the original message is temporarily blocked (resulting in an exception report message being generated and the original message being put on a dead-letter queue), but the blockage clears and an application then reads the original message from the dead-letter queue and puts it again to its destination, the following may occur:

   - Even though an exception report message has been generated, the original message eventually arrives successfully at its destination.
   - More than one exception report message is generated in respect of a single original message, since the original message may encounter another blockage later.

Report messages when putting to a topic:

1. Reports can be generated when putting a message to a topic. This message will be sent to all subscribers to the topic, which could be zero, one or many. This should be taken into account when choosing to use report options as many report messages could be generated as a result.
2. When putting a message to a topic, there may be many destination queues that are to be given a copy of the message. If some of these destination queues have a problem, such as queue full, then the successful completion of the MQPUT depends on the setting of NPMSGDLV or PMSGDLV (depending on the persistence of the message). If the setting is such that message delivery to the destination queue must be successful (for example, it is a persistent message to a durable subscriber and PMSGDLV is set to ALL or ALLDUR), then success is defined as one of the following criteria being met:

   - Successful put to the subscriber queue
   - Use of RODLQ and a successful put to the Dead-letter queue if the subscriber queue cannot take the message
   - Use of RODISC if the subscriber queue cannot take the message.

Report messages for message segments:

1. Report messages can be requested for messages that have segmentation allowed (see the description of the MFSEGA flag). If the queue manager finds it necessary to segment the message, a report message can be generated for each of the segments that subsequently encounters the relevant condition. Applications should therefore be prepared to receive multiple report messages for each type of report message requested. The `MDGID` field in the report message can be used to correlate the multiple reports with the group identifier of the original message, and the `MDFB` field used to identify the type of each report message.
2. If GMLOGO is used to retrieve report messages for segments, be aware that reports of different types may be returned by the successive MQGET calls. For example, if both COA and COD reports are requested for a message that is segmented by the queue manager, the MQGET calls for the report messages may return the COA and COD report messages interleaved in an unpredictable fashion. This can be avoided by using the GMCMPM option (optionally with GMATM). GMCMPM causes the queue manager to reassemble report messages that have the same report type.
   For example, the first MQGET call might reassemble all of the COA messages relating to the original message, and the second MQGET call might reassemble all of the COD messages. Which is reassembled first depends on which type of report message happens to occur first on the queue.
3. Applications that themselves put segments can specify different report options for each segment. However, the following points should be noted:

   - If the segments are retrieved using the GMCMPM option, only the report options in the first segment are honored by the queue manager.
   - If the segments are retrieved one by one, and most of them have one of the ROCOD* options, but at least one segment does not, it will not be possible to use the GMCMPM option to retrieve the report messages with a single MQGET call, or use the GMASGA option to detect when all of the report messages have arrived.

4. In an MQ network, it is possible for the queue managers to have differing capabilities. If a report message for a segment is generated by a queue manager or MCA that does not support segmentation, the queue manager or MCA will not by default include the necessary segment information in the report message, and this may make it difficult to identify the original message that caused the report to be generated. This difficulty can be avoided by requesting data with the report message, that is, by specifying the appropriate RO*D or RO*F options. However, be aware that if RO*D is specified, less than 100 bytes of application message data may be returned to the application which retrieves the report message, if the report message is generated by a queue manager or MCA that does not support segmentation.

Contents of the message descriptor for a report message: When the queue manager or message channel agent (MCA) generates a report message, it sets the fields in the message descriptor to the following values, and then puts the message in the normal way.

Table 708. Values used for MQMD fields when a report message is system-generated

Field in MQMD	Value used
MDSID	MDSIDV
MDVER	MDVER2
MDREP	RONONE
MDMT	MTRPRT
MDEXP	EIULIM
MDFB	As appropriate for the nature of the report (FBCOA, FBCOD, FBEXP, or an RC* value)
MDENC	Copied from the original message descriptor
MDCSI	Copied from the original message descriptor
MDFMT	Copied from the original message descriptor
MDPRI	Copied from the original message descriptor
MDPER	Copied from the original message descriptor
MDMID	As specified by the report options in the original message descriptor
MDCID	As specified by the report options in the original message descriptor
MDBOC	0
MDRQ	Blanks
MDRM	Name of queue manager
MDUID	As set by the PMPASI option
MDACC	As set by the PMPASI option
MDAID	As set by the PMPASI option
MDPAT	ATQM, or as appropriate for the message channel agent
MDPAN	First 28 bytes of the queue manager name or message channel agent name. For report messages generated by the IMS bridge, this field contains the XCF group name and XCF member name of the IMS system to which the message relates.
MDPD	Date when report message is sent
MDPT	Time when report message is sent
MDAOD	Blanks
MDGID	Copied from the original message descriptor

Table 708. Values used for MQMD fields when a report message is system-generated (continued)

Field in MQMD	Value used
MDSEQ	Copied from the original message descriptor
MDOFF	Copied from the original message descriptor
MDMFL	Copied from the original message descriptor
MDOLN	Copied from the original message descriptor if not OLUNDF, and set to the length of the original message data otherwise

An application generating a report is recommended to set similar values, except for the following:

- The MDRM field can be set to blanks (the queue manager will change this to the name of the local queue manager when the message is put).
- The context fields should be set using the option that would have been used for a reply, normally PMPASI.

Analyzing the report field: The MDREP field contains subfields; because of this, applications that need to check whether the sender of the message requested a particular report should use one of the techniques described in "Analyzing the report field on IBM i" on page 1420.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The initial value of this field is RONONE.

MDRM (48-byte character string)

Name of reply queue manager.

This is the name of the queue manager to which the reply message or report message should be sent. MDRQ is the local name of a queue that is defined on this queue manager.

If the MDRM field is blank, the local queue manager looks up the **MDRQ** name in its queue definitions. If a local definition of a remote queue exists with this name, the **MDRM** value in the transmitted message is replaced by the value of the **RemoteQMgrName** attribute from the definition of the remote queue, and this value will be returned in the message descriptor when the receiving application issues an MQGET call for the message. If a local definition of a remote queue does not exist, the MDRM that is transmitted with the message is the name of the local queue manager.

If the name is specified, it may contain trailing blanks; the first null character and characters following it are treated as blanks. Otherwise, however, no check is made that the name satisfies the naming rules for queue managers, or that this name is known to the sending queue manager; this is also true for the name transmitted, if the **MDRM** is replaced in the transmitted message.

If a reply-to queue is not required, it is recommended (although this is not checked) that the MDRM field should be set to blanks; the field should not be left uninitialized.

For the MQGET call, the queue manager always returns the name padded with blanks to the length of the field.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by LNQMN. The initial value of this field is 48 blank characters.

MDRQ (48-byte character string)

Name of reply queue.

This is the name of the message queue to which the application that issued the get request for the message should send MTRPLY and MTRPRT messages. The name is the local name of a queue that is defined on the queue manager identified by MDRM. This queue should not be a model queue, although the sending queue manager does not verify this when the message is put.

For the MQPUT and MQPUT1 calls, this field must not be blank if the MDMT field has the value MTRQST, or if any report messages are requested by the MDREP field. However, the value specified (or

substituted) is passed on to the application that issues the get request for the message, whatever the message type.

If the MDRM field is blank, the local queue manager looks up the MDRQ name in its own queue definitions. If a local definition of a remote queue exists with this name, the MDRQ value in the transmitted message is replaced by the value of the **RemoteQName** attribute from the definition of the remote queue, and this value will be returned in the message descriptor when the receiving application issues an MQGET call for the message. If a local definition of a remote queue does not exist, MDRQ is unchanged.

If the name is specified, it may contain trailing blanks; the first null character and characters following it are treated as blanks. Otherwise, however, no check is made that the name satisfies the naming rules for queues; this is also true for the name transmitted, if the MDRQ is replaced in the transmitted message. The only check made is that a name has been specified, if the circumstances require it.

If a reply-to queue is not required, it is recommended (although this is not checked) that the MDRQ field should be set to blanks; the field should not be left uninitialized.

For the MQGET call, the queue manager always returns the name padded with blanks to the length of the field.

If a message that requires a report message cannot be delivered, and the report message also cannot be delivered to the queue specified, both the original message and the report message go to the dead-letter (undelivered-message) queue. See the **DeadLetterQName** attribute described in "Attributes for the queue manager on IBM i" on page 1384.

This is an output field for the MQGET call, and an input field for the MQPUT and MQPUT1 calls. The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

MDSEQ (10-digit signed integer)

Sequence number of logical message within group.

Sequence numbers start at 1, and increase by 1 for each new logical message in the group, up to a maximum of 999 999 999. A physical message which is not in a group has a sequence number of 1.

This field need not be set by the application on the MQPUT or MQGET call if:

- On the MQPUT call, PMLOGO is specified.
- On the MQGET call, MOSEQN is not specified.

These are the recommended ways of using these calls for messages that are not report messages. However, if the application requires more control, or the call is MQPUT1, the application must ensure that MDSEQ is set to an appropriate value.

On input to the MQPUT and MQPUT1 calls, the queue manager uses the value detailed in Table 1. On output from the MQPUT and MQPUT1 calls, the queue manager sets this field to the value that was sent with the message.

On input to the MQGET call, the queue manager uses the value detailed in Table 1. On output from the MQGET call, the queue manager sets this field to the value for the message retrieved.

The initial value of this field is one. This field is ignored if MDVER is less than MDVER2.

MDSID (4-byte character string)

Structure identifier.

The value must be:

MDSIDV
Identifier for message descriptor structure.

This is always an input field. The initial value of this field is MDSIDV.

MDUID (12-byte character string)

User identifier.

This is part of the *identity context* of the message. For more information about message context, see Message context and Controlling context information.

MDUID specifies the user identifier of the application that originated the message. The queue manager treats this information as character data, but does not define the format of it.

After a message has been received, MDUID can be used in the ODAU field of the **OBJDSC** parameter of a subsequent MQOPEN or MQPUT1 call, so that the authorization check is performed for the MDUID user instead of the application performing the open.

When the queue manager generates this information for an MQPUT or MQPUT1 call, the queue manager uses a user identifier determined from the environment.

When the user identifier is determined from the environment:

- z/OS On z/OS, the queue manager uses:
  - For batch, the user identifier from the JES JOB card or started task
  - For TSO, the log on user identifier
  - For CICS, the user identifier associated with the task
  - For IMS, the user identifier depends on the type of application:
    - For:
      - Nonmessage BMP regions
      - Nonmessage IFP regions
      - Message BMP and message IFP regions that have not issued a successful GU call

      the queue manager uses the user identifier from the region JES JOB card or the TSO user identifier. If these are blank or null, it uses the name of the program specification block (PSB).
    - For:
      - Message BMP and message IFP regions that have issued a successful GU call
      - MPP regions

      the queue manager uses one of:
      - The signed-on user identifier associated with the message
      - The logical terminal (LTERM) name
      - The user identifier from the region JES JOB card
      - The TSO user identifier
      - The PSB name
- IBM i On IBM i, the queue manager uses the name of the user profile associated with the application job.
- UNIX On UNIX, the queue manager uses:
  - The application's logon name
  - The effective user identifier of the process if no logon is available
  - The user identifier associated with the transaction, if the application is a CICS transaction
- On VSE/ESA, this is a reserved field.
- Windows On Windows, the queue manager uses the first 12 characters of the logged-on user name.

For the MQPUT and MQPUT1 calls, this is an input/output field if PMSETI or PMSETA is specified in the **PMO** parameter. Any information following a null character within the field is discarded. The null character and any following characters are converted to blanks by the queue manager. If PMSETI or PMSETA is not specified, this field is ignored on input and is an output-only field.

After the successful completion of an MQPUT or MQPUT1 call, this field contains the MDUID that was transmitted with the message if it was put to a queue. This will be the value of MDUID that is kept with the message if it is retained (see description of PMRET for more details about retained publications) but is not used as the MDUID when the message is sent as a publication to subscribers since they provide a value to override MDUID in all publications sent to them. If the message has no context, the field is entirely blank.

This is an output field for the MQGET call. The length of this field is given by LNUID. The initial value of this field is 12 blank characters.

MDVER (10-digit signed integer)

Structure version number.

The value must be one of the following:

MDVER1
Version-1 message descriptor structure.

MDVER2
Version-2 message descriptor structure.

Note: When a version-2 MQMD is used, the queue manager performs additional checks on any MQ header structures that may be present at the beginning of the application message data; for further details see the usage notes for the MQPUT call.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MDVERC
Current version of message descriptor structure.

This is always an input field. The initial value of this field is MDVER1.

Initial values

Table 709. Initial values of fields in MQMD

Field name	Name of constant	Value of constant
MDSID	MDSIDV	'MD¬¬'
MDVER	MDVER1	1
MDREP	RONONE	0
MDMT	MTDGRM	8
MDEXP	EIULIM	-1
MDFB	FBNONE	0
MDENC	ENNAT	Depends on environment
MDCSI	CSQM	0
MDFMT	FMNONE	Blanks
MDPRI	PRQDEF	-1
MDPER	PEQDEF	2
MDMID	MINONE	Nulls
MDCID	CINONE	Nulls
MDBOC	None	0
MDRQ	None	Blanks

Field name	Name of constant	Value of constant
MDRM	None	Blanks
MDUID	None	Blanks
MDACC	ACNONE	Nulls
MDAID	None	Blanks
MDPAT	ATNCON	0
MDPAN	None	Blanks
MDPD	None	Blanks
MDPT	None	Blanks
MDAOD	None	Blanks
MDGID	GINONE	Nulls
MDSEQ	None	1
MDOFF	None	0
MDMFL	MFNONE	0
MDOLN	OLUNDF	-1

Table 709. Initial values of fields in MQMD (continued)

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D*
D* MQMD Structure
D*
D* Structure identifier
D  MDSID                  1      4    INZ('MD  ')
D* Structure version number
D  MDVER                  5      8I 0 INZ(1)
D* Options for report messages
D  MDREP                  9     12I 0 INZ(0)
D* Message type
D  MDMT                  13     16I 0 INZ(8)
D* Message lifetime
D  MDEXP                 17     20I 0 INZ(-1)
D* Feedback or reason code
D  MDFB                  21     24I 0 INZ(0)
D* Numeric encoding of message data
D  MDENC                 25     28I 0 INZ(273)
D* Character set identifier of messagedata
D  MDCSI                 29     32I 0 INZ(0)
D* Format name of message data
D  MDFMT                 33     40    INZ('        ')
D* Message priority
D  MDPRI                 41     44I 0 INZ(-1)
D* Message persistence
D  MDPER                 45     48I 0 INZ(2)
D* Message identifier
D  MDMID                 49     72    INZ(X'00000000000000-
D                                     0000000000000000000000-
D                                     000000000000')
D* Correlation identifier
D  MDCID                 73     96    INZ(X'00000000000000-
D                                     0000000000000000000000-
D                                     000000000000')
D* Backout counter
```

```
     D  MDBOC                 97    100I 0 INZ(0)
     D* Name of reply queue
     D  MDRQ                 101    148    INZ
     D* Name of reply queue manager
     D  MDRM                 149    196    INZ
     D* User identifier
     D  MDUID                197    208    INZ
     D* Accounting token
     D  MDACC                209    240    INZ(X'00000000000000-
     D                                     0000000000000000000000-
     D                                     0000000000000000000000-
     D                                     000000')
     D* Application data relating toidentity
     D  MDAID                241    272    INZ
     D* Type of application that put themessage
     D  MDPAT                273    276I 0 INZ(0)
     D* Name of application that put themessage
     D  MDPAN                277    304    INZ
     D* Date when message was put
     D  MDPD                 305    312    INZ
     D* Time when message was put
     D  MDPT                 313    320    INZ
     D* Application data relating toorigin
     D  MDAOD                321    324    INZ
     D* Group identifier
     D  MDGID                325    348    INZ(X'00000000000000-
     D                                     0000000000000000000000-
     D                                     000000000000')
     D* Sequence number of logical messagewithin group
     D  MDSEQ                349    352I 0 INZ(1)
     D* Offset of data in physical messagefrom start of logical message
     D  MDOFF                353    356I 0 INZ(0)
     D* Message flags
     D  MDMFL                357    360I 0 INZ(0)
     D* Length of original message
     D  MDOLN                361    364I 0 INZ(-1)
```

IBM i MQMDE (Message descriptor extension) on IBM i

Overview

Purpose: The MQMDE structure describes the data that sometimes occurs preceding the application message data. The structure contains those MQMD fields that exist in the version-2 MQMD, but not in the version-1 MQMD.

Format name: FMMDE.

Character set and encoding: Data in MQMDE must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT for the C programming language.

The character set and encoding of the MQMDE must be set into the *MDCSI* and *MDENC* fields in:

- The MQMD (if the MQMDE structure is at the start of the message data), or
- The header structure that precedes the MQMDE structure (all other cases).

If the MQMDE is not in the queue manager's character set and encoding, the MQMDE is accepted but not honored, that is, the MQMDE is treated as message data.

Usage: Normal applications should use a version-2 MQMD, in which case they will not encounter an MQMDE structure. However, specialized applications, and applications that continue to use a version-1 MQMD, may encounter an MQMDE in some situations. The MQMDE structure can occur in the following circumstances:

- Specified on the MQPUT and MQPUT1 calls
- Returned by the MQGET call
- In messages on transmission queues
- “MQMDE specified on MQPUT and MQPUT1 calls” on page 1141

- “MQMDE returned by MQGET call” on page 1141
- “MQMDE in messages on transmission queues” on page 1142
- “Fields” on page 1142
- “Initial values” on page 1144
- “RPG declaration” on page 1144

MQMDE specified on MQPUT and MQPUT1 calls

On the MQPUT and MQPUT1 calls, if the application provides a version-1 MQMD, the application can optionally prefix the message data with an MQMDE, setting the *MDFMT* field in MQMD to FMMDE to indicate that an MQMDE is present. If the application does not provide an MQMDE, the queue manager assumes default values for the fields in the MQMDE. The default values that the queue manager uses are the same as the initial values for the structure - see Table 711 on page 1144.

If the application provides a version-2 MQMD *and* prefixes the application message data with an MQMDE, the structures are processed as shown in Table 710 on page 1141.

Table 710. Queue manager action when MQMDE specified on MQPUT or MQPUT1

MQMD version	Values of version-2 fields	Values of corresponding fields in MQMDE	Action taken by queue manager
1	-	Valid	MQMDE is honored
2	Default	Valid	MQMDE is honored
2	Not default	Valid	MQMDE is treated as message data
1 or 2	Any	Not valid	Call fails with an appropriate reason code
1 or 2	Any	MQMDE is in the wrong character set or encoding, or is an unsupported version	MQMDE is treated as message data

There is one special case. If the application uses a version-2 MQMD to put a message that is a segment (that is, the MFSEG or MFLSEG flag is set), and the format name in the MQMD is FMDLH, the queue manager generates an MQMDE structure and inserts it *between* the MQDLH structure and the data that follows it. In the MQMD that the queue manager retains with the message, the version-2 fields are set to their default values.

Several of the fields that exist in the version-2 MQMD but not the version-1 MQMD are input/output fields on MQPUT and MQPUT1. However, the queue manager does not return any values in the equivalent fields in the MQMDE on output from the MQPUT and MQPUT1 calls; if the application requires those output values, it must use a version-2 MQMD.

MQMDE returned by MQGET call

On the MQGET call, if the application provides a version-1 MQMD, the queue manager prefixes the message returned with an MQMDE, but only if one or more of the fields in the MQMDE has a nondefault value. The queue manager sets the *MDFMT* field in MQMD to the value FMMDE to indicate that an MQMDE is present.

If the application provides an MQMDE at the start of the **BUFFER** parameter, the MQMDE is ignored. On return from the MQGET call, it is replaced by the MQMDE for the message (if one is needed), or overwritten by the application message data (if the MQMDE is not needed).

If an MQMDE is returned by the MQGET call, the data in the MQMDE is typically in the queue manager's character set and encoding. However the MQMDE may be in some other character set and encoding if:

- The MQMDE was treated as data on the MQPUT or MQPUT1 call (see Table 710 on page 1141 for the circumstances that can cause this).
- The message was received from a remote queue manager connected by a TCP connection, and the receiving message channel agent (MCA) was not set up correctly (see Security of IBM MQ for IBM i objects for further information).

MQMDE in messages on transmission queues

Messages on transmission queues are prefixed with the MQXQH structure, which contains within it a version-1 MQMD. An MQMDE may also be present, positioned between the MQXQH structure and application message data, but it will typically be present only if one or more of the fields in the MQMDE has a nondefault value.

Other IBM MQ header structures can also occur between the MQXQH structure and the application message data. For example, when the dead-letter header MQDLH is present, and the message is not a segment, the order is:

- MQXQH (containing a version-1 MQMD)
- MQMDE
- MQDLH
- Application message data

Fields

The MQMDE structure contains the following fields; the fields are described in **alphabetical order**:

MECSI (10-digit signed integer)

Character-set identifier of data that follows MQMDE.

This specifies the character set identifier of the data that follows the MQMDE structure; it does not apply to character data in the MQMDE structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that this field is valid. The following special value can be used:

CSINHT

Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

MEENC (10-digit signed integer)

MEENC (10-digit signed integer)

This specifies the numeric encoding of the data that follows the MQMDE structure; it does not apply to numeric data in the MQMDE structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that the field is valid. See the *MDENC* field described in “MQMD (Message descriptor) on IBM i” on page 1097 for more information about data encodings.

The initial value of this field is ENNAT.

MEFLG (10-digit signed integer)

General flags.

The following flag can be specified:

MEFNON
No flags.

The initial value of this field is MEFNON.

MEFMT (8-byte character string)

Format name of data that follows MQMDE.

This specifies the format name of the data that follows the MQMDE structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The queue manager does not check that this field is valid. See the *MDFMT* field described in "MQMD (Message descriptor) on IBM i" on page 1097 for more information about format names.

The initial value of this field is FMNONE.

MEGID (24-byte bit string)

Group identifier.

See the *MDGID* field described in "MQMD (Message descriptor) on IBM i" on page 1097. The initial value of this field is GINONE.

MELEN (10-digit signed integer)

Length of MQMDE structure.

The following value is defined:

MELEN2
Length of version-2 message descriptor extension structure.

The initial value of this field is MELEN2.

MEMFL (10-digit signed integer)

Message flags.

See the *MDMFL* field described in "MQMD (Message descriptor) on IBM i" on page 1097. The initial value of this field is MFNONE.

MEOFF (10-digit signed integer)

Offset of data in physical message from start of logical message.

See the *MDOFF* field described in "MQMD (Message descriptor) on IBM i" on page 1097. The initial value of this field is 0.

MEOLN (10-digit signed integer)

Length of original message.

See the *MDOLN* field described in "MQMD (Message descriptor) on IBM i" on page 1097. The initial value of this field is OLUNDF.

MESEQ (10-digit signed integer)

Sequence number of logical message within group.

See the *MDSEQ* field described in "MQMD (Message descriptor) on IBM i" on page 1097. The initial value of this field is 1.

MESID (4-byte character string)

Structure identifier.

The value must be:

MESIDV
Identifier for message descriptor extension structure.

The initial value of this field is MESIDV.

MEVER (10-digit signed integer)

Structure version number.

The value must be:

MEVER2
Version-2 message descriptor extension structure.

The following constant specifies the version number of the current version:

MEVERC
Current version of message descriptor extension structure.

The initial value of this field is MEVER2.

Initial values

Table 711. Initial values of fields in MQMDE

Field name	Name of constant	Value of constant
MESID	MESIDV	'MDE¬'
MEVER	MEVER2	2
MELEN	MELEN2	72
MEENC	ENNAT	Depends on environment
MECSI	CSUNDF	0
MEFMT	FMNONE	Blanks
MEFLG	MEFNON	0
MEGID	GINONE	Nulls
MESEQ	None	1
MEOFF	None	0
MEMFL	MFNONE	0
MEOLN	OLUNDF	-1

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQMDE Structure
     D*
     D* Structure identifier
     D  MESID                  1      4    INZ('MDE ')
     D* Structure version number
     D  MEVER                  5      8I 0 INZ(2)
     D* Length of MQMDE structure
     D  MELEN                  9     12I 0 INZ(72)
     D* Numeric encoding of data that followsMQMDE
     D  MEENC                 13     16I 0 INZ(273)
     D* Character-set identifier of data thatfollows MQMDE
     D  MECSI                 17     20I 0 INZ(0)
     D* Format name of data that followsMQMDE
```

```
     D  MEFMT                21     28    INZ('        ')
     D* General flags
     D  MEFLG                29     32I 0 INZ(0)
     D* Group identifier
     D  MEGID                33     56    INZ(X'00000000000000-
     D                                    0000000000000000000000-
     D                                    000000000000')
     D* Sequence number of logical messagewithin group
     D  MESEQ                57     60I 0 INZ(1)
     D* Offset of data in physical messagefrom start of logical message
     D  MEOFF                61     64I 0 INZ(0)
     D* Message flags
     D  MEMFL                65     68I 0 INZ(0)
     D* Length of original message
     D  MEOLN                69     72I 0 INZ(-1)
```

IBM i MQMHBO (Message handle to buffer options) on IBM i

Structure defining the message handle to buffer options

Overview

Purpose: The MQMHBO structure allows applications to specify options that control how buffers are produced from message handles. The structure is an input parameter on the MQMHBUF call.

Character set and encoding: Data in MQMHBO must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1145
- "Initial values" on page 1146
- "RPG declaration" on page 1146

Fields

The MQMHBO structure contains the following fields; the fields are described in **alphabetical order**:

MBOPT (10-digit signed integer)

Message handle to buffer options structure - MBOPT field.

These options control the action of MQMHBUF.

You must specify the following option:

MBPRRF
When converting properties from a message handle into a buffer, convert them into the MQRFH2 format.

Optionally, you can also specify the following option. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

MBDLPR
Properties that are added to the buffer are deleted from the message handle. If the call fails no properties are deleted.

This is always an input field. The initial value of this field is MBPRRF.

MBSID (10-digit signed integer)

Message handle to buffer options structure - MBSID field.

This is the structure identifier. The value must be:

MBSIDV
Identifier for message handle to buffer options structure.

This is always an input field. The initial value of this field isMBSIDV.

MBVER (10-digit signed integer)

This is the structure version number. The value must be:

MBVER1
Version number for message handle to buffer options structure.

The following constant specifies the version number of the current version:

MBVERC
Current version of message handle to buffer options structure.

This is always an input field. The initial value of this field is MBVER1.

Initial values

Table 712. Initial values of fields in MQMHBO

Field name	Name of constant	Value of constant
MVSID	MBSIDV	'MHBO'
MBVER	MBVER1	1
MBOPT	MBPRRF	

Notes:

1. The value Null string or blanks denotes a blank character.

RPG declaration

```
     D* MQMHBO Structure
     D*
     D*
     D* Structure identifier
     D  MBSID                  1      4    INZ('MHBO')
     D*
     D* Structure version number
     D  MBVER                  5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQMHBUF
     D  MBOPT                  9     12I 0 INZ(1)
```

IBM i MQOD (Object descriptor) on IBM i

The MQOD structure is used to specify an object by name.

Overview

Purpose: The following types of object are valid:

- Queue or distribution list
- Namelist
- Process definition
- Queue manager
- Topic

The structure is an input/output parameter on the MQOPEN and MQPUT1 calls.

Version: The current version of MQOD is ODVER4. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQOD that is supported by the environment, but with the initial value of the *ODVER* field set to ODVER1. To use fields that are not present in the version-1 structure, the application must set the *ODVER* field to the version number of the version required.

To open a distribution list, *ODVER* must be ODVER2 or greater.

Character set and encoding: Data in MQOD must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

- "Fields" on page 1147
- "Initial values" on page 1154
- "RPG declaration" on page 1155

Fields

The MQOD structure contains the following fields; the fields are described in **alphabetical order**:

ODASI (40-byte bit string)

Alternate security identifier.

This is a security identifier that is passed with the *ODAU* to the authorization service to allow appropriate authorization checks to be performed. *ODASI* is used only if:

- OOALTU is specified on the MQOPEN call, or
- PMALTU is specified on the MQPUT1 call,

and the *ODAU* field is not entirely blank up to the first null character or the end of the field.

The *ODASI* field has the following structure:

- The first byte is a binary integer containing the length of the significant data that follows; the value excludes the length byte itself. If no security identifier is present, the length is zero.
- The second byte indicates the type of security identifier that is present; the following values are possible:

  SITWNT
  Windows security identifier.

  SITNON
  No security identifier.
- The third and subsequent bytes up to the length defined by the first byte contain the security identifier itself.
- Remaining bytes in the field are set to binary zero.

The following special value may be used:

SINONE
No security identifier specified.

The value is binary zero for the length of the field.

This is an input field. The length of this field is given by LNSCID. The initial value of this field is SINONE. This field is ignored if *ODVER* is less than ODVER3.

ODAU (12-byte character string)

Alternate user identifier.

If OOALTU is specified for the MQOPEN call, or PMALTU for the MQPUT1 call, this field contains an alternate user identifier that is to be used to check the authorization for the open, in place of the user

identifier that the application is currently running under. Some checks, however, are still carried out with the current user identifier (for example, context checks).

If OOALTU and PMALTU are not specified and this field is entirely blank up to the first null character or the end of the field, the open can succeed only if no user authorization is needed to open this object with the options specified.

If neither OOALTU nor PMALTU is specified, this field is ignored.

This is an input field. The length of this field is given by LNUID. The initial value of this field is 12 blank characters.

ODDN (48-byte character string)

Dynamic queue name.

This is the name of a dynamic queue that is to be created by the MQOPEN call. This is of relevance only when *ODON* specifies the name of a model queue; in all other cases *ODDN* is ignored.

The characters that are valid in the name are the same as those for *ODON*, except that an asterisk is also valid. A name that is blank (or one in which only blanks are shown before the first null character) is not valid if *ODON* is the name of a model queue.

If the last nonblank character in the name is an asterisk (`*`), the queue manager replaces the asterisk with a string of characters that guarantees that the name generated for the queue is unique at the local queue manager. To allow a sufficient number of characters for this, the asterisk is valid only in positions 1 through 33. There must be no characters other than blanks or a null character following the asterisk.

It is valid for the asterisk to occur in the first character position, in which case the name consists solely of the characters generated by the queue manager.

This is an input field. The length of this field is given by LNQN. The initial value of this field is `'AMQ.*'`, padded with blanks.

ODIDC (10-digit signed integer)

Number of queues that failed to open.

This is the number of queues in the distribution list that failed to open successfully. If present, this field is also set when opening a single queue which is not in a distribution list.

Note: If present, this field is set only if the **CMPCOD** parameter on the MQOPEN or MQPUT1 call is CCOK or CCWARN; it is not set if the **CMPCOD** parameter is CCFAIL.

This is an output field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODKDC (10-digit signed integer)

Number of local queues opened successfully.

This is the number of queues in the distribution list that resolve to local queues and that were opened successfully. The count does not include queues that resolve to remote queues (even though a local transmission queue is used initially to store the message). If present, this field is also set when opening a single queue which is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODMN (48-byte character string)

Object queue manager name.

This is the name of the queue manager on which the *ODON* object is defined. The characters that are valid in the name are the same as those for *ODON* (see previously). A name that is entirely blank up to the first null character or the end of the field denotes the queue manager to which the application is connected (the local queue manager).

The following points apply to the types of object indicated:

- If *ODOT* is OTTOP, OTNLST, OTPRO, or OTQM, *ODMN* must be blank or the name of the local queue manager.
- If *ODON* is the name of a model queue, the queue manager creates a dynamic queue with the attributes of the model queue, and returns in the *ODMN* field the name of the queue manager on which the queue is created; this is the name of the local queue manager. A model queue can be specified only on the MQOPEN call; a model queue is not valid on the MQPUT1 call.
- If *ODON* is the name of a cluster queue, and *ODMN* is blank, the actual destination of messages sent using the queue handle returned by the MQOPEN call is chosen by the queue manager (or cluster workload exit, if one is installed) as follows:
  - If OOBNDO is specified, the queue manager selects an instance of the cluster queue during the processing of the MQOPEN call, and all messages put using this queue handle are sent to that instance.
  - If OOBNDN is specified, the queue manager may choose a different instance of the destination queue (residing on a different queue manager in the cluster) for each successive MQPUT call that uses this queue handle.

  If the application needs to send a message to a *specific* instance of a cluster queue (that is, a queue instance that resides on a particular queue manager in the cluster), the application should specify the name of that queue manager in the *ODMN* field. This forces the local queue manager to send the message to the specified destination queue manager.
- If the object being opened is a distribution list (that is, *ODREC* is greater than zero), *ODMN* must be blank or the null string. If this condition is not satisfied, the call fails with reason code RC2153.

This is an input/output field for the MQOPEN call when *ODON* is the name of a model queue, and an input-only field in all other cases. The length of this field is given by LNQMN. The initial value of this field is 48 blank characters.

ODON (48-byte character string)

Object name.

This is the local name of the object as defined on the queue manager identified by *ODMN*. The name can contain the following characters:

- Uppercase alphabetic characters (A - Z)
- Lowercase alphabetic characters (a - z)
- Numeric digits (0 - 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but may contain trailing blanks. A null character can be used to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply in the environments indicated:

- On systems that use EBCDIC Katakana, lowercase characters cannot be used.
- On IBM i, names containing lowercase characters, forward slash, or percent, must be enclosed in quotation marks when specified on commands. These quotation marks must not be specified for names that occur as fields in structures or as parameters on calls.

The following points apply to the types of object indicated:

- If *ODON* is the name of a model queue, the queue manager creates a dynamic queue with the attributes of the model queue, and returns in the *ODON* field the name of the queue created. A model queue can be specified only on the MQOPEN call; a model queue is not valid on the MQPUT1 call.
- If the object being opened is a distribution list (that is, *ODREC* is present and greater than zero), *ODON* must be blank or the null string. If this condition is not satisfied, the call fails with reason code RC2152.

- If *ODOT* is OTQM, special rules apply; in this case the name must be entirely blank up to the first null character or the end of the field.
- If ODON is the name of an alias queue with TARGTYPE(TOPIC), a security check is first made on the named alias queue, as is normal for the use of alias queues. If this security check is successful, this MQOPEN call will continue and behaves like an MQOPEN of an OTTOP, including making a security check against the administrative topic object.

This is an input/output field for the MQOPEN call when *ODON* is the name of a model queue, and an input-only field in all other cases. The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

The full topic name can be built from two different fields: *ODON* and *ODOS*. For details of how these two fields are used, see Combining topic strings.

ODORO (10-digit signed integer)

Offset of first object record from start of MQOD.

This is the offset in bytes of the first MQOR object record from the start of the MQOD structure. The offset can be positive or negative. *ODORO* is used only when a distribution list is being opened. The field is ignored if *ODREC* is zero.

When a distribution list is being opened, an array of one or more MQOR object records must be provided in order to specify the names of the destination queues in the distribution list. This can be done in one of two ways:

- By using the offset field *ODORO*

  In this case, the application should declare its own structure containing an MQOD followed by the array of MQOR records (with as many array elements as are needed), and set *ODORO* to the offset of the first element in the array from the start of the MQOD. Care must be taken to ensure that this offset is correct.
- By using the pointer field *ODORP*

  In this case, the application can declare the array of MQOR structures separately from the MQOD structure, and set *ODORP* to the address of the array.

Whichever technique is chosen, one of *ODORO* and *ODORP* must be used; the call fails with reason code RC2155 if both are zero, or both are nonzero.

This is an input field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODORP (pointer)

Address of first object record.

This is the address of the first MQOR object record. *ODORP* is used only when a distribution list is being opened. The field is ignored if *ODREC* is zero.

This is an input field. The initial value of this field is the null pointer. Either *ODORP* or *ODORO* can be used to specify the object records, but not both; see the description of the *ODORO* field previously for details. If *ODORP* is not used, it must be set to the null pointer or null bytes. This field is ignored if *ODVER* is less than ODVER2.

ODOS (MQCHARV)

ODOS specifies the long object name to be used.

This field is referenced only for certain values of *ODOT*. See the description of *ODOT* for details of which values indicate that this field is used.

If *ODOS* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2441.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

The full topic name can be built from two different fields: *ODON* and *ODOS*. For details of how these two fields are used, see Combining topic strings. This field is ignored if *ODVER* is less than ODVER4.

ODOT (10-digit signed integer)

Object type.

Type of object being named in *ODON*. Possible values are:

OTQ
Queue. The name of the object is found in *ODON*.

OTNLST
Namelist. The name of the object is found in *ODON*.

OTPRO
Process definition. The name of the object is found in *ODON*.

OTQM
Queue manager. The name of the object is found in *ODON*.

OTTOP
Topic. The full topic name can be built from two different fields: *ODON* and *ODOS*.

For details of how those two fields are used, see Combining topic strings.

If the object identified by the *ODON* field cannot be found, the call will fail with reason code RC2425 even if there is a string specified in *ODOS*.

This is always an input field. The initial value of this field is OTQ.

ODREC (10-digit signed integer)

Number of object records present.

This is the number of MQOR object records that have been provided by the application. If this number is greater than zero, it indicates that a distribution list is being opened, with *ODREC* being the number of destination queues in the list. It is valid for a distribution list to contain only one destination.

The value of *ODREC* must not be less than zero, and if it is greater than zero *ODOT* must be OTQ; the call fails with reason code RC2154 if these conditions are not satisfied.

This is an input field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODRMN (48-byte character string)

Resolved queue manager name.

This is the name of the destination queue manager after name resolution has been performed by the local queue manager. The name returned is the name of the queue manager that owns the queue identified by *ODRQN*. *ODRMN* can be the name of the local queue manager.

If *ODRQN* is a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *ODRMN* is the name of the queue sharing group. If the queue is owned by some other queue sharing group, *ODRQN* can be the name of the queue sharing group or the name of a queue manager that is a member of the queue sharing group (the nature of the value returned is determined by the queue definitions that exist at the local queue manager).

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *ODRMN* is set to blanks:

- Not a queue
- A queue, but not opened for browse, input, or output
- A cluster queue with OOBNDN specified (or with OOBNDQ in effect when the **DefBind** queue attribute has the value BNDNOT)
- A distribution list

This is an output field. The length of this field is given by LNQN. The initial value of this field is the null string in C, and 48 blank characters in other programming languages. This field is ignored if *ODVER* is less than ODVER3.

ODRO (MQCHARV)

ODRO is the long object name after the queue manager resolves the name provided in *ODON*.

This field is returned only for certain types of objects, topics, and queue aliases which reference a topic object.

If the long object name is provided in *ODOS* and nothing is provided in *ODON*, the value returned in this field is the same as provided in *ODOS*.

If this field is omitted (that is ODRO.VSBufSize is zero), the *ODRO* is not returned, but the length is returned in ODRO.VSLength. If the length is shorter than the full *ODRO* then it is truncated and returns as many of the rightmost characters as can fit in the provided length.

If *ODRO* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2520. This field is ignored if *ODVER* is less than ODVER4.

ODRQN (48-byte character string)

Resolved queue name.

This is the name of the destination queue after name resolution has been performed by the local queue manager. The name returned is the name of a queue that exists on the queue manager identified by *ODRMN*.

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *ODRQN* is set to blanks:

- Not a queue
- A queue, but not opened for browse, input, or output
- A distribution list
- An alias queue that references a topic object (refer to “ODRO (MQCHARV)” on page 1152 instead)

This is an output field. The length of this field is given by LNQN. The initial value of this field is the null string in C, and 48 blank characters in other programming languages. This field is ignored if *ODVER* is less than ODVER3.

ODRRO (10-digit signed integer)

Offset of first response record from start of MQOD.

This is the offset in bytes of the first MQRR response record from the start of the MQOD structure. The offset can be positive or negative. *ODRRO* is used only when a distribution list is being opened. The field is ignored if *ODREC* is zero.

When a distribution list is being opened, an array of one or more MQRR response records can be provided in order to identify the queues that failed to open (*RRCC* field in MQRR), and the reason for each failure (*RRREA* field in MQRR). The data is returned in the array of response records in the same order as the queue names occur in the array of object records. The queue manager sets the response records only when the outcome of the call is mixed (that is, some queues were opened successfully while others failed, or all failed but for differing reasons); reason code RC2136 from the call indicates this case. If the same reason code applies to all queues, that reason is returned in the **REASON** parameter of the MQOPEN or MQPUT1 call, and the response records are not set. Response records are optional, but if they are supplied there must be *ODREC* of them.

The response records can be provided in the same way as the object records, either by specifying an offset in *ODRRO*, or by specifying an address in *ODRRP* ; see the description of *ODORO* previously for details of how to do this. However, no more than one of *ODRRO* and *ODRRP* can be used; the call fails with reason code RC2156 if both are nonzero.

For the MQPUT1 call, these response records are used to return information about errors that occur when the message is sent to the queues in the distribution list, as well as errors that occur when the queues are opened. The completion code and reason code from the put operation for a queue replace those from the open operation for that queue only if the completion code from the latter was CCOK or CCWARN.

This is an input field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODRRP (pointer)

Address of first response record.

This is the address of the first MQRR response record. *ODRRP* is used only when a distribution list is being opened. The field is ignored if *ODREC* is zero.

Either *ODRRP* or *ODRRO* can be used to specify the response records, but not both; see the previous description of the *ODRRO* field for details. If *ODRRP* is not used, it must be set to the null pointer or null bytes.

This is an input field. The initial value of this field is the null pointer. This field is ignored if *ODVER* is less than ODVER2.

ODSID (4-byte character string)

Structure identifier.

The value must be:

ODSIDV
Identifier for object descriptor structure.

This is always an input field. The initial value of this field is ODSIDV.

ODSS (MQCHARV)

ODSS contains the string used to provide the selection criteria used when retrieving messages off a queue.

ODSS must not be provided in the following cases:

- If *ODOT* is not OTQ
- If the queue being opened is not being opened using one of the input options, OOINP*

If *ODSS* is provided in these cases, the call fails with reason code RC2516.

If *ODSS* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2519. This field is ignored if *ODVER* is less than ODVER4.

ODUDC (10-digit signed integer)

Number of remote queues opened successfully

This is the number of queues in the distribution list that resolve to remote queues and that were opened successfully. If present, this field is also set when opening a single queue which is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is ignored if *ODVER* is less than ODVER2.

ODVER (10-digit signed integer)

Structure version number.

The value must be one of the following:

ODVER1
Version-1 object descriptor structure.

ODVER2
Version-2 object descriptor structure.

ODVER3
Version-3 object descriptor structure.

ODVER4
Version-4 object descriptor structure.

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

ODVERC
Current version of object descriptor structure.

This is always an input field. The initial value of this field is ODVER1.

Initial values

Table 713. Initial values of fields in MQOD

Field name	Name of constant	Value of constant
ODSID	ODSIDV	`'OD¬¬'`
ODVER	ODVER1	`1`
ODOT	OTQ	`1`
ODON	None	Blanks
ODMN	None	Blanks
ODDN	None	`'AMQ.*'`
ODAU	None	Blanks
ODREC	None	`0`
ODKDC	None	`0`
ODUDC	None	`0`
ODIDC	None	`0`
ODORO	None	`0`
ODRRO	None	`0`
ODORP	None	Null pointer or null bytes
ODRRP	None	Null pointer or null bytes
ODASI	SINONE	Nulls
ODRQN	None	Blanks
ODRMN	None	Blanks
ODOS	As defined for MQCHARV	As defined for MQCHARV
ODRO	As provided in *ODOS*	As provided in *ODOS*
ODSS	None	Blanks

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQOD Structure
     D*
     D*
     D* Structure identifier
     D  ODSID                  1      4    INZ('OD  ')
     D*
     D* Structure version number
     D  ODVER                  5      8I 0 INZ(1)
     D*
     D* Object type
     D  ODOT                   9     12I 0 INZ(1)
     D*
     D* Object name
     D  ODON                  13     60    INZ
     D*
     D* Object queue manager name
     D  ODMN                  61    108    INZ
     D*
     D* Dynamic queue name
     D  ODDN                 109    156    INZ('AMQ.*')
     D*
     D* Alternate user identifier
     D  ODAU                 157    168    INZ
     D*
     ** Number of object records
     D* present
     D  ODREC                169    172I 0 INZ(0)
     D*
     ** Number of local queues opened
     D* successfully
     D  ODKDC                173    176I 0 INZ(0)
     D*
     ** Number of remote queues opened
     D* successfully
     D  ODUDC                177    180I 0 INZ(0)
     D*
     ** Number of queues that failed to
     D* open
     D  ODIDC                181    184I 0 INZ(0)
     D*
     ** Offset of first object record
     D* from start of MQOD
     D  ODORO                185    188I 0 INZ(0)
     D*
     ** Offset of first response record
     D* from start of MQOD
     D  ODRRO                189    192I 0 INZ(0)
     D*
     D* Address of first object record
     D  ODORP                193    208*   INZ(*NULL)
     D*
     ** Address of first response
     D* record
     D  ODRRP                209    224*   INZ(*NULL)
     D*
     D* Alternate security identifier
     D  ODASI                225    264    INZ(X'00000000000000000-
     D                                     000000000000000000000000-
     D                                     000000000000000000000000-
     D                                     0000000000000')
     D*
     D* Resolved queue name
     D  ODRQN                265    312    INZ
     D*
     D* Resolved queue manager name
     D  ODRMN                313    360    INZ
     D*
     D* reserved field
     D  ODRE1                361    364I 0 INZ(0)
     D*
     D* reserved field
     D  ODRS2                365    368I 0 INZ(0)
     D*
     D* Object long name
     D* Address of variable length string
     D  ODOSCHRP             369    384*   INZ(*NULL)
```

```
     D* Offset of variable length string
     D  ODOSCHRO              385    388I 0 INZ(0)
     D* Size of buffer
     D  ODOSVSBS              389    392I 0 INZ(-1)
     D* Length of variable length string
     D  ODOSCHRL              393    396I 0 INZ(0)
     D* CCSID of variable length string
     D  ODOSCHRC              397    400I 0 INZ(-3)
     D*
     D* Message Selector
     D* Address of variable length string
     D  ODSSCHRP              401    416*   INZ(*NULL)
     D* Offset of variable length string
     D  ODSSCHRO              417    420I 0 INZ(0)
     D* Size of buffer
     D  ODSSVSBS              421    424I 0 INZ(-1)
     D* Length of variable length string
     D  ODSSCHRL              425    428I 0 INZ(0)
     D* CCSID of variable length string
     D  ODSSCHRC              429    432I 0 INZ(-3)
     D*
     D* Resolved long object name
     D* Address of variable length string
     D  ODRSOCHRP             433    448*   INZ(*NULL)
     D* Offset of variable length string
     D  ODRSOCHRO             449    452I 0 INZ(0)
     D* Size of buffer
     D  ODRSOVSBS             453    456I 0 INZ(-1)
     D* Length of variable length string
     D  ODRSOCHRL             457    460I 0 INZ(0)
     D* CCSID of variable length string
     D  ODRSOCHRC             461    464I 0 INZ(-3)
     D*
     D* Alias queue resolved object type
     D  ODRT                  465    468I 0 INZ(0)
```

IBM i MQOR (Object record) on IBM i

The MQOR structure is used to specify the queue name and queue manager name of a single destination queue.

Overview

Purpose: MQOR is an input structure for the MQOPEN and MQPUT1 calls.

Character set and encoding: Data in MQOR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

Usage: By providing an array of these structures on the MQOPEN call, it is possible to open a list of queues; this list is called a *distribution list*. Each message put using the queue handle returned by that MQOPEN call is placed on each of the queues in the list, if the queue was opened successfully.

- “Fields” on page 1156
- “Initial values” on page 1157
- “RPG declaration” on page 1157

Fields

The MQOR structure contains the following fields; the fields are described in **alphabetical order**:

ORMN (48-byte character string)

Object queue manager name.

This is the same as the *ODMN* field in the MQOD structure (see MQOD for details).

This is always an input field. The initial value of this field is 48 blank characters.

ORON (48-byte character string)

Object name.

This is the same as the *ODON* field in the MQOD structure (see MQOD for details), except that:

- It must be the name of a queue.
- It must not be the name of a model queue.

This is always an input field. The initial value of this field is 48 blank characters.

Initial values

Table 714. Initial values of fields in MQOR

Field name	Name of constant	Value of constant
ORON	None	Blanks
ORMN	None	Blanks

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQOR Structure
     D*
     D* Object name
     D  ORON                   1     48    INZ
     D* Object queue manager name
     D  ORMN                  49     96    INZ
```

MQPD - Property descriptor

The **MQPD** is used to define the attributes of a property.

Overview

Purpose: The structure is an input/output parameter on the MQSETMP call and an output parameter on the MQINQMP call.

Character set and encoding: Data in MQPD must be in the character set of the application and encoding of the application (ENNAT).

- “Fields” on page 1157
- “Initial values” on page 1160
- “RPG declaration” on page 1160

Fields

The MQPD structure contains the following fields; the fields are described in **alphabetical order**:

PDCT (10-digit signed integer)

This describes what message context the property belongs to.

When a queue manager receives a message containing an IBM MQ-defined property that the queue manager recognizes as being incorrect. the queue manager corrects the value of the *PDCT* field.

The following option can be specified:

PDUSC
The property is associated with the user context.

No special authorization is required to be able to set a property associated with the user context using the MQSETMP call.

On an IBM WebSphere MQ 7.0 queue manager, a property associated with the user context is saved as described for OOSAVA. An MQPUT call with PMPASA specified, causes the property to be copied from the saved context into the new message.

If the option previously described is not required, the following option can be used:

PDNOC
The property is not associated with a message context.

An unrecognized value is rejected with a *PDREA* code of RC2482.

This is an input/output field to the MQSETMP call and an output field from the MQINQMP call. The initial value of this field is PDNOC.

PDCPYOPT (10-digit signed integer)

This describes which type of messages the property should be copied into.

This is an output only field for recognized IBM MQ-defined properties; IBM MQ sets the appropriate value.

When a queue manager receives a message containing an IBM MQ-defined property that the queue manager recognizes as being incorrect. the queue manager corrects the value of the `CopyOptions` field.

You can specify one or more of these options. To specify more than one option, either add the values together (do not add the same constant more than once), or combine the values using the bitwise OR operation (if the programming language supports bit operations).

COPFOR
This property is copied into a message being forwarded.

COPPUB
This property is copied into the message received by a subscriber when a message is being published.

COPREP
This property is copied into a reply message.

COPRP
This property is copied into a report message.

COPALL
This property is copied into all types of subsequent messages.

COPNON
This property is not copied into a message.

Default option: The following option can be specified to supply the default set of copy options:

COPDEF
This property is copied into a message being forwarded, into a report message, or into a message received by a subscriber when a message is being published.

This is equivalent to specifying the combination of options COPFOR, plus COPRP, plus COPPUB.

If none of the options described previously are required, use the following option:

COPNON
Use this value to indicate that no other copy options have been specified; programmatically no relationship exists between this property and subsequent messages. This is always returned for message descriptor properties.

This is an input/output field to the MQSETMP call and an output field from the MQINQMP call. The initial value of this field is COPDEF.

PDOPT (10-digit signed integer)

The value must be:

PDNONE
No options specified

This is always an input field. The initial value of this field is PDNONE.

PDSID (10-digit signed integer)

This is the structure identifier; the value must be:

PSIDV
Identifier for property descriptor structure.

This is always an input field. The initial value of this field is **PSIDV**.

PDSUP (10-digit signed integer)

This field describes what level of support for the message property is required of the queue manager, in order for the message containing this property to be put to a queue. This applies only to IBM MQ-defined properties; support for all other properties is optional.

The field is automatically set to the correct value when the IBM MQ-defined property is known by the queue manager. If the property is not recognized, PDSUPO is assigned. When a queue manager receives a message containing an IBM MQ-defined property that the queue manager recognizes as being incorrect. the queue manager corrects the value of the *PDSUP* field.

When setting an IBM MQ-defined property using the MQSETMP call on a message handle where the CMNOVA option was set, *PDSUP* becomes an input field. This allows an application to put an IBM MQ-defined property, with the correct value, where the property is unsupported by the connected queue manager, but where the message is intended to be processed on another queue manager.

The value PDSUPO is always assigned to properties that are not IBM MQ-defined properties.

If an IBM WebSphere MQ 7.0 queue manager, that supports message properties, receives a property that contains an unrecognized *PDSUP* value, the property is treated as if:

- PDSUPR was specified if any of the unrecognized values are contained in the PDRUM.
- PDSUPL was specified if any of the unrecognized values are contained in the PDAUXM
- PDSUPO was specified otherwise.

One of the following values is returned by the MQINQMP call, or one of the values can be specified, when using the MQSETMP call on a message handle where the CMNOVA option is set:

PDSUPO
The property is accepted by a queue manager even if it is not supported. The property can be discarded in order for the message to flow to a queue manager that does not support message properties. This value is also assigned to properties that are not IBM MQ-defined.

PDSUPR
Support for the property is required. The message is rejected by a queue manager that does not support the IBM MQ-defined property. The MQPUT or MQPUT1 call fails with completion code CCFAIL and reason code RC2490.

PDSUPL
The message is rejected by a queue manager that does not support the IBM MQ-defined property if the message is destined for a local queue. The MQPUT or MQPUT1 call fails with completion code CCFAIL and reason code RC2490.

The MQPUT or MQPUT1 call succeeds if the message is destined for a remote queue manager.

This is an output field on the MQINQMP call and an input field on the MQSETMP call if the message handle was created with the CMNOVA option set. The initial value of this field is PDSUPO.

PDVER (10-digit signed integer)

This is the structure version number; the value must be:

PDVER1
Version-1 property descriptor structure.

The following constant specifies the version number of the current version:

PDVERC
Current version of property descriptor structure.

This is always an input field. The initial value of this field is **PDVER1**.

Initial values

Table 715. Initial values of fields in MQPD

Field name	Name of constant	Value of constant
PDSID	PDSIDV	'PD'
PDVER	PDVER1	1
PDOPT	PDNONE	0
PDSUP	PDSUPO	0
PDCT	PDNOC	0
PDCPYOPT	COPDEF	0

RPG declaration

```
     D* MQDMHO Structure
     D*
     D*
     D* Structure identifier
     D  DMSID                 1      4    INZ('DMHO')
     D*
     D* Structure version number
     D  DMVER                 5      8I 0 INZ(1)
     D*
     D* Options that control the action of MQDLTMH
     D  DMOPT                 9     12I 0 INZ(0)
```

IBM i MQPMO (Put-message options) on IBM i

The MQPMO structure allows the application to specify options that control how messages are placed on queues or published to topics.

Overview

Purpose
The structure is an input/output parameter on the MQPUT and MQPUT1 calls.

Version
The current version of MQPMO is PMVER2. Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions that follow.

The COPY file provided contains the most recent version of MQPMO that is supported by the environment, but with the initial value of the *PMVER* field set to PMVER1. To use fields that are not

present in the version-1 structure, the application must set the *PMVER* field to the version number of the version required.

Character set and encoding

Data in MQPMO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

- "Fields" on page 1161
- "Initial values" on page 1174
- "RPG declaration" on page 1175

Fields

The MQPMO structure contains the following fields; the fields are described in alphabetical order:

PMCT (10 digit signed integer)

Object handle of input queue.

If PMPASI or PMPASA is specified, this field must contain the input queue handle from which context information to be associated with the message being put is taken.

If PMPASI and PMPASA are not specified, this field is ignored.

This is an input field. The initial value of this field is 0.

PMIDC (10 digit signed integer)

Number of messages that could not be sent.

This is the number of messages that could not be sent to queues in the distribution list. The count includes queues that failed to open, and queues that were opened successfully but for which the put operation failed. This field is also set when putting a message to a single queue which is not in a distribution list.

Note: This field is set only if the **CMPCOD** parameter on the MQPUT or MQPUT1 call is CCOK or CCWARN; it is not set if the **CMPCOD** parameter is CCFAIL.

This is an output field. The initial value of this field is 0. This field is not set if *PMVER* is less than PMVER2.

PMKDC (10 digit signed integer)

Number of messages sent successfully to local queues.

This is the number of messages that the current MQPUT or MQPUT1 call has sent successfully to queues in the distribution list that are local queues. The count does not include messages sent to queues that resolve to remote queues (even though a local transmission queue is used initially to store the message). This field is also set when putting a message to a single queue which is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is not set if *PMVER* is less than PMVER2.

PMOPT (10 digit signed integer)

Options that control the action of MQPUT and MQPUT1.

Any or none of the following can be specified. If more than one is required the values can be added (do not add the same constant more than once). Combinations that are not valid are noted; any other combinations are valid.

Publishing options: The following options control the way messages are published to a topic.

PMSRTO

Any information filled into the MDRQ and MDRM fields of the MQMD of this publication is not passed on to subscribers. If this option is used with a report option that requires a ReplyToQ, the call fails with RC2027 .

PMRET

The publication being sent is to be retained by the queue manager. This allows a subscriber to request a copy of this publication after the time it was published, by using the MQSUBRQ call. It also allows a publication to be sent to applications which make their subscription after the time this publication was made, unless they choose not to be sent it by using the option SONEWP. If an application is sent a publication which was retained, it is indicated by the mq.IsRetained message property of that publication.

Only one publication can be retained at each node of the topic tree. That means if there already is a retained publication for this topic, published by any other application, it is replaced with this publication. It is therefore better to avoid having more than one publisher retaining messages on the same topic.

When retained publications are requested by a subscriber, the subscription used may contain a wildcard in the topic, in which case a number of retained publications might match (at various nodes in the topic tree) and several publications may be sent to the requesting application. See the description of the “MQSUBRQ - Subscription request” on page 783 call for more details.

If this option is used and the publication cannot be retained, the message is not published and the call fails with RC2479 .

Syncpoint options: The following options relate to the participation of the MQPUT or MQPUT1 call within a unit of work:

PMSYP

Put message with syncpoint control.

The request is to operate within the normal unit-of-work protocols. The message is not visible outside the unit of work until the unit of work is committed. If the unit of work is backed out, the message is deleted.

If this option and PMNSYP are not specified, the put request is not within a unit of work.

PMSYP must not be specified with PMNSYP.

PMNSYP

Put message without syncpoint control.

The request is to operate outside the normal unit-of-work protocols. The message is available immediately, and it cannot be deleted by backing out a unit of work.

If this option and PMSYP are not specified, the put request is not within a unit of work.

PMNSYP must not be specified with PMSYP.

Message-identifier and correlation-identifier options: The following options request the queue manager to generate a new message identifier or correlation identifier:

PMNMID

Generate a new message identifier.

This option causes the queue manager to replace the contents of the *MDMID* field in MQMD with a new message identifier. This message identifier is sent with the message, and returned to the application on output from the MQPUT or MQPUT1 call.

This option can also be specified when the message is being put to a distribution list; see the description of the *PRMID* field in the MQPMR structure for details.

Using this option relieves the application of the need to reset the *MDMID* field to MINONE before each MQPUT or MQPUT1 call.

PMNCID

Generate a new correlation identifier.

This option causes the queue manager to replace the contents of the *MDCID* field in MQMD with a new correlation identifier. This correlation identifier is sent with the message, and returned to the application on output from the MQPUT or MQPUT1 call.

This option can also be specified when the message is being put to a distribution list; see the description of the *PRCID* field in the MQPMR structure for details.

PMNCID is useful in situations where the application requires a unique correlation identifier.

Group and segment options: The following option relates to the processing of messages in groups and segments of logical messages. These definitions might be of help in understanding the option:

Physical message

This is the smallest unit of information that can be placed on or removed from a queue; it often corresponds to the information specified or retrieved on a single MQPUT, MQPUT1, or MQGET call. Every physical message has its own message descriptor (MQMD). Generally, physical messages are distinguished by differing values for the message identifier (*MDMID* field in MQMD), although this is not enforced by the queue manager.

Logical message

This is a single unit of application information. In the absence of system constraints, a logical message would be the same as a physical message. But where logical messages are large, system constraints may make it advisable or necessary to split a logical message into two or more physical messages, called *segments*.

A logical message that has been segmented consists of two or more physical messages that have the same nonnull group identifier (*MDGID* field in MQMD), and the same message sequence number (*MDSEQ* field in MQMD). The segments are distinguished by differing values for the segment offset (*MDOFF* field in MQMD), which gives the offset of the data in the physical message from the start of the data in the logical message. Because each segment is a physical message, the segments in a logical message typically have differing message identifiers.

A logical message that has not been segmented, but for which segmentation has been permitted by the sending application, also has a nonnull group identifier, although in this case there is only one physical message with that group identifier if the logical message does not belong to a message group. Logical messages for which segmentation has been inhibited by the sending application have a null group identifier (GINONE), unless the logical message belongs to a message group.

Message group

This is a set of one or more logical messages that have the same nonnull group identifier. The logical messages in the group are distinguished by differing values for the message sequence number, which is an integer in the range 1 through n, where n is the number of logical messages in the group. If one or more of the logical messages is segmented, there are more than n physical messages in the group.

PMLOGO

Messages in groups and segments of logical messages are put in logical order.

This option tells the queue manager how the application puts messages in groups and segments of logical messages. It can be specified only on the MQPUT call; it is not valid on the MQPUT1 call.

If PMLOGO is specified, it indicates that the application uses successive MQPUT calls to:

- Put the segments in each logical message in the order of increasing segment offset, starting from 0, with no gaps.
- Put all of the segments in one logical message before putting the segments in the next logical message.
- Put the logical messages in each message group in the order of increasing message sequence number, starting from 1, with no gaps.

- Put all of the logical messages in one message group before putting logical messages in the next message group.

This order is called "logical order".

Because the application has told the queue manager how it puts messages in groups and segments of logical messages, the application does not have to maintain and update the group and segment information about each MQPUT call, as the queue manager does this. Specifically, it means that the application does not need to set the *MDGID*, *MDSEQ*, and *MDOFF* fields in MQMD, as the queue manager sets these to the appropriate values. The application need set only the *MDMFL* field in MQMD, to indicate when messages belong to groups or are segments of logical messages, and to indicate the last message in a group or last segment of a logical message.

Once a message group or logical message has been started, subsequent MQPUT calls must specify the appropriate MF* flags in *MDMFL* in MQMD. If the application tries to put a message not in a group when there is an unterminated message group, or put a message which is not a segment when there is an unterminated logical message, the call fails with reason code RC2241 or RC2242 , as appropriate. However, the queue manager retains the information about the current message group or current logical message, and the application can terminate them by sending a message (possibly with no application message data) specifying MFLMIG or MFLSEG as appropriate, before reissuing the MQPUT call to put the message that is not in the group or not a segment.

Table 716 on page 1165 shows the combinations of options and flags that are valid, and the values of the *MDGID*, *MDSEQ*, and *MDOFF* fields that the queue manager uses in each case. Combinations of options and flags that are not shown in the table are not valid. The columns in the table have the following meanings:

LOG ORD
: Indicates whether the PMLOGO option is specified on the call.

MIG
: Indicates whether the MFMIG or MFLMIG option is specified on the call.

SEG
: Indicates whether the MFSEG or MFLSEG option is specified on the call.

SEG OK
: Indicates whether the MFSEGA option is specified on the call.

Cur grp
: Indicates whether a current message group exists before the call.

Cur log msg
: Indicates whether a current logical message exists before the call.

Other columns
: Show the values that the queue manager uses. "Previous" denotes the value used for the field in the previous message for the queue handle.

PMRLOC
: Specifies that the PMRQN in the MQPMO structure must be completed with the name of the local queue which the message actually gets put to. The ResolvedQMgrName is similarly completed with the name of the local queue manager hosting the local queue. See OORLOQ for what this means. If a user is authorized for a put to a queue then they have the required authority to specify this flag on the MQPUT call. No special authority is needed.

Table 716. MQPUT options relating to messages in groups and segments of logical messages								
Options you specify				**Group and log-msg status before call**		**Values the queue manager uses**		
LOG ORD	**MIG**	**SEG**	**SEG OK**	**Cur grp**	**Cur log msg**	*MDGID*	*MDSEQ*	*MDOFF*
Yes	No	No	No	No	No	GINONE	1	0
Yes	No	No	Yes	No	No	New group id	1	0
Yes	No	Yes	Yes or No	No	No	New group id	1	0
Yes	No	Yes	Yes or No	No	Yes	Previous group id	1	Previous offset + previous segment length
Yes	Yes	Yes or No	Yes or No	No	No	New group id	1	0
Yes	Yes	Yes or No	Yes or No	Yes	No	Previous group id	Previous sequence number + 1	0
Yes	Yes	Yes	Yes or No	Yes	Yes	Previous group id	Previous sequence number	Previous offset + previous segment length
No	No	No	No	Yes or No	Yes or No	GINONE	1	0
No	No	No	Yes	Yes or No	Yes or No	New group ID if GINONE, else value in field	1	0
No	No	Yes	Yes or No	Yes or No	Yes or No	New group ID if GINONE, else value in field	1	Value in field
No	Yes	No	Yes or No	Yes or No	Yes or No	New group ID if GINONE, else value in field	Value in field	0
No	Yes	Yes	Yes or No	Yes or No	Yes or No	New group ID if GINONE, else value in field	Value in field	Value in field

Note:

- PMLOGO is not valid on the MQPUT1 call.
- For the *MDMID* field, the queue manager generates a new message identifier if PMNMID or MINONE is specified, and uses the value in the field otherwise.
- For the *MDCID* field, the queue manager generates a new correlation identifier if PMNCID is specified, and uses the value in the field otherwise.

When PMLOGO is specified, the queue manager requires that all messages in a group and segments in a logical message be put with the same value in the *MDPER* field in MQMD, that is, all must be persistent, or all must be nonpersistent. If this condition is not satisfied, the MQPUT call fails with reason code RC2185 .

The PMLOGO option affects units of work as follows:

- If the first physical message in a group or logical message is put within a unit of work, all of the other physical messages in the group or logical message must be put within a unit of work, if the same queue handle is used. However, they need not be put within the same unit of work. This allows a message group or logical message consisting of many physical messages to be split across two or more consecutive units of work for the queue handle.
- If the first physical message in a group or logical message is not put within a unit of work, none of the other physical messages in the group or logical message can be put within a unit of work, if the same queue handle is used.

If these conditions are not satisfied, the MQPUT call fails with reason code RC2245 .

When PMLOGO is specified, the MQMD supplied on the MQPUT call must not be less than MDVER2. If this condition is not satisfied, the call fails with reason code RC2257 .

If PMLOGO is not specified, messages in groups and segments of logical messages can be put in any order, and it is not necessary to put complete message groups or complete logical messages. It is the responsibility of the application to ensure that the *MDGID*, *MDSEQ*, *MDOFF*, and *MDMFL* fields have appropriate values.

This is the technique that can be used to restart a message group or logical message in the middle, after a system failure has occurred. When the system restarts, the application can set the *MDGID*, *MDSEQ*, *MDOFF*, *MDMFL*, and *MDPER* fields to the appropriate values, and then issue the MQPUT call with PMSYP or PMNSYP set as *necessary*, but without specifying PMLOGO. If this call is successful, the queue manager retains the group and segment information, and subsequent MQPUT calls using that queue handle can specify PMLOGO as normal.

The group and segment information that the queue manager retains for the MQPUT call is separate from the group and segment information that it retains for the MQGET call.

For any given queue handle, the application is free to mix MQPUT calls that specify PMLOGO with MQPUT calls that do not, but the following points should be noted:

- If PMLOGO is not specified, each successful MQPUT call causes the queue manager to set the group and segment information for the queue handle to the values specified by the application; this replaces the existing group and segment information retained by the queue manager for the queue handle.
- If PMLOGO is not specified, the call does not fail if there is a current message group or logical message; the call might however succeed with a CCWARN completion code. Table 717 on page 1166 shows the various cases that can arise. In these cases, if the completion code is not CCOK, the reason code is one of the following (as appropriate):
  - RC2241
  - RC2242
  - RC2185
  - RC2245

  Note: The queue manager does not check the group and segment information for the MQPUT1 call.

Table 717. Outcome when MQPUT or MQCLOSE call is not consistent with group and segment information

Current call is	Previous call was MQPUT with PMLOGO	Previous call was MQPUT without PMLOGO
MQPUT with PMLOGO	CCFAIL	CCFAIL
MQPUT without PMLOGO	CCWARN	CCOK

Table 717. Outcome when MQPUT or MQCLOSE call is not consistent with group and segment information (continued)

Current call is	Previous call was MQPUT with PMLOGO	Previous call was MQPUT without PMLOGO
MQCLOSE with an unterminated group or logical message	CCWARN	CCOK

Applications that simply want to put messages and segments in logical order are recommended to specify PMLOGO, as this is the simplest option to use. This option relieves the application of the need to manage the group and segment information, because the queue manager manages that information. However, specialized applications may need more control than provided by the PMLOGO option, and this can be achieved by not specifying that option. If this is done, the application must ensure that the *MDGID*, *MDSEQ*, *MDOFF*, and *MDMFL* fields in MQMD are set correctly, before each MQPUT or MQPUT1 call.

For example, an application that wants to forward physical messages that it receives, without regard for whether those messages are in groups or segments of logical messages, must not specify PMLOGO. There are two reasons for this:

- If the messages are retrieved and put in order, specifying PMLOGO causes a new group identifier to be assigned to the messages, and this might make it difficult or impossible for the originator of the messages to correlate any reply or report messages that result from the message group.
- In a complex network with multiple paths between sending and receiving queue managers, the physical messages might arrive out of order. By not specifying PMLOGO and the corresponding GMLOGO on the MQGET call, the forwarding application can retrieve and forward each physical message as soon as it arrives, without needing to wait for the next one in logical order to arrive.

Applications that generate report messages for messages in groups or segments of logical messages must also not specify PMLOGO when putting the report message.

PMLOGO can be specified with any of the other PM* options.

Context options: The following options control the processing of message context:

PMNOC

No context is to be associated with the message.

Both identity and origin context are set to indicate no context. This means that the context fields in MQMD are set to:

- Blanks for character fields
- Nulls for byte fields
- Zeros for numeric fields

PMDEFC

Use default context.

The message is to have default context information associated with it, for both identity and origin. The queue manager sets the context fields in the message descriptor as follows:

Table 718. Default context information values for MQMD fields

Field in MQMD	Value used
MDUID	Determined from the environment if possible; set to blanks otherwise.
MDACC	Determined from the environment if possible; set to ACNONE otherwise.
MDAID	Set to blanks.
MDPAT	Determined from the environment.

Table 718. Default context information values for MQMD fields (continued)

Field in MQMD	Value used
MDPAN	Determined from the environment if possible; set to blanks otherwise.
MDPD	Set to date when message is put.
MDPT	Set to time when message is put.
MDAOD	Set to blanks.

For more information about message context, see Message context and Controlling context information.

This is the default action if no context options are specified.

PMPASI
Pass identity context from an input queue handle.

The message is to have context information associated with it. Identity context is taken from the queue handle specified in the *PMCT* field. Origin context information is generated by the queue manager in the same way that it is for PMDEFC (see the previous table for values). For more information about message context, see Message context and Controlling context information.

For the MQPUT call, the queue must have been opened with the OOPASI option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the OOPASI option.

PMPASA
Pass all context from an input queue handle.

The message is to have context information associated with it. Both identity and origin context are taken from the queue handle specified in the *PMCT* field. For more information about message context, see Message context and Controlling context information.

For the MQPUT call, the queue must have been opened with the OOPASA option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the OOPASA option.

PMSETI
Set identity context from the application.

The message is to have context information associated with it. The application specifies the identity context in the MQMD structure. Origin context information is generated by the queue manager in the same way that it is for PMDEFC (see the previous table for values). For more information about message context, see Message context and Controlling context information.

For the MQPUT call, the queue must have been opened with the OOSETI option (or an option that implies it). For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the OOSETI option.

PMSETA
Set all context from the application.

The message is to have context information associated with it. The application specifies the identity and origin context in the MQMD structure. For more information about message context, see Message context and Controlling context information.

For the MQPUT call, the queue must have been opened with the OOSETA option. For the MQPUT1 call, the same authorization check is carried out as for the MQOPEN call with the OOSETA option.

Only one of the PM* context options can be specified. If none of these options is specified, PMDEFC is assumed.

Put response types. The following options control the response returned to an MQPUT or MQPUT1 call . You can only specify one of these options. If PMARES and PMSRES are not specified, PMRASQ or PMRAST is assumed.

PMARES

The PMARES option requests that an MQPUT or MQPUT1 operation is completed without the application waiting for the queue manager to complete the call. Using this option can improve messaging performance, particularly for applications using client bindings. An application can periodically check, using the MQSTAT verb, whether an error has occurred during any previous asynchronous calls.

With this option, only the following fields are guaranteed to be completed in the MQMD;

- MDAID
- MDPAT
- MDPAN
- MDAOD

Additionally, if either or both of PMNMID or PMNCID are specified as options, the MDMID and MDCID returned are also completed. (PMNMID can be implicitly specified by specifying a blank MDMID field).

Only the fields previously specified are completed. Other information that would normally be returned in the MQMD or MQPMO structure is undefined.

When requesting asynchronous put response for MQPUT or MQPUT1, a CMPCOD and REASON of CCOK and RCNONE does not necessarily mean that the message was successfully put to a queue. When developing an MQI application that uses asynchronous put response and require confirmation that messages have been put to a queue you should check both CMPCOD and REASON codes from the put operations and also use MQSTAT to query asynchronous error information.

Although the success or failure of each individual MQPUT/MQPUT1 call might not be returned immediately, the first error that occurred under an asynchronous call can be determined at a later juncture through a call to MQSTAT.

If a persistent message under syncpoint fails to be delivered using asynchronous put response, and you attempt to commit the transaction, the commit fails and the transaction is backed out with a completion code of CCFAIL and a reason of `RC2003` . The application can make a call to MQSTAT to determine the cause of a previous MQPUT or MQPUT1 failure

PMSRES

Specifying this value for a put option in the MQPMO structure ensures that the MQPUT or MQPUT1 operation is always issued synchronously. If the operation is successful, all fields in the MQMD and MQPMO are completed. It is provided to ensure a synchronous response irrespective of the default put response value defined on the queue or topic object.

PMRASQ

If this value is specified for an MQPUT call, the put response type used is taken from the DEFPRESP value specified on the queue when it was opened by the application. If a client application is connected to a queue manager at a level earlier than IBM WebSphere MQ 7.0, it behaves as if PMSRES was specified.

If this option is specified for an MQPUT1 call, the DEFPRESP value from the queue definition is not used. If the MQPUT1 call is using PMSYP it behaves as for PMARES, and if it is using PMNSYP it behaves as for PMSRES.

PMRAST

This is a synonym for PMRASQ for use with topic objects.

Other options: The following options control authorization checking, and what happens when the queue manager is quiescing:

PMALTU

Validate with specified user identifier.

This indicates that the *ODAU* field in the **OBJDSC** parameter of the MQPUT1 call contains a user identifier that is to be used to validate authority to put messages on the queue. The call can succeed only if this *ODAU* is authorized to open the queue with the specified options, regardless of whether the user identifier under which the application is running is authorized to do so. (This does not apply to the context options specified, however, which are always checked against the user identifier under which the application is running.)

This option is valid only with the MQPUT1 call.

PMFIQ
Fail if queue manager is quiescing.

This option forces the MQPUT or MQPUT1 call to fail if the queue manager is in the quiescing state.

The call returns completion code CCFAIL with reason code RC2161 .

Default option: If none of the options described previously are required, the following option can be used:

PMNONE
No options specified.

This value can be used to indicate that no other options have been specified; all options assume their default values. PMNONE is defined to aid program documentation; it is not intended that this option is used with any other, but as its value is zero, such use cannot be detected.

This is an input field. The initial value of the *PMOPT* field is PMNONE.

PMPRF (10 digit signed integer)

Flags indicating which MQPMR fields are present.

This field contains flags that must be set to indicate which MQPMR fields are present in the put message records provided by the application. *PMPRF* is used only when the message is being put to a distribution list. The field is ignored if *PMREC* is zero, or both *PMPRO* and *PMPRP* are zero.

For fields that are present, the queue manager uses for each destination the values from the fields in the corresponding put message record. For fields that are absent, the queue manager uses the values from the MQMD structure.

One or more of the following flags can be specified to indicate which fields are present in the put message records:

PFMID
Message-identifier field is present.

PFCID
Correlation-identifier field is present.

PFGID
Group-identifier field is present.

PFFB
Feedback field is present.

PFACC
Accounting-token field is present.

If this flag is specified, either PMSETI or PMSETA must be specified in the *PMOPT* field; if this condition is not satisfied, the call fails with reason code RC2158 .

If no MQPMR fields are present, the following can be specified:

PFNONE
No put-message record fields are present.

If this value is specified, either *PMREC* must be zero, or both *PMPRO* and *PMPRP* must be zero.

PFNONE is defined to aid program documentation. It is not intended that this constant is used with any other, but as its value is zero, such use cannot be detected.

If *PMPRF* contains flags which are not valid, or put message records are provided but *PMPRF* has the value PFNONE, the call fails with reason code RC2158 .

This is an input field. The initial value of this field is PFNONE. This field is ignored if *PMVER* is less than PMVER2.

PMPRO (10 digit signed integer)

Offset of first put message record from start of MQPMO.

This is the offset in bytes of the first MQPMR put message record from the start of the MQPMO structure. The offset can be positive or negative. *PMPRO* is used only when the message is being put to a distribution list. The field is ignored if *PMREC* is zero.

When the message is being put to a distribution list, an array of one or more MQPMR put message records can be provided in order to specify certain properties of the message for each destination individually; these properties are:

- message identifier
- correlation identifier
- group identifier
- feedback value
- accounting token

It is not necessary to specify all of these properties, but whatever subset is chosen, the fields must be specified in the correct order. See the description of the MQPMR structure for further details.

Usually, there should be as many put message records as there are object records specified by MQOD when the distribution list is opened; each put message record supplies the message properties for the queue identified by the corresponding object record. Queues in the distribution list which fail to open must still have put message records allocated for them at the appropriate positions in the array, although the message properties are ignored in this case.

It is possible for the number of put message records to differ from the number of object records. If there are fewer put message records than object records, the message properties for the destinations which do not have put message records are taken from the corresponding fields in the message descriptor MQMD. If there are more put message records than object records, the excess are not used (although it must still be possible to access them). Put message records are optional, but if they are supplied there must be *PMREC* of them.

The put message records can be provided in a similar way to the object records in MQOD, either by specifying an offset in *PMPRO*, or by specifying an address in *PMPRP* ; for details of how to do this, see the *ODORO* field described in “MQOD (Object descriptor) on IBM i” on page 1146.

No more than one of *PMPRO* and *PMPRP* can be used; the call fails with reason code RC2159 if both are nonzero.

This is an input field. The initial value of this field is 0. This field is ignored if *PMVER* is less than PMVER2.

PMPRP (pointer)

Address of first put message record.

This is the address of the first MQPMR put message record. *PMPRP* is used only when the message is being put to a distribution list. The field is ignored if *PMREC* is zero.

Either *PMPRP* or *PMPRO* can be used to specify the put message records, but not both; see the description of the PMRRO field for details. If *PMPRP* is not used, it must be set to the null pointer or null bytes.

This is an input field. The initial value of this field is the null pointer. This field is ignored if *PMVER* is less than PMVER2.

PMREC (10 digit signed integer)

Number of put message records or response records present.

This is the number of MQPMR put message records or MQRR response records that have been provided by the application. This number can be greater than zero only if the message is being put to a distribution list. Put message records and response records are optional - the application need not provide any records, or it can choose to provide records of only one type. However, if the application provides records of both types, it must provide *PMREC* records of each type.

The value of *PMREC* need not be the same as the number of destinations in the distribution list. If too many records are provided, the excess are not used; if too few records are provided, default values are used for the message properties for those destinations that do not have put message records (see *PMPRO* later in this topic).

If *PMREC* is less than zero, or is greater than zero but the message is not being put to a distribution list, the call fails with reason code RC2154 .

This is an input field. The initial value of this field is 0. This field is ignored if *PMVER* is less than PMVER2.

PMRMN (48 byte character string)

Resolved name of destination queue manager.

This is the name of the destination queue manager after name resolution has been performed by the local queue manager. The name returned is the name of the queue manager that owns the queue identified by *PMRQN*, and can be the name of the local queue manager.

If *PMRQN* is a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *PMRMN* is the name of the queue sharing group. If the queue is owned by some other queue sharing group, *PMRQN* can be the name of the queue sharing group or the name of a queue manager that is a member of the queue sharing group (the nature of the value returned is determined by the queue definitions that exist at the local queue manager).

A nonblank value is returned only if the object is a single queue; if the object is a distribution list or topic, the value returned is undefined.

This is an output field. The length of this field is given by LNQMN. The initial value of this field is 48 blank characters.

PMRQN (48 byte character string)

Resolved name of destination queue.

This is the name of the destination queue after name resolution has been performed by the local queue manager. The name returned is the name of a queue that exists on the queue manager identified by *PMRMN*.

A nonblank value is returned only if the object is a single queue; if the object is a distribution list or topic, the value returned is undefined.

This is an output field. The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

PMRRO (10 digit signed integer)

Offset of first response record from start of MQPMO.

This is the offset in bytes of the first MQRR response record from the start of the MQPMO structure. The offset can be positive or negative. *PMRRO* is used only when the message is being put to a distribution list. The field is ignored if *PMREC* is zero.

When the message is being put to a distribution list, an array of one or more MQRR response records can be provided in order to identify the queues to which the message was not sent successfully (*RRCC* field in MQRR), and the reason for each failure (*RRREA* field in MQRR). The message might not have been sent either because the queue failed to open, or because the put operation failed. The queue manager sets the response records only when the outcome of the call is mixed (that is, some

messages were sent successfully while others failed, or all failed but for differing reasons); reason code RC2136 from the call indicates this case. If the same reason code applies to all queues, that reason is returned in the **REASON** parameter of the MQPUT or MQPUT1 call, and the response records are not set.

Usually, there should be as many response records as there are object records specified by MQOD when the distribution list is opened; when necessary, each response record is set to the completion code and reason code for the put to the queue identified by the corresponding object record. Queues in the distribution list which fail to open must still have response records allocated for them at the appropriate positions in the array, although they are set to the completion code and reason code resulting from the open operation, rather than the put operation.

It is possible for the number of response records to differ from the number of object records. If there are fewer response records than object records, it may not be possible for the application to identify all of the destinations for which the put operation failed, or the reasons for the failures. If there are more response records than object records, the excess are not used (although it must still be possible to access them). Response records are optional, but if they are supplied there must be *PMREC* of them.

The response records can be provided in a similar way to the object records in MQOD, either by specifying an offset in *PMRRO*, or by specifying an address in *PMRRP* ; for details of how to do this, see the *ODORO* field described in "MQOD (Object descriptor) on IBM i" on page 1146. However, no more than one of *PMRRO* and *PMRRP* can be used; the call fails with reason code RC2156 if both are nonzero.

For the MQPUT1 call, this field must be zero. This is because the response information (if requested) is returned in the response records specified by the object descriptor MQOD.

This is an input field. The initial value of this field is 0. This field is ignored if *PMVER* is less than PMVER2.

PMRRP (pointer)

Address of first response record.

This is the address of the first MQRR response record. *PMRRP* is used only when the message is being put to a distribution list. The field is ignored if *PMREC* is zero.

Either *PMRRP* or *PMRRO* can be used to specify the response records, but not both; see the description of the PMRRO field for details. If *PMRRP* is not used, it must be set to the null pointer or null bytes.

For the MQPUT1 call, this field must be the null pointer or null bytes. This is because the response information (if requested) is returned in the response records specified by the object descriptor MQOD.

This is an input field. The initial value of this field is the null pointer. This field is ignored if *PMVER* is less than PMVER2.

PMSID (4 byte character string)

Structure identifier.

The value must be:

PMSIDV
Identifier for put-message options structure.

This is always an input field. The initial value of this field is PMSIDV.

PMSL (MQLONG)

The level of subscription targeted by this publication.

Only those subscriptions with the highest *PMSL* less than or equal to this value receives this publication. This value must be in the range zero to 9; zero is the lowest level.

The initial value of this field is 9.

PMTO (10 digit signed integer)

Reserved.

This is a reserved field; its value is not significant. The initial value of this field is -1.

PMUDC (10 digit signed integer)

Number of messages sent successfully to remote queues.

This is the number of messages that the current MQPUT or MQPUT1 call has sent successfully to queues in the distribution list that resolve to remote queues. Messages that the queue manager retains temporarily in distribution-list form count as the number of individual destinations that those distribution lists contain. This field is also set when putting a message to a single queue which is not in a distribution list.

This is an output field. The initial value of this field is 0. This field is not set if *PMVER* is less than PMVER2.

PMVER (10 digit signed integer)

Structure version number.

The value must be one of the following:

PMVER1
Version-1 put-message options structure.

PMVER2
Version-2 put-message options structure.

Fields that exist only in the more-recent version of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

PMVERC
Current version of put-message options structure.

This is always an input field. The initial value of this field is PMVER1.

Initial values

Table 719. Initial values of fields in MQPMO

Field name	Name of constant	Value of constant
PMSID	PMSIDV	'PMO¬'
PMVER	PMVER1	1
PMOPT	PMNONE	0
PMTO	None	-1
PMCT	None	0
PMKDC	None	0
PMUDC	None	0
PMIDC	None	0
PMRQN	None	Blanks
PMRMN	None	Blanks
PMREC	None	0
PMPRF	PFNONE	0
PMPRO	None	0

Table 719. Initial values of fields in MQPMO (continued)		
Field name	**Name of constant**	**Value of constant**
PMRRO	None	0
PMPRP	None	Null pointer or null bytes
PMRRP	None	Null pointer or null bytes
Note: 1. The symbol ¬ represents a single blank character.		

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQPMO Structure
D*
D* Structure identifier
D  PMSID                   1      4    INZ('PMO ')
D* Structure version number
D  PMVER                   5      8I 0 INZ(1)
D* Options that control the action of MQPUT and MQPUT1
D  PMOPT                   9     12I 0 INZ(0)
D* Reserved
D  PMTO                   13     16I 0 INZ(-1)
D* Object handle of input queue
D  PMCT                   17     20I 0 INZ(0)
D* Number of messages sent successfully to local queues
D  PMKDC                  21     24I 0 INZ(0)
D* Number of messages sent successfully to remote queues
D  PMUDC                  25     28I 0 INZ(0)
D* Number of messages that could notbe sent
D  PMIDC                  29     32I 0 INZ(0)
D* Resolved name of destination queue
D  PMRQN                  33     80    INZ
D* Resolved name of destination queue manager
D  PMRMN                  81    128    INZ
D* Number of put message records or response records present
D  PMREC                 129    132I 0 INZ(0)
D* Flags indicating which MQPMR fields are present
D  PMPRF                 133    136I 0 INZ(0)
D* Offset of first put message record from start of MQPMO
D  PMPRO                 137    140I 0 INZ(0)
D* Offset of first response record from start of MQPMO
D  PMRRO                 141    144I 0 INZ(0)
D* Address of first put message record
D  PMPRP                 145    160*   INZ(*NULL)
D* Address of first response record
D  PMRRP                 161    176*   INZ(*NULL)
D* Original message handle
D  PMOMH                 177    184I 0
D* New message handle
D  PMNMH                 185    190I 0
D* The action being performed
D  PMACT                 191    194I 0
D* Reserved
D  PMRE1                 195    198I 0
```

IBM i MQPMR (Put-message record) on IBM i

The MQPMR structure is used to specify various message properties for a single destination when a message is being put to a distribution list.

Overview

Purpose: MQPMR is an input/output structure for the MQPUT and MQPUT1 calls.

Character set and encoding: Data in MQPMR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the

application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

Usage: By providing an array of these structures on the MQPUT or MQPUT1 call, it is possible to specify different values for each destination queue in a distribution list. Some of the fields are input only, others are input/output.

Note: This structure is unusual in that it does not have a fixed layout. The fields in this structure are optional, and the presence or absence of each field is indicated by the flags in the *PMPRF* field in MQPMO. Fields that are present ***must occur in the following order*** :

- *PRMID*
- *PRCID*
- *PRGID*
- *PRFB*
- *PRACC*

Fields that are absent occupy no space in the record.

Because MQPMR does not have a fixed layout, no definition of it is provided in the COPY file. The application programmer should create a declaration containing the fields that are required by the application, and set the flags in *PMPRF* to indicate the fields that are present.

- "Fields" on page 1176
- "Initial values" on page 1177
- "RPG declaration" on page 1177

Fields

The MQPMR structure contains the following fields; the fields are described in **alphabetical order**:

PRACC (32-byte bit string)

Accounting token.

This is the accounting token to be used for the message sent to the queue with a name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MDACC* field in MQMD for a put to a single queue. See the description of *MDACC* in "MQMD (Message descriptor) on IBM i" on page 1097 for information about the content of this field.

If this field is not present, the value in MQMD is used.

This is an input field.

PRCID (24-byte bit string)

Correlation identifier.

This is the correlation identifier to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MDCID* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *PRCID* field.

If PMNCID is specified, a *single* new correlation identifier is generated and used for all of the destinations in the distribution list, regardless of whether they have MQPMR records. This is different from the way that PMNMID is processed (see *PRMID* field).

This is an input/output field.

PRFB (10-digit signed integer)

Feedback or reason code.

This is the feedback code to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MDFB* field in MQMD for a put to a single queue.

If this field is not present, the value in MQMD is used.

This is an input field.

PRGID (24-byte bit string)

Group identifier.

This is the group identifier to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MDGID* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *PRGID* field. The value is processed as documented in Table 716 on page 1165, but with the following differences:

- In those cases where a new group identifier would be used, the queue manager generates a different group identifier for each destination (that is, no two destinations have the same group identifier).
- In those cases where the value in the field would be used, the call fails with reason code RC2258.

This is an input/output field.

PRMID (24-byte bit string)

Message identifier.

This is the message identifier to be used for the message sent to the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call. It is processed in the same way as the *MDMID* field in MQMD for a put to a single queue.

If this field is not present in the MQPMR record, or there are fewer MQPMR records than destinations, the value in MQMD is used for those destinations that do not have an MQPMR record containing a *PRMID* field. If that value is MINONE, a new message identifier is generated for *each* of those destinations (that is, no two of those destinations have the same message identifier).

If PMNMID is specified, new message identifiers are generated for all of the destinations in the distribution list, regardless of whether they have MQPMR records. This is different from the way that PMNCID is processed (see *PRCID* field).

This is an input/output field.

Initial values

There are no initial values defined for this structure, as no structure declaration is provided. The following sample declaration shows how the structure should be declared by the application programmer if all of the fields are required.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D* MQPMR Structure
     D*
     D* Message identifier
     D  PRMID                  1     24
     D* Correlation identifier
     D  PRCID                 25     48
     D* Group identifier
```

```
     D  PRGID                  49     72
     D* Feedback or reason code
     D  PRFB                   73     76I 0
     D* Accounting token
     D  PRACC                  77    108
```

IBM i MQRFH (Rules and formatting header) on IBM i

The MQRFH structure defines the layout of the rules and formatting header.

Overview

Purpose: This header can be used to send string data in the form of name-value pairs.

Format name: FMRFH.

Character set and encoding: The fields in the MQRFH structure (including *RFNVS*) are in the character set and encoding given by the *MDCSI* and *MDENC* fields in the header structure that precedes the MQRFH, or by those fields in the MQMD structure if the MQRFH is at the start of the application message data.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

- “Fields” on page 1178
- “Initial values” on page 1180
- “RPG declaration” on page 1180

Fields

The MQRFH structure contains the following fields; the fields are described in **alphabetical order**:

RFCSI (10-digit signed integer)

Character set identifier of data that follows *RFNVS*.

This specifies the character set identifier of the data that follows *RFNVS* ; it does not apply to character data in the MQRFH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT

Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

Numeric encoding of data that follows *RFNVS*.

This specifies the numeric encoding of the data that follows *RFNVS* ; it does not apply to numeric data in the MQRFH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is ENNAT.

RFFLG (10-digit signed integer)

Flags.

The following can be specified:

RFNONE
No flags.

The initial value of this field is RFNONE.

RFFMT (8-byte character string)

Format name of data that follows *RFNVS*.

This specifies the format name of the data that follows *RFNVS*.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The initial value of this field is FMNONE.

RFLEN (10-digit signed integer)

Total length of MQRFH including *RFNVS*.

This is the length in bytes of the MQRFH structure, including the *RFNVS* field at the end of the structure. The length does not include any user data that follows the *RFNVS* field.

To avoid problems with data conversion of the user data in some environments, consider using *RFLEN* as a multiple of four.

The following constant gives the length of the *fixed* part of the structure, that is, the length excluding the *RFNVS* field:

RFLENV
Length of fixed part of MQRFH structure.

The initial value of this field is RFLENV.

RFNVS (n-byte character string)

String containing name-value pairs.

This is a variable-length character string containing name-value pairs in the form:

```
name1 value1 name2 value2 name3 value3 ...
```

Each name or value must be separated from the adjacent name or value by one or more blank characters; these blanks are not significant. A name or value can contain significant blanks by prefixing and suffixing the name or value with the quotation mark character; all characters between the opening quotation mark and the matching closing quotation mark are treated as significant. In the following example, the name is `FAMOUS_WORDS`, and the value is `Hello World`:

```
FAMOUS_WORDS "Hello World"
```

A name or value can contain any characters other than the null character (which acts as a delimiter for *RFNVS*). However, to assist interoperability an application might prefer to restrict names to the following characters:

- First character: uppercase or lowercase alphabetic (A through Z, or a through z), or underscore.
- Subsequent characters: upper or lowercase alphabetic, decimal digit (0 through 9), underscore, hyphen, or dot.

If a name or value contains one or more quotation marks, the name or value must be enclosed in quotation marks, and each quotation mark within the string must be doubled:

```
Famous_Words "The program displayed ""Hello World"""
```

Names and values are case sensitive, that is, lowercase letters are not considered to be the same as uppercase letters. For example, `FAMOUS_WORDS` and `Famous_Words` are two different names.

The length in bytes of *RFNVS* is equal to *RFLEN* minus RFLENV. To avoid problems with data conversion of the user data in some environments, it is recommended that this length should be a multiple of four. *RFNVS* must be padded with blanks to this length, or terminated earlier by placing a null character following the last significant character in the string. The null character and the bytes following it, up to the specified length of *RFNVS*, are ignored.

Note: Because the length of this field is not fixed, the field is omitted from the declarations of the structure that are provided for the supported programming languages.

RFSID (4-byte character string)

Structure identifier.

The value must be:

RFSIDV
Identifier for rules and formatting header structure.

The initial value of this field is RFSIDV.

RFVER (10-digit signed integer)

Structure version number.

The value must be:

RFVER1
Version-1 rules and formatting header structure.

The initial value of this field is RFVER1.

Initial values

Table 720. Initial values of fields in MQRFH

Field name	Name of constant	Value of constant
RFSID	RFSIDV	'RFH¬'
RFVER	RFVER1	1
RFLEN	RFLENV	32
RFENC	ENNAT	Depends on environment
RFCSI	CSUNDF	0
RFFMT	FMNONE	Blanks
RFFLG	RFNONE	0

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQRFH Structure
D*
D* Structure identifier
D  RFSID                  1      4    INZ('RFH ')
D* Structure version number
D  RFVER                  5      8I 0 INZ(1)
D* Total length of MQRFH includingNameValueString
D  RFLEN                  9     12I 0 INZ(32)
D* Numeric encoding of data that followsNameValueString
D  RFENC                 13     16I 0 INZ(273)
```

```
     D* Character set identifier of data thatfollows NameValueString
     D  RFCSI                 17     20I 0 INZ(0)
     D* Format name of data that followsNameValueString
     D  RFFMT                 21     28    INZ('        ')
     D* Flags
     D  RFFLG                 29     32I 0 INZ(0)
```

IBM i MQRFH2 (Rules and formatting header 2) on IBM i

The MQRFH2 structure defines the format of the version-2 rules and formatting header.

Overview

Purpose: This header can be used to send data that has been encoded using an XML-like syntax. A message can contain two or more MQRFH2 structures in series, with user data optionally following the last MQRFH2 structure in the series.

Format name: FMRFH2.

Character set and encoding: Special rules apply to the character set and encoding used for the MQRFH2 structure:

- Fields other than *RF2NVD* are in the character set and encoding given by the *MDCSI* and *MDENC* fields in the header structure that precedes MQRFH2, or by those fields in the MQMD structure if the MQRFH2 is at the start of the application message data.

  The character set must be one that has single-byte characters for the characters that are valid in queue names.

  When GMCONV is specified on the MQGET call, the queue manager converts these fields to the requested character set and encoding.
- *RF2NVD* is in the character set given by the *RF2NVC* field. Only certain Unicode character sets are valid for *RF2NVC* (see the description of *RF2NVC* for details).

  Some character sets have a representation that is dependent on the encoding. If *RF2NVC* is one of these character sets, *RF2NVD* must be in the same encoding as the other fields in the MQRFH2.

  When GMCONV is specified on the MQGET call, the queue manager converts *RF2NVD* to the requested encoding, but does not change its character set.

- “Fields” on page 1181
- “Initial values” on page 1186
- “RPG declaration” on page 1186

Fields

The MQRFH2 structure contains the following fields; the fields are described in **alphabetical order**:

RF2CSI (10-digit signed integer)

Character set identifier of data that follows last *RF2NVD* field.

This specifies the character set identifier of the data that follows the last *RF2NVD* field; it does not apply to character data in the MQRFH2 structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT

Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSINHT.

RF2ENC (10-digit signed integer)

Numeric encoding of data that follows last *RF2NVD* field.

This specifies the numeric encoding of the data that follows the last *RF2NVD* field; it does not apply to numeric data in the MQRFH2 structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is ENNAT.

RF2FLG (10-digit signed integer)

Flags.

The following value must be specified:

RFNONE
No flags.

The initial value of this field is RFNONE.

RF2FMT (8-byte character string)

Format name of data that follows last *RF2NVD* field.

This specifies the format name of the data that follows the last *RF2NVD* field.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The initial value of this field is FMNONE.

RF2LEN (10-digit signed integer)

Total length of MQRFH2 including all *RF2NVL* and *RF2NVD* fields.

This is the length in bytes of the MQRFH2 structure, including the *RF2NVL* and *RF2NVD* fields at the end of the structure. It is valid for there to be multiple pairs of *RF2NVL* and *RF2NVD* fields at the end of the structure, in the sequence:

```
length1, data1, length2, data2, ...
```

RF2LEN does not include any user data that may follow the last *RF2NVD* field at the end of the structure.

To avoid problems with data conversion of the user data in some environments, consider using *RF2LEN* as a multiple of four.

The following constant gives the length of the *fixed* part of the structure, that is, the length excluding the *RF2NVL* and *RF2NVD* fields:

RFLEN2
Length of fixed part of MQRFH2 structure.

The initial value of this field is RFLEN2.

RF2NVC (10-digit signed integer)

Character set identifier of *RF2NVD*.

This specifies the coded character set identifier of the data in the *RF2NVD* field. This is different from the character set of the other strings in the MQRFH2 structure, and can be different from the character set of the data (if any) that follows the last *RF2NVD* field at the end of the structure.

RF2NVC must have one of the following CCSID values:

1200
UTF-16, most recent Unicode version supported

13488
UTF-16, Unicode version 2.0 subset

17584
UTF-16, Unicode version 3.0 subset (includes the Euro symbol)

1208
UTF-8, most recent Unicode version supported

For the UTF-16 character sets, the encoding (byte order) of the *RF2NVD* must be the same as the encoding of the other fields in the MQRFH2 structure. Surrogate characters (X'D800' through X'DFFF') are not supported.

Note: If *RF2NVC* does not have one of the values listed previously, and the MQRFH2 structure requires conversion on the MQGET call, the call completes with reason code RC2111 and the message is returned unconverted.

The initial value of this field is 1208.

RF2NVD (n-byte character string)

Name/value data.

This is a variable-length character string containing data encoded using an XML-like syntax. The length in bytes of this string is provided by the *RF2NVL* field that precedes the *RF2NVD* field; this length should be a multiple of four.

The *RF2NVL* and *RF2NVD* fields are optional, but if present they must occur as a pair and be adjacent. The pair of fields can be repeated as many times as required, for example:

```
length1 data1 length2 data2 length3 data3
```

Because these fields are optional, they are omitted from the declarations of the structure that are provided for the various programming languages supported.

RF2NVD is unusual because it is not converted to the character set specified on the MQGET call when the message is retrieved with the GMCONV option in effect; *RF2NVD* remains in its original character set. However, *RF2NVD* is converted to the encoding specified on the MQGET call.

Syntax of name/value data: The string consists of a single "folder" that contains zero or more properties. The folder is delimited by XML start and end tags with the same name as the the folder:

```
<folder> property1 property2 ... </folder>
```

Characters following the folder end tag, up to the length defined by *RF2NVL*, must be blank. Within the folder, each property is composed of a name and a value, and optionally a data type:

```
<name dt="datatype">value</name>
```

In these examples:

- The delimiter characters (<, =, ", /, and >) must be specified exactly as shown.
- `name` is the user-specified name of the property; see the following example for more information about names.

- `datatype` is an optional user-specified data type of the property; see the following example for valid data types.
- `value` is the user-specified value of the property; see the following paragraphs for more information about values.
- Blanks are significant between the > character which precedes a value, and the < character which follows the value, and at least one blank must precede `dt=`. Elsewhere blanks can be coded freely between tags, or preceding or following tags (for example, in order to improve readability); these blanks are not significant.

If properties are related to each other, they can be grouped together by enclosing them within XML start and end tags with the same name as the group:

```
<folder> <group> property1 property2 ... </group> </folder>
```

Groups can be nested within other groups, without limit, and a group can occur more than once within a folder. It is also valid for a folder to contain some properties in groups and other properties not in groups.

Names of properties, groups, and folders: Names of properties, groups, and folders must be valid XML tag names, with the exception of the colon character, which is not permitted in a property, group, or folder name. In particular:

- Names must start with a letter or an underscore. Valid letters are defined in the W3C XML specification, and consist essentially of Unicode categories Ll, Lu, Lo, Lt, and Nl.
- The remaining characters in a name can be letters, decimal digits, underscores, hyphens, or dots. These correspond to Unicode categories Ll, Lu, Lo, Lt, Nl, Mc, Mn, Lm, and Nd.
- The Unicode compatibility characters (X'F900' and above) are not permitted in any part of a name.
- Names must not start with the string `XML` in any mixture of upper or lowercase.

In addition:

- Names are case-sensitive. For example, `ABC`, `abc`, and `Abc` are three different names.
- Each folder has a separate namespace. As a result, a group or property in one folder does not conflict with a group or property of the same name in another folder.
- Groups and properties occupy the same namespace within a folder. As a result, a property cannot have the same name as a group within the folder containing that property.

Generally, programs that analyze the *RF2NVD* field should ignore properties or groups that have names that the program does not recognize, provided that those properties or groups are correctly formed.

Data types of properties: Each property can have an optional data type. If specified, the data type must be one of the following values, in upper, lower, or mixed case:

Table 721. Data types and their usage

Data type	Used for
`string`	Any sequence of characters. Certain characters must be specified using escape sequences.
`boolean`	The character 0 or 1 (1 denotes TRUE).
`bin.hex`	Hexadecimal digits representing octets.
`i1`	Integer number in the range -128 through +127, expressed using only decimal digits and optional sign.
`i2`	Integer number in the range -32 768 through +32 767, expressed using only decimal digits and optional sign.

Table 721. Data types and their usage (continued)	
Data type	**Used for**
i4	Integer number in the range -2 147 483 648 through +2 147 483 647, expressed using only decimal digits and optional sign.
i8	Integer number in the range -9 223 372 036 854 775 808 through +9 223 372 036 854 775 807, expressed using only decimal digits and optional sign.
int	Integer number in the range -9 223 372 036 854 775 808 through +9 223 372 036 854 775 807, expressed using only decimal digits and optional sign. This can be used in place of i1, i2, i4, or i8 if the sender does not want to imply a particular precision.
r4	Floating-point number with magnitude in the range 1.175E-37 through 3.402 823 47E+38, expressed using decimal digits, optional sign, optional fractional digits, and optional exponent.
r8	Floating-point number with magnitude in the range 2.225E-307 through 1.797 693 134 862 3E+308 expressed using decimal digits, optional sign, optional fractional digits, and optional exponent.

Values of properties: The value of a property can consist of any characters, except as detailed in the following table. Each occurrence in the value of a character marked as "mandatory" must be replaced by the corresponding escape sequence. Each occurrence in the value of a character marked as "optional" can be replaced by the corresponding escape sequence, but this is not required.

Table 722. Escaped characters and their usage		
Character	**Escape sequence**	**Usage**
&	&	Mandatory
<	<	Mandatory
>	>	Optional
"	"	Optional
'	'	Optional

Note: The & character at the start of an escape sequence must not be replaced by &.

In the following example, the blanks in the value are significant; however, no escape sequences are needed:

```
<Famous_Words>The program displayed "Hello World"</Famous_Words>
```

RF2NVL (10-digit signed integer)

Length of *RF2NVD*.

This specifies the length in bytes of the data in the *RF2NVD* field. To avoid problems with data conversion of the data (if any) that *follows* the *RF2NVD* field, *RF2NVL* should be a multiple of four.

Note: The *RF2NVL* and *RF2NVD* fields are optional, but if present they must occur as a pair and be adjacent. The pair of fields can be repeated as many times as required, for example:

```
length1 data1 length2 data2 length3 data3
```

Because these fields are optional, they are omitted from the declarations of the structure that are provided for the various programming languages supported.

RF2SID (4-byte character string)

Structure identifier.

The value must be:

RFSIDV
Identifier for rules and formatting header structure.

The initial value of this field is RFSIDV.

RF2VER (10-digit signed integer)

Structure version number.

The value must be:

RFVER2
Version-2 rules and formatting header structure.

The initial value of this field is RFVER2.

Initial values

Table 723. Initial values of fields in MQRFH2

Field name	Name of constant	Value of constant
RF2SID	RFSIDV	'RFH¬'
RF2VER	RFVER2	2
RF2LEN	RFLEN2	36
RF2ENC	ENNAT	Depends on environment
RF2CSI	CSINHT	-2
RF2FMT	FMNONE	Blanks
RF2FLG	RFNONE	0
RF2NVC	None	1208

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQRFH2 Structure
     D*
     D* Structure identifier
     D  RF2SID                 1      4    INZ('RFH ')
     D* Structure version number
     D  RF2VER                 5      8I 0 INZ(2)
     D* Total length of MQRFH2 including allNameValueLength and
     D* NameValueDatafields
     D  RF2LEN                 9     12I 0 INZ(36)
     D* Numeric encoding of data that followslast NameValueData field
     D  RF2ENC                13     16I 0 INZ(273)
     D* Character set identifier of data thatfollows last NameValueData field
     D  RF2CSI                17     20I 0 INZ(-2)
     D* Format name of data that follows lastNameValueData field
     D  RF2FMT                21     28    INZ('        ')
     D* Flags
     D  RF2FLG                29     32I 0 INZ(0)
```

```
D* Character set identifier ofNameValueData
D  RF2NVC                 33     36I 0 INZ(1208)
```

IBM i MQRMH (Reference message header) on IBM i

The MQRMH structure defines the format of a reference message header.

Overview

Purpose: This header is used with user-written message channel exits to send large amounts of data (called "bulk data") from one queue manager to another. The difference compared to normal messaging is that the bulk data is not stored on a queue; instead, only a *reference* to the bulk data is stored on the queue. This reduces the possibility of IBM MQ resources being exhausted by a few large messages.

Format name: FMRMH.

Character set and encoding: Character data in MQRMH, and the strings addressed by the offset fields, must be in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute. Numeric data in MQRMH must be in the native machine encoding; this is given by the value of ENNAT for the C programming language.

The character set and encoding of the MQRMH must be set into the *MDCSI* and *MDENC* fields in:

- The MQMD (if the MQRMH structure is at the start of the message data), or
- The header structure that precedes the MQRMH structure (all other cases).

Usage: An application puts a message consisting of an MQRMH, but omitting the bulk data. When the message is read from the transmission queue by a message channel agent (MCA), a user-supplied message exit is invoked to process the reference message header. The exit can append to the reference message the bulk data identified by the MQRMH structure, before the MCA sends the message through the channel to the next queue manager.

At the receiving end, a message exit that waits for reference messages should exist. When a reference message is received, the exit should create the object from the bulk data that follows the MQRMH in the message, and then pass on the reference message without the bulk data. The reference message can later be retrieved by an application reading the reference message (without the bulk data) from a queue.

Normally, the MQRMH structure is all that is in the message. However, if the message is on a transmission queue, one or more additional headers will precede the MQRMH structure.

A reference message can also be sent to a distribution list. In this case, the MQDH structure and its related records precede the MQRMH structure when the message is on a transmission queue.

Note: A reference message should not be sent as a segmented message, because the message exit cannot process it correctly.

- “Data conversion” on page 1187
- “Fields” on page 1188
- “Initial values” on page 1192
- “RPG declaration” on page 1193

Data conversion

For data conversion purposes, conversion of the MQRMH structure includes conversion of the source environment data, source object name, destination environment data, and destination object name. Any other bytes within *RMLEN* bytes of the start of the structure are either discarded or have undefined values after data conversion. The bulk data will be converted provided that all of the following statements are true:

- The bulk data is present in the message when the data conversion is performed.
- The *RMFMT* field in MQRMH has a value other than FMNONE.

- A user-written data-conversion exit exists with the format name specified.

Be aware, however, that typically the bulk data is not present in the message when the message is on a queue, and that as a result the bulk data will not be converted by the GMCONV option.

Fields

The MQRMH structure contains the following fields; the fields are described in **alphabetical order**:

RMCSI (10-digit signed integer)

Character set identifier of bulk data.

This specifies the character set identifier of the bulk data; it does not apply to character data in the MQRMH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT

Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

RMDEL (10-digit signed integer)

Length of destination environment data.

If this field is zero, there is no destination environment data, and *RMDEO* is ignored.

RMDEO (10-digit signed integer)

Offset of destination environment data.

This field specifies the offset of the destination environment data from the start of the MQRMH structure. Destination environment data can be specified by the creator of the reference message, if that data is known to the creator. For example, the destination environment data might be the directory path of the object where the bulk data is to be stored. However, if the creator does not know the destination environment data, it is the responsibility of the user-supplied message exit to determine any environment information needed.

The length of the destination environment data is given by *RMDEL* ; if this length is zero, there is no destination environment data, and *RMDEO* is ignored. If present, the destination environment data must reside completely within *RMLEN* bytes from the start of the structure.

Applications should not assume that the destination environment data is contiguous with any of the data addressed by the *RMSEO*, *RMSNO*, and *RMDNO* fields.

The initial value of this field is 0.

RMDL (10-digit signed integer)

Length of bulk data.

The *RMDL* field specifies the length of the bulk data referenced by the MQRMH structure.

If the bulk data is present in the message, the data begins at an offset of *RMLEN* bytes from the start of the MQRMH structure. The length of the entire message minus *RMLEN* gives the length of the bulk data present.

If data is present in the message, *RMDL* specifies the amount of that data that is relevant. The normal case is for *RMDL* to have the same value as the length of data present in the message.

If the MQRMH structure represents the remaining data in the object (starting from the specified logical offset), the value zero can be used for *RMDL*, if the bulk data is not present in the message.

If no data is present, the end of MQRMH coincides with the end of the message.

The initial value of this field is 0.

RMDNL (10-digit signed integer)

Length of destination object name.

If this field is zero, there is no destination object name, and *RMDNO* is ignored.

RMDNO (10-digit signed integer)

Offset of destination object name.

This field specifies the offset of the destination object name from the start of the MQRMH structure. The destination object name can be specified by the creator of the reference message, if that data is known to the creator. However, if the creator does not know the destination object name, it is the responsibility of the user-supplied message exit to identify the object to be created or modified.

The length of the destination object name is given by *RMDNL* ; if this length is zero, there is no destination object name, and *RMDNO* is ignored. If present, the destination object name must reside completely within *RMLEN* bytes from the start of the structure.

Applications should not assume that the destination object name is contiguous with any of the data addressed by the *RMSEO*, *RMSNO*, and *RMDEO* fields.

The initial value of this field is 0.

RMDO (10-digit signed integer)

Low offset of bulk data.

This field specifies the low offset of the bulk data from the start of the object of which the bulk data forms part. The offset of the bulk data from the start of the object is called the *logical offset*. This is not the physical offset of the bulk data from the start of the MQRMH structure - that offset is given by *RMLEN*.

To allow large objects to be sent using reference messages, the logical offset is divided into two fields, and the actual logical offset is given by the sum of these two fields:

- *RMDO* represents the remainder obtained when the logical offset is divided by 1 000 000 000. It is thus a value in the range 0 through 999 999 999.
- *RMDO2* represents the result obtained when the logical offset is divided by 1 000 000 000. It is thus the number of complete multiples of 1 000 000 000 that exist in the logical offset. The number of multiples is in the range 0 through 999 999 999.

The initial value of this field is 0.

RMDO2 (10-digit signed integer)

High offset of bulk data.

This field specifies the high offset of the bulk data from the start of the object of which the bulk data forms part. It is a value in the range 0 through 999 999 999. See *RMDO* for details.

The initial value of this field is 0.

RMENC (10-digit signed integer)

Numeric encoding of bulk data.

This specifies the numeric encoding of the bulk data; it does not apply to numeric data in the MQRMH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is ENNAT.

RMFLG (10-digit signed integer)

Reference message flags.

The following flags are defined:

RMLAST
Reference message contains or represents last part of object.

This flag indicates that the reference message represents or contains the last part of the referenced object.

RMNLST
Reference message does not contain or represent last part of object.

RMNLST is defined to aid program documentation. It is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

The initial value of this field is RMNLST.

RMFMT (8-byte character string)

Format name of bulk data.

This specifies the format name of the bulk data.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The initial value of this field is FMNONE.

RMLEN (10-digit signed integer)

Total length of MQRMH, including strings at end of fixed fields, but not the bulk data.

The initial value of this field is zero.

RMOII (24-byte bit string)

Object instance identifier.

This field can be used to identify a specific instance of an object. If it is not needed, it should be set to the following value:

OIINON
No object instance identifier specified.

The value is binary zero for the length of the field.

The length of this field is given by LNOIID. The initial value of this field is OIINON.

RMOT (8-byte character string)

Object type.

This is a name that can be used by the message exit to recognize types of reference message that it supports. Consider making the name conform to the same rules as the *RMFMT* field.

The initial value of this field is 8 blanks.

RMSEL (10-digit signed integer)

Length of source environment data.

If this field is zero, there is no source environment data, and *RMSEO* is ignored.

The initial value of this field is 0.

RMSEO (10-digit signed integer)

Offset of source environment data.

This field specifies the offset of the source environment data from the start of the MQRMH structure. Source environment data can be specified by the creator of the reference message, if that data is

known to the creator. For example, the source environment data might be the directory path of the object containing the bulk data. However, if the creator does not know the source environment data, it is the responsibility of the user-supplied message exit to determine any environment information needed.

The length of the source environment data is given by *RMSEL* ; if this length is zero, there is no source environment data, and *RMSEO* is ignored. If present, the source environment data must reside completely within *RMLEN* bytes from the start of the structure.

Applications should not assume that the environment data starts immediately after the last fixed field in the structure or that it is contiguous with any of the data addressed by the *RMSNO*, *RMDEO*, and *RMDNO* fields.

The initial value of this field is 0.

RMSID (4-byte character string)

Structure identifier.

The value must be:

RMSIDV
Identifier for reference message header structure.

The initial value of this field is RMSIDV.

RMSNL (10-digit signed integer)

Length of source object name.

If this field is zero, there is no source object name, and *RMSNO* is ignored.

The initial value of this field is 0.

RMSNO (10-digit signed integer)

Offset of source object name.

This field specifies the offset of the source object name from the start of the MQRMH structure. The source object name can be specified by the creator of the reference message, if that data is known to the creator. However, if the creator does not know the source object name, it is the responsibility of the user-supplied message exit to identify the object to be accessed.

The length of the source object name is given by *RMSNL* ; if this length is zero, there is no source object name, and *RMSNO* is ignored. If present, the source object name must reside completely within *RMLEN* bytes from the start of the structure.

Applications should not assume that the source object name is contiguous with any of the data addressed by the *RMSEO*, *RMDEO*, and *RMDNO* fields.

The initial value of this field is 0.

RMVER (10-digit signed integer)

Structure version number.

The value must be:

RMVER1
Version-1 reference message header structure.

The following constant specifies the version number of the current version:

RMVERC
Current version of reference message header structure.

The initial value of this field is RMVER1.

Initial values

Table 724. Initial values of fields in MQRMH

Field name	Name of constant	Value of constant
RMSID	RMSIDV	'RMH¬'
RMVER	RMVER1	1
RMLEN	None	0
RMENC	ENNAT	Depends on environment
RMCSI	CSUNDF	0
RMFMT	FMNONE	Blanks
RMFLG	RMNLST	0
RMOT	None	Blanks
RMOII	OIINON	Nulls
RMSEL	None	0
RMSEO	None	0
RMSNL	None	0
RMSNO	None	0
RMDEL	None	0
RMDEO	None	0
RMDNL	None	0
RMDNO	None	0
RMDL	None	0
RMDO	None	0
RMDO2	None	0

Notes:

1. The symbol ¬ represents a single blank character.

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D*
D* MQRMH Structure
D*
D* Structure identifier
D  RMSID                  1      4    INZ('RMH ')
D* Structure version number
D  RMVER                  5      8I 0 INZ(1)
D* Total length of MQRMH, includingstrings at end of fixed fields,but not
D* the bulk data
D  RMLEN                  9     12I 0 INZ(0)
D* Numeric encoding of bulk data
D  RMENC                 13     16I 0 INZ(273)
D* Character set identifier of bulkdata
D  RMCSI                 17     20I 0 INZ(0)
D* Format name of bulk data
D  RMFMT                 21     28    INZ('        ')
D* Reference message flags
D  RMFLG                 29     32I 0 INZ(0)
D* Object type
D  RMOT                  33     40    INZ
```

```
     D* Object instance identifier
     D  RMOII                41     64    INZ(X'00000000000000-
     D                                    0000000000000000000000-
     D                                    000000000000')
     D* Length of source environmentdata
     D  RMSEL                65     68I 0 INZ(0)
     D* Offset of source environmentdata
     D  RMSEO                69     72I 0 INZ(0)
     D* Length of source object name
     D  RMSNL                73     76I 0 INZ(0)
     D* Offset of source object name
     D  RMSNO                77     80I 0 INZ(0)
     D* Length of destination environmentdata
     D  RMDEL                81     84I 0 INZ(0)
     D* Offset of destination environmentdata
     D  RMDEO                85     88I 0 INZ(0)
     D* Length of destination objectname
     D  RMDNL                89     92I 0 INZ(0)
     D* Offset of destination objectname
     D  RMDNO                93     96I 0 INZ(0)
     D* Length of bulk data
     D  RMDL                 97    100I 0 INZ(0)
     D* Low offset of bulk data
     D  RMDO                101    104I 0 INZ(0)
     D* High offset of bulk data
     D  RMDO2               105    108I 0 INZ(0)
```

RPG declaration

IBM i MQRR (Response record) on IBM i

The MQRR structure is used to receive the completion code and reason code resulting from the open or put operation for a single destination queue, when the destination is a distribution list.

Overview

Purpose: MQRR is an output structure for the MQOPEN, MQPUT, and MQPUT1 calls.

Character set and encoding: Data in MQRR must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

Usage: By providing an array of these structures on the MQOPEN and MQPUT calls, or on the MQPUT1 call, it is possible to determine the completion codes and reason codes for all of the queues in a distribution list when the outcome of the call is mixed, that is, when the call succeeds for some queues in the list but fails for others. Reason code RC2136 from the call indicates that the response records (if provided by the application) have been set by the queue manager.

- “Fields” on page 1193
- “Initial values” on page 1194
- “RPG declaration” on page 1194

Fields

The MQRR structure contains the following fields; the fields are described in **alphabetical order**:

RRCC (10-digit signed integer)

Completion code for queue.

This is the completion code resulting from the open or put operation for the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call.

This is always an output field. The initial value of this field is CCOK.

RRREA (10-digit signed integer)

Reason code for queue.

This is the reason code resulting from the open or put operation for the queue with the name that was specified by the corresponding element in the array of MQOR structures provided on the MQOPEN or MQPUT1 call.

This is always an output field. The initial value of this field is RCNONE.

Initial values

Table 725. Initial values of fields in MQRR

Field name	Name of constant	Value of constant
RRCC	CCOK	0
RRREA	RCNONE	0

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQRR Structure
     D*
     D* Completion code for queue
     D  RRCC                   1      4I 0 INZ(0)
     D* Reason code for queue
     D  RRREA                  5      8I 0 INZ(0)
```

IBM i MQSCO (TLS configuration options) on IBM i

The MQSCO structure (with the TLS fields in the MQCD structure) allows an application running as an IBM MQ MQI client to specify configuration options that control the use of TLS for the client connection when the channel protocol is TCP/IP.

Overview

Purpose: The structure is an input parameter on the MQCONNX call.

If the channel protocol for the client channel is not TCP/IP, the MQSCO structure is ignored.

Character set and encoding: Data in MQSCO must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

- “Fields” on page 1194
- “Initial values” on page 1198
- “RPG declaration” on page 1198

Fields

The MQSCO structure contains the following fields; the fields are described in **alphabetical order**:

SCAIC (10-digit signed integer)

This is the number of authentication information (MQAIR) records addressed by the *SCAIP* or *SCAIO* fields. For more information, see“MQAIR (Authentication information record) on IBM i” on page 1003. The value must be zero or greater. If the value is not valid, the call fails with reason code RC2383.

This is an input field. The initial value of this field is 0.

SCAIO (10-digit signed integer)

This is the offset in bytes of the first authentication information record from the start of the MQSCO structure. The offset can be positive or negative. The field is ignored if *SCAIC* is zero.

You can use either *SCAIO* or *SCAIP* to specify the MQAIR records, but not both; see the description of the *SCAIP* field for details.

This is an input field. The initial value of this field is 0.

SCAIP (10-digit signed integer)

This is the address of the first authentication information record. The field is ignored if *SCAIC* is zero.

You can provide the array of MQAIR records in one of two ways:

- By using the pointer field *SCAIP*

  In this case, the application can declare an array of MQAIR records that is separate from the MQSCO structure, and set *SCAIP* to the address of the array.

  Consider using *SCAIP* for programming languages that support the pointer data type in a fashion that is portable to different environments (for example, the C programming language).

- By using the offset field *SCAIO*

  In this case, the application must declare a compound structure containing an MQSCO followed by the array of MQAIR records, and set *SCAIO* to the offset of the first record in the array from the start of the MQSCO structure. Ensure that this value is correct, and has a value that can be accommodated within an MQLONG (the most restrictive programming language is COBOL, for which the valid range is -999 999 999 through +999 999 999).

  Consider using *SCAIO* for programming languages that do not support the pointer data type, or that implement the pointer data type in a fashion that is not portable to different environments (for example, the COBOL programming language).

Whatever technique you choose, only one of *SCAIP* and *SCAIO* can be used; the call fails with reason code RC2384 if both are nonzero.

This is an input field. The initial value of this field is the null pointer in those programming languages that support pointers, and an all-null byte string otherwise.

Note: On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

SCCERLBL (10-digit signed integer)

This field gives details of the certificate label being used.

IBM MQ initializes the value for the SCCERLBL field as blanks. Either enter the required value, or accept the default value.

`ibmwebspheremq`*`user_id`* is a valid value for this field for all versions of the product, and for MQSCO versions less than 5.0 it is the only valid value. Therefore the value of this field is interpreted at run time, and changed if necessary. If you specify an MQSCO version less than 5.0, or accept the default value of blanks for the SCCERLBL field, the system uses the value `ibmwebspheremq`*`user_id`*.

This is an input field.

SCCERTVPOL (10-digit signed integer)

This field specifies what type of certificate validation policy is used. The field can be set to one of the following values:

MQ_CERT_VAL_POLICY_ANY

Apply each of the certificate validation policies supported by the secure sockets library. Accept the certificate chain if any of the policies considers the certificate chain valid.

MQ_CERT_VAL_POLICY_RFC5280
Apply only the RFC5280 compliant certificate validation policy. This setting provides stricter validation than the ANY setting, but rejects some older digital certificates.

The initial value of this field is MQ_CERT_VAL_POLICY_ANY

SCCH (10-digit signed integer)

This field gives configuration details for cryptographic hardware connected to the client system.

Set the field to a string in the following format, or leave it blank or null:

```
GSK_PKCS11=the PKCS #11 driver path and file name;the PKCS #11
token label;the PKCS #11 token password;symmetric cipher setting>;
```

To use cryptographic hardware which conforms to the PKCS11 interface, for example, the IBM 4960 or IBM 4963, specify the PKCS11 driver path, PKCS11 token label, and PKCS11 token password strings, each terminated by a semi-colon.

The PKCS #11 driver path is an absolute path to the shared library providing support for the PKCS #11 card. The PKCS #11 driver file name is the name of the shared library. An example of the value required for the PKCS #11 path and file name is:

```
/usr/lib/pkcs11/PKCS11_API.so
```

The PKCS #11 token label must be entirely in lowercase. If you have configured your hardware with a mixed case or uppercase token label, reconfigure it with this lowercase label.

If no cryptographic hardware configuration is required, set the field to blank or null.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. If the value is not valid, or leads to a failure when used to configure the cryptographic hardware, the call fails with reason code RC2382.

This is an input field. The length of this field is given by LNSSCH. The initial value of this field is blank characters.

SCEPSUITEB (10-digit signed integer)
This field Specifies whether Suite B compliant cryptography is used and what level of strength is employed. The value can be one or more of:

- SCEPSUITEB0

  Suite B compliant cryptography is not used.
- SCEPSUITEB1

  Suite B 128-bit strength security is used.
- SCEPSUITEB2

  Suite B 192-bit strength security is used.

Note: Using SCEPSUITEB0 with any other value in this field is invalid.

SCFR (10-digit signed integer)

IBM MQ can be configured with cryptographic hardware so that the cryptography modules used are those provided by the hardware product; these can be FIPS-certified to a particular level depending on the cryptographic hardware product in use.

Use this field to specify that only FIPS-certified algorithms are used if the cryptography is provided in IBM MQ-provided software.

When IBM MQ is installed an implementation of TLS cryptography is also installed which provides some FIPS-certified modules.

The values can be:

MQSSL_FIPS_NO
This is the default value. When set to this value:

- Any CipherSpec supported on a particular platform can be used.
- If run without use of cryptographic hardware, the following CipherSpecs run using FIPS 140-2 certified cryptography on the IBM MQ platforms:
  - TLS_RSA_WITH_3DES_EDE_CBC_SHA
  - TLS_RSA_WITH_AES_128_CBC_SHA
  - TLS_RSA_WITH_AES_256_CBC_SHA

MQSSL_FIPS_YES
When set to this value, unless you are using cryptographic hardware to perform the cryptography, you can be sure that

- Only FIPS-certified cryptographic algorithms can be used in the CipherSpec applying to this client connection.
- Inbound and outbound TLS channel connections only succeed if one of the following Cipher Specs are used:
  - TLS_RSA_WITH_3DES_EDE_CBC_SHA
  - TLS_RSA_WITH_AES_128_CBC_SHA
  - TLS_RSA_WITH_AES_256_CBC_SHA

Notes:

1. CipherSpec TLS_RSA_WITH_3DES_EDE_CBC_SHA is deprecated.
2. Where possible, if FIPS-only CipherSpecs is configured then the MQI client rejects connections which specify a non-FIPS CipherSpec withRC2393. IBM MQ does not guarantee to reject all such connections and it is your responsibility to determine whether your IBM MQ configuration is FIPS-compliant.

SCKR (10-digit signed integer)

This field is relevant only for IBM MQ MQI clients running on UNIX and Windows systems. It specifies the location of the key database file in which keys and certificates are stored. The key database file must have a file name of the form `zzz`.kdb, where `zzz` is user-selectable. The *SCKR* field contains the path to this file, along with the file name stem (all characters in the file name up to but not including the final `.`kdb). The `.`kdb file suffix is added automatically.

Each key database file has an associated *password stash file*. This holds encrypted passwords that are used to allow programmatic access to the key database. The password stash file must reside in the same directory and have the same file stem as the key database, and must end with the suffix `.sth`.

For example, if the *SCKR* field has the value `/xxx/yyy/key`, the key database file must be `/xxx/yyy/key.`kdb, and the password stash file must be `/xxx/yyy/key.sth`, where `xxx` and `yyy` represent directory names.

If the value is shorter than the length of the field, terminate the value with a null character, or pad it with blanks to the length of the field. The value is not checked; if there is an error in accessing the key repository, the call fails with reason code RC2381.

To run a TLS connection from an IBM MQ MQI client, set *SCKR* to a valid key database file name.

This is an input field. The length of this field is given by LNSSKR. The initial value of this field is a blank character.

SCSID (10-digit signed integer)

This is the structure identifier; the value must be:

SCSIDV
Identifier for TLS configuration options structure.

This is always an input field. The initial value of this field is SCSIDV.

SCVER (10-digit signed integer)

This is the structure version number; the value must be:

SCVER1
Version-1 TLS configuration options structure.

SCVER2
Version-2 TLS configuration options structure.

The following constant specifies the version number of the current version:

SCVERC
Current version of TLS configuration options structure.

This is always an input field. The initial value of this field is SCVER2

Initial values

Table 726. Initial values of fields in MQSCO

Field name	Name of constant	Value of constant
SCSID	SCSIDV	'SCO¬'
SCVER	SCVER5	1
SCKR	None	Null string or blanks
SCCH	None	Null string or blanks
SCAIC	None	0
SCAIO	None	0
SCAIP	None	Null pointer or null bytes
SCKRC	None	Null pointer or null bytes
SCFR	None	Null pointer or null bytes
SCEPSUITEB	None	Null pointer or null bytes
SCCERTVPOL	None	Null pointer or null bytes
SCCERLBL	None	Null pointer or null bytes

Notes:

1. The symbol ¬ represents a single blank character.
2. See“RPG declaration” on page 1198for the SCEPSUITEB options.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQSCO Structure
D*
D* Structure identifier
D  SCSID                  1      4    INZ('SCO ')
D* Structure version number
D  SCVER                  5      8I 0 INZ(1)
D* Location of TLS key repository
D  SCKR                   9    264    INZ
D* Cryptographic hardware configuration string
D  SCCH                 265    520    INZ
D* Number of MQAIR records present
D  SCAIC                521    524I 0 INZ(0)
```

```
     D* Offset of first MQAIR record from start of MQSCO structure
     D  SCAIO                525    528I 0 INZ(0)
     D* Address of first MQAIR record
     D SCAIP                 529    544*   INZ(*NULL)
     D* Ver:1 **
     D* Number of unencrypted bytes sent/received before secret key is
     D* reset
     D SCKRC                 545    548I 0 INZ(0)
     D* Using FIPS-certified algorithms
     D SCFR                  549    552I 0 INZ(0)
     D* Ver:2 **
     * Use only Suite B cryptographic algorithms
     D SCEPSUITEB0
     D SCEPSUITEB1           553    556I 0 INZ(1)
     D SCEPSUITEB2           557    560I 0 INZ(0)
     D SCEPSUITEB3           561    564I 0 INZ(0)
     D SCEPSUITEB4           565    568I 0 INZ(0)
     D SCEPSUITEB                    10I 0 DIM(4) OVERLAY(SCEPSUITEB0)
     D* Ver:3 **
     D* Certificate validation policy
     D SCCERTVPOL            569    572I 0 INZ(0)
     D* Ver:4 **
```

IBM i MQSD (Subscription descriptor) on IBM i

The MQSD structure is used to specify details about the subscription being made.

Overview

Purpose
The structure is an input/output parameter on the MQSUB call.

Managed subscriptions
If an application has no specific need to use a particular queue as the destination for those publications that match its subscription, it can use the managed subscription feature. If an application elects to use a managed subscription, the queue manager informs the subscriber about the destination where published messages are sent, by providing an object handle as an output from the MQSUB call. For more information, see HOBJ (10-digit signed integer) - input/output.

When the subscription is removed, the queue manager also undertakes to clean up messages that have not been retrieved from the managed destination, in the following situations:

- When the subscription is removed - by use of MQCLOSE with CORMSB - and the managed Hobj is closed.
- By implicit means when the connection is lost to an application using a non-durable subscription (SONDUR)
- By expiration when a subscription is removed because it has expired and the managed Hobj is closed.

You must use managed subscriptions with non-durable subscriptions, so that the clean up can occur, and so that messages for closed non-durable subscriptions do not take up space in your queue manager. Durable subscriptions can also use managed destinations.

Character set and encoding
Data in MQSD must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT. However, if the application is running as an IBM MQ client, the structure must be in the character set and encoding of the client.

- “Fields” on page 1199
- “Initial values” on page 1212
- “RPG declaration” on page 1212

Fields

The MQSD structure contains the following fields; the fields are described in alphabetical order:

SDAID (32 byte character string)

This value is in the *MDAID* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. *SDAID* is part of the identity context of the message. For more information about message context, see Message context.

For more information about *MDAID* see MDAID.

If the SOSETI option is not specified, the *MDAID* which is set in each message published for this subscription is blanks, as default context information.

If the SOSETI option is specified, the *SDAID* is being generated by the user and this field is an input field which contains the *MDAID* to be set in each publication for this subscription.

The length of this field is given by LNAIDD. The initial value of this field is 32 blank characters.

If altering an existing subscription using the SOALT option, the *SDAID* of any future publication messages can be changed.

On return from an MQSUB call using SORES, this field is set to the current *MDAID* being used for the subscription.

SDACC (32 byte character string)

This value is in the *MDACC* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. *MDACC* is part of the identity context of the message. For more information about message context, see Message context.

For more information about *MDACC* see MDACC.

You can use the following special value for the *SDACC* field:

ACNONE

No accounting token is specified.

The value is binary zero for the length of the field.

If the SOSETI option is not specified, the accounting token is generated by the queue manager as default context information and this field is an output field which contains the *MDACC* which is set in each message published for this subscription.

If the SOSETI option is specified, the accounting token is being generated by the user and this field is an input field which contains the *MDACC* to be set in each publication for this subscription.

The length of this field is given by LNACCT. The initial value of this field is ACNONE.

If altering an existing subscription using the SOALT option, the value of *MDACC* in any future publication messages can be changed.

On return from an MQSUB call using SORES, this field is set to the current *MDACC* being used for the subscription.

SDASI (40 byte bit string)

This is a security identifier that is passed with the *SDAU* to the authorization service to allow appropriate authorization checks to be performed.

SDASI is used only if SOALTU is specified, and the *SDAU* field is not entirely blank up to the first null character or the end of the field.

On return from an MQSUB call using SORES, this field is unchanged.

See the description of ODASI in the MQOD data type for more information.

SDAU (12 byte character string)

If you specify SOALTU, this field contains an alternate user identifier that is used to check the authorization for the subscription and for output to the destination queue (specified in the **Hobj** parameter of the MQSUB call), in place of the user identifier that the application is currently running under.

If successful, the user identifier specified in this field is recorded as the subscription owning user identifier in place of the user identifier that the application is currently running under.

If SOALTU is specified and this field is entirely blank up to the first null character or the end of the field, the subscription can succeed only if no user authorization is needed to subscribe to this topic with the options specified or the destination queue for output.

If SOALTU is not specified, this field is ignored.

On return from an MQSUB call using SORES, this field is unchanged.

This is an input field. The length of this field is given by LNUID. The initial value of this field is 12 blank characters.

SDCID (24 byte bit string)

All publications sent to match this subscription contain this correlation identifier in the message descriptor. If multiple subscriptions use the same queue to get their publications from, using MQGET by correlation ID allows only publications for a specific subscription to be obtained. This correlation identifier can either be generated by the queue manager or by the user.

If the SOSCID option is not specified, the correlation identifier is generated by the queue manager and this field is an output field which contains the correlation identifier which is set in each message published for this subscription.

If the SOSCID option is specified, the correlation identifier is being generated by the user and this field is an input field which contains the correlation identifier to be set in each publication for this subscription. In this case, if the field contains CINONE, the correlation identifier which is set in each message published for this subscription is the correlation identifier that was created by the original put of the message.

If the SOGRP option is specified and the correlation identifier specified is the same as an existing grouped subscription using the same queue and an overlapping topic string, only the most significant subscription in the group is provided with a copy of the publication.

The length of this field is given by LNCID. The initial value of this field is CINONE.

If altering an existing subscription using the SOALT option, and this field is an input field, then the subscription correlation ID can be changed, unless the subscription has been created using the SOGRP option.

On return from an MQSUB call using SORES, this field is set to the current correlation ID for the subscription.

SDEXP (10 digit signed integer)

This is the time expressed in tenths of a second after which the subscription expires. No more publications will match this subscription after this interval has passed. This is also used as the value in the *MDEXP* field in the MQMD of the publications sent to this subscriber.

The following special value is recognized:

EIULIM
The subscription has an unlimited expiration time.

If altering an existing subscription using the SOALT option, the expiry of the subscription can be changed.

On return from an MQSUB call using the SORES option this field is set to the original expiry of the subscription and not the remaining expiry time.

SDON (48 byte character string)

This is the name of the topic object as defined on the local queue manager.

The name can contain the following characters:

- Uppercase alphabetic characters (A through Z)

- Lowercase alphabetic characters (a through z)
- Numeric digits (0 through 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but can contain trailing blanks. Use a null character to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply:

- On systems that use EBCDIC Katakana, lowercase characters cannot be used.
- Names containing lowercase characters, forward slash, or percent, must be enclosed in quotation marks when specified on commands. These quotation marks must not be specified for names that occur as fields in structures or as parameters on calls.

The *SDON* is used to form the Full topic name.

The full topic name can be built from two different fields: *SDON* and *SDOS*. For details of how these two fields are used, see Combining topic strings.

On return from an MQSUB call using the SORES option this field is unchanged.

The length of this field is given by LNTOPN. The initial value of this field is 48 blank characters.

If altering an existing subscription using the SDALT option, the name of the topic object subscribed to cannot be changed. This field and *SDOS* can be omitted. If they are provided they must resolve to the same full topic name or the call fails with RC2510 .

SDOPT (10 digit signed integer)

You must specify at least one of the following options:

- SOALT
- SORES
- SOCRT

The values can be added. Do not add the same constant more than once. The table shows how you can combine these options: Combinations that are not valid are noted; any other combinations are valid.

Access or creation options

Access and creation options control whether a subscription is created, or whether an existing subscription is returned or altered. You must specify at least one of these options. The table displays valid combinations of access or creation options.

Table 727. Valid combinations of access and creation options

Combination of options	Notes
SOCRT	Creates a subscription if one does not exist; fails if the subscription exists.
SORES	Resumes an existing subscription, fails if no subscription exists.
SOCRT + SORES	Creates a subscription if one does not exist and resumes a matching one, if it does exist. Useful combination if used in an application that might be run a number of times.
SORES + SOALT (see note)	Resumes an existing subscription, altering any fields to match those specified in the MQSD, fails if no subscription exists.

Combination of options	Notes
SOCRT + SOALT (see note)	Creates a subscription if one does not exist and resumes a matching one, if it does exist, altering any fields to match those specified in the MQSD. Useful combination if used in an application that wants to ensure that its subscription is in a certain state before proceeding.

Table 727. Valid combinations of access and creation options (continued)

Note:

Options specifying SOALT can also specify SORES, but this combination has no additional effect to specifying SOALT alone. SOALT implies SORES, because calling MQSUB to alter a subscription implies that the subscriptions are also resumed. The opposite is not true, however: resuming a subscription does not imply it is to be altered.

SOCRT

Create a subscription for the topic specified. If a subscription using the same *SDSN* exists, the call fails with RC2432 . This failure can be avoided by combining the SOCRT option with SORES. The *SDSN* is not always necessary. For more details, see the description of that field.

Combining SOCRT with SORES first checks whether there is an existing subscription for the specified *SDSN*, and if there is returns a handle to that preexisting subscription; but if there is no existing subscription, a new one is created using all the fields provided in the MQSD.

SOCRT can also be combined with SOALT to similar effect (see details about SOALT later in this topic).

SORES

Return a handle to a preexisting subscription which matches those specified by *SDSN*. No changes are made to the matching subscription attributes, and they are returned on output in the MQSD structure. Most of the contents of the MQSD are not used: The fields used are *SDSID*, *SDVER*, *SDOPT*, *SDAID* and *SDASI*, and *SDSN*.

The call fails with reason code RC2428 if a subscription does not exist matching the full subscription name. This failure can be avoided by combining the SOCRT option with SORES. For details about SOCRT, see SOCRT.

The user ID of the subscription is the user ID that created the subscription, or if it has been later altered by a different user ID, it is the user ID of the most recent, successful alteration. If an *SDAID* is used, and use of alternate user IDs is allowed for that user, *SDAID* is recorded as the user ID that created the subscription instead of the user ID under which the subscription was made.

The user ID that created the subscription is recorded as *SDAU* if that field is used, and the use of alternate user IDs is allowed for that user.

If a matching subscription exists which was created without the SOAUID option and the user ID of the subscription is different from that of the application requesting a handle to the subscription, the call fails with reason code RC2434 .

If a matching subscription exists and is currently in use by another application, the call fails with reason code RC2429 . If it is currently in use by the same connection, the call does not fail and a handle to the subscription is returned.

If the subscription named in SubName is not a valid subscription to resume or alter from an application, the call fails with RC2523 .

SORES is implied by SOALT and so is not required to be combined with that option, however, it is not an error if those two options are combined.

SOALT

Return a handle to a preexisting subscription with the full subscription name matching those specified in *SDSN*. Any attributes of the subscription that are different from those specified in the MQSD is altered in the subscription unless alteration is disallowed for that attribute. Details are noted in the description of each attribute and are summarized in the following table. If you try to alter an attribute that cannot be changed, the call fails with the reason code shown in the following table.

The call fails with reason code RC2428 if a subscription does not exist matching the full subscription name. This failure can be avoided by combining the SOCRT option with SOALT.

Combining SOCRT with SOALT first checks whether there is an existing subscription for the specified full subscription name, and if there is returns a handle to that preexisting subscription with alterations made as previously detailed; but if there is no existing subscription, a new one is created using all the fields provided in the MQSD.

The user ID of the subscription is the user ID that created the subscription, or if it has been later altered by a different user ID, it is the user ID of the most recent successful alteration. If *SDAU* is used (and use of alternate user IDs is allowed for that user), then the alternate user ID is recorded as the user ID that created the subscription instead of the user ID under which the subscription was made.

If a matching subscription exists that was created without the option SOAUID and the user ID of the subscription is different from that of the application requesting a handle to the subscription, the call fails with reason code RC2434 .

If a matching subscription exists and is currently in use by another application, the call fails with RC2429 . If it is currently in use by the same connection the call does not fail and a handle to the subscription is returned.

If the subscription named in SubName is not a valid subscription to resume or alter from an application, the call fails with RC2523 .

The following tables show the subscription attributes that can be altered by SOALT.

Table 728. Attributes in MQSD and MQSUB that can be altered

Data type descriptor or function call	Field name	Can this attribute be altered using SOALT?	Reason code
MQSD	Durability options	No	RC2509
MQSD	Destination Options	Yes	None
MQSD	Registration options	Yes (see note 1)	RC2515 if you try to alter SOGRP
MQSD	Publication options	Yes (see note 2)	None
MQSD	Wildcard options	No	RC2510
MQSD	Other options	No (see note 3)	None
MQSD	ObjectName	No	RC2510
MQSD	SDAU	No (see note 4)	None
MQSD	SDASI	No (see note 4)	None
MQSD	SDEXP	Yes	None
MQSD	SDOS	No	RC2510
MQSD	SDSN	No (see note 5)	None
MQSD	SDSUD	Yes	None

Table 728. Attributes in MQSD and MQSUB that can be altered (continued)			
Data type descriptor or function call	**Field name**	**Can this attribute be altered using SOALT?**	**Reason code**
MQSD	SDCID	Yes (see note 6)	RC2515 when in a grouped subscription
MQSD	SDPRI	Yes	None
MQSD	SDACC	Yes	None
MQSD	SDAID	Yes	None
MQSD	SDSL	No	RC2512
MQSUB	Hobj	Yes (see note 6)	RC2515 when in a grouped subscription

Notes:

1. SOGRP cannot be altered.
2. SONEWP cannot be altered because it is not part of the subscription
3. These options are not part of the subscription
4. This attribute is not part of the subscription
5. This attribute is the identity of the subscription being altered
6. Alterable except when part of a grouped sub (SOGRP)

Durability options: The following options control how durable the subscription is. You can specify only one of these options. If you are altering an existing subscription using the SOALT option, you cannot change the durability of the subscription. On return from an MQSUB call using SORES, the appropriate durability option is set.

SODUR

Request that the subscription to this topic remains until it is explicitly removed using MQCLOSE with the CORMSB option. If this subscription is not explicitly removed it will remain even after this application connects to the queue manager is closed.

If a durable subscription is requested to a topic that is defined as not allowing durable subscriptions, the call fails with RC2436 .

SONDUR

Request that the subscription to this topic is removed when the application connection to the queue manager is closed, if it has not already been explicitly removed. SONDUR is the opposite of the SODUR option, and is defined to aid program documentation. It is the default if neither is specified.

Destination options: The following options control the destination that publications for a topic that has been subscribed to are sent to. If altering an existing subscription using the SOALT option, the destination used for publications for the subscription can be changed. On return from an MQSUB call using SORES, this option is set if appropriate.

SOMAN

Request that the destination that the publications are sent to is managed by the queue manager.

The object handle returned in *HOBJ* represents a queue manager managed queue, and is for use with subsequent MQGET, MQCB, MQINQ, or MQCLOSE calls.

An object handle returned from a previous MQSUB call cannot be provided in the **Hobj** parameter when SOMAN is not specified.

Registration options: The following options control the details of the registration that is made to the queue manager for this subscription. If altering an existing subscription using the SOALT option, these

registration options can be changed. On return from an MQSUB call using SORES the appropriate registration options is set.

SOGRP

This subscription is grouped with other subscriptions of the same *SDSL* using the same queue and specifying the same correlation ID so that any publications to topics that would cause more than one publication message to be provided to the group of subscriptions, due to an overlapping set of topic strings being used, only causes one message to be delivered to the queue. If this option is not used, then each unique subscription (identified by *SDSN*) that matches is provided with a copy of the publication which might mean that more than one copy of the publication might be placed on the queue shared by a number of subscriptions.

Only the most significant subscription in the group is provided with a copy of the publication. The most significant subscription is based on the Full topic name up to the point where a wildcard is found. If a mixture of wildcard schemes is used within the group, only the position of the wildcard is important. You are advised not to combine different wildcard schemes within a group of subscriptions that share the same queue.

When creating a new grouped subscription it must still have a unique *SDSN*, but if it matches the full topic name of an existing subscription in the group, the call fails with RC2514 .

If the most significant subscription in group also specifies SONOLC and this is a publication from the same application, then no publication is delivered to the queue.

When altering a subscription made with this option, the fields which imply the grouping, *Hobj* on the MQSUB call (representing the queue and queue manager name), and the *SDCID* cannot be changed. Attempting to alter them causes the call to fail with RC2515 .

This option must be combined with SOSCID with a *SDCID* that is not set to CINONE, and cannot be combined with SOMAN.

SOAUID

When SOAUID is specified, the identity of the subscriber is not restricted to a single user ID. This allows any user to alter or resume the subscription when they have suitable authority. Only a single user can have the subscription at any one time. An attempt to resume use of a subscription currently in use by another application causes the call to fail with RC2429 .

To add this option to an existing subscription, the MQSUB call, using SOALT, must come from the same user ID as the original subscription itself.

If an MQSUB call references an existing subscription with SOAUID set, and the user ID differs from the original subscription, the call succeeds only if the new user ID has authority to subscribe to the topic. On successful completion, future publications to this subscriber are put to the subscriber's queue with the new user ID set in the publication message.

Do not specify both SOAUID and SOFUID. If neither is specified, the default is SOFUID.

SOFUID

When SOFUID is specified, the subscription can be altered or resumed by only the last user ID to alter the subscription. If the subscription has not been altered, it is the user ID that created the subscription.

If an MQSUB verb references an existing subscription with SOAUID set and alters the subscription using SOALT to use the SOFUID, the user ID of the subscription is now fixed at this new user ID. The call succeeds only if the new user ID has authority to subscribe to the topic.

If a user ID other than the one recorded as owning a subscription tries to resume or alter an SOFUID subscription, the call fails with RC2434 . The owning user ID of a subscription can be viewed using the **DISPLAY SBSTATUS** command.

Do not specify both SOAUID and SOFUID. If neither is specified, the default is SOFUID.

Publication options: The following options control the way publications are sent to this subscriber. If altering an existing subscription using the SOALT option, these publication options can be changed.

SONOLC

Tells the broker that the application does not want to see any of its own publications. Publications are considered to have originated from the same application if the connection handles are the same. On return from an MQSUB call using SORES this option is set if appropriate.

SONEWP

No currently retained publications are to be sent, when this subscription is created, only new publications. This option only applies when SOCRE is specified. Any subsequent changes to a subscription do not alter the flow of publications and so any publications that have been retained on a topic, has already been sent to the subscriber as new publications.

If this option is specified without SOCRE it causes the call to fail with RC2046 . On return from an MQSUB call using SORES this option is not set even if the subscription was created using this option.

If this option is not used, previously retained messages are sent to the destination queue provided. If this action fails due to an error, either RC2525 or RC2526 , the creation of the subscription fails.

This option is not valid in combination with SOPUBR.

SOPUBR

Setting this option indicates that the subscriber requests information specifically when required. The queue manager does not send unsolicited messages to the subscriber. The retained publication (or possibly multiple publications if a wildcard is specified in the topic) is sent to the subscriber each time an MQSUBRQ call is made using the Hsub handle from a previous MQSUB call. No publications are sent as a result of the MQSUB call using this option. On return from an MQSUB call using SORES this option is set if appropriate.

This option is not valid in combination with SONEWP.

Wildcard options: The following options control how wildcards are interpreted in the string provided in the *SDOS* field of the MQSD. You can specify only one of these options. If altering an existing subscription using the SOALT option, these wildcard options cannot be changed. On return from an MQSUB call using SORES the appropriate wildcard option is set.

SOWCHR

Wildcards only operate on characters within the topic string. The SOWCHR field treats forward slash (/) as just another character with no special significance.

The behavior defined by SOWCHR is shown in the following table:

Table 729. How wildcards are interpreted

Special Character	Behavior
*	Wildcard, zero or more characters
?	Wildcard, one character
%	Escape character to allow the characters '*', '?', or '%' to be used in a string and not be interpreted as a special character, for example, '%*', '%?' or '%%'.

For example, publishing on the following topic:

```
/level0/level1/level2/level3/level4
```

matches subscribers using the following topics:

```
*
/*
/ level0/level1/level2/level3/*
/ level0/level1/*/level3/level4
/ level0/level1/le?el2/level3/level4
```

Note: This use of wildcards supplies exactly the meaning provided in IBM MQ V6 and WebSphere MB V6 when using MQRFH1 formatted messages for Publish/Subscribe. It is recommended that this is not used for newly written applications and is only used for applications that were previously running against that version and have not been changed to use the default wildcard behavior as described in SOWTOP.

SOWTOP

Wildcards only operate on topic elements within the topic string. This is the default behavior if none is chosen.

The behavior required by SOWTOP is shown in the following table:

Table 730. How wildcards are interpreted

Special Character	Behavior
/	Topic level separator
#	Wildcard: multiple topic level
+	Wildcard: single topic level

Note:

The '+' and '#' are not treated as wildcards if they are mixed in with other characters (including themselves) within a topic level. In the following string, the '#' and '+' characters are treated as ordinary characters.

```
level0/level1/#+/level3/level#
```

For example, publishing on the following topic:

```
/level0/level1/level2/level3/level4
```

matches subscribers using the following topics:

```
#
/#
/ level0/level1/level2/level3/#
/ level0/level1/+/level3/level4
```

Note: This use of wildcards supplies the meaning provided in WebSphere Message Broker 6 when using MQRFH2 formatted messages for Publish/Subscribe.

Other options: The following options control the way the API call is issued rather than the subscription. On return from an MQSUB call using SORES these options are unchanged.

SOALTU
The SDAU field contains a user identifier to use to validate this MQSUB call. The call can succeed only if this SDAU is authorized to open the object with the specified access options, regardless of whether the user identifier under which the application is running is authorized to do so.

SOSCID
The subscription is to use the correlation identifier supplied in the *SDCID* field. If this option is not specified, a correlation identifier is automatically created by the queue manager at subscription time and is returned to the application in the *SDCID* field. See SDCID (24-byte bit string)SDCID for more information.

SOSETI

The subscription is to use the accounting token and application identity data supplied in the *SDACC* and *SDAID* fields.

If this option is specified, the same authorization check is carried out as if the destination queue was accessed using an MQOPEN call with OOSETI, except in the case where the SOMAN option is also used in which case there is no authorization check on the destination queue.

If this option is not specified, the publications sent to this subscriber has default context information associated with them as follows:

Table 731. Default context information for publications sent to this subscriber

Field in MQMD	Value used
MDUID	The user ID associated with the subscription at the time the subscription was made.
MDACC	Determined from the environment if possible; Set to ACNONE if not.
MDAID	Set to blanks

This option is only valid with SOCRE and SOALT. If used with SORES, the *SDACC* and *SDAID* fields are ignored, so this option has no effect.

If a subscription is altered without using this option where previously the subscription had supplied identity context information, default context information is generated for the altered subscription.

If a subscription allowing different user IDs to use it with option SOAUID, is resumed by a different user ID, default identity context is generated for the new user ID now owning the subscription and any subsequent publications are delivered containing the new identity context.

SOFIQ

The MQSUB call fails if the queue manager is in quiescing state. On z/OS, for a CICS or IMS application, this option also forces the MQSUB call to fail if the connection is in quiescing state.

SDAU (12 byte character string)

If you specify SOALTU, this field contains an alternate user identifier that is used to check the authorization for the subscription and for output to the destination queue (specified in the **Hobj** parameter of the MQSUB call), in place of the user identifier that the application is currently running under.

If successful, the user identifier specified in this field is recorded as the subscription owning user identifier in place of the user identifier that the application is currently running under.

If SOALTU is specified and this field is entirely blank up to the first null character or the end of the field, the subscription can succeed only if no user authorization is must subscribe to this topic with the options specified or the destination queue for output.

If SOALTU is not specified, this field is ignored.

On return from an MQSUB call using SORES, this field is unchanged.

This is an input field. The length of this field is given by LNUID. The initial value of this field is 12 blank characters.

SDPRI (10 digit signed integer)

This is the value that is in the *MQPRI* field of the Message Descriptor (MQMD) of all publication messages matching this subscription. For more information about the *MQPRI* field in the MQMD, see MDPRI.

The value must be greater than or equal to zero; zero is the lowest priority. The following special values can also be used:

PRQDEF

When a subscription queue is provided in the Hobj field in the MQSUB call, and is not a managed handle, then the priority for the message is taken from the **DefPriority** attribute of this queue. If the queue so identified is a cluster queue or there is more than one definition in the queue-name resolution path then the priority is determined when the publication message is put to the queue as described for MDPRI.

If the MQSUB call uses a managed handle, the priority for the message is taken from the **DefPriority** attribute of the model queue associated with the topic subscribed to.

PRPUB

The priority for the message is the priority of the original publication. This is the initial value of the field.

If altering an existing subscription using the SOALT option, the *MQPRI* of any future publication messages can be changed.

On return from an MQSUB call using SORES, this field is set to the current priority being used for the subscription.

SDRO (MQCHARV)

SDRO is the long object name after the queue manager resolves the name provided in *SDON*.

If the long object name is provided in *SDOS* and nothing is provided in *SDON*, the value returned in this field is the same as provided in *SDOS*.

If this field is omitted (that is SDRO.VSBufSize is zero), the *SDRO* is not returned, but the length is returned in SDRO.VSLength. If the length is shorter than the full *SDRO*, it is truncated and returns as many of the rightmost characters as can fit in the provided length.

If *SDRO* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2520 .

SDSID (4 byte character string)

This is the structure identifier; the value must be:

SDSIDV

Identifier for Subscription Descriptor structure.

This is always an input field. The initial value of this field is SDSIDV

SDSL (10 digit signed integer)

This is the level associated with the subscription. Publications are only delivered to this subscription if it is in the set of subscriptions with the highest *SDSL* value less than or equal to the PubLevel used at publication time.

The value must be in the range zero to 9. Zero is the lowest level.

The initial value of this field is 1.

If altering an existing subscription using the SOALT option, then *SDSL* cannot be changed.

SDSN (MQCHARV)

SDSN specifies the subscription name.

This field is required only if *SDOPT* specifies the SODUR option, but if it is provided it is used by the queue manager for SONDUR as well. If specified, *SDSN* must be unique within the queue manager, because it is the field used to identify subscriptions.

The maximum length of *SDSN* is 10240.

This field serves two purposes. For a SODUR subscription, it is the means by which you identify a subscription to resume it after it has been created, if you have either closed the handle to the subscription (using the COKPSB option) or have been disconnected from the queue manager. Identifying a subscription to remove it after it has been created is done using the MQSUB call with the

SORES option. The SDSN field is also displayed in the administration view of subscriptions in the *SDSN* field in DISPLAY SBSTATUS.

If *SDSN* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, or if it is omitted when it is required (that is *SDSN*. *VCHRL* is zero), or if it exceeds the maximum length, the call fails with reason code RC2440 .

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

If altering an existing subscription using the SOALT option, the subscription name cannot be changed, because it is the field used to identify the subscription. It is not changed on output from an MQSUB call with the SORES option.

SDSS (MQCHARV)

SDSS is the string that provides the selection criteria used when subscribing for messages from a topic.

This variable length field is returned on output from an MQSUB call using the SORES option, if a buffer is provided, and if there is also a positive buffer length in VSBufSize. If no buffer is provided on the call, only the length of the selection string is returned in the VSLength field of the MQCHARV. If the buffer provided is smaller than the space required to return the field, only VSBufSize bytes are returned in the provided buffer.

If *SDSS* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2519 .

SDSUD (MQCHARV)

The data provided on the subscription in this field is included as the mq.SubUserData message property of every publication sent to this subscription.

The maximum length of *SDSUD* is 10240.

If *SDSUD* is specified incorrectly, according to the description of how to use the MQCHARV structure, or if it exceeds the maximum length, the call fails with reason code RC2431.

This is an input field. The initial values of the fields in this structure are the same as those in the MQCHARV structure.

If altering an existing subscription using the SOALT option, the subscription user data can be changed.

This variable length field is returned on output from an MQSUB call using the SORES option, if a buffer is provided and there is a positive buffer length in *VSBufLen*. If no buffer is provided on the call, only the length of the subscription user data is returned in the *VCHRL* field of the MQCHARV. If the buffer provided is smaller than the space required to return the field, only *VSBufLen* bytes are returned in the provided buffer.

SDVER (10 digit signed integer)

This is the structure version number; the value must be:

SDVER1
Version-1 Subscription Descriptor structure.

The following constant specifies the version number of the current version:

SDVERC
Current version of Subscription Descriptor structure.

This is always an input field. The initial value of the field is SDVER1.

Initial values

Table 732. Initial values of fields in MQSD

Field name	Name of constant	Value of constant
SDSID	SDSIDV	'SD¬¬'
SDVER	SDVER1	1
SDOPT	SONDUR	0
SDON	None	Blanks
SDAU	None	Blanks
SDASI	SINONE	Nulls
SDEXP	EIULIM	-1
SDOS	Names and values as defined for MQCHARV	
SDSN	Names and values as defined for MQCHARV	
SDSUD	Names and values as defined for MQCHARV	
SDCID	CINONE	Nulls
SDPRI	PRQDEF	-3
SDACC	ACNONE	Nulls
SDAID	None	Blanks
SDSL	None	1
SDRO	Names and values as defined in MQCHARV	

Note:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQSD Structure
D*
D* Structure identifier
D  SDSID                  1      4
D* Structure version number
D  SDVER                  5      8I 0
D* Options associated with subscribing
D  SDOPT                  9     12I 0
D* Object name
D  SDON                  13     60
D* Alternate user identifier
D  SDAU                  61     72
D* Alternate security identifier
D  SDASI                 73    112
D* Expiry of Subscription
D  SDEXP                113    116I 0
D* Object Long name
D SDOSP                 117    132*
D SDOSO                 133    136I 0
D SDOSS                 137    140I 0
D SDOSL                 141    144I 0
```

```
 D SDOSC                 145    148I 0
 D* Subscription name
 D SDSNP                 149    164*
 D SDSNO                 165    168I 0
 D SDSNS                 169    172I 0
 D SDSNL                 173    176I 0
 D SDSNC                 177    180I 0
 D* Subscription User data
 D SDSUDP                181    196*
 D SDSUDO                197    200I 0
 D SDSUDS                201    204I 0
 D SDSUDL                205    208I 0
 D SDSUDC                209    212I 0
 D* Correlation Id related to this subscription
 D SDCID                 213    236
 D* Priority set in publications
 D SDPRI                 237    240I 0
 D* Accounting Token set in publications
 D SDACC                 241    272
 D* Appl Identity Data set in publications
 D SDAID                 273    304
 D* Message Selector
 D SDSSP                 305    320*
 D SDSSO                 321    324I 0
 D SDSSS                 325    328I 0
 D SDSSL                 329    332I 0
 D SDSSC                 333    336
 D* Subscription level
 D SDSL                  337    340  0
 D* Resolved Long object name
 D SDROP                 341    356*
 D SDROO                 357    360I 0
 D SDROS                 361    364I 0
 D SDROL                 365    368I 0
 D SDROC                 369    372I 0
```

IBM i MQSMPO (Set message property options) on IBM i

The **MQSMPO** structure allows applications to specify options that control how properties of messages are set.

Overview

Purpose: The structure is an input parameter on the **MQSETMP** call.

Character set and encoding: Data in **MQSMPO** must be in the character set of the application and encoding of the application (ENNAT).

- "Fields" on page 1213
- "Initial values" on page 1215
- "RPG declaration" on page 1215

Fields

The MQSMPO structure contains the following fields; the fields are described in **alphabetical order**:

SPOPT (10-digit signed integer)

Location options: The following options relate to the relative location of the property compared to the property cursor:

SPSETF

Sets the value of the first property that matches the specified name, or if it does not exist, adds a new property after all other properties with a matching hierarchy.

SPSETC

Sets the value of the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired using either the IPINQF or the IPINQN option.

The property cursor is reset when the message handle is reused, or when the message handle is specified in the *HMSG* field of the MQGMO structure on an MQGET call or the MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established or if the property pointed to by the property cursor has been deleted, the call fails with completion code CCFAIL and reason code RC2471.

SPSETA
Sets a new property after the property pointed to by the property cursor. The property pointed to by the property cursor is the one that was last inquired using either the IPINQF or the IPINQO option.

The property cursor is reset when the message handle is reused, or when the message handle is specified in the *HMSG* field of the MQGMO structure on an MQGET call or the MQPMO structure on an MQPUT call.

If this option is used when the property cursor has not yet been established or if the property pointed to by the property cursor has been deleted, the call fails with completion code CCFAIL and reason code RC2471.

If you need none of the options described, use the following option:

SPNONE
No options specified.

This is always an input field. The initial value of this field is SPSETF.

SPSID (10-digit signed integer)

This is the structure identifier; the value must be:

SPSIDV

Identifier for set message property options structure.

This is always an input field. The initial value of this field is **SPSIDV**.

SPVAKCSI (10-digit signed integer)

The character set of the property value to be set if the value is a character string.

This is always an input field. The initial value of this field is **CSAPL**.

SPVALENC (10-digit signed integer)

The encoding of the property value to be set if the value is numeric.

This is always an input field. The initial value of this field is **ENNAT**.

SPVER (10-digit signed integer)

This is the structure version number; the value must be:

SPVER1
Version-1 set message property options structure.

The following constant specifies the version number of the current version:

SPVERC
Current version of set message property options structure.

This is always an input field. The initial value of this field is **SPVER1**.

Initial values

Table 733. Initial values of fields in MQSMPO

Field name	Name of constant	Value of constant
SPSID	SPSIDV	'SMPO'
SPVER	SPVER1	1
SPOPT	SPNONE	0
SPVALENC	ENNAT	Depends on environment
SPVALCSI	CSAPL	-3

RPG declaration

```
     D* MQSMPO Structure
     D*
     D*
     D* Structure identifier
     D  SPSID                 1      4    INZ('SMPO')
     D*
     D* Structure version number
     D  SPVER                 5      8I 0 INZ(1)
     D*
     ** Options that control the action of
     D* MQSETMP
     D  SPOPT                 9     12I 0 INZ(0)
     D*
     D* Encoding of Value
     D  SPVALENC             13     16I 0 INZ(273)
     D*
     D* Character set identifier of Value
     D  SPVALCSI             17     20I 0 INZ(-3)
```

IBM i MQSRO (Subscription Request Options) on IBM i

The MQSRO structure allows the application to specify options that control how a subscription request is made.

Overview

Purpose: The structure is an input/output parameter on the MQSUBRQ call.

Version: The current version of MQSRO is SRVER1.

- "Fields" on page 1215
- "Initial values" on page 1216
- "RPG declaration" on page 1216

Fields

The MQSRO structure contains the following fields; the fields are described in **alphabetical order**:

SRNMP (10-digit signed integer)

This is an output field, returned to the application to indicate the number of publications sent to the subscription queue as a result of this call. Although this number of publications have been sent as a result of this call, there is no guarantee that this many messages will be available for the application to get, especially if they are non-persistent messages.

There may be more than one publication if the topic subscribed to, contained a wildcard. If no wildcards were present in the topic string when the subscription represented by *HSUB* was created, then at most one publication is sent as a result of this call.

SROPT (10-digit signed integer)

One of the following options must be specified. Only one option can be specified.

Other options: The following option controls what happens when the queue manager is quiescing:

SRFIQ

The MQSUBRQ call fails if the queue manager is in the quiescing state.

Default option: If the option described previously is not required, the following option must be used:

SRNONE

Use this value to indicate that no other options have been specified; all options assume their default values.

SRNONE helps program documentation. Although it is not intended that this option be used with any other, because its value is zero, this use cannot be detected.

SRSID (4-byte character string)

This is the structure identifier; the value must be:

SRSIDV
Identifier for Subscription Request SROPT structure.

This is always an input field. The initial value of this field is SRSIDV.

SRVER (10-digit signed integer)

This is the structure version number; the value must be:

SRVER1
Version-1 Subscription Request Options structure.

The following constant specifies the version number of the current version:

SRVERC
Current version of Subscription Request Options structure.

This is always an input field. The initial value of this field is SRVER1.

Initial values

Table 734. Initial values of fields in MQSRO

Field name	Name of constant	Value of constant
SRSID	SRSIDV	'SRO¬'
SRVER	SRVER1	1
SROPT	SRNONE	0
SRNMP	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. The value Null string or blanks denotes the null string in C, and blank characters in other programming languages.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQSRO Structure
D*
D* Structure identifier
```

```
D  SRSID                 1      4
D* Structure version number
D  SRVER                 5      8I 0
D* Options that control the action of MQSUBRQ
D  SROPT                 9     12I 0
D* Number of publications sent
D  SRNMP                13     16I 0
```

IBM i MQSTS (Status reporting structure) on IBM i

The MQSTS structure describes the data in the status structure returned by the MQSTAT command.

Overview

Character set and encoding: Character data in MQSTS is in the character set of the local queue manager; this is given by the *CodedCharSetId* queue manager attribute. Numeric data in MQSTS is in the native machine encoding; this is given by *ENNAT*.

Usage: The MQSTAT command is used to retrieve status information. This information is returned in an MQSTS structure. For information about MQSTAT, see "MQSTAT (Retrieve status information) on IBM i" on page 1343.

- "Fields" on page 1217
- "Initial values" on page 1220
- "RPG declaration" on page 1221

Fields

The MQSTS structure contains the following fields; the fields are described in **alphabetical order**:

STSCC (10-digit signed integer)

This is the completion code resulting from the first error reported in the MQSTS structure.

This is always an output field. The initial value of this field is CCOK.

STSFC (10-digit signed integer)

This is the number of asynchronous put calls that failed.

This is an output field. The initial value of this field is 0.

STSOBJN (48-byte character string)

This is the local name of the object involved in the first failure.

This is an output field. The initial value of this field is 48 blank characters.

STSOQMGR (48-byte character string)

This is the name of the queue manager on which the *STSOBJN* object is defined. A name that is entirely blank up to the first null character or the end of the field denotes the queue manager to which the application is connected (the local queue manager).

This is an output field. The initial value of this field is 48 blank characters.

STSOO (10-digit signed integer)

The STSOO used to open the object being reported upon. Present only in Version 2 of MQSTS or higher.

The value of STSOO depends on the value of the MQSTAT **STYPE** parameter.

STATAPT

Zero.

STATREC

Zero.

STATRER

The STS00 used when the failure occurred. The reason for the failure is reported in the *STSCC* and *STSRC* fields in the MQSTS structure.

STS00 is an output field. Its initial value is zero.

STSOS (MQCHARV)

Long object name of failing object being reported on. Present only in Version 2 of MQSTS or higher.

STSOS is a MQCHARV field with a maximum length of 10240. See MQCHARV for a description of how to use the MQCHARV structure.

The interpretation of STSOS depends on the value of the MQSTAT **STYPE** parameter.

STATAPT

This is the long object name of the queue or topic used in the MQPUT operation, which failed.

STATREC

Zero length string

STATRER

This is the long object name of the object that caused the reconnection to fail.

STSOS is an output field. Its initial value is a zero length string.

STSOT (10-digit signed integer)

The type of object being named in *ObjectName*. Possible values are:

OTALSQ
Alias queue.

OTLOCQ
Local queue.

OTMODQ
Model queue.

OTQ
Queue.

OTREMQ
Remote queue.

OTTOP
Topic.

This is always an output field. The initial value of this field is OTQ.

STSRC (10-digit signed integer)

This is the reason code resulting from the first error reported in the MQSTS structure

This is always an output field. The initial value of this field is RCNONE.

STSROBJN (48-byte character string)

This is the name of the destination queue named in *STSOBJN* after the local queue manager resolves the name. The name returned is the name of a queue that exists on the queue manager identified by *STSRQMGR*.

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *STSROBJN* is set to blanks:

- A topic
- A queue, but not opened for browse, input, or output

This is an output field. The initial value of this field is 48 blank characters.

STSRQMGR (48-byte character string)

This is the name of the destination queue manager after the local queue manager resolves the name. The name returned is the name of the queue manager that owns the queue identified by *STSROBJN*. *STSRQMGR* can be the name of the local queue manager.

If *STSROBJN* is a shared queue that is owned by the queue sharing group to which the local queue manager belongs, *STSRQMGR* is the name of the queue sharing group. If the queue is owned by some other queue sharing group, *STSROBJN* can be the name of the queue sharing group or the name of a queue manager that is a member of the queue sharing group (the nature of the value returned is determined by the queue definitions that exist at the local queue manager).

A nonblank value is returned only if the object is a single queue opened for browse, input, or output (or any combination). If the object opened is any of the following, *STSRQMGR* is set to blanks:

- A topic
- A queue, but not opened for browse, input, or output
- A cluster queue with OOBNDN specified (or with OOBNDQ in effect when the **DefBind** queue attribute has the value OOBNDN)

This is an output field. The initial value of this field is 48 blank characters.

STSSC (10-digit signed integer)

This is the number of asynchronous put calls that succeeded.

This is an output field. The initial value of this field is 0.

STSSID (4-byte character string)

This is the structure identifier. The value must be:

STSSID
Identifier for status reporting structure.

The initial value of this field is STSSID.

STSSO (10 digit signed integer)

The STSSO used to open the failing subscription. Present only in Version 2 of MQSTS or higher.

The interpretation of STSSO depends on the value of the MQSTAT **STYPE** parameter.

STATAPT

Zero.

STATREC

Zero.

STATRER

The STSSO used when the failure occurred. The reason for the failure is reported in the *STSCC* and *STSRC* fields in the MQSTS structure. If the failure is not related to subscribing to a topic, the value returned is zero.

STSSO is an output field. Its initial value is zero.

STSSUN (MQCHARV)

The name of the failing subscription. Present only in Version 2 of MQSTS or higher.

STSSUN is a MQCHARV field with a maxiumum length of 10240. See MQCHARV for a description of how to use the MQCHARV structure.

The interpretation of STSSUN depends on the value of the MQSTAT **STYPE** parameter.

STATAPT

Zero length string.

STATREC

Zero length string.

STATRER

The name of the subscription that caused reconnection to fail. If no subscription name is available, or the failure is not related to a subscription, this is a zero-length string.

STSSUN is an output field. Its initial value is a zero length string.

STSVER (10-digit signed integer)

This is the structure version number. The value must be:

STSVR1
Version number for status reporting structure.

The following constant specifies the version number of the current version:

STSVRC
Current version of status reporting structure.

The initial value of this field is STSVR1.

STSWC (10-digit signed integer)

This is the number of asynchronous put calls that completed with a warning.

This is an output field. The initial value of this field is 0.

Initial values

Table 735. Initial values of fields in MQSTS

Field name	Name of constant	Value of constant
STSSID	STSID	
STSVER	STSVRC	STSVR1
STSCC	CCOK	0
STSRC	RCNONE	0
STSSC	None	0
STSWC	None	0
STSFC	None	0
STSOT	None	0
STSOBJN	None	Blanks
STSOQMGR	None	Blanks
STSROBJN	None	Blanks
STSRQMGR	None	Blanks
STSOS	Names and values as defined for MQCHARV	
STSSUN	Names and values as defined for MQCHARV	
STSOO	None	0
STSSO	None	0

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQSTS Structure
D*
D* Structure identifier
D  STSSID                 1      4
D* Structure version number
D  STSVER                 5      8I 0
D* Completion code
D  STSCC                  9     12I 0
D* Reason code
D  STSRC                 13     16I 0
D* Success count
D  STSSC                 17     20I 0
D* Warning count
D  STSWC                 21     24I 0
D* Failure count
D  STSFC                 25     28I 0
D* Object type
D  STSOT                 29     32I 0
D* Object name
D  STSOBJN               33     80
D* Object queue manager
D  STSOQMGR              81     128
D* Resolved object name
D  STSROBJN             129     176
D* Resolved object queue manager name
D  STSRQMGR             177     224
D* Ver:1 **
D* Failing object long name
D* Address of variable length string
D  STSOSCHRP            225    240*
D* Offset of variable length string
D  STSOSCHRO            241    244I 0
D* Size of buffer
D  STSOSVSBS            245    248I 0
D* Length of variable length string
D  STSOSCHRL            249    252I 0
D* CCSID of variable length string
D  STSOSCHRC            253    256I 0
D* Failing subscription name
D* Address of variable length string
D  STSSUNCHRP           257    272*
D* Offset of variable length string
D  STSSUNCHRO           273    276I 0
D* Size of buffer
D  STSSUNVSBS           277    280I 0
D* Length of variable length string
D  STSSUNCHRL           281    284I 0
D* CCSID of variable length string
D  STSSUNCHRC           285    288I 0
D* Failing open options
D  STSOO                289    292I 0
D* Failing subscription options
D  STSSO                293    296I 0
D* Ver:2 **
```

MQTM - Trigger message

The MQTM structure describes the data in the trigger message that is sent by the queue manager to a trigger-monitor application when a trigger event occurs for a queue.

Overview

Purpose: This structure is part of the IBM MQ Trigger Monitor Interface (TMI), which is one of the IBM MQ framework interfaces.

Format name: FMTM.

Character set and encoding: Character data in MQTM is in the character set of the queue manager that generates the MQTM. Numeric data in MQTM is in the machine encoding of the queue manager that generates the MQTM.

The character set and encoding of the MQTM are given by the *MDCSI* and *MDENC* fields in:

- The MQMD (if the MQTM structure is at the start of the message data), or
- The header structure that precedes the MQTM structure (all other cases).

Usage: A trigger-monitor application may need to pass some or all of the information in the trigger message to the application which is started by the trigger-monitor application. Information which may be needed by the started application includes *TMQN*, *TMTD*, and *TMUD*. The trigger-monitor application can pass the MQTM structure directly to the started application, or pass an MQTMC2 structure instead, depending on what is permitted by the environment and convenient for the started application. For information about MQTMC2, see "MQTMC2 (Trigger message 2 - character format) on IBM i" on page 1226.

- On IBM i, the trigger-monitor application provided with IBM MQ passes an MQTMC2 structure to the started application.

For information about triggers, see Prerequisites for triggering.

- "MQMD for a trigger message" on page 1222
- "Fields" on page 1223
- "Initial values" on page 1225
- "RPG declaration" on page 1225

MQMD for a trigger message

Table 736. Settings for the fields in the MQMD of a trigger message generated by the queue manager

Field in MQMD	Value used
MDSID	MDSIDV
MDVER	MDVER1
MDREP	RONONE
MDMT	MTDGRM
MDEXP	EIULIM
MDFB	FBNONE
MDENC	ENNAT
MDCSI	Queue manager's **CodedCharSetId** attribute
MDFMT	FMTM
MDPRI	Initiation queue's **DefPriority** attribute
MDPER	PENPER
MDMID	A unique value
MDCID	CINONE
MDBOC	0
MDRQ	Blanks
MDRM	Name of queue manager
MDUID	Blanks
MDACC	ACNONE
MDAID	Blanks
MDPAT	ATQM, or as appropriate for the message channel agent

Table 736. Settings for the fields in the MQMD of a trigger message generated by the queue manager (continued)

Field in MQMD	Value used
MDPAN	First 28 bytes of the queue manager name
MDPD	Date when trigger message is sent
MDPT	Time when trigger message is sent
MDAOD	Blanks

An application that generates a trigger message is recommended to set similar values, except for the following:

- The *MDPRI* field can be set to PRQDEF (the queue manager will change this to the default priority for the initiation queue when the message is put).
- The *MDRM* field can be set to blanks (the queue manager will change this to the name of the local queue manager when the message it put).
- The context fields should be set as appropriate for the application.

Fields

The MQTM structure contains the following fields; the fields are described in **alphabetical order**:

TMAI (256-byte character string)

Application identifier.

This is a character string that identifies the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ApplId** attribute of the process object identified by the *TMPN* field; see "Attributes for process definitions on IBM i" on page 1382 for details of this attribute. The content of this data is of no significance to the queue manager.

The meaning of *TMAI* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ requires *TMAI* to be the name of an executable program.

The length of this field is given by LNPROA. The initial value of this field is 256 blank characters.

TMAT (10-digit signed integer)

Application type.

This identifies the nature of the program to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ApplType** attribute of the process object identified by the *TMPN* field; see "Attributes for process definitions on IBM i" on page 1382 for details of this attribute. The content of this data is of no significance to the queue manager.

TMAT can have one of the following standard values. User-defined types can also be used, but should be restricted to values in the range ATUFST through ATULST:

ATCICS
CICS transaction.

ATVSE
CICS/VSE transaction.

AT400
IBM i application.

ATUFST
Lowest value for user-defined application type.

ATULST
Highest value for user-defined application type.

The initial value of this field is 0.

TMED (128-byte character string)

Environment data.

This is a character string that contains environment-related information pertaining to the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **EnvData** attribute of the process object identified by the *TMPN* field; see "Attributes for process definitions on IBM i" on page 1382 for details of this attribute. The content of this data is of no significance to the queue manager.

The length of this field is given by LNPROE. The initial value of this field is 128 blank characters.

TMPN (48-byte character string)

Name of process object.

This is the name of the queue manager process object specified for the triggered queue, and can be used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **ProcessName** attribute of the queue identified by the *TMQN* field; see "Attributes for queues" on page 1353 for details of this attribute.

Names that are shorter than the defined length of the field are always padded to the right with blanks; they are not ended prematurely by a null character.

The length of this field is given by LNPRON. The initial value of this field is 48 blank characters.

TMQN (48-byte character string)

Name of triggered queue.

This is the name of the queue for which a trigger event occurred, and is used by the application started by the trigger-monitor application. The queue manager initializes this field with the value of the **QName** attribute of the triggered queue; see "Attributes for queues" on page 1353 for details of this attribute.

Names that are shorter than the defined length of the field are padded to the right with blanks; they are not ended prematurely by a null character.

The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

TMSID (4-byte character string)

Structure identifier.

The value must be:

TMSIDV
Identifier for trigger message structure.

The initial value of this field is TMSIDV.

TMTD (64-byte character string)

Trigger data.

This is free-format data for use by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **TriggerData** attribute of the queue identified by the *TMQN* field; see "Attributes for queues" on page 1353 for details of this attribute. The content of this data is of no significance to the queue manager.

The length of this field is given by LNTRGD. The initial value of this field is 64 blank characters.

TMUD (128-byte character string)

User data.

This is a character string that contains user information relevant to the application to be started, and is used by the trigger-monitor application that receives the trigger message. The queue manager initializes this field with the value of the **UserData** attribute of the process object identified by the *TMPN* field; see "Attributes for process definitions on IBM i" on page 1382 for details of this attribute. The content of this data is of no significance to the queue manager.

The length of this field is given by LNPROU. The initial value of this field is 128 blank characters.

TMVER (10-digit signed integer)

Structure version number.

The value must be:

TMVER1
Version number for trigger message structure.

The following constant specifies the version number of the current version:

TMVERC
Current version of trigger message structure.

The initial value of this field is TMVER1.

Initial values

Table 737. Initial values of fields in MQTM

Field name	Name of constant	Value of constant
TMSID	TMSIDV	'TM¬¬'
TMVER	TMVER1	1
TMQN	None	Blanks
TMPN	None	Blanks
TMTD	None	Blanks
TMAT	None	0
TMAI	None	Blanks
TMED	None	Blanks
TMUD	None	Blanks

Notes:

1. The symbol ¬ represents a single blank character.

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D*
D* MQTM Structure
D*
D* Structure identifier
D  TMSID                  1      4    INZ('TM  ')
D* Structure version number
D  TMVER                  5      8I 0 INZ(1)
D* Name of triggered queue
D  TMQN                   9     56    INZ
D* Name of process object
D  TMPN                  57    104    INZ
D* Trigger data
D  TMTD                 105    168    INZ
D* Application type
```

```
     D  TMAT                 169    172I 0 INZ(0)
     D* Application identifier
     D  TMAI                 173    428    INZ
     D* Environment data
     D  TMED                 429    556    INZ
     D* User data
     D  TMUD                 557    684    INZ
```

IBM i MQTMC2 (Trigger message 2 - character format) on IBM i

When a trigger-monitor application retrieves a trigger message (MQTM) from an initiation queue, the trigger monitor might need to pass some or all of the information in the trigger message to the application that is started by the trigger monitor.

Overview

Purpose: Information that may be needed by the started application includes *TC2QN*, *TC2TD*, and *TC2UD*. The trigger monitor application can pass the MQTM structure directly to the started application, or pass an MQTMC2 structure instead, depending on what is permitted by the environment and convenient for the started application.

This structure is part of the IBM MQ Trigger Monitor Interface (TMI), which is one of the IBM MQ framework interfaces.

Character set and encoding: Character data in MQTMC2 is in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute.

Usage: The MQTMC2 structure is like the format of the MQTM structure. The difference is that the non-character fields in MQTM are changed in MQTMC2 to character fields of the same length, and the queue manager name is added at the end of the structure.

- On IBM i, the trigger monitor application provided with IBM MQ passes an MQTMC2 structure to the started application.

- “Fields” on page 1226
- “Initial values” on page 1227
- “RPG declaration” on page 1228

Fields

The MQTMC2 structure contains the following fields; the fields are described in **alphabetical order**:

TC2AI (256-byte character string)

Application identifier.

See the *TMAI* field in the MQTM structure.

TC2AT (4-byte character string)

Application type.

This field always contains blanks, whatever the value in the *TMAT* field in the MQTM structure of the original trigger message.

TC2ED (128-byte character string)

Environment data.

See the *TMED* field in the MQTM structure.

TC2PN (48-byte character string)

Name of process object.

See the *TMPN* field in the MQTM structure.

TC2QMN (48-byte character string)

Queue manager name.

This is the name of the queue manager at which the trigger event occurred.

TC2QN (48-byte character string)

Name of triggered queue.

See the *TMQN* field in the MQTM structure.

TC2SID (4-byte character string)

Structure identifier.

The value must be:

TCSIDV
Identifier for trigger message (character format) structure.

TC2TD (64-byte character string)

Trigger data.

See the *TMTD* field in the MQTM structure.

TC2UD (128-byte character string)

User data.

See the *TMUD* field in the MQTM structure.

TC2VER (4-byte character string)

Structure version number.

The value must be:

TCVER2
Version 2 trigger message (character format) structure.

The following constant specifies the version number of the current version:

TCVERC
Current version of trigger message (character format) structure.

Initial values

Table 738. Initial values of fields in MQTMC2

Field name	Name of constant	Value of constant
TC2SID	TCSIDV	'TMC¬'
TC2VER	TCVER2	'¬¬¬2'
TC2QN	None	Blanks
TC2PN	None	Blanks
TC2TD	None	Blanks
TC2AT	None	Blanks
TC2AI	None	Blanks
TC2ED	None	Blanks
TC2UD	None	Blanks
TC2QMN	None	Blanks

Table 738. Initial values of fields in MQTMC2 (continued)		
Field name	**Name of constant**	**Value of constant**
Notes: 1. The symbol ¬ represents a single blank character.		

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQTMC2 Structure
D*
D* Structure identifier
D  TC2SID                 1      4
D* Structure version number
D  TC2VER                 5      8
D* Name of triggered queue
D  TC2QN                  9     56
D* Name of process object
D  TC2PN                 57    104
D* Trigger data
D  TC2TD                105    168
D* Application type
D  TC2AT                169    172
D* Application identifier
D  TC2AI                173    428
D* Environment data
D  TC2ED                429    556
D* User data
D  TC2UD                557    684
D* Queue manager name
D  TC2QMN               685    732
```

IBM i MQWIH (Work information header) on IBM i

The MQWIH structure describes the information that must be present at the start of a message that is to be handled by the z/OS workload manager.

Overview

Format name: FMWIH.

Character set and encoding: The fields in the MQWIH structure are in the character set and encoding given by the *MDCSI* and *MDENC* fields in the header structure that precedes MQWIH, or by those fields in the MQMD structure if the MQWIH is at the start of the application message data.

The character set must be one that has single-byte characters for the characters that are valid in queue names.

Usage: If a message is to be processed by the z/OS workload manager, the message must begin with an MQWIH structure.

- "Fields" on page 1228
- "Initial values" on page 1230
- "RPG declaration" on page 1231

Fields

The MQWIH structure contains the following fields; the fields are described in **alphabetical order**:

WICSI (10-digit signed integer)

Character-set identifier of data that follows MQWIH.

This specifies the character set identifier of the data that follows the MQWIH structure; it does not apply to character data in the MQWIH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The following special value can be used:

CSINHT
Inherit character-set identifier of this structure.

Character data in the data *following* this structure is in the same character set as this structure.

The queue manager changes this value in the structure sent in the message to the actual character-set identifier of the structure. Provided no error occurs, the value CSINHT is not returned by the MQGET call.

CSINHT cannot be used if the value of the *MDPAT* field in MQMD is ATBRKR.

The initial value of this field is CSUNDF.

WIENC (10-digit signed integer)

Numeric encoding of data that follows MQWIH.

This specifies the numeric encoding of the data that follows the MQWIH structure; it does not apply to numeric data in the MQWIH structure itself.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data.

The initial value of this field is 0.

WIFLG (10-digit signed integer)

Flags

The value must be:

WINONE
No flags.

The initial value of this field is WINONE.

WIFMT (8-byte character string)

Format name of data that follows MQWIH.

This specifies the format name of the data that follows the MQWIH structure.

On the MQPUT or MQPUT1 call, the application must set this field to the value appropriate to the data. The rules for coding this field are the same as those for the *MDFMT* field in MQMD.

The length of this field is given by LNFMT. The initial value of this field is FMNONE.

WILEN (10-digit signed integer)

Length of MQWIH structure.

The value must be:

WILEN1
Length of version-1 work information header structure.

The following constant specifies the length of the current version:

WILENC
Length of current version of work information header structure.

The initial value of this field is WILEN1.

WIRSV (32-byte character string)

Reserved.

This is a reserved field; it must be blank.

WISID (4-byte character string)

Structure identifier.

The value must be:

WISIDV
Identifier for work information header structure.

The initial value of this field is WISIDV.

WISNM (32-byte character string)

Service name.

This is the name of the service that is to process the message.

The length of this field is given by LNSVNM. The initial value of this field is 32 blank characters.

WISST (8-byte character string)

Service step name.

This is the name of the step of *WISNM* to which the message relates.

The length of this field is given by LNSVST. The initial value of this field is 8 blank characters.

WITOK (16-byte bit string)

Message token.

This is a message token that uniquely identifies the message.

For the MQPUT and MQPUT1 calls, this field is ignored. The length of this field is given by LNMTOK. The initial value of this field is MTKNON.

WIVER (10-digit signed integer)

Structure version number.

The value must be:

WIVER1
Version-1 work information header structure.

The following constant specifies the version number of the current version:

WIVERC
Current version of work information header structure.

The initial value of this field is WIVER1.

Initial values

Table 739. Initial values of fields in MQWIH

Field name	Name of constant	Value of constant
WISID	WISIDV	'WIH¬'
WIVER	WIVER1	1
WILEN	WILEN1	120
WIENC	None	0
WICSI	CSUNDF	0
WIFMT	FMNONE	Blanks
WIFLG	WINONE	0
WISNM	None	Blanks

Table 739. Initial values of fields in MQWIH (continued)		
Field name	**Name of constant**	**Value of constant**
WISST	None	Blanks
WITOK	MTKNON	Nulls
WIRSV	None	Blanks
Notes: 1. The symbol ¬ represents a single blank character.		

RPG declaration

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D*
     D* MQWIH Structure
     D*
     D* Structure identifier
     D  WISID                  1      4    INZ('WIH ')
     D* Structure version number
     D  WIVER                  5      8I 0 INZ(1)
     D* Length of MQWIH structure
     D  WILEN                  9     12I 0 INZ(120)
     D* Numeric encoding of data that followsMQWIH
     D  WIENC                 13     16I 0 INZ(0)
     D* Character-set identifier of data thatfollows MQWIH
     D  WICSI                 17     20I 0 INZ(0)
     D* Format name of data that followsMQWIH
     D  WIFMT                 21     28    INZ('        ')
     D* Flags
     D  WIFLG                 29     32I 0 INZ(0)
     D* Service name
     D  WISNM                 33     64    INZ
     D* Service step name
     D  WISST                 65     72    INZ
     D* Message token
     D  WITOK                 73     88    INZ(X'00000000000000-
     D                                     000000000000000000')
     D* Reserved
     D  WIRSV                 89    120    INZ
```

IBM i MQXQH (Transmission-queue header) on IBM i

The MQXQH structure describes the information that is prefixed to the application message data of messages when they are on transmission queues.

Overview

Purpose: A transmission queue is a special type of local queue that temporarily holds messages destined for remote queues (that is, destined for queues that do not belong to the local queue manager). A transmission queue is denoted by the **Usage** queue attribute having the value USTRAN.

Format name: FMXQH.

Character set and encoding: Data in MQXQH must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT for the C programming language.

The character set and encoding of the MQXQH must be set into the *MDCSI* and *MDENC* fields in:

- The separate MQMD (if the MQXQH structure is at the start of the message data), or
- The header structure that precedes the MQXQH structure (all other cases).

Usage: A message that is on a transmission queue has *two* message descriptors:

- One message descriptor is stored separately from the message data; this is called the *separate message descriptor*, and is generated by the queue manager when the message is placed on the transmission queue. Some of the fields in the separate message descriptor are copied from the message descriptor provided by the application on the MQPUT or MQPUT1 call.

  The separate message descriptor is the one that is returned to the application in the **MSGDSC** parameter of the MQGET call when the message is removed from the transmission queue.
- A second message descriptor is stored within the MQXQH structure as part of the message data; this is called the *embedded message descriptor*, and is a copy of the message descriptor that was provided by the application on the MQPUT or MQPUT1 call (with minor variations).

  The embedded message descriptor is always a version-1 MQMD. If the message put by the application has nondefault values for one or more of the version-2 fields in the MQMD, an MQMDE structure follows the MQXQH, and is in turn followed by the application message data (if any). The MQMDE is either:

  – Generated by the queue manager (if the application uses a version-2 MQMD to put the message), or

  – Already present at the start of the application message data (if the application uses a version-1 MQMD to put the message).

  The embedded message descriptor is the one that is returned to the application in the **MSGDSC** parameter of the MQGET call when the message is removed from the final destination queue.

- "Fields in the separate message descriptor" on page 1232
- "Fields in the embedded message descriptor" on page 1233
- "Putting messages on remote queues" on page 1234
- "Putting messages directly on transmission queues" on page 1234
- "Getting messages from transmission queues" on page 1234
- "Fields" on page 1234
- "Initial values" on page 1235
- "RPG declaration" on page 1236

Fields in the separate message descriptor

The fields in the separate message descriptor are set by the queue manager as shown in the following list. If the queue manager does not support the version-2 MQMD, a version-1 MQMD is used without loss of function.

Table 740. Fields in the separate message descriptor and values used

Field in separate MQMD	Value used
MDSID	MDSIDV
MDVER	MDVER2
MDREP	Copied from the embedded message descriptor, but with the bits identified by ROAUXM set to zero. (This prevents a COA or COD report message being generated when a message is placed on or removed from a transmission queue.)
MDMT	Copied from the embedded message descriptor.
MDEXP	Copied from the embedded message descriptor.
MDFB	Copied from the embedded message descriptor.
MDENC	ENNAT
MDCSI	Queue manager's **CodedCharSetId** attribute.
MDFMT	FMXQH

Table 740. Fields in the separate message descriptor and values used (continued)

Field in separate MQMD	Value used
MDPRI	Copied from the embedded message descriptor.
MDPER	Copied from the embedded message descriptor.
MDMID	A new value is generated by the queue manager. This message identifier is different from the *MDMID* that the queue manager may have generated for the embedded message descriptor (see described previously).
MDCID	The *MDMID* from the embedded message descriptor.
MDBOC	0
MDRQ	Copied from the embedded message descriptor.
MDRM	Copied from the embedded message descriptor.
MDUID	Copied from the embedded message descriptor.
MDACC	Copied from the embedded message descriptor.
MDAID	Copied from the embedded message descriptor.
MDPAT	ATQM
MDPAN	First 28 bytes of the queue manager name.
MDPD	Date when message was put on transmission queue.
MDPT	Time when message was put on transmission queue.
MDAOD	Blanks
MDGID	GINONE
MDSEQ	1
MDOFF	0
MDMFL	MFNONE
MDOLN	OLUNDF

Fields in the embedded message descriptor

The fields in the embedded message descriptor have the same values as those in the **MSGDSC** parameter of the MQPUT or MQPUT1 call, except for the following:

- The *MDVER* field always has the value MDVER1.
- If the *MDPRI* field has the value PRQDEF, it is replaced by the value of the queue's **DefPriority** attribute.
- If the *MDPER* field has the value PEQDEF, it is replaced by the value of the queue's **DefPersistence** attribute.
- If the *MDMID* field has the value MINONE, or the PMNMID option was specified, or the message is a distribution-list message, *MDMID* is replaced by a new message identifier generated by the queue manager.

  When a distribution-list message is split into smaller distribution-list messages placed on different transmission queues, the *MDMID* field in each of the new embedded message descriptors is the same as that in the original distribution-list message.
- If the PMNCID option was specified, *MDCID* is replaced by a new correlation identifier generated by the queue manager.
- The context fields are set as indicated by the PM* options specified in the **PMO** parameter; the context fields are:

- *MDACC*
- *MDAID*
- *MDAOD*
- *MDPAN*
- *MDPAT*
- *MDPD*
- *MDPT*
- *MDUID*

• The version-2 fields (if they were present) are removed from the MQMD, and moved into an MQMDE structure, if one or more of the version-2 fields has a nondefault value.

Putting messages on remote queues

: When an application puts a message on a remote queue (either by specifying the name of the remote queue directly, or by using a local definition of the remote queue), the local queue manager:

- Creates an MQXQH structure containing the embedded message descriptor
- Appends an MQMDE if one is needed and is not already present
- Appends the application message data
- Places the message on an appropriate transmission queue

Putting messages directly on transmission queues

It is also possible for an application to put a message directly on a transmission queue. In this case the application must prefix the application message data with an MQXQH structure, and initialize the fields with appropriate values. In addition, the *MDFMT* field in the **MSGDSC** parameter of the MQPUT or MQPUT1 call must have the value FMXQH.

Character data in the MQXQH structure created by the application must be in the character set of the local queue manager (defined by the **CodedCharSetId** queue manager attribute), and integer data must be in the native machine encoding. In addition, character data in the MQXQH structure must be padded with blanks to the defined length of the field; the data must not be ended prematurely by using a null character, because the queue manager does not convert the null and subsequent characters to blanks in the MQXQH structure.

Note however that the queue manager does not check that an MQXQH structure is present, or that valid values have been specified for the fields.

Getting messages from transmission queues

Applications that get messages from a transmission queue must process the information in the MQXQH structure in an appropriate fashion. The presence of the MQXQH structure at the beginning of the application message data is indicated by the value FMXQH being returned in the *MDFMT* field in the **MSGDSC** parameter of the MQGET call. The values returned in the *MDCSI* and *MDENC* fields in the **MSGDSC** parameter, indicates the character set and encoding of the character and integer data in the MQXQH structure. The character set and encoding of the application message data are defined by the *MDCSI* and *MDENC* fields in the embedded message descriptor.

Fields

The MQXQH structure contains the following fields; the fields are described in **alphabetical order**:

XQMD (MQMD1)

Original message descriptor.

This is the embedded message descriptor, and is a close copy of the message descriptor MQMD that was specified as the **MSGDSC** parameter on the MQPUT or MQPUT1 call when the message was originally put to the remote queue.

Note: This is a version-1 MQMD.

The initial values of the fields in this structure are the same as those in the MQMD structure.

XQRQ (48-byte character string)

Name of destination queue.

This is the name of the message queue that is the apparent eventual destination for the message (this may prove not to be the actual eventual destination if, for example, this queue is defined at *XQRQM* to be a local definition of another remote queue).

If the message is a distribution-list message (that is, the *MDFMT* field in the embedded message descriptor is FMDH), *XQRQ* is blank.

The length of this field is given by LNQN. The initial value of this field is 48 blank characters.

XQRQM (48-byte character string)

Name of destination queue manager.

This is the name of the queue manager or queue sharing group that owns the queue that is the apparent eventual destination for the message.

If the message is a distribution-list message, *XQRQM* is blank.

The length of this field is given by LNQMN. The initial value of this field is 48 blank characters.

XQSID (4-byte character string)

Structure identifier.

The value must be:

XQSIDV
Identifier for transmission-queue header structure.

The initial value of this field is XQSIDV.

XQVER (10-digit signed integer)

Structure version number.

The value must be:

XQVER1
Version number for transmission-queue header structure.

The following constant specifies the version number of the current version:

XQVERC
Current version of transmission-queue header structure.

The initial value of this field is XQVER1.

Initial values

Table 741. Initial values of fields in MQXQH

Field name	Name of constant	Value of constant
XQSID	XQSIDV	'XQH¬'
XQVER	XQVER1	1
XQRQ	None	Blanks

Table 741. Initial values of fields in MQXQH (continued)		
Field name	**Name of constant**	**Value of constant**
XQRQM	None	Blanks
XQMD	Same names and values as MQMD; see Table 709 on page 1138	-
Notes: 1. The symbol ¬ represents a single blank character.		

RPG declaration

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D*
D* MQXQH Structure
D*
D* Structure identifier
D  XQSID                  1      4    INZ('XQH ')
D* Structure version number
D  XQVER                  5      8I 0 INZ(1)
D* Name of destination queue
D  XQRQ                   9     56    INZ
D* Name of destination queue manager
D  XQRQM                 57    104    INZ
D* Original message descriptor
D  XQ1SID               105    108    INZ('MD  ')
D  XQ1VER               109    112I 0 INZ(1)
D  XQ1REP               113    116I 0 INZ(0)
D  XQ1MT                117    120I 0 INZ(8)
D  XQ1EXP               121    124I 0 INZ(-1)
D  XQ1FB                125    128I 0 INZ(0)
D  XQ1ENC               129    132I 0 INZ(273)
D  XQ1CSI               133    136I 0 INZ(0)
D  XQ1FMT               137    144    INZ('        ')
D  XQ1PRI               145    148I 0 INZ(-1)
D  XQ1PER               149    152I 0 INZ(2)
D  XQ1MID               153    176    INZ(X'00000000000000-
D                                     0000000000000000000000-
D                                     000000000000')
D  XQ1CID               177    200    INZ(X'00000000000000-
D                                     0000000000000000000000-
D                                     000000000000')
D  XQ1BOC               201    204I 0 INZ(0)
D  XQ1RQ                205    252    INZ
D  XQ1RM                253    300    INZ
D  XQ1UID               301    312    INZ
D  XQ1ACC               313    344    INZ(X'00000000000000-
D                                     0000000000000000000000-
D                                     0000000000000000000000-
D                                     000000')
D  XQ1AID               345    376    INZ
D  XQ1PAT               377    380I 0 INZ(0)
D  XQ1PAN               381    408    INZ
D  XQ1PD                409    416    INZ
D  XQ1PT                417    424    INZ
D  XQ1AOD               425    428    INZ
```

IBM i Function calls on IBM i

Use this information to learn about the function calls available in IBM i programming.

Conventions used in the call descriptions on IBM i

For each call, this collection of topics gives a description of the parameters and usage of the call. This is followed by typical invocations of the call, and typical declarations of its parameters, in the RPG programming language.

Important: When coding IBM MQ API calls you must ensure that all relevant parameters (as described in the following sections) are provided. Failure to do so can produce unpredictable results.

The description of each call contains the following sections:

Call name
The call name, followed by a brief description of the purpose of the call.

Parameters
For each parameter, the name is followed by its data type in parentheses ( ) and its direction; for example:

CMPCOD (9-digit decimal integer) - output

There is more information about the structure data types in "Elementary data types" on page 986.

The direction of the parameter can be:

Input
You (the programmer) must provide this parameter.

Output
The call returns this parameter.

Input/output
You must provide this parameter, but it is modified by the call.

There is also a brief description of the purpose of the parameter, together with a list of any values that the parameter can take.

The last two parameters in each call are a completion code and a reason code. The completion code indicates whether the call completed successfully, partially, or not at all. Further information about the partial success or the failure of the call is given in the reason code.

Usage notes
Additional information about the call, describing how to use it and any restrictions on its use.

RPG invocation
Typical invocation of the call, and declaration of its parameters, in RPG.

Other notational conventions are:

Constants
Names of constants are shown in uppercase; for example, OOOUT.

Arrays
In some calls, parameters are arrays of character strings with a size that is not fixed. In the descriptions of these parameters, a lowercase *n* represents a numeric constant. When you code the declaration for that parameter, replace the *n* with the numeric value you require.

IBM i MQBACK (Back out changes) on IBM i

The MQBACK call indicates to the queue manager that all of the message gets and puts that have occurred since the last syncpoint are to be backed out. Messages put as part of a unit of work are deleted; messages retrieved as part of a unit of work are reinstated on the queue.

- This call is supported in the following environments:

  - AIX
  - IBM i
  - Solaris
  - Windows
- "Syntax" on page 1238

- “Usage notes” on page 1238
- “Parameters” on page 1239
- “RPG Declaration” on page 1240

Syntax

MQBACK *(Hconn, CompCode, Reason)*

Usage notes

Consider these usage notes when using MQBACK.

1. This call can be used only when the queue manager itself coordinates the unit of work. This is a local unit of work, where the changes affect only IBM MQ resources.
2. In environments where the queue manager does not coordinate the unit of work, the appropriate back-out call must be used instead of MQBACK. The environment may also support an implicit back out caused by the application terminating abnormally.
   - On IBM i, this call can be used for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must not have been issued for the job.
3. If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in “MQDISC (Disconnect queue manager) on IBM i” on page 1276 for further details.
4. When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:
   - The values of the *MDGID*, *MDSEQ*, *MDOFF*, and *MDMFL* fields in MQMD.
   - Whether the message is part of a unit of work.
   - For the MQPUT call: whether the message is persistent or nonpersistent.

   The queue manager keeps *three* sets of group and segment information, one set for each of the following:

   - The last successful MQPUT call (this can be part of a unit of work).
   - The last successful MQGET call that removed a message from the queue (this can be part of a unit of work).
   - The last successful MQGET call that browsed a message on the queue (this cannot be part of a unit of work).

   If the application puts or gets the messages as part of a unit of work, and the application then decides to back out the unit of work, the group and segment information is restored to the value that it had previously:

   - The information associated with the MQPUT call is restored to the value that it had before the first successful MQPUT call for that queue handle in the current unit of work.
   - The information associated with the MQGET call is restored to the value that it had before the first successful MQGET call for that queue handle in the current unit of work.

   Queues which were updated by the application after the unit of work had started, but outside the scope of the unit of work, do not have their group and segment information restored if the unit of work is backed out.

   Restoring the group and segment information to its previous value when a unit of work is backed out allows the application to spread a large message group or large logical message consisting of many segments across several units of work, and to restart at the correct point in the message group or logical message if one of the units of work fails. Using several units of work might be advantageous

if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to be able to restart putting or getting messages at the correct point if a system failure occurs. For details of how to restart at the correct point after a system failure, see the PMLOGO option described in “MQPMO (Put-message options) on IBM i” on page 1160, and the GMLOGO option described in “MQGMO (Get-message options) on IBM i” on page 1064.

The remaining usage notes apply only when the queue manager coordinates the units of work:

1. A unit of work has the same scope as a connection handle. This means that all IBM MQ calls which affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See the **HCONN** parameter described in “MQCONN (Connect queue manager) on IBM i” on page 1263 for information about the scope of connection handles.
2. Only messages that were put or retrieved as part of the current unit of work are affected by this call.
3. A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but which never issues a commit or backout call, can cause queues to fill up with messages that are not available to other applications. To guard against this possibility, the administrator should set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

Parameters

The MQBACK call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *COMCOD*.

If *COMCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *COMCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2101
(2101, X'835') Object damaged.

RC2123
: (2123, X'84B') Result of commit or back-out operation is mixed.

RC2162
: (2162, X'872') Queue manager shutting down.

RC2102
: (2102, X'836') Insufficient system resources available.

RC2071
: (2071, X'817') Insufficient storage available.

RC2195
: (2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQBACK(HCONN : COMCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQBACK           PR                  EXTPROC('MQBACK')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Completion code
D COMCOD                        10I 0
D* Reason code qualifying COMCOD
D REASON                        10I 0
```

IBM i MQBEGIN (Begin unit of work) on IBM i

The MQBEGIN call begins a unit of work that is coordinated by the queue manager, and that may involve external resource managers.

- This call is supported in the following environments:

  - AIX
  - IBM i
  - Solaris
  - Windows

- "Syntax" on page 1240
- "Usage notes" on page 1240
- "Parameters" on page 1242
- "RPG Declaration" on page 1243

Syntax

MQBEGIN *(HCONN, BEGOP, CMPCOD, REASON)*

Usage notes

1. The MQBEGIN call can be used to start a unit of work that is coordinated by the queue manager and that might involve changes to resources owned by other resource managers. The queue manager supports three types of unit-of-work:

Queue manager-coordinated local unit of work

This is a unit of work in which the queue manager is the only resource manager participating, and so the queue manager acts as the unit-of-work coordinator.

- To start this type of unit of work, the PMSYP or GMSYP option should be specified on the first MQPUT, MQPUT1, or MQGET call in the unit of work.

  It is not necessary for the application to issue the MQBEGIN call to start the unit of work, but if MQBEGIN is used, the call completes with CCWARN and reason code RC2121.
- To commit or back out this type of unit of work, the MQCMIT or MQBACK call must be used.

Queue manager-coordinated global unit of work

This is a unit of work in which the queue manager acts as the unit-of-work coordinator, both for IBM MQ resources *and* for resources belonging to other resource managers. Those resource managers cooperate with the queue manager to ensure that all changes to resources in the unit of work are committed or backed out together.

- To start this type of unit of work, the MQBEGIN call must be used.
- To commit or back out this type of unit of work, the MQCMIT and MQBACK calls must be used.

Externally-coordinated global unit of work

This is a unit of work in which the queue manager is a participant, but the queue manager does not act as the unit-of-work coordinator. Instead, there is an external unit-of-work coordinator with whom the queue manager cooperates.

- To start this type of unit of work, the relevant call provided by the external unit-of-work coordinator must be used.

  If the MQBEGIN call is used to try to start the unit of work, the call fails with reason code RC2012.
- To commit or back out this type of unit of work, the commit and back-out calls provided by the external unit-of-work coordinator must be used.

  If the MQCMIT or MQBACK call is used to try to commit or back out the unit of work, the call fails with reason code RC2012.

2. If the application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in “MQDISC (Disconnect queue manager) on IBM i” on page 1276 for further details.
3. An application can participate in only one unit of work at a time. The MQBEGIN call fails with reason code RC2128 if there is already a unit of work in existence for the application, regardless of which type of unit of work it is.
4. The MQBEGIN call is not valid in an IBM MQ client environment. An attempt to use the call fails with reason code RC2012.
5. When the queue manager is acting as the unit-of-work coordinator for global units of work, the resource managers that can participate in the unit of work are defined in the queue manager's configuration file.
6. On IBM i, the three types of unit of work are supported as follows:
   - **Queue manager-coordinated local units of work** can be used only when a commitment definition does not exist at the job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must not have been issued for the job.
   - **Queue manager-coordinated global units of work** are not supported.
   - **Externally-coordinated global units of work** can be used only when a commitment definition exists at job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must have been issued for the job. If this has been done, the IBM i COMMIT and ROLLBACK operations apply to IBM MQ resources as well as to resources belonging to other participating resource managers.

Parameters

The MQBEGIN call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

BEGOP (MQBO) - input/output

Options that control the action of MQBEGIN.

See "MQBO (Begin options) on IBM i" on page 1007 for details.

If no options are required, programs written in C or S/390 assembler can specify a null parameter address, instead of specifying the address of an MQBO structure.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2121
(2121, X'849') No participating resource managers registered.

RC2122
(2122, X'84A') Participating resource manager not available.

If *CMPCOD* is CCFAIL:

RC2134
(2134, X'856') Begin-options structure not valid.

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2012
(2012, X'7DC') Call not valid in environment.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RC2128
(2128, X'850') Unit of work already started.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQBEGIN(HCONN : BEGOP : CMPCOD :
C                                       REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQBEGIN          PR                  EXTPROC('MQBEGIN')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Options that control the action of MQBEGIN
D BEGOP                         12A
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQBUFMH (Convert buffer into message handle) on IBM i

The MQBUFMH function call converts a buffer into a message handle and is the inverse of the MQMHBUF call.

This call takes a message descriptor and MQRFH2 properties in the buffer and makes them available through a message handle. The MQRFH2 properties in the message data are, optionally, removed. The *Encoding*, *CodedCharSetId*, and *Format* fields of the message descriptor are updated, if necessary, to correctly describe the contents of the buffer after the properties have been removed.

- “Syntax” on page 1243
- “Usage notes” on page 1243
- “Parameters” on page 1243
- “RPG Declaration” on page 1245

Syntax

MQBUFMH *(Hconn, Hmsg, BufMsgHOpts, MsgDesc, Buffer, BufferLength, DataLength, CompCode, Reason)*

Usage notes

MQBUFMH calls cannot be intercepted by API exits - a buffer is converted into a message handle in the application space; the call does not reach the queue manager.

Parameters

The MQBUFMH call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *HCONN* must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created by using HCUNAS, a valid connection must be established on the thread converting a buffer into a message handle. If a valid connection is not established, the call fails with RC2009.

HMSG (20-digit signed integer) - input

This handle is the message handle for which a buffer is required. The value was returned by a previous MQCRTMH call.

BMHOPT (MQBMHO) - input

The MQBMHO structure allows applications to specify options that control how message handles are produced from buffers.

See "MQBMHO (Buffer to message handle options) on IBM i" on page 1006 for details.

MSGDSC (MQMD) - input/output

The *MSGDSC* structure contains the message descriptor properties and describes the contents of the buffer area.

On output from the call, the properties are optionally removed from the buffer area and, in this case, the message descriptor is updated to correctly describe the buffer area.

Data in this structure must be in the character set and encoding of the application.

BUFLEN (10-digit signed integer) - input

BUFLEN is the length of the Buffer area, in bytes.

A *BUFLEN* of zero bytes is valid, and indicates that the buffer area contains no data.

BUFFER (1-byte bit string x BUFLEN) - input/output

BUFFER defines the area containing the message buffer. For most data, you must align the buffer on a 4-byte boundary.

If *BUFFER* contains character or numeric data, set the *CodedCharSetId* and *Encoding* fields in the **MSGDSC** parameter to the values appropriate to the data; this enables the data to be converted, if necessary.

If properties are found in the message buffer they are optionally removed; they later become available from the message handle on return from the call.

In the C programming language, the parameter is declared as a pointer-to-void, which means the address of any type of data can be specified as the parameter.

If the **BUFLEN** parameter is zero, *BUFFER* is not referred to. In this case, the parameter address passed by programs written in C or System/390 assembler can be null.

DATLEN (10-digit signed integer) - output

DATLEN is the length, in bytes, of the buffer which might have the properties removed.

CMPCOD (10-digit signed integer) - output

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2489
(2489, X'09B9') Buffer to message handle options structure not valid.

RC2004
(2004, X'07D4') Buffer parameter not valid.

RC2005
(2005, X'07D5') Buffer length parameter not valid.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2009
(2009, X'07D9') Connection to queue manager lost.

RC2460
(2460, X'099C') Message handle not valid.

RC2026
(2026, X'07EA') Message descriptor not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2046
(2046, X'07FE') Options not valid or not consistent.

RC2334
(2334, X'091E') MQRFH2 structure not valid.

RC2421
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQBUFMH(HCONN : HMSG : BMHOPT :
                                        MSGDSC : BUFLEN : BUFFER :
                                        DATLEN : CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQBUFMH          PR                  EXTPROC('MQBUFMH')
D* Connection handle
D HCONN                         10I 0
D* Message handle
D HMSG                          10I 0
D* Options that control the action of MQBUFMH
D BMHOPT                        12A   VALUE
D* Message descriptor
D MSGDSC                       364A
D* Length in bytes of the Buffer area
D BUFLEN                        10I 0
D* Area to contain the message buffer
```

```
     D BUFFER                          *   VALUE
     D* Length of the output buffer
     D DATLEN                        10I 0
     D* Completion code
     D CMPCOD                        10I 0
     D* Reason code qualifying CompCode
     D REASON                        10I 0
```

IBM i MQCB (Manage callback) on IBM i

The MQCB call reregisters a callback for the specified object handle and controls activation and changes to the callback.

A callback is a piece of code (specified as either the name of a function that can be dynamically linked or as a function pointer) that is called by IBM MQ when certain events occur.

To use MQCB and MQCTL on a V7 client you must be connected to a V7 server and the **SHARECNV** parameter of the channel must have a non-zero value.

For information about Global units of work see: Global units of work.

The types of callback that can be defined are:

Message consumer
A message consumer callback function is called when a message, meeting the selection criteria specified, is available on an object handle.

Only one callback function can be registered against each object handle. If a single queue is to be read with multiple selection criteria then the queue must be opened multiple times and a consumer function registered on each handle.

Event handler
The event handler is called for conditions that affect the whole callback environment.

The function is called when an event condition occurs, for example, a queue manager or connection stopping or quiescing.

The function is not called for conditions that are specific to a single message consumer, for example RC2016; it is called however if a callback function does not end normally.

- "Syntax" on page 1246
- "Usage notes for MQCB" on page 1246
- "Parameters for MQCB" on page 1248
- "RPG Declaration" on page 1254

Syntax

MQCB *(HCONN, OPERATN, HOBJ, CBDSC, MSGDSC, GMO, CMPCOD, REASON)*

Usage notes for MQCB

1. MQCB is used to define the action to be invoked for each message, matching the specified criteria, available on the queue. When the action is processed, either the message is removed from the queue and passed to the defined message consumer, or a message token is provided, which is used to retrieve the message.
2. MQCB can be used to define callback routines before starting consumption with MQCTL or it can be used from within a callback routine.
3. To use MQCB from outside of a callback routine, you must first suspend message consumption by using MQCTL and resume consumption afterward.

Message consumer callback sequence

You can configure a consumer to invoke callback at key points during the lifecycle of the consumer. For example:

- when the consumer is first registered,
- when the connection is started,
- when the connection is stopped and
- when the consumer is deregistered, either explicitly, or implicitly by an MQCLOSE.

Table 742. MQCTL verb definitions

Verb	Meaning
MQCTL(START)	MQCTL call by using the CTLSR Operation
MQCTL(STOP)	MQCTL call by using the CTLSP Operation
MQCTL(WAIT)	MQCTL call by using the CTLSW Operation

Allows the consumer to maintain state associated with the consumer. When a callback is requested by an application, the rules for consumer invocation are as follows:

REGISTER
Is always the first type of invocation of the callback.

Is always called on the same thread as the MQCB(CBREG) call.

START
Is always called synchronously with the MQCTL(START) verb.

- All START callbacks are completed before the MQCTL(START) verb returns.

Is on the same thread as the message delivery if CTLTHR is requested.

The call with start is not guaranteed if, for example, a previous callback issues MQCTL(STOP) during the MQCTL(START).

STOP
No further messages or events are delivered after this call until the connection is restarted.

A STOP is guaranteed if the application was previously called for START, or a message, or an event.

DEREGISTER
Is always the last type of invocation of the callback.

Ensure that your application performs thread-based initialization and cleanup in the START and STOP callbacks. You can do non thread-based initialization and cleanup with REGISTER and DEREGISTER callbacks.

Do not make any assumptions about the life and availability of the thread other than what is stated. For example, do not rely on a thread staying alive beyond the last call to DEREGISTER. Similarly, when you have chosen not to use CTLTHR, do not assume that the thread exists whenever the connection is started.

If your application has particular requirements for thread characteristics, it can always create a thread accordingly, then use MQCTL(WAIT). This step *donates* the thread to IBM MQ for asynchronous message delivery.

Message consumer connection usage

Normally, when an application issues another MQI call while one is outstanding, the call fails with reason code RC2219.

There are special cases, however, when the application must issue a further MQI call before the previous call has completed. For example, the consumer can be invoked during an MQCB call with CBRE.

In such an instance, when as a result of the application issuing either an MQCB or MQCTL verb, the application is called back, the application is allowed to issue a further MQI call. This instance means you can issue, for example, an MQOPEN call, in the consumer function when called with a CBCCALLT type of CBCTRC. Any MQI call, except for MQDISC, is allowed.

Parameters for MQCB

The MQCB call has the following parameters:

HCONN (10-digit signed integer) - input

Manage callback function - HCONN parameter.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

OPERATN (10-digit signed integer) - input

Manage callback function - OPERATN parameter.

The operation being processed on the callback defined for the specified object handle. You must specify one of the following options; if more than one option is required, the values can be added (do not add the same constant more than once) or combined by using the bitwise OR operation (if the programming language supports bit operations).

Combinations that are not valid are noted; all other combinations are valid.

CBREG

Define the callback function for the specified object handle. This operation defines the function to be called and the selection criteria to be used.

If a callback function is already defined for the object handle the definition is replaced. If an error is detected while replacing the callback, the function is deregistered.

If a callback is registered in the same callback function in which it was previously deregistered, this is treated as a replace operation; any initial or final calls are not invoked.

You can use CBREG with CTLSU or CTLRE.

CBUNR

Stop the consuming of messages for the object handle and removes the handle from those eligible for a callback.

A callback is automatically deregistered if the associated handle is closed.

If CBUNR is called from within a consumer, and the callback has a stop call defined, it is invoked upon return from the consumer.

If this operation is issued against an *Hobj* with no registered consumer, the call returns with RC2448.

CTLSU

Suspends the consuming of messages for the object handle.

If this operation is applied to an event handler, the event handler does not get events while suspended, and any events missed while in the suspended state are not provided to the operation when it is resumed.

While suspended, the consumer function continues to get the control type callbacks.

CTLRE

Resume the consuming of messages for the object handle.

If this operation is applied to an event handler, the event handler does not get events while suspended, and any events missed while in the suspended state are not provided to the operation when it is resumed.

CBDSC (MQCBD) - input

Manage callback function - CBDSC parameter.

This is a structure that identifies the callback function that is being registered by the application and the options used when registering it.

See "MQCBD - Callback descriptor" on page 283 for details of the structure.

Callback descriptor is required only for the CBREG option; if the descriptor is not required, the parameter address passed can be null.

HOBJ (10-digit signed integer) - input

Manage callback function - HOBJ parameter.

This handle represents the access that has been established to the object from which a message is to be consumed. This is a handle that has been returned from a previous MQOPEN or MQSUB call (in the **HOBJ** parameter).

HOBJ is not required when defining an event handler routine (CBTEH) and must be specified as HONONE.

If this *Hobj* has been returned from an MQOPEN call, the queue must have been opened with one or more of the following options:

- OOINPS
- OOINPX
- OOINPQ
- OOBRW

MSGDSC (MQMD) - input

Manage callback function -MSGDSC parameter.

This structure describes the attributes of the message required, and the attributes of the message retrieved.

The **MsgDesc** parameter defines the attributes of the messages required by the consumer, and the version of the MQMD to be passed to the message consumer.

The *MsgId*, *CorrelId*, *GroupId*, *MsgSeqNumber*, and *Offset* in the MQMD are used for message selection, depending on the options specified in the **GetMsgOpts** parameter.

The *Encoding* and *CodedCharSetId* are used for message conversion if you specify the GMCONV option.

See MQMD for details.

MsgDesc is used only for CBREG and, if you require values other than the default for any fields. *MsgDesc* is not used for an event handler.

If the descriptor is not required the parameter address passed can be null.

Note, that if multiple consumers are registered against the same queue with overlapping selectors, the chosen consumer for each message is undefined.

GMO (MQGMO) - input

Manage callback function - GMO parameter.

Options that control how the message consumer gets messages.

All options have the meaning as described in "MQGMO (Get-message options) on IBM i" on page 1064, when used on an MQGET call, except:

GMSSIG
: This option is not permitted.

GMBRWF, GMBRWN, GMMBH, GMMBC
The order of messages delivered to a browsing consumer is dictated by the combinations of these options. Significant combinations are:

GMBRWF
The first message on the queue is delivered repeatedly to the consumer. This is useful when the consumer destructively consumes the message in the callback. Use this option with care.

GMBRWN
The consumer is given each message on the queue, from the current cursor position until the end of the queue is reached.

GMBRWF + GMBRWN
The cursor is reset to the start of the queue. The consumer is then given each message until the cursor reaches the end of the queue.

GMBRWF + GMMBH or GMMBC
Starting at the beginning of the queue, the consumer is given the first nonmarked message on the queue, which is then marked for this consumer. This combination ensures that the consumer can receive new messages added behind the current cursor point.

GMBRWN + GMMBH or GMMBC
Starting at the cursor position the consumer is given the next nonmarked message on the queue, which is then marked for this consumer. Use this combination with care because messages can be added to the queue behind the current cursor position.

GMBRWF + GMBRWN + GMMBH or GMMBC
This combination is not permitted, if used the call returns RC2046.

GMNWT, GMWT and GMWI
These options control how the consumer is invoked.

GMNWT
The consumer is never called with RC2033. The consumer is only invoked for messages and events

GMWT with a zero GMWI
The RC2033 code is only passed to the consumer when there are no messages and

- the consumer has been started
- the consumer has been delivered at least one message since the last no messages reason code.

This prevents the consumer from polling in a busy loop when a zero wait interval is specified.

GMWT and a positive GMWI
The user is invoked after the specified wait interval with reason code RC2033. This call is made regardless of whether any messages have been delivered to the consumer. This allows the user to perform heartbeat or batch type processing.

GMWT and GMWI of WIULIM
This specifies an infinite wait before returning RC2033. The consumer is never called with RC2033.

GMO is used only for CBREG and, if you require values other than the default for any fields. *GMO* is not used for an event handler.

If the options are not required the parameter address passed can be null.

If a message properties handle is provided in the MQGMO structure, a copy is provided in the MQGMO structure that is passed into the consumer callback. On return from the MQCB call, the application can delete the message properties handle.

CMPCOD (10-digit signed integer) - output

Manage callback function - CMPCOD parameter.

The completion code; it is one of the following:

CCOK
: Successful completion.

CCWARN
: Warning (partial completion).

CCFAIL
: Call failed.

REASON (10-digit signed integer) - output

Manage callback function - REASON parameter.

The following reason codes are the codes that the queue manager can return for the **REASON** parameter.

If *CMPCOD* is CCOK:

RCNONE
: (0, X'000') No reason to report.

If *CompCode* is CCFAIL:

RC2204
: (2204, X'89C') Adapter not available.

RC2133
: (2133, X'855') Unable to load data conversion services modules.

RC2130
: (2130, X'852') Unable to load adapter service module.

RC2374
: (2374, X'946') API exit failed.

RC2183
: (2183, X'887') Unable to load API exit.

RC2157
: (2157, X'86D') Primary and home ASIDs differ.

RC2005
: (2005, X'7D5') Buffer length parameter not valid.

RC2219
: (2219, X'8AB') MQI call entered before previous call complete.

RC2487
: (2487, X'9B7') Incorrect callback type field.

RC2448
: (2448, X'990') Unable to deregister, suspend, or resume because there is no registered callback.

RC2486
: (2486, X'9B6') Either *CallbackFunction* or *CallbackName* must be specified but not both.

RC2483
: (2483, X'9B3') Incorrect callback type field.

RC2484
: (2484, X'9B4') Incorrect MQCBD options field.

RC2140
: (2140, X'85C') Wait request rejected by CICS.

RC2009
: (2009, X'7D9') Connection to queue manager lost.

RC2217
: (2217, X'8A9') Not authorized for connection.

RC2202
: (2202, X'89A') Connection quiescing.

RC2203
(2203, X'89B') Connection shutting down.

RC2207
(2207, X'89F') Correlation-identifier error.

RC2010
(2010, X'7DA') Data length parameter not valid.

RC2016
(2016, X'7E0') Gets inhibited for the queue.

RC2351
(2351, X'92F') Global units of work conflict.

RC2186
(2186, X'88A') Get-message options structure not valid.

RC2353
(2353, X'931') Handle in use for global unit of work.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2259
(2259, X'8D3') Inconsistent browse specification.

RC2245
(2245, X'8C5') Inconsistent unit-of-work specification.

RC2246
(2246, X'8C6') Message under cursor not valid for retrieval.

RC2352
(2352, X'930') Global unit of work conflicts with local unit of work.

RC2247
(2247, X'8C7') Match options not valid.

RC2485
(2485, X'9B4') Incorrect *MaxMsgLength* field.

RC2026
(2026, X'7EA') Message descriptor not valid.

RC2497
(2497, X'9C1') The specified function entry point could not be found in the module.

RC2496
(2496, X'9C0') Module found, however it is of the wrong type; not 32 bit, 64 bit, or a valid dynamic link library.

RC2495
(2495, X'9BF') Module not found in the search path or not authorized to load.

RC2250
(2250, X'8CA') Message sequence number not valid.

RC2331
(2331, X'91B') Use of message token not valid.

RC2033
(2033, X'7F1') No message available.

RC2034
(2034, X'7F2') Browse cursor not positioned on message.

RC2036
(2036, X'7F4') Queue not open for browse.

RC2037
(2037, X'7F5') Queue not open for input.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2101
(2101, X'835') Object damaged.

RC2206
(2206, X'89E') Incorrect operation code on API Call.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2193
(2193, X'891') Error accessing page-set data set.

RC2052
(2052, X'804') Queue has been deleted.

RC2394
(2394, X'95A') Queue has wrong index type.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2069
(2069, X'815') Signal outstanding for this handle.

RC2071
(2071, X'817') Insufficient storage available.

RC2109
(2109, X'83D') Call suppressed by exit program.

RC2024
(2024, X'7E8') No more messages can be handled within current unit of work.

RC2072
(2072, X'818') Syncpoint support not available.

RC2195
(2195, X'893') Unexpected error occurred.

RC2354
(2354, X'932') Enlistment in global unit of work failed.

RC2355
(2355, X'933') Mixture of unit-of-work calls not supported.

RC2255
(2255, X'8CF') Unit of work not available for the queue manager to use.

RC2090
(2090, X'82A') Wait interval in MQGMO not valid.

RC2256
(2256, X'8D0') Wrong version of MQGMO supplied.

RC2257
(2257, X'8D1') Wrong version of MQMD supplied.

RC2298
(2298, X'8FA') The function requested is not available in the current environment.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQCB(HCONN : OPERATN : CBDSC :
                                 HOBJ : MSGDSC : GMO :
                                 DATLEN : CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQCB             PR                  EXTPROC('MQCB')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Operation
D OPERATN                       10I 0 VALUE
D* Callback descriptor
D CBDSC                        180A
D* Object handle
D HOBJ                          10I 0 VALUE
D* Message Descriptor
D MSGDSC                       364A
D* Get options
D GMO                          112A
D* Completion code
D CMPCOD                        10I 0
* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQCLOSE (Close object) on IBM i

The MQCLOSE call relinquishes access to an object, and is the inverse of the MQOPEN call.

- “Syntax” on page 1254
- “Usage notes” on page 1254
- “Parameters” on page 1255
- “RPG Declaration” on page 1260

Syntax

MQCLOSE *(HCONN, HOBJ, OPTS, CMPCOD, REASON)*

Usage notes

1. When an application issues the MQDISC call, or ends either normally or abnormally, any objects that were opened by the application and are still open are closed automatically with the CONONE option.
2. The following points apply if the object being closed is a *queue*:
   - If operations on the queue are performed as part of a unit of work, the queue can be closed before or after the syncpoint occurs without affecting the outcome of the syncpoint.
   - If the queue was opened with the OOBRW option, the browse cursor is destroyed. If the queue is later reopened with the OOBRW option, a new browse cursor is created (see the OOBRW option described in MQOPEN).
   - If a message is currently locked for this handle at the time of the MQCLOSE call, the lock is released (see the GMLK option described in “MQGMO (Get-message options) on IBM i” on page 1064).
3. The following points apply if the object being closed is a *dynamic queue* (either permanent or temporary):

- For a dynamic queue, the options CODEL or COPURG can be specified regardless of the options specified on the corresponding MQOPEN call.
- When a dynamic queue is deleted, all MQGET calls with the GMWT option that are outstanding against the queue are canceled and reason code RC2052 is returned. See the GMWT option described in "MQGMO (Get-message options) on IBM i" on page 1064.

  After a dynamic queue has been deleted, any call (other than MQCLOSE) that attempts to reference the queue using a previously acquired *HOBJ* handle fails with reason code RC2052.

  Be aware that although a deleted queue cannot be accessed by applications, the queue is not removed from the system, and associated resources are not freed, until all handles that reference the queue have been closed, and all units of work that affect the queue have been either committed or backed out.
- When a permanent dynamic queue is deleted, if the *HOBJ* handle specified on the MQCLOSE call is not the one that was returned by the MQOPEN call that created the queue, a check is made that the user identifier which was used to validate the MQOPEN call is authorized to delete the queue. If the OOALTU option was specified on the MQOPEN call, the user identifier checked is the *ODAU*.

  This check is not performed if:

  – The handle specified is the one returned by the MQOPEN call that created the queue.

  – The queue being deleted is a temporary dynamic queue.
- When a temporary dynamic queue is closed, if the *HOBJ* handle specified on the MQCLOSE call is the one that was returned by the MQOPEN call that created the queue, the queue is deleted. This occurs regardless of the close options specified on the MQCLOSE call. If there are messages on the queue, they are discarded; no report messages are generated.

  If there are uncommitted units of work that affect the queue, the queue and its messages are still deleted, but this does not cause the units of work to fail. However, as described previously, the resources associated with the units of work are not freed until each of the units of work has been either committed or backed out.

4. The following points apply if the object being closed is a *distribution list*:

   - The only valid close option for a distribution list is CONONE; the call fails with reason code RC2046 or RC2045 if any other options are specified.
   - When a distribution list is closed, individual completion codes and reason codes are not returned for the queues in the list - only the **CMPCOD** and **REASON** parameters of the call are available for diagnostic purposes.

     If a failure occurs closing one of the queues, the queue manager continues processing and attempts to close the remaining queues in the distribution list. The **CMPCOD** and **REASON** parameters of the call are then set to return information describing the failure. Thus it is possible for the completion code to be CCFAIL, even though most of the queues were closed successfully. The queue that encountered the error is not identified.

     If there is a failure on more than one queue, it is not defined which failure is reported in the **CMPCOD** and **REASON** parameters.

Parameters

The MQCLOSE call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

HOBJ (10-digit signed integer) - input/output

Object handle.

This handle represents the object that is being closed. The object can be of any type. The value of *HOBJ* was returned by a previous MQOPEN call.

On successful completion of the call, the queue manager sets this parameter to a value that is not a valid handle for the environment. This value is:

HOUNUH
Unusable object handle.

OPTS (10-digit signed integer) - input

Options that control the action of MQCLOSE.

The **OPTS** parameter controls how the object is closed. Only permanent dynamic queues and subscriptions can be closed in more than one way. Permanent dynamic queues can either be retained or deleted; these are queues with a **DefinitionType** attribute that has the value QDPERM (see the **DefinitionType** attribute described in "Attributes for queues" on page 1353). The close options are summarized in a table later in this topic.

Durable subscriptions can either be kept or removed; these are created using the MQSUB call with the SODUR option.

When closing the handle to a managed destination (that is the **Hobj** parameter returned on an MQSUB call which used the SOMAN option) the queue manager will clean up any unretrieved publications when the associated subscription has also been removed. That is done using the CORMSB option on the **Hsub** parameter returned on an MQSUB call. Note that CORMSB is the default behavior on MQCLOSE for a non-durable subscription.

When closing a handle to a non-managed destination you are responsible for cleaning up the queue where publications are sent. You are recommended to close the subscription using CORMSB first and then process messages off the queue until there are none remaining.

One (and only one) of the following must be specified:

Dynamic queue closure options

These options control how permanent dynamic queues are closed:

CODEL
Delete the queue.

The queue is deleted if either of the following is true:

- It is a permanent dynamic queue, created by a previous MQOPEN call, and there are no messages on the queue and no uncommitted get or put requests outstanding for the queue (either for the current task or any other task).
- It is the temporary dynamic queue that was created by the MQOPEN call that returned *HOBJ*. In this case, all the messages on the queue are purged.

In all other cases, including the case where the *Hobj* was returned on an MQSUB call, the call fails with reason code RC2045, and the object is not deleted.

COPURG
Delete the queue, purging any messages on it.

The queue is deleted if either of the following is true:

- It is a permanent dynamic queue, created by a previous MQOPEN call, and there are no uncommitted get or put requests outstanding for the queue (either for the current task or any other task).
- It is the temporary dynamic queue that was created by the MQOPEN call that returned *HOBJ*.

In all other cases, including the case where the *Hobj* was returned on an MQSUB call, the call fails with reason code RC2045, and the object is not deleted.

The next table shows which close options are valid, and whether the object is retained or deleted.

Table 743. Valid close options for use with retained or deleted objects			
Type of object or queue	**CONONE**	**CODEL**	**COPURG**
Object other than a queue	Retained	Not valid	Not valid
Predefined queue	Retained	Not valid	Not valid
Permanent dynamic queue	Retained	Deleted if empty and no pending updates	Messages deleted; queue deleted if no pending updates
Temporary dynamic queue (call issued by creator of queue)	Deleted	Deleted	Deleted
Temporary dynamic queue (call not issued by creator of queue)	Retained	Not valid	Not valid
Distribution list	Retained	Not valid	Not valid
Managed subscription destination	Retained	Not valid	Not valid
Distribution list (subscription has been removed)	Messages deleted; queue deleted	Not valid	Not valid

Subscription closure options

These options control whether durable subscriptions are removed when the handle is closed, and whether publications still waiting to be read by the application are cleaned up. These options are only valid for use with an object handle returned in the **HSUB** parameter of an MQSUB call.

COKPSB

The handle to the subscription is closed but the subscription made is kept. Publications will continue to be sent to the destination specified in the subscription. This option is only valid if the subscription was made with the option SODUR. COKPSB is the default if the subscription is durable

CORMSB

The subscription is removed and the handle to the subscription is closed.

The **Hobj** parameter of the MQSUB call is not invalidated by closure of the **Hsub** parameter and may continue to be used for MQGET or MQCB to receive the remaining publications. When the **Hobj** parameter of the MQSUB call is also closed, if it was a managed destination any unretrieved publications will be removed.

CORMSB is the default if the subscription is non-durable.

These subscription closure options are summarized in the following tables:

To close a durable subscription handle but leave the subscription around, use the following subscription closure options:

Table 744. Task options for closing a durable subscription handle and leaving the subscription around	
Task	**Subscription closure option**
Keep publications on an MQOPENed handle	COKPSB
Remove publications on an MQOPENed handle	Action not allowed
Keep publications on a handle with SOMAN	COKPSB
Remove publications on a handle with SOMAN	Action not allowed

To unsubscribe, either by closing a durable subscription handle and unsubscribing it or closing a non-durable subscription handle, use the following subscription closure options:

Table 745. Task options for unsubscribing

Task	Subscription closure option
Keep publications on an MQOPENed handle	CORMSB
Remove publications on an MQOPENed handle	Action not allowed
Keep publications on a handle with SOMAN	CORMSB
Remove publications on a handle with SOMAN	COPGSB

Read ahead options

The following options control what happens to non-persistent messages which have been sent to the client before an application requested them and have not yet been consumed by the application. These messages are stored in the client read ahead buffer waiting to be requested by the application and can either be discarded or consumed from the queue before the MQCLOSE is completed.

COIMM
The object is closed immediately and any messages which have been sent to the client before an application requested them are discarded and are not available to be consumed by any application. This is the default value.

COQSC
A request to close the object is made, but if any messages which have been sent to the client before an application requested them, still reside in the client read ahead buffer, the MQCLOSE call will return with a warning code of RC2458, and the object handle will remain valid.

The application can then continue to use the object handle to retrieve messages until no more are available, and then close the object again. No more messages will be sent to the client ahead of an application requesting then, read ahead is now turned off.

Applications are advised to use COQSC rather than trying to reach a point where there are no more messages in the client read ahead buffer, since a message could arrive between the last MQGET call and the following MQCLOSE which would be discarded if COIMM was used.

If an MQCLOSE with COQSC is issued from within an asynchronous callback function, the same behavior of reading ahead messages applies. If the warning code RC2458 is returned, then the callback function will be called at least one more time. When the last remaining message that was read ahead has been passed to the callback function the CBCFLG field is set to CBCFBE.

Default option

If you require none of the options described previously, you can use the following option:

CONONE
No optional close processing required.

This must be specified for:

- Objects other than queues
- Predefined queues
- Temporary dynamic queues (but only in those cases where *HOBJ* is not the handle returned by the MQOPEN call that created the queue).
- Distribution lists

In all of the previous cases, the object is retained and not deleted.

If this option is specified for a temporary dynamic queue:

- The queue is deleted, if it was created by the MQOPEN call that returned *HOBJ* ; any messages that are on the queue are purged.

- In all other cases the queue (and any messages on it) are retained.

If this option is specified for a permanent dynamic queue, the queue is retained and not deleted.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2241
(2241, X'8C1') Message group not complete.

RC2242
(2242, X'8C2') Logical message not complete.

If *CMPCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2035
(2035, X'7F3') Not authorized for access.

RC2101
(2101, X'835') Object damaged.

RC2045
(2045, X'7FD') Option not valid for object type.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2162
(2162, X'872') Queue manager shutting down.

RC2055
(2055, X'807') Queue contains one or more messages or uncommitted put or get requests.

RC2102
(2102, X'836') Insufficient system resources available.

RC2063
(2063, X'80F') Security error occurred.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQCLOSE(HCONN : HOBJ : OPTS :
C                                       CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQCLOSE          PR                  EXTPROC('MQCLOSE')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object handle
D HOBJ                          10I 0
D* Options that control the action of MQCLOSE
D OPTS                          10I 0 VALUE
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQCMIT (Commit changes) on IBM i

The MQCMIT call indicates to the queue manager that the application has reached a syncpoint, and that all of the message gets and puts that have occurred since the last syncpoint are to be made permanent. Messages put as part of a unit of work are made available to other applications; messages retrieved as part of a unit of work are deleted.

- “Syntax” on page 1260
- “Usage notes” on page 1260
- “Parameters” on page 1261
- “RPG Declaration” on page 1262

Syntax

MQCMIT *(HCONN, COMCOD, REASON)*

Usage notes

Consider these usage notes when using MQCMIT.

1. This call can be used only when the queue manager itself coordinates the unit of work. This is a local unit of work, where the changes affect only IBM MQ resources.
2. In environments where the queue manager does not coordinate the unit of work, the appropriate commit call must be used instead of MQCMIT. The environment may also support an implicit commit caused by the application terminating normally.

- On IBM i, this call can be used for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the STRCMTCTL command with the **CMTSCOPE(*JOB)** parameter must not have been issued for the job.

3. If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in “MQDISC (Disconnect queue manager) on IBM i” on page 1276 for further details.
4. When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:

   - The values of the *MDGID*, *MDSEQ*, *MDOFF*, and *MDMFL* fields in MQMD.
   - Whether the message is part of a unit of work.
   - For the MQPUT call: whether the message is persistent or nonpersistent.

   When a unit of work is committed, the queue manager retains the group and segment information, and the application can continue putting or getting messages in the current message group or logical message.

   Retaining the group and segment information when a unit of work is committed allows the application to spread a large message group or large logical message consisting of many segments across several units of work. Using several units of work might be advantageous if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to be able to restart putting or getting messages at the correct point if a system failure occurs. For details of how to restart at the correct point after a system failure, see the PMLOGO option described in “MQPMO (Put-message options) on IBM i” on page 1160, and the GMLOGO option described in “MQGMO (Get-message options) on IBM i” on page 1064.

The remaining usage notes apply only when the queue manager coordinates the units of work:

1. A unit of work has the same scope as a connection handle. This means that all IBM MQ calls which affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See the **HCONN** parameter described in MQCONN for information about the scope of connection handles.
2. Only messages that were put or retrieved as part of the current unit of work are affected by this call.
3. A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but which never issues a commit or back-out call, can cause queues to fill up with messages that are not available to other applications. To guard against this possibility, the administrator should set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

Parameters

The MQCMIT call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

COMCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *COMCOD*.

If *COMCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *COMCOD* is CCWARN:

RC2003
(2003, X'7D3') Unit of work backed out.

RC2124
(2124, X'84C') Result of commit operation is pending.

If *COMCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2101
(2101, X'835') Object damaged.

RC2123
(2123, X'84B') Result of commit or back-out operation is mixed.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQCMIT(HCONN : COMCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQCMIT           PR                  EXTPROC('MQCMIT')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Completion code
D COMCOD                        10I 0
D* Reason code qualifying COMCOD
D REASON                        10I 0
```

IBM i MQCONN (Connect queue manager) on IBM i

The MQCONN call connects an application program to a queue manager. It provides a queue manager connection handle, which is used by the application on subsequent message queuing calls.

- Applications must use the MQCONN or MQCONNX call to connect to the queue manager, and the MQDISC call to disconnect from the queue manager.

On IBM MQ for Windows, UNIX, and IBM i, each thread in an application can connect to different queue managers. On other systems, all concurrent connections within a process must be to the same queue manager.

- "Syntax" on page 1263
- "Usage notes" on page 1263
- "Parameters" on page 1263
- "RPG Declaration" on page 1266

Syntax

MQCONN *(QMNAME, HCONN, CMPCOD, REASON)*

Usage notes

1. The queue manager to which connection is made using the MQCONN call is called the *local queue manager*.
2. Queues that are owned by the local queue manager appear to the application as local queues. It is possible to put messages on and get messages from these queues.

   Shared queues that are owned by the queue sharing group to which the local queue manager belongs appear to the application as local queues. It is possible to put messages on and get messages from these queues.

   Queues that are owned by remote queue managers appear as remote queues. It is possible to put messages on these queues, but not possible to get messages from these queues.
3. If the queue manager fails while an application is running, the application must issue the MQCONN call again in order to obtain a new connection handle to use on subsequent IBM MQ calls. The application can issue the MQCONN call periodically until the call succeeds.

   If an application is not sure whether it is connected to the queue manager, the application can safely issue an MQCONN call in order to obtain a connection handle. If the application is already connected, the handle returned is the same as that returned by the previous MQCONN call, but with completion code CCWARN and reason code RC2002.
4. When the application has finished using IBM MQ calls, the application should use the MQDISC call to disconnect from the queue manager.
5. On IBM i, programs that end abnormally are not automatically disconnected from the queue manager. Therefore applications should be written to allow for the possibility of the MQCONN or MQCONNX call returning completion code CCWARN and reason code RC2002. The connection handle returned in this situation can be used as normal.

Parameters

The MQCONN call has the following parameters:

QMNAME (48-byte character string) - input

Name of queue manager.

This is the name of the queue manager to which the application wants to connect. The name can contain the following characters:

- Uppercase alphabetic characters (A through Z)
- Lowercase alphabetic characters (a through z)
- Numeric digits (0 through 9)
- Period (.), forward slash (/), underscore (_), percent (%)

The name must not contain leading or embedded blanks, but might contain trailing blanks. A null character can be used to indicate the end of significant data in the name; the null and any characters following it are treated as blanks. The following restrictions apply in the environments indicated:

- On IBM i, names containing lowercase characters, forward slash, or percent must be enclosed in quotation marks when specified on commands. These quotation marks must not be specified in the **QMNAME** parameter.

If the name consists entirely of blanks, the name of the *default* queue manager is used.

The name specified for *QMNAME* must be the name of a *connectable* queue manager.

Queue sharing groups: On systems where several queue managers exist and are configured to form a queue sharing group, the name of the queue sharing group can be specified for *QMNAME* in place of the name of a queue manager. This allows the application to connect to *any* queue manager that is available in the queue sharing group. The system can also be configured so that a blank *QMNAME* causes connection to the queue sharing group instead of to the default queue manager.

If *QMNAME* specifies the name of the queue sharing group, but there is also a queue manager with that name on the system, connection is made to the latter in preference to the former. Only if that connection fails is connection to one of the queue managers in the queue sharing group attempted.

If the connection is successful, the handle returned by the MQCONN or MQCONNX call can be used to access *all* of the resources (both shared and nonshared) that belong to the particular queue manager to which connection has been made. Access to these resources is subject to the typical authorization controls.

If the application issues two MQCONN or MQCONNX calls in order to establish concurrent connections, and one or both calls specifies the name of the queue sharing group, the second call may return completion code CCWARN and reason code RC2002. This occurs when the second call connects to the same queue manager as the first call.

Queue sharing groups are supported only on z/OS. Connection to a queue sharing group is supported only in the batch, RRS batch, and TSO environments.

IBM MQ client applications: For IBM MQ MQI client applications, a connection is attempted for each client-connection channel definition with the specified queue manager name, until one is successful. The queue manager, however, must have the same name as the specified name. If an all-blank name is specified, each client-connection channel with an all-blank queue manager name is tried until one is successful; in this case there is no check against the actual name of the queue manager.

IBM MQ client queue manager groups: If the specified name starts with an asterisk (*), the actual queue manager to which connection is made may have a name that is different from that specified by the application. The specified name (without the asterisk) defines a *group* of queue managers that are eligible for connection. The implementation selects one from the group by trying each one in turn, in alphabetic order, until one is found to which a connection can be made. If none of the queue managers in the group is available for connection, the call fails. Each queue manager is tried once only. If an asterisk alone is specified for the name, an implementation-defined default queue manager group is used.

Queue manager groups are supported only for applications running in an MQ-client environment; the call fails if a non-client application specifies a queue manager name beginning with an asterisk. A group is defined by providing several client connection channel definitions with the same queue manager name (the specified name without the asterisk), to communicate with each of the queue managers in the group. The default group is defined by providing one or more client connection

channel definitions, each with a blank queue manager name (specifying an all-blank name therefore has the same effect as specifying a single asterisk for the name for a client application).

After connecting to one queue manager of a group, an application can specify blanks in the typical way in the queue manager name fields in the message and object descriptors to mean the name of the queue manager to which the application has actually connected (the *local queue manager*). If the application needs to know this name, the MQINQ call can be issued to inquire the **`QMgrName`** queue manager attribute.

Prefixing an asterisk to the connection name implies that the application is not dependent on connecting to a particular queue manager in the group. Suitable applications would be:

- Applications that put messages but do not get messages.
- Applications that put request messages and then get the reply messages from a *temporary dynamic* queue.

Unsuitable applications would be those that need to get messages from a particular queue at a particular queue manager; such applications should not prefix the name with an asterisk.

Note that if an asterisk is specified, the maximum length of the remainder of the name is 47 characters.

The length of this parameter is given by LNQMN.

HCONN (10-digit signed integer) - output

Connection handle.

This handle represents the connection to the queue manager. It must be specified on all subsequent message queuing calls issued by the application. It ceases to be valid when the MQDISC call is issued, or when the unit of processing that defines the scope of the handle terminates.

The scope of the handle is restricted to the smallest unit of parallel processing supported by the platform on which the application is running; the handle is not valid outside the unit of parallel processing from which the MQCONN call was issued.

- On IBM i, the scope of the handle is the job issuing the call.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2002
(2002, X'7D2') Application already connected.

If *CMPCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2267
(2267, X'8DB') Unable to load cluster workload exit.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2035
(2035, X'7F3') Not authorized for access.

RC2137
(2137, X'859') Object not opened successfully.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2063
(2063, X'80F') Security error occurred.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQCONN(QMNAME : HCONN : CMPCOD :
C                                      REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQCONN           PR                  EXTPROC('MQCONN')
D* Name of queue manager
D QMNAME                        48A
D* Connection handle
D HCONN                         10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQCONNX (Connect queue manager (extended)) on IBM i

The MQCONNX call connects an application program to a queue manager. It provides a queue manager connection handle, which is used by the application on subsequent IBM MQ calls.

The MQCONNX call is like the MQCONN call, except that MQCONNX allows options to be specified to control the way that the call works.

On IBM MQ for Windows, UNIX, and IBM i, each thread in an application can connect to different queue managers. On other systems, all concurrent connections within a process must be to the same queue manager.

- "Syntax" on page 1267
- "Parameters" on page 1267
- "RPG Declaration" on page 1268

Syntax

MQCONNX *(QMNAME, CNOPT, HCONN, CMPCOD, REASON)*

Parameters

The MQCONNX call has the following parameters:

QMNAME (48-byte character string) - input

Name of queue manager.

See the **QMNAME** parameter described in "MQCONN (Connect queue manager) on IBM i" on page 1263 for details.

CNOPT (MQCNO) - input/output

Options that control the action of MQCONNX.

See "MQCNO (Connect options) on IBM i" on page 1036 for details.

HCONN (10-digit signed integer) - output

Connection handle.

See the **HCONN** parameter described in "MQCONN (Connect queue manager) on IBM i" on page 1263 for details.

CMPCOD (10-digit signed integer) - output

Completion code.

See the **CMPCOD** parameter described in "MQCONN (Connect queue manager) on IBM i" on page 1263 for details.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

See the **REASON** parameter described in "MQCONN (Connect queue manager) on IBM i" on page 1263 for details of possible reason codes.

The following additional reason codes can be returned by the MQCONNX call:

If *CMPCOD* is CCFAIL:

RC2278
(2278, X'8E6') Client connection fields not valid.

RC2139
(2139, X'85B') Connect-options structure not valid.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQCONN(QMNAME : HCONN : CMPCOD :
C                                       REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQCONN           PR                  EXTPROC('MQCONN')
D* Name of queue manager
D QMNAME                        48A
D* Options that control the action of MQCONNX
D HCONN                        224A
D* Connection handle
D HCONN                         10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQCRTMH (Create message handle) on IBM i

The MQCRTMH call returns a message handle.

An application can use it on subsequent message queuing calls:

- Use the MQSETMP call to set a property of the message handle.
- Use the MQINQMP call to inquire on the value of a property of the message handle.
- Use the MQDLTMP call to delete a property of the message handle.

The message handle can be used on the MQPUT and MQPUT1 calls to associate the properties of the message handle with the properties of the message being put. Similarly, by specifying a message handle on the MQGET call, the properties of the message being retrieved can be accessed by using the message handle when the MQGET call completes.

Use MQDLTMH to delete the message handle.

- “Syntax” on page 1268
- “Parameters” on page 1268
- “RPG Declaration” on page 1270

Syntax

MQCRTMH *(Hconn, CrtMsgHOpts, Hmsg, CompCode, Reason)*

Parameters

The MQCRTMH call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call. If the connection to the queue manager ceases to be valid and no IBM MQ call is operating on the message handle, MQDLTMH is implicitly called to delete the message.

Alternatively, you can specify the following value:

HCUNAS

The connection handle does not represent a connection to any particular queue manager.

When this value is used, the message handle must be deleted with an explicit call to MQDLTMH in order to release any storage allocated to it; IBM MQ never implicitly deletes the message handle.

There must be at least one valid connection to a queue manager established on the thread creating the message handle, otherwise the call fails with RC2018.

CRTOPT (MQCMHO) - input

The options that control the action of MQCRTMH. See MQCMHO for details.

HMSG (20-digit signed integer) - output

On output a message handle is returned that can be used to set, inquire, and delete properties of the message handle. Initially the message handle contains no properties.

A message handle also has an associated message descriptor. Initially this message descriptor contains the default values. The values of the associated message descriptor fields can be set and inquired by using the MQSETMP and MQINQMP calls. The MQDLTMP call resets a field of the message descriptor back to its default value.

If the *HCONN* parameter is specified as the value HCUNAS then the returned message handle can be used on MQGET, MQPUT, or MQPUT1 calls with any connection within the unit of processing, but can be in use by only one IBM MQ call at a time. If the handle is in use when a second IBM MQ call attempts to use the same message handle, the second IBM MQ call fails with reason code RC2499.

If the *HCONN* parameter is not HCUNAS then the returned message handle can be used only on the specified connection.

The same *HCONN* parameter value must be used on the subsequent MQI calls where this message handle is used:

- MQDLTMH
- MQSETMP
- MQINQMP
- MQDLTMP
- MQMHBUF
- MQBUFMH

The returned message handle ceases to be valid when the MQDLTMH call is issued for the message handle, or when the unit of processing that defines the scope of the handle terminates. MQDLTMH is called implicitly if a specific connection is supplied when the message handle is created and the connection to the queue manager ceases to be valid, for example, if MQDBC is called.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2461
(2461, X'099D') Create message handle options structure not valid.

RC2273
(2273, X'7D9') Connection to queue manager lost.

RC2017
(2017, X'07E1') No more handles available.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2460
(2460, X'099C') Message handle pointer not valid.

RC2046
(2046, X'07FE') Options not valid or not consistent.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

See "Return codes for IBM i (ILE RPG)" on page 1411 for more details.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQCRTMH(HCONN : CRTOPT : HMSG :
                                        CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQCRTMH          PR                  EXTPROC('MQCRTMH')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Options that control the action of MQCRTMH
D CRTOPT                        12A
D* Message handle
D HMSG                          20I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQCTL (Control callback) on IBM i

The MQCTL call performs controlling actions on the object handles opened for a connection.

- "Syntax" on page 1270
- "Usage notes" on page 1271
- "Parameters" on page 1271
- "RPG Declaration" on page 1275

Syntax

MQCTL *(Hconn, Operation, ControlOpts, CompCode, Reason)*

Usage notes

1. Callback routines must check the responses from all services they invoke, and if the routine detects a condition that cannot be resolved, it must issue an MQCB(CBREG) command to prevent repeated calls to the callback routine.

Parameters

The MQCTL call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

OPERATN (10-digit signed integer) - input

The operation being processed on the callback defined for the specified object handle. You must specify one, and one only, of the following options:

CTLSR

Start the consuming of messages for all defined message consumer functions for the specified connection handle.

Callbacks run on a thread started by the system, which is different from any of the application threads.

This operation gives control of the provided connection handle to system. The only MQI calls which can be issued by a thread other than the consumer thread are:

- MQCTL with Operation CTLSP
- MQCTL with Operation CTLSU
- MQDISC - This performs MQCTL with Operation CTLSP before disconnection the HConn.

RC2500 is returned if an IBM MQ API call is issued while the connection handle is started, and the call does not originate from a message consumer function.

If a connection fails, this stops the conversation as soon as possible. It is possible, therefore, for an IBM MQ API call being issued on the main thread to receive the return code RC2500 for a while, followed by the return code RC2009 when the connection reverts to the stopped state.

This can be issued in a consumer function. For the same connection as the callback routine, its only purpose is to cancel a previously issued CTLSP operation.

This option is not supported if the application is bound with a nonthreaded IBM MQ library.

CTLSW

Start the consuming of messages for all defined message consumer functions for the specified connection handle.

Message consumers run on the same thread and control is not returned to the caller of MQCTL until:

- Released by the use of the MQCTL CTLSP or CTLSU operations, or
- All consumer routines have been deregistered or suspended.

If all consumers are deregistered or suspended, an implicit CTLSP operation is issued.

This option cannot be used from within a callback routine, either for the current connection handle or any other connection handle. If the call is attempted it returns with RC2012.

If, at any time during a CTLSW operation there are no registered, non-suspended consumers the call fails with a reason code of RC2446.

If, during a CTLSW operation, the connection is suspended, the MQCTL call returns a warning reason code of RC2521; the connection remains 'started'.

The application can choose to issue CTLSP or CTLRE. In this instance, the CTLRE operation blocks.

This option is not supported in a single threaded client.

CTLSP

Stop the consuming of messages, and wait for all consumers to complete their operations before this option completes. This operation releases the connection handle.

If issued from within a callback routine, this option does not take effect until the routine exits. No more message consumer routines are called after the consumer routines for messages already read have completed, and after stop calls (if requested) to callback routines have been made.

If issued outside a callback routine, control does not return to the caller until the consumer routines for messages already read have completed, and after stop calls (if requested) to callbacks have been made. The callbacks themselves, however, remain registered.

This function has no effect on read ahead messages. You must ensure that consumers run MQCLOSE(COQSC), from within the callback function, to determine whether there are any further messages available to be delivered.

CTLSU

Pause the consuming of messages. This operation releases the connection handle.

This does not affect the reading ahead of messages for the application. If you intend to stop consuming messages for a long period, consider closing the queue and reopening it when consumption must continue.

If issued from within a callback routine, it does not take effect until the routine exits. No more message consumer routines will be called after the current routine exits.

If issued outside a callback, control does not return to the caller until the current consumer routine has completed and no more are called.

CTLRE

Resume the consuming of messages.

This option is normally issued from the main application thread, but it can also be used from within a callback routine to cancel an earlier suspension request issued in the same routine.

If CTLRE is used to resume a CTLSW, then the operation blocks.

PCTLOP (MQCTLO) - input

Options that control the action of MQCTL

See MQCTLO for details of the structure.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK

Successful completion.

CCWARN

Warning (partial completion).

CCFAIL

Call failed.

REASON (10-digit signed integer) - output

The following reason codes are the ones that the queue manager can return for the **Reason** parameter.

If *CMPCOD* is CCOK:

RCNONE

(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2133
(2133, X'855') Unable to load data conversion services modules.

RC2204
(2204, X'89C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2374
(2374, X'946') API exit failed.

RC2183
(2183, X'887') Unable to load API exit.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2005
(2005, X'7D5') Buffer length parameter not valid.

RC2487
(2487, X'9B7') Unable to call the callback routine

RC2448
(2448, X'990') Unable to Deregister, Suspend, or Resume because there is no registered callback

RC2486
(2486, X'9B6') Either, both CallbackFunction and CallbackName have been specified on a CBREG call, or either one of CallbackFunction or CallbackName has been specified but does not match the currently registered callback function.

RC2483
(2483, X'9B3') Incorrect CallBackType field.

RC2219
(2219, X'8AB') MQI call entered before previous call complete.

RC2444
(2444, X'98C') Option block is incorrect.

RC2484
(2484, X'9B4') Incorrect MQCBD options field.

RC2140
(2140, X'85C') Wait request rejected by CICS.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2217
(2217, X'8A9') Not authorized for connection.

RC2202
(2202, X'89A') Connection quiescing.

RC2203
(2203, X'89B') Connection shutting down.

RC2207
(2207, X'89F') Correlation-identifier error.

RC2016
(2016, X'7E0') Gets inhibited for the queue.

RC2351
(2351, X'92F') Global units of work conflict.

RC2186
(2186, X'88A') Get-message options structure not valid.

RC2353
(2353, X'931') Handle in use for global unit of work.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2259
(2259, X'8D3') Inconsistent browse specification.

RC2245
(2245, X'8C5') Inconsistent unit-of-work specification.

RC2246
(2246, X'8C6') Message under cursor not valid for retrieval.

RC2352
(2352, X'930') Global unit of work conflicts with local unit of work.

RC2247
(2247, X'8C7') Match options not valid.

RC2485
(2485, X'9B5') Incorrect MaxMsgLength field

RC2026
(2026, X'7EA') Message descriptor not valid.

RC2497
(2497, X'9C1')The specified function entry point was not be found in the module.

RC2496
(2496, X'9C0') Module is found but is of the wrong type (32-bit or 64-bit) or is not a valid dll.

RC2495
(2495, X'9BF') Module not found in the search path or not authorized to load.

RC2206
(2206, X'89E') Message-identifier error.

RC2250
(2250, X'8CA') Message sequence number not valid.

RC2331
(2331, X'91B') Use of message token not valid.

RC2036
(2036, X'7F4') Queue not open for browse.

RC2037
(2037, X'7F5') Queue not open for input.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2101
(2101, X'835') Object damaged.

RC2488
(2488, X'9B8') Incorrect Operation code on API Call

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2193
(2193, X'891') Error accessing page-set data set.

RC2052
(2052, X'804') Queue has been deleted.

RC2394
(2394, X'95A') Queue has wrong index type.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2069
(2069, X'815') Signal outstanding for this handle.

RC2071
(2071, X'817') Insufficient storage available.

RC2109
(2109, X'83D') Call suppressed by exit program.

RC2072
(2072, X'818') Syncpoint support not available.

RC2195
(2195, X'893') Unexpected error occurred.

RC2354
(2354, X'932') Enlistment in global unit of work failed.

RC2355
(2355, X'933') Mixture of unit-of-work calls not supported.

RC2255
(2255, X'8CF') Unit of work not available for the queue manager to use.

RC2090
(2090, X'82A') Wait interval in MQGMO not valid.

RC2256
(2256, X'8D0') Wrong version of MQGMO supplied.

RC2257
(2257, X'8D1') Wrong version of MQMD supplied.

RC2298
(2298, X'8FA') The function requested is not available in the current environment.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQCTL(HCONN : OPERATN : PCTLOP :
                                       CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQCTL            PR                  EXTPROC('MQCTL')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Operation
D OPERATN                       10I 0 VALUE
D* Control options
D PCTLOP                        32A
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQDISC (Disconnect queue manager) on IBM i

The MQDISC call breaks the connection between the queue manager and the application program, and is the inverse of the MQCONN or MQCONNX call.

- “Syntax” on page 1276
- “Usage notes” on page 1276
- “Parameters” on page 1276
- “RPG Declaration” on page 1277

Syntax

MQDISC *(HCONN, CMPCOD, REASON)*

Usage notes

1. If an MQDISC call is issued when the application still has objects open, those objects are closed by the queue manager, with the close options set to CONONE.
2. If the application ends with uncommitted changes in a unit of work, the disposition of those changes depends on how the application ends:
   a. If the application issues the MQDISC call before ending:
      - For a queue manager coordinated unit of work, the queue manager issues the MQCMIT call on behalf of the application. The unit of work is committed if possible, and backed out if not.
      - For an externally coordinated unit of work, there is no change in the status of the unit of work; however, the queue manager will indicate that the unit of work should be committed, when asked by the unit-of-work coordinator.
   b. If the application ends normally but without issuing the MQDISC call, the unit of work is backed out.
   c. If the application ends *abnormally* without issuing the MQDISC call, the unit of work is backed out.

Parameters

The MQDISC call has the following parameters:

HCONN (10-digit signed integer) - input/output

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

On successful completion of the call, the queue manager sets *HCONN* to a value that is not a valid handle for the environment. This value is:

HCUNUH
Unusable connection handle.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQDISC(HCONN : CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQDISC          PR                  EXTPROC('MQDISC')
D* Connection handle
D HCONN                        10I 0
D* Completion code
D CMPCOD                       10I 0
D* Reason code qualifying CMPCOD
D REASON                       10I 0
```

IBM i MQDLTMH (Delete message handle) on IBM i

The MQDLTMH call deletes a message handle and is the inverse of the MQCRTMH call.

- “Syntax” on page 1278
- “Usage notes” on page 1278
- “Parameters” on page 1279
- “RPG Declaration” on page 1280

Syntax

MQDLTMH *((Hconn, Hmsg, DltMsgHOpts, CompCode, Reason)*

Usage notes

1. You can use this call only when the queue manager itself coordinates the unit of work. This can be:
   - A local unit of work, where the changes affect only IBM MQ resources.
   - A global unit of work, where the changes can affect resources belonging to other resource managers, as well as affecting IBM MQ resources.

   For further details about local and global units of work, see "MQBEGIN (Begin unit of work) on IBM i" on page 1240.
2. In environments where the queue manager does not coordinate the unit of work, use the appropriate back-out call instead of MQBACK. The environment might also support an implicit back out caused by the application terminating abnormally.
   - On z/OS, use the following calls:
     - Batch programs (including IMS batch DL/I programs) can use the MQBACK call if the unit of work affects only IBM MQ resources. However, if the unit of work affects both IBM MQ resources and resources belonging to other resource managers (for example, Db2), use the SRRBACK call provided by the z/OS Recoverable Resource Service (RRS). The SRRBACK call backs out changes to resources belonging to the resource managers that have been enabled for RRS coordination.
     - CICS applications must use the `EXEC CICS SYNCPOINT ROLLBACK` command to back out the unit of work. Do not use the MQBACK call for CICS applications.
     - IMS applications (other than batch DL/I programs) must use IMS calls such as `ROLB` to back out the unit of work. Do not use the MQBACK call for IMS applications (other than batch DL/I programs).
   - On IBM i, use this call for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the STRCMTCTL command with the **`CMTSCOPE(*JOB)`** parameter must not have been issued for the job.
3. If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in "MQDISC (Disconnect queue manager) on IBM i" on page 1276 for further details.
4. When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:
   - The values of the *GroupId*, *MsgSeqNumber*, *Offset*, and *MsgFlags* fields in MQMD.
   - Whether the message is part of a unit of work.
   - For the MQPUT call: whether the message is persistent or nonpersistent.

   The queue manager keeps three sets of group and segment information, one set for each of the following:
   - The last successful MQPUT call (this can be part of a unit of work).
   - The last successful MQGET call that removed a message from the queue (this can be part of a unit of work).
   - The last successful MQGET call that browsed a message on the queue (this cannot be part of a unit of work).

   If the application puts or gets the messages as part of a unit of work, and the application then backs out the unit of work, the group and segment information is restored to the value that it had previously:
   - The information associated with the MQPUT call is restored to the value that it had before the first successful MQPUT call for that queue handle in the current unit of work.

- The information associated with the MQGET call is restored to the value that it had before the first successful MQGET call for that queue handle in the current unit of work.

Queues that were updated by the application after the unit of work started, but outside the scope of the unit of work, do not have their group and segment information restored if the unit of work is backed out.

Restoring the group and segment information to its previous value when a unit of work is backed out allows the application to spread a large message group or large logical message consisting of many segments across several units of work, and to restart at the correct point in the message group or logical message if one of the units of work fails. Using several units of work might be advantageous if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to be able to restart putting or getting messages at the correct point if that a system failure occurs.

For details of how to restart at the correct point after a system failure, see the PMLOGO option described in PMOPT (10 digit signed integer), and the GMLOGO option described in GMOPT (10 digit signed integer).

The remaining usage notes apply only when the queue manager coordinates the units of work:

5. A unit of work has the same scope as a connection handle. All IBM MQ calls that affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See HCONN (10 digit signed integer) - output for information about the scope of connection handles.
6. Only messages that were put or retrieved as part of the current unit of work are affected by this call.
7. A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but that never issues a commit or backout call, can fill queues with messages that are not available to other applications. To guard against this possibility, the administrator must set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

Parameters

The MQDLTMH call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager.

The value must match the connection handle that was used to create the message handle specified in the **HMSG** parameter.

If the message handle was created using HCUNAS then a valid connection must be established on the thread deleting the message handle, otherwise the call fails with RC2009 .

HMSG (20-digit signed integer) - input/output

This is the message handle to be deleted. The value was returned by a previous MQCRTMH call.

On successful completion of the call, the handle is set to an invalid value for the environment. This value is:

HMUNUH
Unusable message handle.

The message handle cannot be deleted if another IBM MQ call is in progress that was passed the same message handle.

DLTOPT (MQDMHO) - input

See MQDMHO for details.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2009
(2009, X'07D9') Connection to queue manager lost.

RC2462
(2462, X'099E') Delete message handle options structure not valid.

RC2460
(2460, X'099C') Message handle pointer not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2046
(2046, X'07FE') Options not valid or not consistent.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

See "Return codes for IBM i (ILE RPG)" on page 1411 for more details.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQDLTMH(HCONN : HMSG : DLTOPT :
                                    CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQDLTMH          PR                  EXTPROC('MQDLTMH')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Message handle
D HMSG                          20I 0
D* Options that control the action of MQDLTMH
D DLTOPT                        12A
D* Completion code
D CMPCOD                        10I 0
```

```
     D* Reason code qualifying CompCode
     D REASON                        10I 0
```

MQDLTMP - Delete message property

The MQDLTMP call deletes a property from a message handle and is the inverse of the MQSETMP call.

- “Syntax” on page 1281
- “Parameters” on page 1281
- “RPG Declaration” on page 1282

Syntax

MQDLTMP *(Hconn, Hmsg, DltPropOpts, Name, CompCode, Reason)*

Parameters

The MQDLTMP call has the following parameters:

HCONN (10-digit signed integer) - Input

This handle represents the connection to the queue manager. The value must match the connection handle that was used to create the message handle specified in the **HMSG** parameter.

If the message handle was created using HCUNAS then a valid connection must be established on the thread deleting the message handle otherwise the call fails with RC2009.

HMSG (20-digit signed integer) - input

This is the message handle containing the property to be deleted. The value was returned by a previous MQCRTMH call.

DLTOPT (MQDMPO) - Input

See the MQDMPO data type for details.

PRNAME (MQCHARV) - input

The name of the property to delete. See Property names for further information about property names.

Wildcards are not allowed in the property name.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2471
(2471, X'09A7') Property not available.

RC2421
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'0852') Unable to load adapter service module.

RC2157
(2157, X'086D') Primary and home ASIDs differ.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2009
(2009, X'07D9') Connection to queue manager lost.

RC2481
(2481, X'09B1') Delete message property options structure not valid.

RC2460
(2460, X'099C') Message handle not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2046
(2046, X'07FE') Options not valid or not consistent.

RC2442
(2442, X'098A') Invalid property name.

RC2111
(2111, X'083F') Property name coded character set identifier not valid.

RC2195
(2195, X'0893') Unexpected error occurred.

For more information about these codes, see API completion and reason codes.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                      CALLP     MQDLTMP(HCONN : HMSG : DLTOPT :
                                    PRNAME : CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQDLTMP          PR                  EXTPROC('MQDLTMP')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Message handle
D HMSG                          20I 0 VALUE
D* Options that control the action of MQDLTMP
D DLTOPT                        12A
D* Property name
D PRNAME                        32A
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQGET (Get message) on IBM i

The MQGET call retrieves a message from a local queue that has been opened by using the MQOPEN call.

- "Syntax" on page 1283
- "Usage notes" on page 1283
- "Parameters" on page 1286
- "RPG Declaration" on page 1290

Syntax

MQGET *(HCONN, HOBJ, MSGDSC, GMO, BUFLEN, BUFFER, DATLEN, CMPCOD, REASON)*

Usage notes

1. The message retrieved is normally deleted from the queue. This deletion can occur as part of the MQGET call itself, or as part of a syncpoint. Message deletion does not occur if a GMBRWF or GMBRWN option is specified on the **GMO** parameter (see the *GMOPT* field described in "MQGMO (Get-message options) on IBM i" on page 1064).
2. If the GMLK option is specified with one of the browse options, the browsed message is locked so that it is visible only to this handle.

   If the GMUNLK option is specified, a previously locked message is unlocked. No message is retrieved in this case, and the **MSGDSC**, **BUFLEN**, **BUFFER** and **DATLEN** parameters are not checked or altered.
3. If the application issuing the MQGET call is running as an IBM MQ MQI client, it is possible for the message retrieved to be lost if during the processing of the MQGET call the IBM MQ MQI client terminates abnormally or the client connection is severed. This arises because the surrogate that is running on the platform of the queue manager and which issues the MQGET call on the behalf of the client cannot detect the loss of the client until the surrogate is about to return the message to the client; this is after the message has been removed from the queue. This can occur for both persistent messages and nonpersistent messages.

   The risk of losing messages in this way can be eliminated by always retrieving messages within units of work (that is, by specifying the GMSYP option on the MQGET call, and using the MQCMIT or MQBACK calls to commit or back out the unit of work when processing of the message is complete). If GMSYP is specified, and the client terminates abnormally or the connection is severed, the surrogate backs out the unit of work on the queue manager and the message is reinstated on the queue.

   In principle, the same situation can arise with applications that are running on the platform of the queue manager, but in this case the window during which a message can be lost is small. However, as with IBM MQ MQI clients the risk can be eliminated by retrieving the message within a unit of work.
4. If an application puts a sequence of messages on a particular queue within a single unit of work, and then commits that unit of work successfully, the messages become available for retrieval as follows:
   - If the queue is a *nonshared queue* (that is, a local queue), all messages within the unit of work become available at the same time.
   - If the queue is a *shared queue*, messages within the unit of work become available in the order in which they were put, but not all at the same time. When the system is heavily laden, it is possible for the first message in the unit of work to be retrieved successfully, but for the MQGET call for the second or subsequent message in the unit of work to fail with RC2033. If this occurs, the application must wait a short while and then try the operation again.
5. If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if certain conditions are satisfied. See the usage notes in the description of the MQPUT call for details. If the conditions are satisfied, the messages are presented to the receiving application in the order in which they were sent, if:

- Only one receiver is getting messages from the queue.

  If there are two or more applications getting messages from the queue, they must agree with the sender the mechanism to be used to identify messages that belong to a sequence. For example, the sender might set all of the MDCID fields in the messages in a sequence to a value that was unique to that sequence of messages.
- The receiver does not deliberately change the order of retrieval, for example by specifying a particular MDMID or MDCID.

If the sending application put the messages as a message group, the messages are presented to the receiving application in the correct order if the receiving application specifies the GMLOGO option on the MQGET call. For more information about message groups, see:

- MDMFL field in MQMD
- PMLOGO option in MQPMO
- GMLOGO option in MQGMO

6. Applications test for the feedback code FBQUIT in the MDFB field of the **MSGDSC** parameter. If this value is found, the application ends. See the MDFB field described in “MQMD (Message descriptor) on IBM i” on page 1097 for more information.
7. If the queue identified by HOBJ was opened with the OOSAVA option, and the completion code from the MQGET call is CCOK or CCWARN, the context associated with the queue handle HOBJ is set to the context of the message that has been retrieved (unless the GMBRWF or GMBRWN option is set, in which case the context is marked as not available). This context can be used on a subsequent MQPUT or MQPUT1 call by specifying the PMPASI or PMPASA options. This enables the context of the message received to be transferred in whole or in part to another message (for example, when the message is forwarded to another queue). For more information about message context, see Message context and Controlling context information.
8. If the GMCONV option is included in the **GMO** parameter, the application message data is converted to the representation requested by the receiving application, before the data is placed in the **BUFFER** parameter:

   - The MDFMT field in the control information in the message identifies the structure of the application data, and the MDCSI and MDENC fields in the control information in the message specify its character-set identifier and encoding.
   - The application issuing the MQGET call specifies in the MDCSI and MDENC fields in the **MSGDSC** parameter the character-set identifier and encoding to which the application message data must be converted.

   When conversion of the message data is necessary, the conversion is performed either by the queue manager itself or by a user-written exit, depending on the value of the MDFMT field in the control information in the message:

   - The following formats are converted automatically by the queue manager; these formats are called "built-in" formats:

FMADMN	FMMDE
FMCICS	FMPCF
FMCMD1	FMRMH
FMCMD2	FMRFH
FMDLH	FMRFH2
FMDH	FMSTR
FMEVNT	FMTM
FMIMS	FMXQH
FMIMVS	

- The format name FMNONE is a special value that indicates that the nature of the data in the message is undefined. As a consequence, the queue manager does not attempt conversion when the message is retrieved from the queue.

  Note: If GMCONV is specified on the MQGET call for a message that has a format name of FMNONE, and the character set or encoding of the message differs from that specified in the **MSGDSC** parameter, the message is still returned in the **BUFFER** parameter (assuming no other errors), but the call completes with completion code CCWARN and reason code RC2110.

  FMNONE can be used either when the nature of the message data means that it does not require conversion, or when the sending and receiving applications have agreed between themselves the form in which the message data should be sent.
- All other format names cause the message to be passed to a user-written exit for conversion. The exit has the same name as the format, apart from environment-specific additions. User-specified format names must not begin with the letters "MQ", as such names might conflict with format names supported in the future.

User data in the message can be converted between any supported character sets and encodings. However, be aware that if the message contains one or more IBM MQ header structures, the message cannot be converted from or to a character set that has double-byte or multi-byte characters for any of the characters that are valid in queue names. Reason code RC2111 or RC2115 results if this is attempted, and the message is returned unconverted. Unicode character set UTF-16 is an example of such a character set.

On return from MQGET, the following reason code indicates that the message was converted successfully:

- RCNONE

The following reason code indicates that the message might have been converted successfully; the application must check the `MDCSI` and `MDENC` fields in the **MSGDSC** parameter to find out:

- RC2079

All other reason codes indicate that the message was not converted.

Note: The interpretation of the reason code described in this example is true for conversions performed by user-written exits only if the exit conforms to the processing guidelines.

9. For the built-in formats listed previously, the queue manager might perform default conversion of character strings in the message when the GMCONV option is specified. Default conversion allows the queue manager to use an installation-specified default character set that approximates the actual character set, when converting string data. As a result, the MQGET call can succeed with completion code CCOK, instead of completing with CCWARN and reason code RC2111 or RC2115.

   Note: The result of using an approximate character set to convert string data is that some characters might be converted incorrectly. This can be avoided by using in the string only characters which are common to both the actual character set and the default character set.

   Default conversion applies both to the application message data and to character fields in the MQMD and MQMDE structures:

   - Default conversion of the application message data occurs only when all of the following statements are true:
     - The application specifies GMCONV.
     - The message contains data that must be converted either from or to a character set which is not supported.
     - Default conversion was enabled when the queue manager was installed or restarted.
   - Default conversion of the character fields in the MQMD and MQMDE structures occurs as necessary, if default conversion is enabled for the queue manager. The conversion is performed even if the GMCONV option is not specified by the application on the MQGET call.

10. The **BUFFER** parameter shown in the RPG programming example is declared as a string; this restricts the maximum length of the parameter to 256 bytes. If a larger buffer is required, the parameter must be declared instead as a structure, or as a field in a physical file.

    Declaring the parameter as a structure increases the maximum length possible to 9999 bytes, while declaring the parameter as a field in a physical file increases the maximum length possible to approximately 32 KB.

Parameters

The MQGET call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of HCONN was returned by a previous MQCONN or MQCONNX call.

HOBJ (10-digit signed integer) - input

Object handle.

This handle represents the queue from which a message is to be retrieved. The value of HOBJ was returned by a previous MQOPEN call. The queue must have been opened with one or more of the following options (see “MQOPEN (Open object) on IBM i” on page 1307 for details):

- OOINPS
- OOINPX
- OOINPQ
- OOBRW

MSGDSC (MQMD) - input/output

Message descriptor.

This structure describes the attributes of the message required, and the attributes of the message retrieved. See “MQMD (Message descriptor) on IBM i” on page 1097 for details.

If BUFLEN is less than the message length, MSGDSC is still entered by the queue manager, whether GMATM is specified on the **GMO** parameter (see the GMOPT field described in “MQGMO (Get-message options) on IBM i” on page 1064).

If the application provides a version-1 MQMD, the message returned has an MQMDE prefixed to the application message data, but only if one or more of the fields in the MQMDE has a nondefault value. If all of the fields in the MQMDE have default values, the MQMDE is omitted. A format name of FMMDE in the MDFMT field in MQMD indicates that an MQMDE is present.

GMO (MQGMO) - input/output

Options that control the action of MQGET.

See “MQGMO (Get-message options) on IBM i” on page 1064 for details.

BUFLEN (10-digit signed integer) - input

Length in bytes of the BUFFER area.

Zero can be specified for messages that have no data, or if the message is to be removed from the queue and the data discarded (GMATM must be specified in this case).

Note: The length of the longest message that it is possible to read from the queue is given by the **MaxMsgLength** queue attribute; see “Attributes for queues” on page 1353.

BUFFER (1-byte bit string x BUFLEN) - output

Area to contain the message data.

The buffer must be aligned on a boundary appropriate to the nature of the data in the message. 4-byte alignment must be suitable for most messages (including messages containing IBM MQ header structures), but some messages might require more stringent alignment. For example, a message containing a 64-bit binary integer might require 8-byte alignment.

If BUFLEN is less than the message length, as much of the message as possible is moved into BUFFER ; this happens whether GMATM is specified on the **GMO** parameter (see the GMOPT field described in "MQGMO (Get-message options) on IBM i" on page 1064 for more information).

The character set and encoding of the data in **BUFFER** are given by the MDCSI and MDENC fields returned in the **MSGDSC** parameter. If these values are different from the values required by the receiver, the receiver must convert the application message data to the character set and encoding required. The GMCONV option can be used with a user-written exit to perform the conversion of the message data (see "MQGMO (Get-message options) on IBM i" on page 1064 for details of this option).

Note: All of the other parameters on the MQGET call are in the character set and encoding of the local queue manager (given by the **CodedCharSetId** queue manager attribute and ENNAT).

If the call fails, the contents of the buffer might still have changed.

DATLEN (10-digit signed integer) - output

Length of the message.

This is the length in bytes of the application data in the message. If this message length is greater than BUFLEN, only BUFLEN bytes are returned in the **BUFFER** parameter (that is, the message is truncated). If the value is zero, it means that the message contains no application data.

If BUFLEN is less than the message length, DATLEN is still entered by the queue manager, whether GMATM is specified on the **GMO** parameter (see the GMOPT field described in "MQGMO (Get-message options) on IBM i" on page 1064 for more information). This allows the application to determine the size of the buffer required to accommodate the message data, and then reissue the call with a buffer of the appropriate size.

However, if the GMCONV option is specified, and the converted message data is too long to fit in BUFFER, the value returned for DATLEN is:

- The length of the unconverted data, for queue manager defined formats.

  In this case, if the nature of the data causes it to expand during conversion, the application must allocate a buffer bigger than the value returned by the queue manager for DATLEN.
- The value returned by the data-conversion exit, for application-defined formats.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying CMPCOD.

The following reason codes are the ones that the queue manager can return for the **REASON** parameter. If the application specifies the GMCONV option, and a user-written exit is invoked to convert some or all of the message data, it is the exit that decides what value is returned for the **REASON** parameter. As a result, values other than the values documented later in this section are possible.

If CMPCOD is CCOK:

RCNONE
(0, X'000') No reason to report.

If CMPCOD is CCWARN:

RC2120
(2120, X'848') Converted data too large for buffer.

RC2190
(2190, X'88E') Converted string too large for field.

RC2150
(2150, X'866') DBCS string not valid.

RC2110
(2110, X'83E') Message format not valid.

RC2243
(2243, X'8C3') Message segments have differing CCSIDs.

RC2244
(2244, X'8C4') Message segments have differing encodings.

RC2209
(2209, X'8A1') No message locked.

RC2119
(2119, X'847') Message data not converted.

RC2272
(2272, X'8E0') Message data partially converted.

RC2145
(2145, X'861') Source buffer parameter not valid.

RC2111
(2111, X'83F') Source coded character set identifier not valid.

RC2113
(2113, X'841') Packed-decimal encoding in message not recognized.

RC2114
(2114, X'842') Floating-point encoding in message not recognized.

RC2112
(2112, X'840') Source integer encoding not recognized.

RC2143
(2143, X'85F') Source length parameter not valid.

RC2146
(2146, X'862') Target buffer parameter not valid.

RC2115
(2115, X'843') Target coded character set identifier not valid.

RC2117
(2117, X'845') Packed-decimal encoding specified by receiver not recognized.

RC2118
(2118, X'846') Floating-point encoding specified by receiver not recognized.

RC2116
(2116, X'844') Target integer encoding not recognized.

RC2079
(2079, X'81F') Truncated message returned (processing completed).

RC2080
(2080, X'820') Truncated message returned (processing not completed).

If CMPCOD is CCFAIL:

RC2004
(2004, X'7D4') Buffer parameter not valid.

RC2005
(2005, X'7D5') Buffer length parameter not valid.

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2010
(2010, X'7DA') Data length parameter not valid.

RC2016
(2016, X'7E0') Gets inhibited for the queue.

RC2186
(2186, X'88A') Get-message options structure not valid.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2241
(2241, X'8C1') Message group not complete.

RC2242
(2242, X'8C2') Logical message not complete.

RC2259
(2259, X'8D3') Inconsistent browse specification.

RC2245
(2245, X'8C5') Inconsistent unit-of-work specification.

RC2246
(2246, X'8C6') Message under cursor not valid for retrieval.

RC2247
(2247, X'8C7') Match options not valid.

RC2026
(2026, X'7EA') Message descriptor not valid.

RC2250
(2250, X'8CA') Message sequence number not valid.

RC2033
(2033, X'7F1') No message available.

RC2034
(2034, X'7F2') Browse cursor not positioned on message.

RC2036
(2036, X'7F4') Queue not open for browse.

RC2037
(2037, X'7F5') Queue not open for input.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2101
(2101, X'835') Object damaged.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2052
(2052, X'804') Queue has been deleted.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2071
(2071, X'817') Insufficient storage available.

RC2024
(2024, X'7E8') No more messages can be handled within current unit of work.

RC2072
(2072, X'818') Syncpoint support not available.

RC2195
(2195, X'893') Unexpected error occurred.

RC2255
(2255, X'8CF') Unit of work not available for the queue manager to use.

RC2090
(2090, X'82A') Wait interval in MQGMO not valid.

RC2256
(2256, X'8D0') Wrong version of MQGMO supplied.

RC2257
(2257, X'8D1') Wrong version of MQMD supplied.

RPG Declaration

```
     C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     C                     CALLP     MQGET(HCONN : HOBJ : MSGDSC : GMO :
     C                                     BUFLEN : BUFFER : DATLEN :
     C                                     CMPCOD : REASON)
```

The prototype definition for the call is:

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     DMQGET            PR                  EXTPROC('MQGET')
     D* Connection handle
     D HCONN                         10I 0 VALUE
     D* Object handle
     D HOBJ                          10I 0 VALUE
     D* Message descriptor
     D MSGDSC                       364A
     D* Options that control the action of MQGET
     D GMO                          112A
     D* Length in bytes of the Buffer area
     D BUFLEN                        10I 0 VALUE
     D* Area to contain the message data
     D BUFFER                          *   VALUE
     D* Length of the message
     D DATLEN                        10I 0
     D* Completion code
     D CMPCOD                        10I 0
     D* Reason code qualifying CMPCOD
     D REASON                        10I 0
```

IBM i MQINQ (Inquire about object attributes) on IBM i

The MQINQ call returns an array of integers and a set of character strings containing the attributes of an object.

The following types of object are valid:

- Queue
- Namelist
- Process definition
- Queue manager

- "Syntax" on page 1291
- "Usage notes" on page 1291
- "Parameters" on page 1292
- "RPG Declaration" on page 1299

Syntax

MQINQ *(HCONN, HOBJ, SELCNT, SELS, IACNT, INTATR, CALEN, CHRATR, CMPCOD, REASON)*

Usage notes

1. The values returned are a snapshot of the selected attributes. There is no guarantee that the attributes are not changed before the application can act upon the returned values.
2. When you open a model queue, a dynamic local queue is created. This is true even if you open the model queue to inquire about its attributes.

   The attributes of the dynamic queue (with certain exceptions) are the same as those of the model queue at the time the dynamic queue is created. If you then use the MQINQ call on this queue, the queue manager returns the attributes of the dynamic queue, and not those of the model queue. See Table 1 for details of which attributes of the model queue are inherited by the dynamic queue.
3. If the object being inquired is an alias queue, the attribute values returned by the MQINQ call are those of the alias queue, and not those of the base queue to which the alias resolves.
4. If the object being inquired is a cluster queue, the attributes that can be inquired depend on how the queue is opened:
   - If the cluster queue is opened for inquire plus one or more of input, browse, or set, there must be a local instance of the cluster queue in order for the open to succeed. In this case the attributes that can be inquired are those valid for local queues.
   - If the cluster queue is opened for inquire alone, or inquire and output, only the following attributes can be inquired; the **QType** attribute has the value QTCLUS in this case:
     - CAQD
     - CAQN
     - IADBND
     - IADPER
     - IADPRI
     - IAIPUT
     - IAQTYP

     If the cluster queue is opened with no fixed binding (that is, OOBNDN specified on the MQOPEN call, or OOBNDQ specified when the **DefBind** attribute has the value BNDNOT), successive MQINQ calls for the queue might inquire different instances of the cluster queue, although typically all of the instances have the same attribute values.

For more information about cluster queues, see Configuring a queue manager cluster.

5. If a number of attributes are to be inquired, and then some of them are to be set using the MQSET call, it might be convenient to position at the beginning of the selector arrays the attributes that are to be set, so that the same arrays (with reduced counts) can be used for MQSET.
6. If more than one of the warning situations arise (see the **CMPCOD** parameter), the reason code returned is the *first* one in the following list that applies:
   a. RC2068
   b. RC2022
   c. RC2008
7. For more information about object attributes, see:
   - "Attributes for queues" on page 1353
   - "Attributes for namelists" on page 1381
   - "Attributes for process definitions on IBM i" on page 1382
   - "Attributes for the queue manager on IBM i" on page 1384
8. A new local queue SYSTEM.ADMIN.COMMAND.EVENT is used for queuing messages that are generated whenever commands are issued. Messages are put onto this queue for most commands, depending on how the CMDEV queue manager attribute is set:
   - ENABLED - command event messages are generated and put onto the queue for all successful commands.
   - NODISPLAY - command event messages are generated and put onto the queue for all successful commands other than the DISPLAY (MQSC) command, and the Inquire (PCF) command.
   - DISABLED - command event messages are not generated (this is the queue manager's initial default value).

Parameters

The MQINQ call has the following parameters:

HCONN (10 digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

HOBJ (10 digit signed integer) - input

Object handle.

This handle represents the object (of any type) with attributes that are required. The handle must have been returned by a previous MQOPEN call that specified the OOINQ option.

SELCNT (10 digit signed integer) - input

Count of selectors.

This is the count of selectors that are supplied in the *SELS* array. It is the number of attributes that are to be returned. Zero is a valid value. The maximum number allowed is 256.

SELS (10 digit signed integer x SELCNT) - input

Array of attribute selectors.

This is an array of **SELCNT** attribute selectors; each selector identifies an attribute (integer or character) with a value that is required.

Each selector must be valid for the type of object that *HOBJ* represents, otherwise the call fails with completion code CCFAIL and reason code RC2067.

In the special case of queues:

- If the selector is not valid for queues of *any* type, the call fails with completion code CCFAIL and reason code RC2067.
- If the selector is applicable only to queues of type or types other than that of the object, the call succeeds with completion code CCWARN and reason code RC2068.
- If the queue being inquired is a cluster queue, the selectors that are valid depend on how the queue was resolved; see usage note 4 for further details.

Selectors can be specified in any order. Attribute values that correspond to integer attribute selectors (IA* selectors) are returned in *INTATR* in the same order in which these selectors occur in *SELS*. Attribute values that correspond to character attribute selectors (CA* selectors) are returned in *CHRATR* in the same order in which those selectors occur. IA* selectors can be interleaved with the CA* selectors; only the relative order within each type is important.

Note:

1. The integer and character attribute selectors are allocated within two different ranges; the IA* selectors reside within the range IAFRST through IALAST, and the CA* selectors within the range CAFRST through CALAST.

   For each range, the constants IALSTU and CALSTU define the highest value that the queue manager accepts.
2. If all the IA* selectors occur first, the same element numbers can be used to address corresponding elements in the *SELS* and *INTATR* arrays.

The attributes that can be inquired are listed in the following tables. For the CA* selectors, the constant that defines the length in bytes of the resulting string in *CHRATR* is given in parentheses.

Table 746. MQINQ attribute selectors for queues

Selector	Description	Note
CAALTD	Date of most recent alteration (LNDATE).	1
CAALTT	Time of most recent alteration (LNTIME).	1
CABRQN	Excessive backout-requeue name (LNQN).	5
CABASQ	Name of queue that alias resolves to (LNQN).	
CACFSN	Coupling-facility structure name (LNCFSN).	3
CACLN	Cluster name (LNCLUN).	1
CACLNL	Cluster namelist (LNNLN).	1
CACRTD	Queue creation date (LNCRTD).	
CACRTT	Queue creation time (LNCRTT).	
CAINIQ	Initiation queue name (LNQN).	
CAPRON	Name of process definition (LNPRON).	
CAQD	Queue description (LNQD).	
CAQN	Queue name (LNQN).	
CARQMN	Name of remote queue manager (LNQMN).	
CARQN	Name of remote queue as known on remote queue manager (LNQN).	
CATRGD	Trigger data (LNTRGD).	5
CAXQN	Transmission queue name (LNQN).	

Selector	Description	Note
IABTHR	Backout threshold.	5
IACDEP	Number of messages on queue.	
IADBND	Default binding.	1
IADINP	Default open-for-input option.	5
IADPER	Default message persistence.	
IADPRI	Default message priority.	5
IADEFT	Queue definition type.	
IADIST	Distribution list support.	2
IAHGB	Whether to harden backout count.	5
IAIGET	Whether get operations are allowed.	
IAIPUT	Whether put operations are allowed.	
IAMLEN	Maximum message length.	
IAMDEP	Maximum number of messages allowed on queue.	
IAMDS	Whether message priority is relevant.	5
IAOIC	Number of MQOPEN calls that have the queue open for input.	
IAOOC	Number of MQOPEN calls that have the queue open for output.	
IAQDHE	Control attribute for queue depth high events.	4, 5
IAQDHL	High limit for queue depth.	4, 5
IAQDLE	Control attribute for queue depth low events.	4, 5
IAQDLL	Low limit for queue depth.	4, 5
IAQDME	Control attribute for queue depth max events.	4, 5
IAQSI	Limit for queue service interval.	4, 5
IAQSIE	Control attribute for queue service interval events.	4, 5
IAQTYP	Queue type.	
IAQSGD	Queue sharing group disposition.	3
IARINT	Queue retention interval.	5
IASCOP	Queue definition scope.	4, 5
IASHAR	Whether queue can be shared for input.	
IATRGC	Trigger control.	
IATRGD	Trigger depth.	5
IATRGP	Threshold message priority for triggers.	5
IATRGT	Trigger type.	
IAUSAG	Usage.	
CLWLUSEQ	Use remote queues.	

Table 746. MQINQ attribute selectors for queues (continued)

Note:

1. Supported on the following platforms:
   - AIX
   - IBM i
   - Solaris
   - Windows
   - z/OS

   and for IBM MQ MQI clients connected to these systems.
2. Supported on the following platforms:
   - AIX
   - IBM i
   - Solaris
   - Windows

   and for IBM MQ clients connected to these systems.
3. Supported on z/OS.
4. Not supported on z/OS.
5. Not supported on VSE/ESA.

Table 747. MQINQ attribute selectors for namelists

Selector	Description	Note
CAALTD	Date of most recent alteration (LNDATE)	1
CAALTT	Time of most recent alteration (LNTIME)	1
CALSTD	Namelist description (LNNLD)	1
CALSTN	Name of namelist object (LNNLN)	1
CANAMS	Names in the namelist (LNQN x *Number of names in the list)*	1
IANAMC	Number of names in the namelist	1
IAQSGD	Queue sharing group disposition	3

Table 748. MQINQ attribute selectors for process definitions

Selector	Description	Note
CAALTD	Date of most recent alteration (LNDATE)	1
CAALTT	Time of most recent alteration (LNTIME)	1
CAAPPI	Application identifier (LNPROA)	5
CAENVD	Environment data (LNPROE)	5
CAPROD	Description of process definition (LNPROD)	5
CAPRON	Name of process definition (LNPRON)	5
CAUSRD	User data (LNPROU)	5

Table 748. MQINQ attribute selectors for process definitions (continued)		
Selector	**Description**	**Note**
IAAPPT	Application type	5
IAQSGD	Queue sharing group disposition	3

Table 749. MQINQ attribute selectors for the queue manager		
Selector	**Description**	**Note**
CAALTD	Date of most recent alteration (LNDATE)	1
CAALTT	Time of most recent alteration (LNTIME)	1
CACADX	Automatic channel definition exit name (LNEXN)	1
CACLWD	Data passed to cluster workload exit (LNEXDA)	1
CACLWX	Name of cluster workload exit (LNEXN)	1
CACMDQ	System command input queue name (LNQN)	5
CADLQ	Name of dead-letter queue (LNQN)	5
CADXQN	Default transmission queue name (LNQN)	5
CAQMD	Queue manager description (LNQMD)	5
CAQMID	Queue manager identifier (LNQMID)	1
CAQMN	Name of local queue manager (LNQMN)	5
CAQSGN	Queue sharing group name (LNQSGN)	3
CARPN	Name of cluster for which queue manager provides repository services (LNQMN)	1
CARPNL	Name of namelist object containing names of clusters for which queue manager provides repository services (LNNLN)	1
CMDEV	Control attribute that determines whether messages generated when commands are issued, are put onto a queue	8
IAAUTE	Control attribute for authority events	4, 5
IACAD	Control attribute for automatic channel definition	2
IACADE	Control attribute for automatic channel definition events	2
IACLXQ	Default cluster transmission queue type	4
IACLWL	Cluster workload length	1
IACCSI	Coded character set identifier	5
IACMDL	Command level supported by queue manager	5
IACFGE	Control attribute for configuration events	3
IADIST	Distribution list support	2
IAINHE	Control attribute for inhibit events	4, 5
IALCLE	Control attribute for local events	4, 5
IAMHND	Maximum number of handles	5
IAMLEN	Maximum message length	5

Table 749. MQINQ attribute selectors for the queue manager (continued)		
Selector	**Description**	**Note**
IAMPRI	Maximum priority	5
IAMUNC	Maximum number of uncommitted messages within a unit of work	5
IAPFME	Control attribute for performance events	4, 5
IAPLAT	Platform on which the queue manager resides	5
IARMTE	Control attribute for remote events	4, 5
IASSE	Control attribute for start stop events	4, 5
IASYNC	Sync point availability	5
IATRLFT	Lifetime of unused non-administrative topics	
IATRGI	Trigger interval	5

IACNT (10 digit signed integer) - input

Count of integer attributes.

This is the number of elements in the INTATR array. Zero is a valid value.

If this is at least the number of IA* selectors in the **SELS** parameter, all integer attributes requested are returned.

INTATR (10 digit signed integer x IACNT) - output

Array of integer attributes.

This is an array of *IACNT* integer attribute values.

Integer attribute values are returned in the same order as the IA* selectors in the **SELS** parameter. If the array contains more elements than the number of IA* selectors, the excess elements are unchanged.

If HOBJ represents a queue, but an attribute selector is not applicable to that type of queue, the specific value IAVNA is returned for the corresponding element in the INTATR array.

CALEN (10 digit signed integer) - input

Length of character attributes buffer.

This is the length in bytes of the **CHRATR** parameter.

This must be at least the sum of the lengths of the requested character attributes (see SELS). Zero is a valid value.

CHRATR (1 byte character string x CALEN) - output

Character attributes.

This is the buffer in which the character attributes are returned, concatenated together. The length of the buffer is given by the **CALEN** parameter.

Character attributes are returned in the same order as the CA* selectors in the **SELS** parameter. The length of each attribute string is fixed for each attribute (see SELS), and the value in it is padded to the right with blanks if necessary. If the buffer is larger than that needed to contain all of the requested character attributes (including padding), the bytes beyond the last attribute value returned are unchanged.

If HOBJ represents a queue, but an attribute selector is not applicable to that type of queue, a character string consisting entirely of asterisks (*) is returned as the value of that attribute in CHRATR.

CMPCOD (10 digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10 digit signed integer) - output

Reason code qualifying CMPCOD.

If CMPCOD is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2008
(2008, X'7D8') Not enough space allowed for character attributes.

RC2022
(2022, X'7E6') Not enough space allowed for integer attributes.

RC2068
(2068, X'814') Selector not applicable to queue type.

If *CMPCOD* is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2006
(2006, X'7D6') Length of character attributes not valid.

RC2007
(2007, X'7D7') Character attributes string not valid.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2021
(2021, X'7E5') Count of integer attributes not valid.

RC2023
(2023, X'7E7') Integer attributes array not valid.

RC2038
(2038, X'7F6') Queue not open for inquire.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2101
(2101, X'835') Object damaged.

RC2052
(2052, X'804') Queue has been deleted.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2065
(2065, X'811') Count of selectors not valid.

RC2067
(2067, X'813') Attribute selector not valid.

RC2066
(2066, X'812') Count of selectors too large.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQINQ(HCONN : HOBJ : SELCNT :
C                                     SELS(1) : IACNT : INTATR(1) :
C                                     CALEN : CHRATR : CMPCOD :
C                                     REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQINQ            PR                  EXTPROC('MQINQ')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object handle
D HOBJ                          10I 0 VALUE
D* Count of selectors
D SELCNT                        10I 0 VALUE
D* Array of attribute selectors
D SELS                          10I 0
D* Count of integer attributes
D IACNT                         10I 0 VALUE
D* Array of integer attributes
D INTATR                        10I 0
D* Length of character attributes buffer
D CALEN                         10I 0 VALUE
D* Character attributes
D CHRATR                          *   VALUE
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQINQMP (Inquire message property) on IBM i

The MQINQMP call returns the value of a property of a message.

- “Syntax” on page 1300
- “Parameters” on page 1300
- “RPG Declaration” on page 1303

Syntax

MQINQMP *(Hconn, Hmsg, InqPropOpts, Name, PropDesc, Type, ValueLength, Value, DataLength, CompCode, Reason)*

Parameters

The MQINQMP call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *Hconn* must match the connection handle that was used to create the message handle specified in the **Hmsg** parameter.

If the message handle was created using HCUNAS then a valid connection must be established on the thread inquiring a property of the message handle, otherwise the call fails with RC2009.

HMSG (20-digit signed integer) - input

This is the message handle to be inquired. The value was returned by a previous **MQCRTMH** call.

INQOPT (MQIMPO) - input

See the MQIMPO data type for details.

PRNAME (MQCHARV) - input

This describes the name of the property to inquire.

If no property with this name can be found, the call fails with reason RC2471.

You can use the percent sign (%) character at the end of the property name. The wildcard matches zero or more characters, including the period (.) character. This allows an application to inquire the value of many properties. Call MQINQMP with option IPINQF to get the first matching property and again with the option IPINQN to get the next matching property. When no more matching properties are available, the call fails with RC2471. If the *ReturnedName* field of the InqPropOpts structure is initialized with an address or offset for the returned name of the property, this is completed on return from MQINQMP with the name of the property that has been matched. If the *VSBufSize* field of the *ReturnedName* in the InqPropOpts structure is less than the length of the returned property name the completion code is set CCFAIL with reason RC2465.

Properties that have known synonyms are returned as follows:

1. Properties with the prefix "mqps." are returned with the IBM MQ property name. For example, "MQTopicString" is the returned name rather than "mqps.Top".
2. Properties with the prefix "jms." or "mcd." are returned as the JMS header field name. For example, "JMSExpiration" is the returned name rather than "jms.Exp".
3. Properties with the prefix "usr." are returned without that prefix. For example, "Color" is returned rather than "usr.Color".

Properties with synonyms are only returned once.

In the RPG programming language, the following macro variables are defined for inquiring on all properties and all properties that begin "usr.":

INQALL
Inquire on all properties of the message.

INQUSR
Inquire on all properties of the message that start "usr.". The returned name is returned without the "usr." prefix.

If IPINQN is specified but Name has changed since the previous call or this is the first call, then IPINQF is implied.

See Property names and Property name restrictions for further information about the use of property names.

PRPDSC (MQPD) - output

This structure is used to define the attributes of a property, including what happens if the property is not supported, what message context the property belongs to, and what messages the property should be copied into. See MQPD for details of this structure.

TYPE (10-digit signed integer) - input/output

On return from the MQINQMP call this parameter is set to the data type of *Value*. The data type can be any of the following:

TYPBOL
A boolean.

TYPBST
a byte string.

TYPI8
An 8-bit signed integer.

TYPI16
A 16-bit signed integer.

TYPI32
A 32-bit signed integer.

TYPI64
A 64-bit signed integer.

TYPF32
A 32-bit floating-point number.

TYPF64
A 64-bit floating-point number.

TYPSTR
A character string.

TYPNUL
The property exists but has a null value.

If the data type of the property value is not recognized then TYPSTR is returned and a string representation of the value is placed into the *Value* area. A string representation of the data type can be found in the *IPTYP* field of the *IPOPT* parameter. A warning completion code is returned with reason RC2467.

Additionally, if the option IPCTYP is specified, conversion of the property value is requested. Use *Type* as an input to specify the data type that you want the property to be returned as. See the description of the IPCTYP option of the “MQIMPO (Inquire message property options) on IBM i” on page 1090 for details of data type conversion.

If you do not request type conversion, you can use the following value on input:

TYPAST
The value of the property is returned without converting its data type.

VALLEN (10-digit signed integer) - input

The length in bytes of the Value area.

Specify zero for properties that you do not require the value returned for. These could be properties which are designed by an application to have a null value or an empty string. Also specify zero if the IPQLEN option has been specified; in this case no value is returned.

VALUE (1-byte bit stringxVALLEN) - output

This is the area to contain the inquired property value. The buffer should be aligned on a boundary appropriate for the value being returned. Failure to do so might result in an error when the value is later accessed.

If *VALLEN* is less than the length of the property value, as much of the property value as possible is moved into *VALUE* and the call fails with completion code CCFAIL and reason RC2469.

The character set of the data in *VALUE* is given by the IPRETCSI field in the INQOPT parameter. The encoding of the data in *VALUE* is given by the IPRETENC field in the INQOPT parameter.

If the *VALLEN* parameter is zero, VALUE is not referred to.

DATLEN (10-digit signed integer) - output

This is the length in bytes of the actual property value as returned in the *Value* area.

If *DataLength* is less than the property value length, *DataLength* is still entered on return from the MQINQMP call. This allows the application to determine the size of the buffer required to accommodate the property value, and then reissue the call with a buffer of the appropriate size.

The following values may also be returned.

If the *Type* parameter is set to TYPSTR or TYPBST:

VLEMP
The property exists but contains no characters or bytes.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CompCode*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CompCode* is CCWARN:

RC2492
(2492, X'09BC') Returned property name not converted.

RC2466
(2466, X'09A2') Property value not converted.

RC2467
(2467, X'09A3') Property data type is not supported.

RC2421
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'0852') Unable to load adapter service module.

RC2157
(2157, X'086D') Primary and home ASIDs differ.

RC2004
(2004, X'07D4') Value parameter not valid.

RC2005
(2005, X'07D5') Value length parameter not valid.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2009
(2009, X'07D9') Connection to queue manager lost.

RC2010
(2010, X'07DA') Data length parameter not valid.

RC2464
(2464, X'09A0') Inquire message property options structure not valid.

RC2460
(2460, X'099C') Message handle not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2064
(2046, X'07F8') Options not valid or not consistent.

RC2482
(2482, X'09B2') Property descriptor structure not valid.

RC2470
(2470, X'09A6') Conversion from the actual to requested data type not supported.

RC2442
(2442, X'098A') Invalid property name.

RC2465
(2465, X'09A1') Property name too large for returned name buffer.

RC2471
(2471, X'09A7) Property not available.

RC2469
(2469, X'09A5') Property value too large for the Value area.

RC2472
(2472, X'09A8') Number format error encountered in value data.

RC2473
(2473, X'09A9') Invalid requested property type.

RC2111
(2111, X'083F') Property name coded character set identifier not valid.

RC2071
(2071, X'0871') Insufficient storage available.

RC2195
(2195, X'0893') Unexpected error occurred.

For detailed information about these codes, see:

- IBM MQ for z/OS messages, completion, and reason codes for IBM MQ for z/OS
- Messages and reason codes for all other IBM MQ platforms

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQINQMP(HCONN : HMSG : INQOPT :
                                        PRNAME : PRPDSC : TYPE :
                                        VALLEN : VALUE : DATLEN :
                                        CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQINQMP          PR                  EXTPROC('MQINQMP')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Message handle
D HMSG                          20I 0 VALUE
D* Options that control the action of MQINQMP
D INQOPT                        72A
D* Property name
D PRNAME                        32A
D* Property descriptor
D PRPDSC                        24A
D* Property data type
D TYPE                          10I 0
D* Length in bytes of the Value area
D VALLEN                        10I 0 VALUE
D* Property value
D VALUE                           *   VALUE
D* Length of the property value
D DATLEN                        10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQMHBUF (Convert message handle into buffer) on IBM i

The MQMHBUF converts a message handle into a buffer and is the inverse of the MQBUFMH call.

- “Syntax” on page 1304
- “Usage notes” on page 1304
- “Parameters” on page 1304
- “RPG Declaration” on page 1306

Syntax

MQMHBUF *(Hconn, Hmsg, MsgHBufOpts, Name, MsgDesc, BufferLength, Buffer, DataLength, CompCode, Reason)*

Usage notes

MQMHBUF converts a message handle into a buffer.

You can use it with an MQGET API exit to access certain properties, by using the message property APIs, and then pass these properties in a buffer back to an application designed to use MQRFH2 headers rather than message handles.

This call is the inverse of the MQBUFMH call, which you can use to parse message properties from a buffer into a message handle.

Parameters

The MQMHBUF call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager.

The value of *HCONN* must match the connection handle that was used to create the message handle specified in the **HMSG** parameter.

If the message handle was created by using HCUNAS, a valid connection must be established on the thread deleting the message handle. If a valid connection is not established, the call fails with RC2009.

HMSG (20-digit signed integer) - input

This handle is the message handle for which a buffer is required.

The value was returned by a previous MQCRTMH call.

MHBOPT (MQMHBO) - input

The MQMHBO structure allows applications to specify options that control how buffers are produced from message handles.

See "MQBMHO (Buffer to message handle options) on IBM i" on page 1006 for details.

PRNAME (MQCHARV) - input

The name of the property or properties to put into the buffer.

If no property matching the name can be found, the call fails with RC2471.

Wildcards

You can use a wildcard to put more than one property into the buffer. To do so, use the percent sign (%) at the end of the property name. This wildcard matches zero or more characters, including the period (.) character.

See Property names and Property name restrictions for further information about the use of property names.

MSGDSC (MQMD) - input/output

The *MSGDSC* structure describes the contents of the buffer area.

On output, the *Encoding*, *CodedCharSetId* and *Format* fields are set to correctly describe the encoding, character set identifier, and format of the data in the buffer area as written by the call.

Data in this structure is in the character set and encoding of the application.

BUFLEN (10-digit signed integer) - input

BUFFLEN is the length of the Buffer area, in bytes.

BUFFER (1-byte bit string x BUFLEN) - input/output

BUFFER defines the area containing the message buffer. For most data, you must align the buffer on a 4-byte boundary.

If *BUFFER* contains character or numeric data, set the *CodedCharSetId* and *Encoding* fields in the **MSGDSC** parameter to the values appropriate to the data; this enables the data to be converted, if necessary.

If properties are found in the message buffer they are optionally removed; they later become available from the message handle on return from the call.

In the C programming language, the parameter is declared as a pointer-to-void, which means the address of any type of data can be specified as the parameter.

If the **BUFLEN** parameter is zero, *BUFFER* is not referred to. In this case, the parameter address passed by programs written in C or System/390 assembler can be null.

DATLEN (10-digit signed integer) - output

DATLEN is the length, in bytes, of the returned properties in the buffer. If the value is zero, no properties matched the value given in *PRNAME* and the call fails with reason code RC2471.

If *BUFLEN* is less than the length required to store the properties in the buffer, the MQMHBUF call fails with RC2469, but a value is still entered into *DATLEN*. This allows the application to determine the size of the buffer required to accommodate the properties, and then reissue the call with the required *BUFLEN*.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2501
(2501, X'095C') Message handle to buffer options structure not valid.

RC2004
(2004, X'07D4') Buffer parameter not valid.

RC2005
(2005, X'07D5') Buffer length parameter not valid.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2009
(2009, X'07D9') Connection to queue manager lost.

RC2010
(2010, X'07DA') Data length parameter not valid.

RC2460
(2460, X'099C') Message handle not valid.

RC2026
(2026, X'07EA') Message descriptor not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2046
(2046, X'07FE') Options not valid or not consistent.

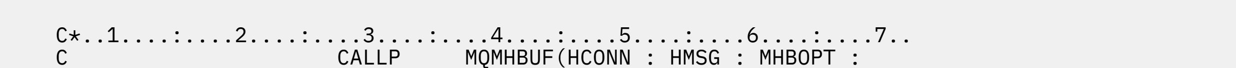
RC2442
(2442, X'098A') Property name is not valid.

RC2471
(2471, X'09A7') Property not available.

RC2469
(2469, X'09A5') BufferLength value is too small to contain specified properties.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration



```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQMHBUF(HCONN : HMSG : MHBOPT :
```

```
                                              PRNAME : MSGDSC : BUFLEN :
                                              BUFFER : DATLEN :
                                              CMPCOD : REASON)
```

The prototype definition for the call is:

```
     DMQMHBUF          PR                   EXTPROC('MQMHBUF')
     D* Connection handle
     D HCONN                         10I 0 VALUE
     D* Message handle
     D HMSG                          20I 0 VALUE
     D* Options that control the action of MQMHBUF
     D MHBOPT                        12A
     D* Property name
     D PRNAME                        32A
     D* Message descriptor
     D MSGDSC                       364A
     D* Length in bytes of the Buffer area
     D BUFLEN                        10I 0 VALUE
     D* Area to contain the properties
     D BUFFER                          *   VALUE
     D* Length of the properties
     D DATLEN                        10I 0
     D* Completion code
     D CMPCOD                        10I 0
     D* Reason code qualifying CompCode
     D REASON                        10I 0
```

IBM i MQOPEN (Open object) on IBM i

The MQOPEN call establishes access to an object.

The following types of object are valid:

- Queue (including distribution lists)
- Namelist
- Process definition
- Queue manager
- Topic

Index

- “Syntax” on page 1307
- “Usage notes” on page 1307
- “Parameters” on page 1311
- “RPG Declaration” on page 1318

Syntax

MQOPEN *(HCONN, OBJDSC, OPTS, HOBJ, CMPCOD, REASON)*

Usage notes

1. The object opened is one of the following:
   - A queue, in order to:
     - Get or browse messages (using the MQGET call)
     - Put messages (using the MQPUT call)
     - Inquire about the attributes of the queue (using the MQINQ call)
     - Set the attributes of the queue (using the MQSET call)

     If the queue named is a model queue, a dynamic local queue is created.

A distribution list is a special type of queue object that contains a list of queues. It can be opened to put messages, but not to get or browse messages, or to inquire or set attributes. See usage note 8 for further details.

A queue that has `QSGDISP(GROUP)` is a special type of queue definition that cannot be used with the MQOPEN or MQPUT1 calls.

- A namelist, in order to:
  - Inquire about the names of the queues in the list (using the MQINQ call).
- A process definition, in order to:
  - Inquire about the process attributes (using the MQINQ call).
- The queue manager, in order to:
  - Inquire about the attributes of the local queue manager (using the MQINQ call).

2. It is valid for an application to open the same object more than once. A different object handle is returned for each open. Each handle that is returned can be used for the functions for which the corresponding open was performed.
3. If the object being opened is a queue but not a cluster queue, all name resolution within the local queue manager takes place at the time of the MQOPEN call. This might include one or more of the following for a particular MQOPEN call:

   - Alias resolution to the name of a base queue
   - Resolution of the name of a local definition of a remote queue to the name of the remote queue manager, and the name by which the queue is known at the remote queue manager
   - Resolution of the remote queue manager name to the name of a local transmission queue

   However, be aware that subsequent MQINQ or MQSET calls for the handle relate solely to the name that has been opened, and not to the object resulting after name resolution has occurred. For example, if the object opened is an alias, the attributes returned by the MQINQ call are the attributes of the alias, not the attributes of the base queue to which the alias resolves. Name resolution checking is still carried out, however, regardless of what is specified for the **OPTS** parameter on the corresponding MQOPEN.

   If the object being opened is a cluster queue, name resolution can occur at the time of the MQOPEN call, or be deferred until later. The point at which resolution occurs is controlled by the OOBND* options specified on the MQOPEN call:

   - OOBNDO
   - OOBNDN
   - OOBNDQ

   See Name resolution for more information about name resolution for cluster queues.
4. The attributes of an object can change while an application has the object open. In many cases, the application does not notice this, but for certain attributes the queue manager marks the handle as no longer valid. These are:

   - Any attribute that affects the name resolution of the object. This applies regardless of the open options used, and includes the following:
     - A change to the **BaseQName** attribute of an alias queue that is open.
     - A change to the **RemoteQName** or **RemoteQMgrName** queue attributes, for any handle that is open for this queue, or for a queue which resolves through this definition as a queue manager alias.
     - Any change that causes a currently open handle for a remote queue to resolve to a different *transmission* queue, or to fail to resolve to one at all. For example, this can include:
       - A change to the **XmitQName** attribute of the local definition of a remote queue, whether the definition is being used for a queue, or for a queue manager alias.

There is one exception to this, namely the creation of a new transmission queue. A handle that would have resolved to this queue had it been present when the handle was opened, but instead resolved to the default transmission queue, is not made invalid.

– A change to the **DefXmitQName** queue manager attribute. In this case all open handles that resolved to the previously named queue (that resolved to it only because it was the default transmission queue) are marked as invalid. Handles that resolved to this queue for other reasons are not affected.

- The **Shareability** queue attribute, if there are two or more handles that are currently providing OOINPS access for this queue, or for a queue that resolves to this queue. If so, *all* handles that are open for this queue, or for a queue that resolves to this queue, are marked as invalid, regardless of the open options.
- The **Usage** queue attribute, for all handles that are open for this queue, or for a queue that resolves to this queue, regardless of the open options.

When a handle is marked as invalid, all subsequent calls (other than MQCLOSE) using this handle fail with reason code RC2041; the application should issue an MQCLOSE call (using the original handle) and then reopen the queue. Any uncommitted updates against the old handle from previous successful calls can still be committed or backed out, as required by the application logic.

If changing an attribute will cause this to happen, a special "force" version of the command must be used.

5. The queue manager performs security checks when an MQOPEN call is issued, to verify that the user identifier under which the application is running has the appropriate level of authority before access is permitted. The authority check is made on the name of the object being opened, and not on the name, or names, resulting after a name has been resolved.

   If the object being opened is a model queue, the queue manager performs a full security check against both the name of the model queue and the name of the dynamic queue that is created. If the resulting dynamic queue is then opened explicitly, a further resource security check is performed against the name of the dynamic queue.

6. A remote queue can be specified in one of two ways in the **OBJDSC** parameter of this call (see the *ODON* and *ODMN* fields described in "MQOD (Object descriptor) on IBM i" on page 1146):

   - By specifying for *ODON* the name of a local definition of the remote queue. In this case, *ODMN* refers to the local queue manager, and can be specified as blanks.

     The security validation performed by the local queue manager verifies that the user is authorized to open the local definition of the remote queue.

   - By specifying for *ODON* the name of the remote queue as known to the remote queue manager. In this case, *ODMN* is the name of the remote queue manager.

     The security validation performed by the local queue manager verifies that the user is authorized to send messages to the transmission queue resulting from the name resolution process.

   In either case:

   - No messages are sent by the local queue manager to the remote queue manager in order to check that the user is authorized to put messages on the queue.
   - When a message arrives at the remote queue manager, the remote queue manager might reject it because the user originating the message is not authorized.

7. An MQOPEN call with the OOBRW option establishes a browse cursor, for use with MQGET calls that specify the object handle and one of the browse options. This allows the queue to be scanned without altering its contents. A message that has been found by browsing can later be removed from the queue by using the GMMUC option.

   Multiple browse cursors can be active for a single application by issuing several MQOPEN requests for the same queue.

8. The following notes apply to the use of distribution lists.

   - Fields in the MQOD structure must be set as follows when opening a distribution list:

- *ODVER* must be ODVER2 or greater.
- *ODOT* must be OTQ.
- *ODON* must be blank or the null string.
- *ODMN* must be blank or the null string.
- *ODREC* must be greater than zero.
- One of *ODORO* and *ODORP* must be zero and the other nonzero.
- No more than one of *ODRRO* and *ODRRP* can be nonzero.
- There must be *ODREC* object records, addressed by either *ODORO* or *ODORP*. The object records must be set to the names of the destination queues to be opened.
- If one of *ODRRO* and *ODRRP* is nonzero, there must be *ODREC* response records present. They are set by the queue manager if the call completes with reason code RC2136.

A version-2 MQOD can also be used to open a single queue that is not in a distribution list, by ensuring that *ODREC* is zero.

- Only the following open options are valid in the **OPTS** parameter:
  - OOOUT
  - OOPAS*
  - OOSET*
  - OOALTU
  - OOFIQ
- The destination queues in the distribution list can be local, alias, or remote queues, but they cannot be model queues. If a model queue is specified, that queue fails to open, with reason code RC2057. However, this does not prevent other queues in the list being opened successfully.
- The completion code and reason code parameters are set as follows:
  - If the open operations for the queues in the distribution list all succeed or fail in the same way, the completion code and reason code parameters are set to describe the common result. The MQRR response records (if provided by the application) are not set in this case.

    For example, if every open succeeds, the completion code is set to CCOK and the reason code is RCNONE; if every open fails because none of the queues exists, the parameters are set to CCFAIL and RC2085.
  - If the open operations for the queues in the distribution list do not all succeed or fail in the same way:
    - The completion code parameter is set to CCWARN if at least one open succeeded, and to CCFAIL if all failed.
    - The reason code parameter is set to RC2136.
    - The response records (if provided by the application) are set to the individual completion codes and reason codes for the queues in the distribution list.
- When a distribution list has been opened successfully, the handle *HOBJ* returned by the call can be used on subsequent MQPUT calls to put messages to queues in the distribution list, and on an MQCLOSE call to relinquish access to the distribution list. The only valid close option for a distribution list is CONONE.

  The MQPUT1 call can also be used to put a message to a distribution list; the MQOD structure defining the queues in the list is specified as a parameter on that call.
- Each successfully opened destination in the distribution list counts as a *separate* handle when checking whether the application has exceeded the permitted maximum number of handles (see the **MaxHandles** queue manager attribute). This is true even when two or more of the destinations in the distribution list actually resolve to the same physical queue. If the MQOPEN or MQPUT1 call for a distribution list would cause the number of handles in use by the application to exceed *MaxHandles*, the call fails with reason code RC2017.

- Each destination that is opened successfully has the value of its **OpenOutputCount** attribute incremented by one. If two or more of the destinations in the distribution list actually resolve to the same physical queue, that queue has its **OpenOutputCount** attribute incremented by the number of destinations in the distribution list that resolve to that queue.
- Any change to the queue definitions that would have caused a handle to become invalid had the queues been opened individually (for example, a change in the resolution path), does not cause the distribution-list handle to become invalid. However, it does result in a failure for that particular queue when the distribution-list handle is used on a subsequent MQPUT call.
- It is valid for a distribution list to contain only one destination.

9. The following notes apply to the use of cluster queues.

   - When a cluster queue is opened for the first time, and the local queue manager is not a full repository queue manager, the local queue manager obtains information about the cluster queue from a full repository queue manager. When the network is busy, it may take several seconds for the local queue manager to receive the needed information from the repository queue manager. As a result, the application issuing the MQOPEN call might have to wait for up to 10 seconds before control returns from the MQOPEN call. If the local queue manager does not receive the needed information about the cluster queue within this time, the call fails with reason code RC2189.
   - When a cluster queue is opened and there are multiple instances of the queue in the cluster, the instance actually opened depends on the options specified on the MQOPEN call:
     - If the options specified include any of the following:
       - OOBRW
       - OOINPQ
       - OOINPX
       - OOINPS
       - OOSET

       the instance of the cluster queue opened is required to be the local instance. If there is no local instance of the queue, the MQOPEN call fails.
     - If the options specified include none of the above, but do include one or both of the following:
       - OOINQ
       - OOOUT

       the instance opened is the local instance if there is one, and a remote instance otherwise. The instance chosen by the queue manager can, however, be altered by a cluster workload exit (if there is one).

   For more information about cluster queues, see Cluster queues.

10. Applications started by a trigger monitor are passed the name of the queue that is associated with the application when the application is started. This queue name can be specified in the **OBJDSC** parameter to open the queue. See the description of the MQTMC structure for further details.
11. When using the OORLOQ option, the local queue is already returned when either a local, alias, or model queue is opened, but this is not the case when, for example, a remote queue or a non-local cluster queue is opened; the ResolvedQName and ResolvedQMgrName are entered with the RemoteQName and RemoteQMgrName found in the remote queue definition, or similarly with the chosen remote cluster queue. If OORLOQ is specified when opening, for example, a remote queue, ResolvedQName will now be the transmission queue which messages will be put to. The ResolvedQMgrName will be entered with the name of the local queue manager hosting the transmission queue. If a user is authorized for browse, input or output on a queue, they have the required authority to specify this flag on the MQOPEN call. No special authority is needed.

Parameters

The MQOPEN call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

OBJDSC (MQOD) - input/output

Object descriptor.

This is a structure that identifies the object to be opened; see "MQOD (Object descriptor) on IBM i" on page 1146 for details.

If the *ODON* field in the **OBJDSC** parameter is the name of a model queue, a dynamic local queue is created with the attributes of the model queue; this happens irrespective of the open options specified by the **OPTS** parameter. Subsequent operations using the *HOBJ* returned by the MQOPEN call are performed on the new dynamic queue, and not on the model queue. This is true even for the MQINQ and MQSET calls. The name of the model queue in the **OBJDSC** parameter is replaced with the name of the dynamic queue created. The type of the dynamic queue is determined by the value of the **DefinitionType** attribute of the model queue (see "Attributes for queues" on page 1353). For information about the close options applicable to dynamic queues, see the description of the MQCLOSE call.

OPTS (10-digit signed integer) - input

Options that control the action of MQOPEN.

At least one of the following options must be specified:

- OOBRW
- OOINP* (only one of these)
- OOINQ
- OOOUT
- OOSET
- OORLQ

Other options can be specified as required. If more than one option is required, the values can be added (do not add the same constant more than once). Combinations that are not valid are noted; all other combinations are valid. Only options that are applicable to the type of object specified by *OBJDSC* are allowed (see Valid MQOPEN options for each queue type).

Access options: The following options control the type of operations that can be performed on the object:

OOINPQ

Open queue to get messages using queue-defined default.

The queue is opened for use with subsequent MQGET calls. The type of access is either shared or exclusive, depending on the value of the **DefInputOpenOption** queue attribute; see "Attributes for queues" on page 1353 for details.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

OOINPS

Open queue to get messages with shared access.

The queue is opened for use with subsequent MQGET calls. The call can succeed if the queue is currently open by this or another application with OOINPS, but fails with reason code RC2042 if the queue is currently open with OOINPX.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

OOINPX

Open queue to get messages with exclusive access.

The queue is opened for use with subsequent MQGET calls. The call fails with reason code RC2042 if the queue is currently open by this or another application for input of any type (OOINPS or OOINPX).

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects that are not queues.

The following notes apply to these options:

- Only one of these options can be specified.
- An MQOPEN call with one of these options can succeed even if the **InhibitGet** queue attribute is set to QAGETI (although subsequent MQGET calls will fail while the attribute is set to this value).
- If the queue is defined as not being shareable (that is, the **Shareability** queue attribute has the value QANSHR), attempts to open the queue for shared access are treated as attempts to open the queue with exclusive access.
- If an alias queue is opened with one of these options, the test for exclusive use (or for whether another application has exclusive use) is against the base queue to which the alias resolves.
- These options are not valid if *ODMN* is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

OOBRW

Open queue to browse messages.

The queue is opened for use with subsequent MQGET calls with one of the following options:

- GMBRWF
- GMBRWN
- GMBRWC

This is allowed even if the queue is currently open for OOINPX. An MQOPEN call with the OOBRW option establishes a browse cursor, and positions it logically before the first message on the queue; see the *GMOPT* field described in "MQGMO (Get-message options) on IBM i" on page 1064 for further information.

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects which are not queues. It is also not valid if *ODMN* is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

OOOUT

Open queue to put messages, or a topic or topic string to publish messages.

The queue is opened for use with subsequent MQPUT calls.

An MQOPEN call with this option can succeed even if the **InhibitPut** queue attribute is set to QAPUTI (although subsequent MQPUT calls will fail while the attribute is set to this value).

This option is valid for all types of queue, including distribution lists and topics.

OOINQ

Open object to inquire attributes.

The queue, namelist, process definition, or queue manager is opened for use with subsequent MQINQ calls.

This option is valid for all types of object other than distribution lists. It is not valid if *ODMN* is the name of a queue manager alias; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

OOSET

Open queue to set attributes.

The queue is opened for use with subsequent MQSET calls.

This option is valid for all types of queue other than distribution lists. It is not valid if *ODMN* is the name of a local definition of a remote queue; this is true even if the value of the **RemoteQMgrName** attribute in the local definition of a remote queue used for queue manager aliasing is the name of the local queue manager.

Binding options: The following options apply when the object being opened is a cluster queue; these options control the binding of the queue handle to an instance of the cluster queue:

OOBNDO

Bind handle to destination when queue is opened.

This causes the local queue manager to bind the queue handle to an instance of the destination queue when the queue is opened. As a result, all messages put using this handle are sent to the same instance of the destination queue, and by the same route.

This option is valid only for queues, and affects only cluster queues. If specified for a queue that is not a cluster queue, the option is ignored.

OOBNDN

Do not bind to a specific destination.

This stops the local queue manager binding the queue handle to an instance of the destination queue. As a result, successive MQPUT calls using this handle may result in the messages being sent to *different* instances of the destination queue, or being sent to the same instance but by different routes. It also allows the instance selected to be changed later by the local queue manager, by a remote queue manager, or by a message channel agent (MCA), according to network conditions.

Note: Client and server applications which need to exchange a *series* of messages in order to complete a transaction should not use OOBNDN (or OOBNDQ when *DefBind* has the value BNDNOT), because successive messages in the series may be sent to different instances of the server application.

If OOBRW or one of the OOINP* options is specified for a cluster queue, the queue manager is forced to select the local instance of the cluster queue. As a result, the binding of the queue handle is fixed, even if OOBNDN is specified.

If OOINQ is specified with OOBNDN, successive MQINQ calls using that handle may inquire different instances of the cluster queue, although typically all of the instances have the same attribute values.

OOBNDN is valid only for queues, and affects only cluster queues. If specified for a queue that is not a cluster queue, the option is ignored.

OOBNDQ

Use default binding for queue.

This causes the local queue manager to bind the queue handle in the way defined by the **DefBind** queue attribute. The value of this attribute is either BNDOPN or BNDNOT.

OOBNDQ is the default if OOBNDO and OOBNDN are not specified.

OOBNDQ is defined to aid program documentation. It is not intended that this option is used with either of the other two bind options, but because its value is zero such use cannot be detected.

Context options: The following options control the processing of message context:

OOSAVA

Save context when message retrieved.

Context information is associated with this queue handle. This information is set from the context of any message retrieved using this handle. For more information about message context, see Message context and Controlling context information.

This context information can be passed to a message that is later put on a queue using the MQPUT or MQPUT1 calls. See the PMPASI and PMPASA options described in "MQPMO (Put-message options) on IBM i" on page 1160.

Until a message has been successfully retrieved, context cannot be passed to a message being put on a queue.

A message retrieved using one of the GMBRW* browse options does not have its context information saved (although the context fields in the **MSGDSC** parameter are set after a browse).

This option is valid only for local, alias, and model queues; it is not valid for remote queues, distribution lists, and objects which are not queues. One of the OOINP* options must be specified.

OOPASI
Allow identity context to be passed.

This allows the PMPASI option to be specified in the **PMO** parameter when a message is put on a queue; this gives the message the identity context information from an input queue that was opened with the OOSAVA option. For more information about message context, see Message context and Controlling context information.

The OOOUT option must be specified.

This option is valid for all types of queue, including distribution lists.

OOPASA
Allow all context to be passed.

This allows the PMPASA option to be specified in the **PMO** parameter when a message is put on a queue; this gives the message the identity and origin context information from an input queue that was opened with the OOSAVA option. For more information about message context, see Message context and Controlling context information.

This option implies OOPASI, which need not therefore be specified. The OOOUT option must be specified.

This option is valid for all types of queue, including distribution lists.

OOSETI
Allow identity context to be set.

This allows the PMSETI option to be specified in the **PMO** parameter when a message is put on a queue; this gives the message the identity context information contained in the **MSGDSC** parameter specified on the MQPUT or MQPUT1 call. For more information about message context, see Message context and Controlling context information.

This option implies OOPASI, which need not therefore be specified. The OOOUT option must be specified.

This option is valid for all types of queue, including distribution lists.

OOSETA
Allow all context to be set.

This allows the PMSETA option to be specified in the **PMO** parameter when a message is put on a queue; this gives the message the identity and origin context information contained in the **MSGDSC** parameter specified on the MQPUT or MQPUT1 call. For more information about message context, see Message context and Controlling context information.

This option implies the following options, which need not therefore be specified:

- OOPASI
- OOPASA

- OOSETI

The OOOUT option must be specified.

This option is valid for all types of queue, including distribution lists.

Other options: The following options control authorization checking, and what happens when the queue manager is quiescing:

OOALTU
Validate with specified user identifier.

This indicates that the *ODAU* field in the **OBJDSC** parameter contains a user identifier that is to be used to validate this MQOPEN call. The call can succeed only if this *ODAU* is authorized to open the object with the specified access options, regardless of whether the user identifier under which the application is running is authorized to do so. This does not apply to any context options specified, however, which are always checked against the user identifier under which the application is running.

This option is valid for all types of object.

OOFIQ
Fail if queue manager is quiescing.

This option forces the MQOPEN call to fail if the queue manager is in quiescing state.

This option is valid for all types of object.

OORLQ
Enter the name of local queue that was opened.

This option specifies that the ResolvedQName in the MQOD structure (if available) should be entered with the name of the local queue which was opened. The ResolvedQMgrName will similarly be entered with the name of the local queue manager hosting the local queue.

Table 750. Valid MQOPEN options for each queue type

Option	Alias (“1” on page 1317)	Local and Model	Remote	Nonlocal Cluster	Distribution list	Topic
OOINPQ	✓	✓	-	-	-	-
OOINPS	✓	✓	-	-	-	-
OOINPX	✓	✓	-	-	-	-
OOBRW	✓	✓	-	-	-	-
OOOUT	✓	✓	✓	✓	✓	✓
OOINQ	✓	✓	“2” on page 1317	✓	-	-
OOSET	✓	✓	“2” on page 1317	-	-	-
OOBNDO (“3” on page 1317)	✓	✓	✓	✓	✓	-
OOBNDN (“3” on page 1317)	✓	✓	✓	✓	✓	-
OOBNDQ (“3” on page 1317)	✓	✓	✓	✓	✓	-

Option	Alias (“1” on page 1317)	Local and Model	Remote	Nonlocal Cluster	Distribution list	Topic
OOSAVA	✓	✓	-	-	-	-
OOPASI	✓	✓	✓	✓	✓	“5” on page 1317
OOPASA	✓	✓	✓	✓	✓	“5” on page 1317
OOSETI	✓	✓	✓	✓	✓	“5” on page 1317
OOSETA	✓	✓	✓	✓	✓	“5” on page 1317
OOALTU	✓	✓	✓	✓	✓	✓
OOFIQ	✓	✓	✓	✓	✓	✓
OORLQ	✓	✓	✓	✓	-	-

Table 750. Valid MQOPEN options for each queue type (continued)

Notes:

1. The validity of options for aliases depends on the validity of the option for the queue to which the alias resolves.
2. This option is valid only for the local definition of a remote queue.
3. This option can be specified for any queue type, but is ignored if the queue is not a cluster queue.
4. This attribute is ignored for a topic.
5. These attributes can be used with a topic, but only affect the context set for the retained message, not the context fields sent to any subscriber.

HOBJ (10-digit signed integer) - output

Object handle.

This handle represents the access that has been established to the object. It must be specified on subsequent message queuing calls that operate on the object. It ceases to be valid when the MQCLOSE call is issued, or when the unit of processing that defines the scope of the handle terminates.

The scope of the handle is restricted to the smallest unit of parallel processing supported by the platform on which the application is running; the handle is not valid outside the unit of parallel processing from which the MQOPEN call was issued:

- On IBM i, the scope of the handle is the job issuing the call.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

RPG Declaration

```
     C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     C                     CALLP     MQOPEN(HCONN : OBJDSC : OPTS :
     C                                      HOBJ : CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQOPEN           PR                  EXTPROC('MQOPEN')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object descriptor
D OBJDSC                       468A
D* Options that control the action of MQOPEN
D OPTS                          10I 0 VALUE
D* Object handle
D HOBJ                          10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQPUT (Put message) on IBM i

The MQPUT call puts a message on a queue, distribution list or to a topic. The queue, distribution list, or topic must already be open.

- "Syntax" on page 1318
- "Usage notes" on page 1318
  - "Topics" on page 1318
  - "MQPUT and MQPUT1" on page 1319
  - "Destination queues" on page 1319
  - "Distribution lists" on page 1320
  - "Headers" on page 1321
  - "Buffer" on page 1322
- "Parameters" on page 1322
- "RPG Declaration" on page 1327

Syntax

MQPUT *(HCONN, HOBJ, MSGDSC, PMO, BUFLEN, BUFFER, CMPCOD, REASON)*

Usage notes

Topics

The following notes apply to the use of topics:

1. When using MQPUT to publish messages on a topic, where one or more subscribers to that topic cannot be given the publication due to a problem with their subscriber queue (for example it is full), the Reason code returned to the MQPUT call and the delivery behavior is dependent on the setting of the PMSGDLV or NPMSGDLV attributes on the TOPIC. Note that delivery of a publication to the dead letter queue when RODLQ is specified, or discarding the message when RODISC is specified, is considered a successful delivery of the message. If none of the publications are delivered, the MQPUT will return with RC2502. This can happen in the following cases:

- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALL and any subscription (durable or not) has a queue which cannot receive the publication.
- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLDUR and a durable subscription has a queue which cannot receive the publication.

The MQPUT can return with RCNONE even though publications could not be delivered to some subscribers in the following cases:

- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLAVAIL and any subscription, durable or not, has a queue which cannot receive the publication.
- A message is published to a TOPIC with PMSGDLV or NPMSGDLV (depending on the persistence of the message) set to ALLDUR and a non-durable subscription has a queue which cannot receive the publication.

2. If there are no subscribers to the topic being used, the message published is not sent to any queue and is discarded. It does not make any difference whether this message is persistent or non-persistent, or whether it has unlimited expiry or some small expiry time, it is still discarded if there are no subscribers. The exception to this is if the message is to be retained, in which case, although it is not sent to any subscribers' queues, it is stored against the topic to be delivered to any new subscriptions or to any subscribers that ask for retained publications using MQSUBRQ.

MQPUT and MQPUT1

Both the MQPUT and MQPUT1 calls can be used to put messages on a queue; which call to use depends on the circumstances

- The MQPUT call should be used when multiple messages are to be placed on the *same* queue.

  An MQOPEN call specifying the OOOUT option is issued first, followed by one or more MQPUT requests to add messages to the queue; finally the queue is closed with an MQCLOSE call. This gives better performance than repeated use of the MQPUT1 call.
- The MQPUT1 call should be used when only *one* message is to be put on a queue.

  This call encapsulates the MQOPEN, MQPUT, and MQCLOSE calls into a single call, minimizing the number of calls that must be issued.

Destination queues

If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if the following conditions are satisfied. Some conditions apply to both local and remote destination queues; other conditions apply only to remote destination queues.

Conditions for local and remote destination queues

- All of the MQPUT calls are within the same unit of work, or none of them is within a unit of work.

  When messages are put onto a particular queue within a single unit of work, messages from other applications might be interspersed with the sequence of messages on the queue.
- All of the MQPUT calls are made using the same object handle *HOBJ*.

  In some environments, message sequence is also preserved when different object handles are used, provided the calls are made from the same application. The meaning of "same application" is determined by the environment:

  – On IBM i, the application is the job.
- The messages all have the same priority.

Additional conditions for remote destination queues

- There is only one path from the sending queue manager to the destination queue manager.

If there is a possibility that some messages in the sequence may go on a different path (for example, because of reconfiguration, traffic balancing, or path selection based on message size), the order of the messages at the destination queue manager cannot be guaranteed.

- Messages are not placed temporarily on dead-letter queues at the sending, intermediate, or destination queue managers.

  If one or more of the messages is put temporarily on a dead-letter queue (for example, because a transmission queue or the destination queue is temporarily full), the messages can arrive on the destination queue out of sequence.

- The messages are either all persistent or all nonpersistent.

  If a channel on the route between the sending and destination queue managers has its **CDNPM** attribute set to NPFAST, nonpersistent messages can jump ahead of persistent messages, resulting in the order of persistent messages relative to nonpersistent messages not being preserved. However, the order of persistent messages relative to each other, and of nonpersistent messages relative to each other, is preserved.

If these conditions are not satisfied, message groups can be used to preserve message order, but note that this requires both the sending and receiving applications to use the message-grouping support. For more information about message groups, see:

- *MDMFL* field in MQMD
- PMLOGO option in MQPMO
- GMLOGO option in MQGMO

Distribution lists

The following notes apply to the use of distribution lists.

1. Messages can be put to a distribution list using either a version-1 or a version-2 MQPMO. If a version-1 MQPMO is used (or a version-2 MQPMO with *PMREC* equal to zero), no put message records or response records can be provided by the application. This means that it will not be possible to identify the queues which encounter errors, if the message is sent successfully to some queues in the distribution list and not others.

   If put message records or response records are provided by the application, the *PMVER* field must be set to PMVER2.

   A version-2 MQPMO can also be used to send messages to a single queue that is not in a distribution list, by ensuring that *PMREC* is zero.

2. The completion code and reason code parameters are set as follows:

   - If the puts to the queues in the distribution list all succeed or fail in the same way, the completion code and reason code parameters are set to describe the common result. The MQRR response records (if provided by the application) are not set in this case.

     For example, if every put succeeds, the completion code is set to CCOK and the reason code is RCNONE; if every put fails because all of the queues are inhibited for puts, the parameters are set to CCFAIL and RC2051.

   - If the puts to the queues in the distribution list do not all succeed or fail in the same way:

     – The completion code parameter is set to CCWARN if at least one put succeeded, and to CCFAIL if all failed.

     – The reason code parameter is set to RC2136.

     – The response records (if provided by the application) are set to the individual completion codes and reason codes for the queues in the distribution list.

     If the put to a destination fails because the open for that destination failed, the fields in the response record are set to CCFAIL and RC2137; that destination is included in *PMIDC*.

3. If a destination in the distribution list resolves to a local queue, the message is placed on that queue in normal form (that is, not as a distribution-list message). If more than one destination resolves to the same local queue, one message is placed on the queue for each such destination.

   If a destination in the distribution list resolves to a remote queue, a message is placed on the appropriate transmission queue. Where several destinations resolve to the same transmission queue, a single distribution-list message containing those destinations may be placed on the transmission queue, even if those destinations were not adjacent in the list of destinations provided by the application. However, this can be done only if the transmission queue supports distribution-list messages (see the **DistLists** queue attribute described in "Attributes for queues" on page 1353).

   If the transmission queue does not support distribution lists, one copy of the message in normal form is placed on the transmission queue for each destination that uses that transmission queue.

   If a distribution list with the application message data is too large for a transmission queue, the distribution list message is split up into smaller distribution-list messages, each containing fewer destinations. If the application message data only just fits on the queue, distribution-list messages cannot be used at all, and the queue manager generates one copy of the message in normal form for each destination that uses that transmission queue.

   If different destinations have different message priority or message persistence (this can occur when the application specifies PRQDEF or PEQDEF), the messages are not held in the same distribution-list message. Instead, the queue manager generates as many distribution-list messages as are necessary to accommodate the differing priority and persistence values.
4. A put to a distribution list might result in:
   - A single distribution-list message, or
   - A number of smaller distribution-list messages, or
   - A mixture of distribution list messages and normal messages, or
   - Normal messages only.

   Which of the previous occurs depends on whether:
   - The destinations in the list are local, remote, or a mixture.
   - The destinations have the same message priority and message persistence.
   - The transmission queues can hold distribution-list messages.
   - The transmission queues' maximum message lengths are large enough to accommodate the message in distribution-list form.

   However, regardless of which of the above occurs, each *physical* message resulting (that is, each normal message or distribution-list message resulting from the put) counts as only *one* message when:
   - Checking whether the application has exceeded the permitted maximum number of messages in a unit of work (see the **MaxUncommittedMsgs** queue manager attribute).
   - Checking whether the triggering conditions are satisfied.
   - Incrementing queue depths and checking whether the queues' maximum queue depth would be exceeded.
5. Any change to the queue definitions that would have caused a handle to become invalid had the queues been opened individually (for example, a change in the resolution path), does not cause the distribution-list handle to become invalid. However, it does result in a failure for that particular queue when the distribution-list handle is used on a subsequent MQPUT call.

Headers

If a message is put with one or more IBM MQ header structures at the beginning of the application message data, the queue manager performs certain checks on the header structures to verify that they are valid. If the queue manager detects an error, the call fails with an appropriate reason code. The checks performed vary according to the particular structures that are present. In addition, the checks are performed only if a version-2 or later MQMD is used on the MQPUT or MQPUT1 call; the checks are

not performed if a version-1 MQMD is used, even if an MQMDE is present at the start of the application message data.

The following IBM MQ header structures are validated completely by the queue manager: MQDH, MQMDE.

For other IBM MQ header structures, the queue manager performs some validation, but does not check every field. Structures that are not supported by the local queue manager, and structures following the first MQDLH in the message, are not validated.

In addition to general checks on the fields in IBM MQ structures, the following conditions must be satisfied:

- An IBM MQ structure must not be split over two or more segments - the structure must be entirely contained within one segment.
- The sum of the lengths of the structures in a PCF message must equal the length specified by the **BUFLEN** parameter on the MQPUT or MQPUT1 call. A PCF message is a message that has one of the following format names:
  - FMADMN
  - FMEVNT
  - FMPCF
- IBM MQ structures must not be truncated, except in the following situations where truncated structures are permitted:
  - Messages which are report messages.
  - PCF messages.
  - Messages containing an MQDLH structure. (Structures *following* the first MQDLH can be truncated; structures preceding the MQDLH cannot.)

Buffer

The **BUFFER** parameter shown in the RPG programming example is declared as a string; this restricts the maximum length of the parameter to 256 bytes. If a larger buffer is required, the parameter should be declared instead as a structure, or as a field in a physical file. This will increase the maximum length possible to approximately 32 KB.

Parameters

The MQPUT call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

HOBJ (10-digit signed integer) - input

Object handle.

This handle represents the queue to which the message is added, or the topic to which the message is published. The value of *HOBJ* was returned by a previous MQOPEN call that specified the OOOUT option.

MSGDSC (MQMD) - input/output

Message descriptor.

This structure describes the attributes of the message being sent, and receives information about the message after the put request is complete. See "MQMD (Message descriptor) on IBM i" on page 1097 for details.

If the application provides a version-1 MQMD, the message data can be prefixed with an MQMDE structure in order to specify values for the fields that exist in the version-2 MQMD but not the version-1. The *MDFMT* field in the MQMD must be set to FMMDE to indicate that an MQMDE is present. See "MQMDE (Message descriptor extension) on IBM i" on page 1140 for more details.

PMO (MQPMO) - input/output

Options that control the action of MQPUT.

See "MQPMO (Put-message options) on IBM i" on page 1160 for details.

BUFLEN (10-digit signed integer) - input

Length of the message in *BUFFER*.

Zero is valid, and indicates that the message contains no application data. The upper limit for *BUFLEN* depends on various factors:

- If the destination queue is a shared queue, the upper limit is 63 KB (64 512 bytes).
- If the destination is a local queue or resolves to a local queue (but is not a shared queue), the upper limit depends on whether:
  - The local queue manager supports segmentation.
  - The sending application specifies the flag that allows the queue manager to segment the message. This flag is MFSEGA, and can be specified either in a version-2 MQMD, or in an MQMDE used with a version-1 MQMD.

  If both of these conditions are satisfied, *BUFLEN* cannot exceed 999 999 999 minus the value of the *MDOFF* field in MQMD. The longest logical message that can be put is therefore 999 999 999 bytes (when *MDOFF* is zero). However, resource constraints imposed by the operating system or environment in which the application is running may result in a lower limit.

  If one or both of the previously described conditions are not satisfied, *BUFLEN* cannot exceed the smaller of the queue's **MaxMsgLength** attribute and queue manager's **MaxMsgLength** attribute.
- If the destination is a remote queue or resolves to a remote queue, the conditions for local queues apply, *but at each queue manager through which the message must pass in order to reach the destination queue* ; in particular:
  1. The local transmission queue used to store the message temporarily at the local queue manager
  2. Intermediate transmission queues (if any) used to store the message at queue managers on the route between the local and destination queue managers
  3. The destination queue at the destination queue manager

  The longest message that can be put is therefore governed by the most restrictive of these queues and queue managers.

  When a message is on a transmission queue, additional information resides with the message data, and this reduces the amount of application data that can be carried. In this situation it is recommended that LNMHD bytes be subtracted from the *MaxMsgLength* values of the transmission queues when determining the limit for *BUFLEN*.

  Note: Only failure to comply with condition 1 can be diagnosed synchronously (with reason code RC2030 or RC2031) when the message is put. If conditions 2 or 3 are not satisfied, the message is redirected to a dead-letter (undelivered-message) queue, either at an intermediate queue manager or at the destination queue manager. If this happens, a report message is generated if one was requested by the sender.

BUFFER (1-byte bit string x BUFLEN) - input

Message data.

This is a buffer containing the application data to be sent. The buffer should be aligned on a boundary appropriate to the nature of the data in the message. 4-byte alignment should be suitable for most messages (including messages containing MQ header structures), but some messages may require

more stringent alignment. For example, a message containing a 64-bit binary integer might require 8-byte alignment.

If *BUFFER* contains character data, numeric data, or both, the *MDCSI* and *MDENC* fields in the **MSGDSC** parameter should be set to the values appropriate to the data; this will enable the receiver of the message to convert the data (if necessary) to the character set and encoding used by the receiver.

Note: All of the other parameters on the MQPUT call must be in the character set given by the **CodedCharSetId** queue manager attribute, and encoding of the local queue manager given by the ENNAT.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2104
(2104, X'838') Report option in message descriptor not recognized.

RC2136
(2136, X'858') Multiple reason codes returned.

If *CMPCOD* is CCFAIL:

RC2004
(2004, X'7D4') Buffer parameter not valid.

RC2005
(2005, X'7D5') Buffer length parameter not valid.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2013
(2013, X'7DD') Expiry time not valid.

RC2014
(2014, X'7DE') Feedback code not valid.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2024
(2024, X'7E8') No more messages can be handled within current unit of work.

RC2026
(2026, X'7EA') Message descriptor not valid.

RC2027
(2027, X'7EB') Missing reply-to queue.

RC2029
(2029, X'7ED') Message type in message descriptor not valid.

RC2030
(2030, X'7EE') Message length greater than maximum for queue.

RC2031
(2031, X'7EF') Message length greater than maximum for queue manager.

RC2039
(2039, X'7F7') Queue not open for output.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2047
(2047, X'7FF') Persistence not valid.

RC2048
(2048, X'800') Queue does not support persistent messages.

RC2050
(2050, X'802') Message priority not valid.

RC2051
(2051, X'803') Put calls inhibited for the queue.

RC2052
(2052, X'804') Queue has been deleted.

RC2053
(2053, X'805') Queue already contains maximum number of messages.

RC2056
(2056, X'808') No space available on disk for queue.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2061
(2061, X'80D') Report options in message descriptor not valid.

RC2071
(2071, X'817') Insufficient storage available.

RC2072
(2072, X'818') Syncpoint support not available.

RC2093
(2093, X'82D') Queue not open for pass all context.

RC2094
(2094, X'82E') Queue not open for pass identity context.

RC2095
(2095, X'82F') Queue not open for set all context.

RC2096
(2096, X'830') Queue not open for set identity context.

RC2097
(2097, X'831') Queue handle referred to does not save context.

RC2098
(2098, X'832') Context not available for queue handle referred to.

RC2101
(2101, X'835') Object damaged.

RC2102
(2102, X'836') Insufficient system resources available.

RC2135
(2135, X'857') Distribution header structure not valid.

RC2136
(2136, X'858') Multiple reason codes returned.

RC2137
(2137, X'859') Object not opened successfully.

RC2149
(2149, X'865') PCF structures not valid.

RC2154
(2154, X'86A') Number of records present not valid.

RC2156
(2156, X'86C') Response records not valid.

RC2158
(2158, X'86E') Put message record flags not valid.

RC2159
(2159, X'86F') Put message records not valid.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2173
(2173, X'87D') Put-message options structure not valid.

RC2185
(2185, X'889') Inconsistent persistence specification.

RC2188
(2188, X'88C') Call rejected by cluster workload exit.

RC2189
(2189, X'88D') Cluster name resolution failed.

RC2195
(2195, X'893') Unexpected error occurred.

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2241
(2241, X'8C1') Message group not complete.

RC2242
(2242, X'8C2') Logical message not complete.

RC2245
(2245, X'8C5') Inconsistent unit-of-work specification.

RC2248
(2248, X'8C8') Message descriptor extension not valid.

RC2249
(2249, X'8C9') Message flags not valid.

RC2250
(2250, X'8CA') Message sequence number not valid.

RC2251
(2251, X'8CB') Message segment offset not valid.

RC2252
(2252, X'8CC') Original length not valid.

RC2253
(2253, X'8CD') Length of data in message segment is zero.

RC2255
(2255, X'8CF') Unit of work not available for the queue manager to use.

RC2257
(2257, X'8D1') Wrong version of MQMD supplied.

RC2258
(2258, X'8D2') Group identifier not valid.

RC2266
(2266, X'8DA') Cluster workload exit failed.

RC2269
(2269, X'8DD') Cluster resource error.

RC2270
(2270, X'8DE') No destination queues available.

RC2420
(2420) An MQPUT call was issued, but the message data contains an MQEPH structure that is not valid.

RC2479
(2479, X'9AF') Publication could not be retained.

RC2480
(2480, X'9B0') Target type has changed: the alias queue referred to a queue but now refers to a topic.

RC2502
(2502, X'9C6') Publication failed, and publication has not been delivered to any subscribers

RC2551
(2551, X'9F7') Specified selection string is not available.

RC2554
(2554, X'9FA') Message content could not be parsed to determine whether the message should be delivered to a subscriber with an extended message selector.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQPUT(HCONN : HOBJ : MSGDSC : PMO :
C                                     BUFLEN : BUFFER : CMPCOD :
C                                     REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQPUT            PR                  EXTPROC('MQPUT')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object handle
D HOBJ                          10I 0 VALUE
D* Message descriptor
D MSGDSC                       364A
D* Options that control the action of MQPUT
D PMO                          200A
D* Length of the message in Buffer
D BUFLEN                        10I 0 VALUE
D* Message data
D BUFFER                          *   VALUE
D* Completion code
D CMPCOD                        10I 0
```

```
D* Reason code qualifying CMPCOD
D REASON                         10I 0
```

IBM i MQPUT1 (Put one message) on IBM i

The MQPUT1 call puts one message on a queue or distribution list, or to a topic. The queue, distribution list, or topic does not need to be open.

- “Syntax” on page 1328
- “Usage notes” on page 1328
- “Parameters” on page 1329
- “RPG Declaration” on page 1334

Syntax

MQPUT1 *(HCONN, OBJDSC, MSGDSC, PMO, BUFLEN, BUFFER, CMPCOD, REASON)*

Usage notes

1. Both the MQPUT and MQPUT1 calls can be used to put messages on a queue; which call to use depends on the circumstances:
   - The MQPUT call should be used when multiple messages are to be placed on the *same* queue.

     An MQOPEN call specifying the OOOUT option is issued first, followed by one or more MQPUT requests to add messages to the queue; finally the queue is closed with an MQCLOSE call. This gives better performance than repeated use of the MQPUT1 call.
   - The MQPUT1 call should be used when only *one* message is to be put on a queue.

     This call encapsulates the MQOPEN, MQPUT, and MQCLOSE calls into a single call, minimizing the number of calls that must be issued.
2. If an application puts a sequence of messages on the same queue without using message groups, the order of those messages is preserved if certain conditions are satisfied. However, in most environments the MQPUT1 call does not satisfy these conditions, and so does not preserve message order. The MQPUT call must be used instead in these environments. See the usage notes in the description of the MQPUT call for details.
3. The MQPUT1 call can be used to put messages to distribution lists. For general information about this, see the usage notes for the MQOPEN and MQPUT calls.

   The following differences apply when using the MQPUT1 call:

   a. If MQRR response records are provided by the application, they must be provided using the MQOD structure; they cannot be provided using the MQPMO structure.

   b. The reason code RC2137 is never returned by MQPUT1 in the response records; if a queue fails to open, the response record for that queue contains the actual reason code resulting from the open operation.

      If an open operation for a queue succeeds with a completion code of CCWARN, the completion code and reason code in the response record for that queue are replaced by the completion and reason codes resulting from the put operation.

      As with the MQOPEN and MQPUT calls, the queue manager sets the response records (if provided) only when the outcome of the call is not the same for all queues in the distribution list; this is indicated by the call completing with reason code RC2136.
4. If the MQPUT1 call is used to put a message on a cluster queue, the call behaves as though OOBNDN had been specified on the MQOPEN call.

5. If a message is put with one or more IBM MQ header structures at the beginning of the application message data, the queue manager performs certain checks on the header structures to verify that they are valid. For more information about this, see the usage notes for the MQPUT call.
6. If more than one of the warning situations arise (see the **CMPCOD** parameter), the reason code returned is the *first* one in the following list that applies:
   a. RC2136
   b. RC2242
   c. RC2241
   d. RC2049 or RC2104
7. The **BUFFER** parameter shown in the RPG programming example is declared as a string; this restricts the maximum length of the parameter to 256 bytes. If a larger buffer is required, the parameter should be declared instead as a structure, or as a field in a physical file. This will increase the maximum length possible to approximately 32 KB.

Parameters

The MQPUT1 call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

OBJDSC (MQOD) - input/output

Object descriptor.

This is a structure which identifies the queue to which the message is added. See “MQOD (Object descriptor) on IBM i” on page 1146 for details.

The user must be authorized to open the queue for output. The queue must **not** be a model queue.

MSGDSC (MQMD) - input/output

Message descriptor.

This structure describes the attributes of the message being sent, and receives feedback information after the put request is complete. See “MQMD (Message descriptor) on IBM i” on page 1097 for details.

If the application provides a version-1 MQMD, the message data can be prefixed with an MQMDE structure in order to specify values for the fields that exist in the version-2 MQMD but not the version-1. The *MDFMT* field in the MQMD must be set to FMMDE to indicate that an MQMDE is present. See “MQMDE (Message descriptor extension) on IBM i” on page 1140 for more details.

PMO (MQPMO) - input/output

Options that control the action of MQPUT1.

See “MQPMO (Put-message options) on IBM i” on page 1160 for details.

BUFLEN (10-digit signed integer) - input

Length of the message in *BUFFER*.

Zero is valid, and indicates that the message contains no application data. The upper limit depends on various factors; see the description of the **BUFLEN** parameter of the MQPUT call for further details.

BUFFER (1-byte bit string x BUFLEN) - input

Message data.

This is a buffer containing the application message data to be sent. The buffer should be aligned on a boundary appropriate to the nature of the data in the message. 4-byte alignment should be suitable for most messages (including messages containing IBM MQ header structures), but some messages may require more stringent alignment. For example, a message containing a 64-bit binary integer might require 8-byte alignment.

If *BUFFER* contains character data, numeric data, or both, the *MDCSI* and *MDENC* fields in the **MSGDSC** parameter should be set to the values appropriate to the data; this will enable the receiver of the message to convert the data (if necessary) to the character set and encoding used by the receiver.

Note: All of the other parameters on the MQPUT1 call must be in the character set given by the **CodedCharSetId** queue manager attribute and encoding of the local queue manager given by ENNAT.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2104
(2104, X'838') Report option in message descriptor not recognized.

RC2136
(2136, X'858') Multiple reason codes returned.

RC2049
(2049, X'801') Message Priority exceeds maximum value supported.

RC2241
(2241, X'8C1') Message group not complete.

RC2242
(2242, X'8C2') Logical message not complete.

If *CMPCOD* is CCFAIL:

RC2001
(2001, X'7D1') Alias base queue not a valid type.

RC2004
(2004, X'7D4') Buffer parameter not valid.

RC2005
(2005, X'7D5') Buffer length parameter not valid.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2013
(2013, X'7DD') Expiry time not valid.

RC2014
(2014, X'7DE') Feedback code not valid.

RC2017
(2017, X'7E1') No more handles available.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2024
(2024, X'7E8') No more messages can be handled within current unit of work.

RC2026
(2026, X'7EA') Message descriptor not valid.

RC2027
(2027, X'7EB') Missing reply-to queue.

RC2029
(2029, X'7ED') Message type in message descriptor not valid.

RC2030
(2030, X'7EE') Message length greater than maximum for queue.

RC2031
(2031, X'7EF') Message length greater than maximum for queue manager.

RC2035
(2035, X'7F3') Not authorized for access.

RC2042
(2042, X'7FA') Object already open with conflicting options.

RC2043
(2043, X'7FB') Object type not valid.

RC2044
(2044, X'7FC') Object descriptor structure not valid.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2047
(2047, X'7FF') Persistence not valid.

RC2048
(2048, X'800') Queue does not support persistent messages.

RC2050
(2050, X'802') Message priority not valid.

RC2051
(2051, X'803') Put calls inhibited for the queue.

RC2052
(2052, X'804') Queue has been deleted.

RC2053
(2053, X'805') Queue already contains maximum number of messages.

RC2056
(2056, X'808') No space available on disk for queue.

RC2057
(2057, X'809') Queue type not valid.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2061
(2061, X'80D') Report options in message descriptor not valid.

RC2063
(2063, X'80F') Security error occurred.

RC2071
(2071, X'817') Insufficient storage available.

RC2072
(2072, X'818') Syncpoint support not available.

RC2082
(2082, X'822') Unknown alias base queue.

RC2085
(2085, X'825') Unknown object name.

RC2086
(2086, X'826') Unknown object queue manager.

RC2087
(2087, X'827') Unknown remote queue manager.

RC2091
(2091, X'82B') Transmission queue not local.

RC2092
(2092, X'82C') Transmission queue with wrong usage.

RC2097
(2097, X'831') Queue handle referred to does not save context.

RC2098
(2098, X'832') Context not available for queue handle referred to.

RC2101
(2101, X'835') Object damaged.

RC2102
(2102, X'836') Insufficient system resources available.

RC2135
(2135, X'857') Distribution header structure not valid.

RC2136
(2136, X'858') Multiple reason codes returned.

RC2149
(2149, X'865') PCF structures not valid.

RC2154
(2154, X'86A') Number of records present not valid.

RC2155
(2155, X'86B') Object records not valid.

RC2156
(2156, X'86C') Response records not valid.

RC2158
(2158, X'86E') Put message record flags not valid.

RC2159
(2159, X'86F') Put message records not valid.

RC2161
(2161, X'871') Queue manager quiescing.

RC2162
(2162, X'872') Queue manager shutting down.

RC2173
(2173, X'87D') Put-message options structure not valid.

RC2184
(2184, X'888') Remote queue name not valid.

RC2188
(2188, X'88C') Call rejected by cluster workload exit.

RC2189
(2189, X'88D') Cluster name resolution failed.

RC2195
(2195, X'893') Unexpected error occurred.

RC2196
(2196, X'894') Unknown transmission queue.

RC2197
(2197, X'895') Unknown default transmission queue.

RC2198
(2198, X'896') Default transmission queue not local.

RC2199
(2199, X'897') Default transmission queue usage error.

RC2258
(2258, X'8D2') Group identifier not valid.

RC2248
(2248, X'8C8') Message descriptor extension not valid.

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2249
(2249, X'8C9') Message flags not valid.

RC2250
(2250, X'8CA') Message sequence number not valid.

RC2251
(2251, X'8CB') Message segment offset not valid.

RC2252
(2252, X'8CC') Original length not valid.

RC2253
(2253, X'8CD') Length of data in message segment is zero.

RC2255
(2255, X'8CF') Unit of work not available for the queue manager to use.

RC2257
(2257, X'8D1') Wrong version of MQMD supplied.

RC2266
(2266, X'8DA') Cluster workload exit failed.

RC2269
(2269, X'8DD') Cluster resource error.

RC2270
(2270, X'8DE') No destination queues available.

RC2420
(2420) An MQPUT1 call was issued, but the message data contains an MQEPH structure that is not valid.

RC2551
(2551, X'9F7') Specified selection string is not available.

RC2554
(2554, X'9FA') Message content could not be parsed to determine whether the message should be delivered to a subscriber with an extended message selector.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQPUT1(HCONN : OBJDSC : MSGDSC :
C                                      PMO : BUFLEN : BUFFER :
C                                      CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQPUT1           PR                  EXTPROC('MQPUT1')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object descriptor
D OBJDSC                       468A
D* Message descriptor
D MSGDSC                       364A
D* Options that control the action of MQPUT1
D PMO                          200A
D* Length of the message in BUFFER
D BUFLEN                        10I 0 VALUE
D* Message data
D BUFFER                          *   VALUE
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQSET (Set object attributes) on IBM i

The MQSET call is used to change the attributes of an object represented by a handle. The object must be a queue.

- “Syntax” on page 1334
- “Usage notes” on page 1334
- “Parameters” on page 1335
- “RPG Declaration” on page 1338

Syntax

MQSET *(HCONN, HOBJ, SELCNT, SELS, IACNT, INTATR, CALEN, CHRATR, CMPCOD, REASON)*

Usage notes

1. Using this call, the application can specify an array of integer attributes, or a collection of character attribute strings, or both. If no errors occur, the attributes specified are all set simultaneously. If an error occurs (for example, if a selector is not valid, or an attempt is made to set an attribute to a value that is not valid), the call fails and no attributes are set.
2. The values of attributes can be determined using the MQINQ call ; see “MQINQ (Inquire about object attributes) on IBM i” on page 1291 for details.

   Note: Not all attributes with values that can be inquired upon using the MQINQ call can have their values changed using the MQSET call. For example, no process-object or queue manager attributes can be set with this call.
3. Attribute changes are preserved across restarts of the queue manager (other than alterations to temporary dynamic queues, which do not survive restarts of the queue manager).
4. You cannot change the attributes of a model queue using the MQSET call. However, if you open a model queue using the MQOPEN call with the MQOO_SET option, you can use the MQSET call to set the attributes of the dynamic local queue that is created by the MQOPEN call.

5. If the object being set is a cluster queue, there must be a local instance of the cluster queue for the open to succeed.

For more information about object attributes, see:

- "Attributes for queues" on page 1353
- "Attributes for namelists" on page 1381
- "Attributes for process definitions on IBM i" on page 1382
- "Attributes for the queue manager on IBM i" on page 1384

Parameters

The MQSET call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. The value of HCONN was returned by a previous MQCONN or MQCONNX call.

HOBJ (10-digit signed integer) - input

Object handle.

This handle represents the queue object with attributes that are to be set. The handle was returned by a previous MQOPEN call that specified the OOSET option.

SELCNT (10-digit signed integer) - input

Count of selectors.

This is the count of selectors that are supplied in the SELS array. It is the number of attributes that are to be set. Zero is a valid value. The maximum number allowed is 256.

SELS (10-digit signed integer x SELCNT) - input

Array of attribute selectors.

This is an array of **SELCNT** attribute selectors; each selector identifies an attribute (integer or character) with a value that is to be set.

Each selector must be valid for the type of queue that HOBJ represents. Only certain IA* and CA* values are allowed; these values are listed later in this section.

Selectors can be specified in any order. Attribute values that correspond to integer attribute selectors (IA* selectors) must be specified in INTATR in the same order in which these selectors occur in SELS. Attribute values that correspond to character attribute selectors (CA* selectors) must be specified in CHRATR in the same order in which those selectors occur. IA* selectors can be interleaved with the CA* selectors; only the relative order within each type is important.

It is not an error to specify the same selector more than once; if this is done, the last value specified for a particular selector is the one that takes effect.

Note:

1. The integer and character attribute selectors are allocated within two different ranges; the IA* selectors reside within the range IAFRST through IALAST, and the CA* selectors within the range CAFRST through CALAST.

   For each range, the constants IALSTU and CALSTU define the highest value that the queue manager will accept.
2. If all the IA* selectors occur first, the same element numbers can be used to address corresponding elements in the SELS and INTATR arrays.

The attributes that can be set are listed in the following table. No other attributes can be set using this call. For the CA* attribute selectors, the constant that defines the length in bytes of the string that is required in CHRATR is provided in parentheses.

Table 751. MQSET attribute selectors for queues

Selector	Description	Note
CATRGD	Trigger data (LNTRGD).	"2" on page 1336
IADIST	Distribution list support.	"1" on page 1336
IAIGET	Whether get operations are allowed.	
IAIPUT	Whether put operations are allowed.	
IATRGC	Trigger control.	"2" on page 1336
IATRGD	Trigger depth.	"2" on page 1336
IATRGP	Threshold message priority for triggers.	"2" on page 1336
IATRGT	Trigger type.	"2" on page 1336

Notes:

1. Supported only on the following platforms:

   - AIX
   - IBM i
   - Solaris
   - Windows

   and for IBM MQ clients connected to these systems.
2. Not supported on VSE/ESA.

IACNT (10-digit signed integer) - input

Count of integer attributes.

This is the number of elements in the INTATR array, and must be at least the number of IA* selectors in the **SELS** parameter. Zero is a valid value if there are none.

INTATR (10-digit signed integ x rxIACNT) - input

Array of integer attributes.

This is an array of IACNT integer attribute values. These attribute values must be in the same order as the IA* selectors in the SELS array.

CALEN (10-digit signed integer) - input

Length of character attributes buffer.

This is the length in bytes of the **CHRATR** parameter, and must be at least the sum of the lengths of the character attributes specified in the SELS array. Zero is a valid value if there are no CA* selectors in SELS.

CHRATR (1-byte character string x CALEN) - input

Character attributes.

This is the buffer containing the character attribute values, concatenated together. The length of the buffer is given by the **CALEN** parameter.

The characters attributes must be specified in the same order as the CA* selectors in the SELS array. The length of each character attribute is fixed (see SELS). If the value to be set for an attribute contains fewer nonblank characters than the defined length of the attribute, the value in CHRATR must be padded to the right with blanks to make the attribute value match the defined length of the attribute.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying CMPCOD.

If CMPCOD is CCOK:

RCNONE
(0, X'000') No reason to report.

If CMPCOD is CCFAIL:

RC2219
(2219, X'8AB') MQI call reentered before previous call complete.

RC2006
(2006, X'7D6') Length of character attributes not valid.

RC2007
(2007, X'7D7') Character attributes string not valid.

RC2009
(2009, X'7D9') Connection to queue manager lost.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2019
(2019, X'7E3') Object handle not valid.

RC2020
(2020, X'7E4') Value for inhibit-get or inhibit-put queue attribute not valid.

RC2021
(2021, X'7E5') Count of integer attributes not valid.

RC2023
(2023, X'7E7') Integer attributes array not valid.

RC2040
(2040, X'7F8') Queue not open for set.

RC2041
(2041, X'7F9') Object definition changed since opened.

RC2101
(2101, X'835') Object damaged.

RC2052
(2052, X'804') Queue has been deleted.

RC2058
(2058, X'80A') Queue manager name not valid or not known.

RC2059
(2059, X'80B') Queue manager not available for connection.

RC2162
(2162, X'872') Queue manager shutting down.

RC2102
(2102, X'836') Insufficient system resources available.

RC2065
(2065, X'811') Count of selectors not valid.

RC2067
(2067, X'813') Attribute selector not valid.

RC2066
(2066, X'812') Count of selectors too large.

RC2071
(2071, X'817') Insufficient storage available.

RC2075
(2075, X'81B') Value for trigger-control attribute not valid.

RC2076
(2076, X'81C') Value for trigger-depth attribute not valid.

RC2077
(2077, X'81D') Value for trigger-message-priority attribute not valid.

RC2078
(2078, X'81E') Value for trigger-type attribute not valid.

RC2195
(2195, X'893') Unexpected error occurred.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQSET(HCONN : HOBJ : SELCNT :
C                                     SELS(1) : IACNT : INTATR(1) :
C                                     CALEN : CHRATR : CMPCOD :
C                                     REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQSET            PR                  EXTPROC('MQSET')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Object handle
D HOBJ                          10I 0 VALUE
D* Count of selectors
D SELCNT                        10I 0 VALUE
D* Array of attribute selectors
D SELS                          10I 0
D* Count of integer attributes
D IACNT                         10I 0 VALUE
D* Array of integer attributes
D INTATR                        10I 0
D* Length of character attributes buffer
D CALEN                         10I 0 VALUE
D* Character attributes
```

```
     D CHRATR                          *   VALUE
     D* Completion code
     D CMPCOD                        10I 0
     D* Reason code qualifying CMPCOD
     D REASON                        10I 0
```

IBM i MQSETMP (Set message handle property) on IBM i

The MQSETMP call sets or modifies a property of a message handle.

- “Syntax” on page 1339
- “Usage notes” on page 1339
- “Parameters” on page 1340
- “RPG Declaration” on page 1343

Syntax

MQSETMP *(Hconn, Hmsg, SetPropOpts, Name, PropDesc, Type, ValueLength, Value, CompCode, Reason)*

Usage notes

- You can use this call only when the queue manager itself coordinates the unit of work. This can be:
  - A local unit of work, where the changes affect only IBM MQ resources.
  - A global unit of work, where the changes can affect resources belonging to other resource managers, as well as affecting IBM MQ resources.

  For further details about local and global units of work, see “MQBEGIN (Begin unit of work) on IBM i” on page 1240.
- In environments where the queue manager does not coordinate the unit of work, use the appropriate back-out call instead of MQBACK. The environment might also support an implicit back out caused by the application terminating abnormally.
  - On z/OS, use the following calls:
    - Batch programs (including IMS batch DL/I programs) can use the MQBACK call if the unit of work affects only IBM MQ resources. However, if the unit of work affects both IBM MQ resources and resources belonging to other resource managers (for example, Db2), use the SRRBACK call provided by the z/OS Recoverable Resource Service (RRS). The SRRBACK call backs out changes to resources belonging to the resource managers that have been enabled for RRS coordination.
    - CICS applications must use the `EXEC CICS SYNCPOINT ROLLBACK` command to back out the unit of work. Do not use the MQBACK call for CICS applications.
    - IMS applications (other than batch DL/I programs) must use IMS calls such as `ROLB` to back out the unit of work. Do not use the MQBACK call for IMS applications (other than batch DL/I programs).
  - On IBM i, use this call for local units of work coordinated by the queue manager. This means that a commitment definition must not exist at job level, that is, the STRCMTCTL command with the **`CMTSCOPE(*JOB)`** parameter must not have been issued for the job.
- If an application ends with uncommitted changes in a unit of work, the disposition of those changes depends on whether the application ends normally or abnormally. See the usage notes in “MQDISC (Disconnect queue manager) on IBM i” on page 1276 for further details.
- When an application puts or gets messages in groups or segments of logical messages, the queue manager retains information relating to the message group and logical message for the last successful MQPUT and MQGET calls. This information is associated with the queue handle, and includes such things as:
  - The values of the *GroupId*, *MsgSeqNumber*, *Offset*, and *MsgFlags* fields in MQMD.
  - Whether the message is part of a unit of work.

- For the MQPUT call: whether the message is persistent or nonpersistent.

The queue manager keeps three sets of group and segment information, one set for each of the following:

- The last successful MQPUT call (this can be part of a unit of work).
- The last successful MQGET call that removed a message from the queue (this can be part of a unit of work).
- The last successful MQGET call that browsed a message on the queue (this cannot be part of a unit of work).

If the application puts or gets the messages as part of a unit of work, and the application then decides to back out the unit of work, the group and segment information is restored to the value that it had previously:

- The information associated with the MQPUT call is restored to the value that it had before the first successful MQPUT call for that queue handle in the current unit of work.
- The information associated with the MQGET call is restored to the value that it had before the first successful MQGET call for that queue handle in the current unit of work.

Queues that were updated by the application after the unit of work started, but outside the scope of the unit of work, do not have their group and segment information restored if the unit of work is backed out.

Restoring the group and segment information to its previous value when a unit of work is backed out allows the application to spread a large message group or large logical message consisting of many segments across several units of work, and to restart at the correct point in the message group or logical message if one of the units of work fails.

Using several units of work might be advantageous if the local queue manager has only limited queue storage. However, the application must maintain sufficient information to be able to restart putting or getting messages at the correct point if a system failure occurs.

For details of how to restart at the correct point after a system failure, see the PMLOGO option described in PMOPT (10 digit signed integer), and the GMLOGO option described in GMOPT (10 digit signed integer).

The remaining usage notes apply only when the queue manager coordinates the units of work:

- A unit of work has the same scope as a connection handle. All IBM MQ calls that affect a particular unit of work must be performed using the same connection handle. Calls issued using a different connection handle (for example, calls issued by another application) affect a different unit of work. See HCONN (10-digit signed integer) - output for information about the scope of connection handles.
- Only messages that were put or retrieved as part of the current unit of work are affected by this call.
- A long-running application that issues MQGET, MQPUT, or MQPUT1 calls within a unit of work, but that never issues a commit or backout call, can fill queues with messages that are not available to other applications. To guard against this possibility, the administrator must set the **MaxUncommittedMsgs** queue manager attribute to a value that is low enough to prevent runaway applications filling the queues, but high enough to allow the expected messaging applications to work correctly.

Parameters

The MQSETMP call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager.

The value must match the connection handle that was used to create the message handle specified in the **HMSG** parameter.

If the message handle was created using HCUNAS, a valid connection must be established on the thread setting a property of the message handle, otherwise the call fails with reason code RC2009 .

HMSG (20-digit signed integer) - input

This is the message handle to be modified. The value was returned by a previous MQCRTMH call.

SETOPT (MQSMPO) - input

Control how message properties are set.

This structure allows applications to specify options that control how message properties are set. The structure is an input parameter on the MQSETMP call. See MQSMPO for further information.

PRNAME (MQCHARV) - input

This is the name of the property to set.

See Property names and Property name restrictions for further information about the use of property names.

PRPDSC (MQPD) - input/output

This structure is used to define the attributes of a property, including:

- what happens if the property is not supported
- what message context the property belongs to
- what messages the property is copied into as it flows

See MQPD for further information about this structure.

TYPE (10 digit signed integer) - input

The data type of the property being set. It can be one of the following:

TYPBOL
A boolean. *ValueLength* must be 4.

TYPBST
A byte string. *ValueLength* must be zero or greater.

TYPI8
An 8 bit signed integer. *ValueLength* must be 1.

TYPI16
A 16 bit signed integer. *ValueLength* must be 2.

TYPI32
A 32 bit signed integer. *ValueLength* must be 4.

TYPI64
A 64 bit signed integer. *ValueLength* must be 8.

TYPF32
A 32 bit floating-point number. *ValueLength* must be 4.

TYPF64
A 64 bit floating-point number. *ValueLength* must be 8.

TYPSTR
A character string. *ValueLength* must be zero or greater, or the special value VLNULL.

TYPNUL
The property exists but has a null value. *ValueLength* must be zero.

VALLEN (10-digit signed integer) - input

The length in bytes of the property value in the *Value* parameter.

Zero is valid only for null values or for strings or byte strings. Zero indicates that the property exists but that the value contains no characters or bytes.

The value must be greater than or equal to zero or the following special value if the *Type* parameter has TYPSTR set:

VLNULL
The value is delimited by the first null encountered in the string. The null is not included as part of the string. This value is invalid if TYPSTR is not also set.

Note: The null character used to terminate a string if VLNULL is set is a null from the character set of the Value.

VALUE (1-byte bit string x VALLEN) - input

The value of the property to be set. The buffer must be aligned on a boundary appropriate to the nature of the data in the value.

In the C programming language, the parameter is declared as a pointer-to-void; the address of any type of data can be specified as the parameter.

If *ValueLength* is zero, *Value* is not referred to. In this case, the parameter address passed by programs written in C or System/390 assembler can be null.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCWARN:

RC2421
(2421, X'0975') An MQRFH2 folder containing properties could not be parsed.

If *CMPCOD* is CCFAIL:

RC2204
(2204, X'089C') Adapter not available.

RC2130
(2130, X'852') Unable to load adapter service module.

RC2157
(2157, X'86D') Primary and home ASIDs differ.

RC2004
(2004, X'07D4') Value parameter not valid.

RC2005
(2005, X'07D5') Value length parameter not valid.

RC2219
(2219, X'08AB') MQI call entered before previous call completed.

RC2460
(2460, X'099C') Message handle pointer not valid.

RC2499
(2499, X'09C3') Message handle already in use.

RC2046
(2046, X'07FE') Options not valid or not consistent.

RC2482
(2482, X'09B2') Property descriptor structure not valid.

RC2442
(2442, X'098A') Invalid property name.

RC2473
(2473, X'09A9') Invalid property data type.

RC2472
(2472, X'09A8') Number format error encountered in value data.

RC2463
(2463, X'099F') Set message property options structure not valid.

RC2111
(2111, X'083F') Property name coded character set identifier not valid.

RC2071
(2071, X'817') Insufficient storage available.

RC2195
(2195, X'893') Unexpected error occurred.

See “Return codes for IBM i (ILE RPG)” on page 1411 for more details.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQSETMP(HCONN : HMSG : SETOPT :
                                        PRNAME : PRPDSC :
                                        TYPE : VALLEN : VALUE :
                                        CMPCOD : REASON)
```

The prototype definition for the call is:

```
DMQSETMP          PR                  EXTPROC('MQSETMP')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Message handle
D HMSG                          10I 0 VALUE
D* Options that control the action of MQSETMP
D SETOPT                        20A
D* Property name
D PRNAME                        32A
D* Property descriptor
D PRPDSC                        24A
D* Property data type
D TYPE                          10I 0 VALUE
D* Length of the Value area
D VALLEN                        10I 0 VALUE
D* Property value
D VALUE                           *   VALUE
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQSTAT (Retrieve status information) on IBM i

Use the MQSTAT call to retrieve status information. The type of status information returned is determined by the STYPE value specified on the call.

- “Syntax” on page 1344
- “Usage notes” on page 1344
- “Parameters” on page 1344
- “RPG Declaration” on page 1345

Syntax

MQSTAT *(HCONN, STYPE, STAT, CMPCOD, REASON)*

Usage notes

1. A call to MQSTAT specifying a type of STATAPT returns information about previous asynchronous MQPUT and MQPUT1 operations. The MQSTAT structure passed on the call is completed with the first recorded asynchronous warning or error information for that connection. If further errors or warnings follow the first, they do not normally alter these values. However, if an error occurs with a completion code of CCWARN, a subsequent failure with a completion code of CCFAIL is returned instead.
2. If no errors have occurred since the connection was established or since the last call to MQSTAT then a CMPCOD of CCOK and REASON of RCNONE are returned.
3. Counts of the number of asynchronous calls that have been processed under the connection handle are returned by using three counters; STSPSC, STSPWC, and STSPFC. These counters are incremented by the queue manager each time an asynchronous operation is processed successfully, has a warning, or fails (note that for accounting purposes a put to a distribution list counts once per destination queue rather than once per distribution list).
4. A successful call to MQSTAT results in any previous error information or counts being reset.

Parameters

The MQSTAT call has the following parameters:

Hconn (MQHCONN) - input

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN or MQCONNX call.

STYPE (10-digit signed integer) - input

Type of status information being requested. The only valid value is:

STATAPT
Return information about previous asynchronous put operations.

STS (MQSTS) - input/output

Status information structure. See “MQSTS (Status reporting structure) on IBM i” on page 1217 for details.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion.

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2374
(2374, X'946') API exit failed

RC2183
: (2183, X'887') Unable to load API exit.

RC2219
: (2219, X'8AB') MQI call entered before previous call complete.

RC2009
: (2009, X'7D9') Connection to queue manager lost.

RC2203
: (2203, X'89B') Connection shutting down.

RC2018
: (2018, X'7E2') Connection handle not valid.

RC2162
: (2162, X'872') Queue manager stopping

RC2102
: (2102, X'836') Insufficient system resources available.

RC2430
: (2430, X'97E') Error with MQSTAT type.

RC2071
: (2071, X'817') Insufficient storage available.

RC2424
: (2424, X'978') Error with MQSTS structure

RC2195
: (2195, X'893') Unexpected error occurred.

RC2298
: (2298, X'8FA') The function requested is not available in the current environment.

For detailed information about these codes, see:

- Messages and reason codes

RPG Declaration

```
C*.. 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7
C                       CALLP     MQSTAT(HCONN : ETYPE : ERR :
C                                        CMPCOD : REASON)
```

The prototype definition for the call is:

```
D.. 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7
DMQSTAT           PR                  EXTPROC('MQSTAT')
D* Connection handle
D HCONN                             10I 0 VALUE
D* Status information type
D STYPE                             10I 0 VALUE
D* Status information
D STATUS                           296A
D* Completion code
D CMPCOD                            10I 0
D* Reason code qualifying CompCode
D REASON                            10I 0
```

IBM i MQSUB (Register Subscription) on IBM i

The MQSUB call registers the applications subscription to a particular topic.

- “Syntax” on page 1346
- “Usage notes” on page 1346
- “Parameters” on page 1347

- “RPG Declaration” on page 1350

Syntax

MQSUB *(HCONN, SUBDSC, HOBJ, HSUB, CMPCOD, REASON)*

Usage notes

- The subscription is made to a topic, named either using the short name of a pre-defined topic object, the full name of the topic string, or it is formed by the concatenation of two parts, as described in Combining topic strings.
- The queue manager performs security checks when an MQSUB call is issued, to verify that the user identifier under which the application is running has the appropriate level of authority before access is permitted. The appropriate topic object is located either by a short name being provided in the call, or the nearest short name object in the topic hierarchy being found if a long name is provided. An authority check is made on this topic object to ensure authority to subscribe is set and on the destination queue to ensure that authority for output is set. If the SDMAN option is used, this means that an authority check is made on the managed queue name associated with this topic object, and if a non-managed queue is provided, this means that an authority check is made on the queue represented by the **HOBJ** parameter.
- The *HOBJ* returned on the MQSUB call when the SOMAN option is used, can be inquired in order to find out attributes such as the Backout threshold and the Excessive backout requeue name. You can also inquire the name of the managed queue, but you should not attempt to directly open this queue.
- Subscriptions can be grouped allowing only a single publication to be delivered to the group of subscriptions even where more than one of the group matched the publication. Subscriptions are grouped using the SOGRP option and in order to group subscriptions they must:
  - be using the same named queue (that is not using the SOMAN option) on the same queue manager - represented by the **HOBJ** parameter on the MQSUB call
  - share the same *SDCID*
  - be of the same *SDSL*

  These attributes define the set of subscriptions considered to be in the group, and are also the attributes that cannot be altered if a subscription is grouped. Alteration of *SDSL* results in RC2512, and alteration of any of the others (which can be changed if a subscription is not grouped) results in RC2515.
- Fields in the MQSD are completed on return from an MQSUB call which uses the SORES option. The MQSD returned can be passed directly into an MQSUB call which uses the SOALT option with any changes you need to make to the subscription applied to the MQSD. Some fields have special considerations as noted in the table.

Table 752. MQSD output from MQSUB

Field name in MQSD	Special considerations
Access or creation options	None of these options are set on return from the MQSUB call. If you later reuse the MQSD in an MQSUB call the option you require must be explicitly set.
Durability options, Destination options, Registration Options & Wildcard options	These options will be set as appropriate
Publication options	These options will be set as appropriate, except for SONEWP which is only applicable to SOCRE.
Other options	These options are unchanged on return from an MQSUB call. They control how the API call is issued and are not stored with the subscription. They must be set as required on any subsequent MQSUB call reusing the MQSD.
ObjectName	This input only field is unchanged on return from an MQSUB call.

Table 752. MQSD output from MQSUB (continued)	
Field name in MQSD	**Special considerations**
ObjectString	This input only field is unchanged on return from an MQSUB call. The Full topic name used is returned in the *SDRO* field, if a buffer is provided.
AlternateUserId and AlternateSecurityId	These input only fields are unchanged on return from an MQSUB call. They control how the API call is issued and are not stored with the subscription. They must set as required on any subsequent MQSUB call reusing the MQSD.
SubExpiry	On return from an MQSUB call using the SORES option this field will be set to the original expiry of the subscription and not the remaining expiry time. If you then reuse the MQSD in an MQSUB call using the SOALT option you will reset the expiry of the subscription to start counting down again.
SubName	This field is an input field on an MQSUB call and is not changed on output.
SubUserData and SelectionString	These variable length fields will be returned on output from an MQSUB call using the SORES option, if a buffer is provided, and also a positive buffer length in *VCHRP*. If no buffer is provided only the length will be returned in the *VCHRL* field of the MQCHARV.If the buffer provided is smaller than the space required to return the field, only *VCHRP* bytes are returned in the provided buffer. If you later reuse the MQSD in an MQSUB call using the SOALT option and a buffer is not provided but a non-zero *VCHRL* is provided, if that length matches the existing length of the field, no alteration will made to the field.
SubCorrelId and PubAccountingToken	If you do not use SOSCID, then the *SDCID* will be generated by the queue manager. If you do not use SOSETI, then the *SDACC* will be generated by the queue manager. These fields will be returned in the MQSD from an MQSUB call using the SORES option. If they are generated by the queue manager, the generated value will be returned on an MQSUB call using the SOCRE or SOALT option.
PubPriority, SubLevel & PubApplIdentityData	These fields will be returned in the MQSD.
ResObjectString	This output only field will be returned in the MQSD if a buffer is provided.

Parameters

The MQSUB call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

SUBDSC (MQSD) - input/output

This is a structure that identifies the object with use that is being registered by the application. See "MQSD (Subscription descriptor) on IBM i" on page 1199 for more information.

HOBJ (10-digit signed integer) - input/output

This handle represents the access that has been established to obtain the messages sent to this subscription. These messages can either be stored on a specific queue or the queue manager can be asked to manage their storage without the need for a specific queue.

Object handle.

If a specific queue is to be used it must be associated with the subscription at creation time. This can be done in two ways:

- By providing this handle when calling MQSUB with the SDCRT option. If this handle is provided as an input parameter on the call, it must be a valid object handle returned from a previous MQOPEN call of a queue using at least one of OOINP*, OOOUT (if a remote queue for example), or OOBRW option. If this is not the case, the call fails with RC2019. It cannot be an object handle to an alias queue which resolves to a topic object. If so, the call fails with RC2019
- By using the DEFINE SUB MQSC command and provided that command with the name of a queue object.

If the queue manager is to manage the storage of messages sent to this subscription, you should indicate this when the subscription is created, by using the SOMAN option and setting the parameter value to HONONE. The queue manager returns the handle as an output parameter on the call, and the handle that is returned is known as a managed handle. If HONONE is specified and SOMAN is not also specified, the call fails with RC2019.

A managed handle that is returned by the queue manager can be used on an MQGET or MQCB call, with or without browse options, on an MQINQ call, or on MQCLOSE. It cannot be used on MQPUT, MQSET, or on a subsequent MQSUB; attempting to do so fails with RC2039 for MQPUT, RC2040 for MQSET, or RC2038 for MQSUB.

If the SORES option in the *OPTS* field in the MQSD structure is used to resume this subscription, the handle can be returned to the application in this parameter if HONONE is specified. You can use this whether the subscription is using a managed handle or not. It can be useful for subscriptions created using DEFINE SUB if you want the handle to the subscription queue defined on the DEFINE SUB command. In the case where an administratively created subscription is being resumed, the queue is opened with OOINPQ and OOBRW. If other options are needed, the application must open the subscription queue explicitly and provide the object handle on the call. If there is a problem opening the queue the call will fail with RC2522. If the *HOBJ* is provided, it must be equivalent to the *HOBJ* in the original MQSUB call. This means if an object handle returned from an MQOPEN call is being provided, the handle must be to the same queue as previously used or the call fails with RC2019.

If this subscription is being altered, by using the SOALT option in the *OPTS* field in the MQSD structure, then a different *HOBJ* can be provided. Any publications that have been delivered to the queue previously identified through this parameter remain on that queue and it is the responsibility of the application to retrieve those messages if the **HOBJ** parameter now represents a different queue.

The use of this parameter with various subscription options is summarized in the following table:

Table 753. Using Hobj with various subscription options

Options	Hobj	Description
SOCRT + SOMAN	Ignored on input	Creates a subscription with queue manager managed storage of messages.
SOCRT	Valid object handle	Creates a subscription providing a specific queue as the destination for messages.
SORES	HONONE	Resumes a previously created subscription (managed or not) and have the queue manager return the object handle for use by the application.
SORES	Valid, matching, object handle	Resumes a previously created subscription which uses a specific queue as the destination for messages and use an object handle with specific open options.
SOALT + SOMAN	HONONE	Alters an existing subscription which was previously using a specific queue, to now be managed.
SOALT	Valid object handle	Alters an existing subscription to use a specific queue (either from managed, or from a different specific queue).

Whether it was provided or returned, *HOBJ* must be specified on subsequent MQGET calls that you need to receive the publications.

The *HOBJ* handle ceases to be valid when the MQCLOSE call is issued on it, or when the unit of processing that defines the scope of the handle terminates. The scope of the object handle returned is the same as that of the connection handle specified on the call. See HCONN for information about handle scope. An MQCLOSE of the *HOBJ* handle has no effect on the *HSUB* handle.

HSUB (10-digit signed integer) - output

This handle represents the subscription that has been made. It can be used for two further operations:

- It can be used on a subsequent MQSUBRQ call to request that publications be sent when the SOPUBR option has been used when making the subscription.
- It can be used on a subsequent MQCLOSE call to remove the subscription that has been made. The *HSUB* handle ceases to be valid when the MQCLOSE call is issued, or when the unit of processing that defines the scope of the handle terminates. The scope of the object handle returned is the same as that of the connection handle specified on the call. An MQCLOSE of the *HSUB* handle has no effect on the *HOBJ* handle.

This handle cannot be passed to an MQGET or MQCB call. You must use the **HOBJ** parameter. Passing this handle to any other IBM MQ call results in RC2019.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion

CCWARN
Warning (partial completion)

CCFAIL
Call failed

REASON (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CMPCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CMPCOD* is CCFAIL:

RC2019
(2019 X'07E3') Object handle not valid

RC2046
(2046 X'07FE') Options not valid or not consistent

RC2085
(2085 X'0825') Object identified cannot be found

RC2161
(2161 X'0871') Queue manager quiescing

RC2298
(2298 X'08FA') Function not supported.

RC2424
(2424 X'0978') Subscription descriptor (MQSD) not valid

RC2425
(2441 X'979') Topic string not valid

RC2428
(2428 X'097C') Subscription name specified does not match existing subscriptions

RC2429
(2429 X'097D') Subscription name exists and is in use by another application

RC2431
(2431 X'097F') SubUserData field not valid

RC2432
(2432 X'0980') Subscription exists

RC2434
(2434 X'0982') Subscription name matches existing subscription

RC2440
(2440 X'0988') SubName field not valid

RC2441
(2441 X'0989') Objectstring field not valid

RC2435
(2435 X'0983') Attribute cannot be changed using SDALT, or subscription was created with SDIMM.

RC2436
(2436 X'0984') SODUR option not valid

RC2459
(2459, X'99B') Selection string syntax error.

RC2503
(2503 X'09C7') MQSUB calls are currently inhibited for the topics subscribed to.

RC2519
(2519, X'9D7') The selection string is not as specified in the description of how to use an MQCHARV structure.

RC2551
(2551, X'9F7') Specified selection string is not available.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQSUB(HCONN : SUBDSC : HOBJ :
C                                     HSUB : CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQSUB            PR                  EXTPROC('MQSUB')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Subscription descriptor
D SUBDSC                       400A
D* Object handle for queue
D HOBJ                          10I 0
D* Subscription object handle
D HSUB                          10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i MQSUBRQ (Subscription Request) on IBM i

The MQSUBRQ call makes a request on a subscription.

- “Syntax” on page 1351
- “Usage notes” on page 1351
- “Parameters” on page 1351
- “RPG Declaration” on page 1352

Syntax

MQSUBRQ *(HCONN, HSUB, ACTION, SUBROPT, CMPCOD, REASON)*

Usage notes

The following usage notes apply to the use of SRAPUB:

1. If this verb completes successfully, the retained publications matching the subscription specified have been sent to the subscription and can be received by using MQGET or MQCB using the HOBJ returned on the original MQSUB verb that created the subscription.
2. If the topic subscribed to by the original MQSUB verb that created the subscription contained a wildcard, more than one retained publication might be sent. The number of publications sent as a result of this call is recorded in the *SRNMP* field in the SBROPT structure.
3. If this verb completes with a reason code of RC2437 then there were no currently retained publications for the topic specified.
4. If this verb completes with a reason code of RC2525 or RC2526 then there are currently retained publications for the topic specified but an error has occurred that that meant they were unable to be delivered.
5. The application must have a current subscription to the topic before it can make this call. If the subscription was made in a previous instance of the application and a valid handle to the subscription is not available, the application must first call MQSUB with the SORES option to obtain a handle to it for use in this call.
6. The publications are sent to the destination that is registered for use with the current subscription of this application. If the publications should be sent somewhere else, the subscription must first be altered using the MQSUB call with the SOALT option.

Parameters

The MQSUBRQ call has the following parameters:

HCONN (10-digit signed integer) - input

This handle represents the connection to the queue manager. The value of *HCONN* was returned by a previous MQCONN or MQCONNX call.

On z/OS for CICS applications the MQCONN call can be omitted, and the following value specified for *HCONN* :

HCDEFH
Default connection handle.

HSUB (10-digit signed integer) - input

This handle represents the subscription for which an update is to be requested. The value of *HSUB* was returned from a previous MQSUB call.

ACTION (10-digit signed integer) - input

This parameter controls the particular action that is being requested on the subscription. One (and only one) of the following must be specified:

SRAPUB

This action requests that an update publication be sent for the specified topic. This is normally used if the subscriber specified the option SOPUBR on the MQSUB call when it made the subscription. If the queue manager has a retained publication for the topic, this is sent to the subscriber. If not, the call fails. If an application is sent a publication which was retained, this is indicated by the MQIsRetained message property of that publication.

Since the topic in the existing subscription represented by the **HSUB** parameter can contain wildcards, the subscriber might receive multiple retained publications.

SBROPT (MQSRO) - input/output

These options control the action of MQSUBRQ, see "MQSRO - Subscription request options" on page 579 for details.

CMPCOD (10-digit signed integer) - output

The completion code; it is one of the following:

CCOK
Successful completion

CCWARN
Warning (partial completion)

CCFAIL
Call failed

Reason (10-digit signed integer) - output

The reason code qualifying *CMPCOD*.

If *CPMCOD* is CCOK:

RCNONE
(0, X'000') No reason to report.

If *CPMCOD* is CCFAIL:

RC2298
2298 (X'08FA') The function requested is not available in the current environment.

RC2437
2437 (X'0985') There are no retained publications currently stored for this topic.

RC2046
2046 (X'07FE') Options parameter or field contains options that are not valid, or a combination of options that is not valid.

RC2161
2161 (X'0871') Queue manager quiescing

RC2438
2438 (X'0986') On the MQSUBRQ call, the Subscription Request Options MQSRO is not valid.

RPG Declaration

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQSUBRQ(HCONN : HSUB : ACTION :
C                                       SBROPT : CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQSUBRQ          PR                  EXTPROC('MQSUBRQ')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Subscription handle
D HSUB                          10I 0 VALUE
D* Action requested on the subscription
D ACTION                        10I 0 VALUE
D* Subscription Request Options
D SBROPT                        16A
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CompCode
D REASON                        10I 0
```

IBM i Attributes of objects on IBM i

This collection of topics lists only those IBM MQ objects that can be the subject of an MQINQ function call, and gives details of the attributes that can be inquired on and the selectors to be used.

Attributes for queues

Use this information to learn about the different types of queue definitions and the attributes supported by each.

Types of queue: The queue manager supports the following types of queue definition:

Local queue
: This is a physical queue that stores messages. The queue exists on the local queue manager.

  Applications connected to the local queue manager can place messages on and remove messages from queues of this type. The value of the **QType** queue attribute is QTLOC.

Shared queue
: This is a physical queue that stores messages. The queue exists in a shared repository that is accessible to all of the queue managers that belong to the queue sharing group that owns the shared repository.

  Applications connected to any queue manager in the queue sharing group can place messages on and remove messages from queues of this type. Such queues are effectively the same as local queues. The value of the **QType** queue attribute is QTLOC.

  - Shared queues are supported only on z/OS.

Cluster queue
: This is a physical queue that stores messages. The queue exists either on the local queue manager, or on one or more of the queue managers that belong to the same cluster as the local queue manager.

  Applications connected to the local queue manager can place messages on queues of this type, regardless of the location of the queue. If an instance of the queue exists on the local queue manager, the queue behaves in the same way as a local queue, and applications connected to the local queue manager can remove messages from the queue. The value of the **QType** queue attribute is QTCLUS.

Alias queue
: This is not a physical queue - it is an alternative name for a local queue. The name of the local queue to which the alias resolves is part of the definition of the alias queue.

  Applications connected to the local queue manager can place messages on and remove messages from alias queues - the messages are placed on and removed from the local queue to which the alias resolves. The value of the **QType** queue attribute is QTALS.

Remote queue
: This is not a physical queue - it is the local definition of a queue that exists on a remote queue manager. The local definition of the remote queue contains information that tells the local queue manager how to route messages to the remote queue manager.

  Applications connected to the local queue manager can place messages on remote queues - the messages are placed on the local transmission queue used to route messages to the remote queue manager. Applications cannot remove messages from remote queues. The value of the **QType** queue attribute is QTREM.

  A remote queue definition can also be used for:

  - Reply-queue aliasing

    In this case the name of the definition is the name of a reply-to queue. For more information, see Reply-to queue alias definitions.
  - Queue manager aliasing

    In this case the name of the definition is an alias for a queue manager, and not the name of a queue. For more information, see Queue manager alias definitions.

Model queue

This is not a physical queue - it is a set of queue attributes from which a local queue can be created.

Messages cannot be stored on queues of this type.

Some queue attributes apply to all types of queue; other queue attributes apply only to certain types of queue. The types of queue to which an attribute applies are indicated by an "X" in Table 754 on page 1354 and subsequent tables.

Table 754 on page 1354 summarizes the attributes that are specific to queues. The attributes are described in alphabetical order.

The names of the attributes shown in the table are the names used with the MQINQ and MQSET calls. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for details.

In the following table, the columns apply as follows:

- The column for local queues applies also to shared queues.
- The column for model queues indicates which attributes are inherited by the local queue created from the model queue.
- The column for cluster queues indicates the attributes that can be inquired when the cluster queue is opened for inquire alone, or for inquire and output. If the cluster queue is opened for inquire plus one or more of input, browse, or set, the column for local queues applies instead.

Table 754. Attributes for queues

Attribute	Description	Local	Model	Alias	Remote	Cluster
AlterationDate	Date when definition was last changed	X		X	X	
AlterationTime	Time when definition was last changed	X		X	X	
BackoutRequeueQName	Excessive backout requeue queue name	X	X			
BackoutThreshold	Backout threshold	X	X			
BaseQName	Queue name to which alias resolves			X		
ClusterChannelName	Cluster-sender channel name	✓	✓			
ClusterName	Name of cluster to which queue belongs	X		X	X	
ClusterNamelist	Name of namelist object containing names of clusters to which queue belongs	X		X	X	
CreationDate	Date the queue was created	X				
CreationTime	Time the queue was created	X				
CurrentQDepth	Current queue depth	X				
DefBind	Default binding	X		X	X	X
DefinitionType	Queue definition type	X	X			

Table 754. Attributes for queues (continued)						
Attribute	**Description**	**Local**	**Model**	**Alias**	**Remote**	**Cluster**
DefInputOpenOption	Default input open option	X	X			
DefPersistence	Default message persistence	X	X	X	X	X
DefPriority	Default message priority	X	X	X	X	X
DistLists	Distribution list support	X	X			
HardenGetBackout	Whether to maintain an accurate backout count	X	X			
InhibitGet	Controls whether get operations for the queue are allowed	X	X	X		
InhibitPut	Controls whether put operations for the queue are allowed	X	X	X	X	X
InitiationQName	Name of initiation queue	X	X			
MaxMsgLength	Maximum message length in bytes	X	X			
MaxQDepth	Maximum queue depth	X	X			
MediaLog	Identity of oldest log extent (or oldest journal receiver on IBM i) needed for media recovery of a specified queue	✓	✓			
MsgDeliverySequence	Message delivery sequence	X	X			
OpenInputCount	Number of opens for input	X				
OpenOutputCount	Number of opens for output	X				
ProcessName	Process name	X	X			
QDepthHighEvent	Controls whether Queue Depth High events are generated	X	X			
QDepthHighLimit	High limit for queue depth	X	X			

Table 754. Attributes for queues (continued)

Attribute	Description	Local	Model	Alias	Remote	Cluster
QDepthLowEvent	Controls whether Queue Depth Low events are generated	X	X			
QDepthLowLimit	Low limit for queue depth	X	X			
QDepthMaxEvent	Controls whether Queue Full events are generated	X	X			
QDesc	Queue description	X	X	X	X	X
QName	Queue name	X		X	X	X
QServiceInterval	Target for queue service interval	X	X			
QServiceIntervalEvent	Controls whether Service Interval High or Service Interval OK events are generated	X	X			
QType	Queue type	X		X	X	X
RemoteQMgrName	Name of remote queue manager				X	
RemoteQName	Name of remote queue				X	
RetentionInterval	Retention interval	X	X			
Scope	Controls whether an entry for the queue also exists in a cell directory	X		X	X	
Shareability	Queue shareability	X	X			
TriggerControl	Trigger control	X	X			
TriggerData	Trigger data	X	X			
TriggerDepth	Trigger depth	X	X			
TriggerMsgPriority	Threshold message priority for triggers	X	X			
TriggerType	Trigger type	X	X			
Usage	Queue usage	X	X			
XmitQName	Transmission queue name				X	

IBM i AlterationDate (12-byte character string) on IBM i

Date when definition was last changed.

Table 755. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	

This is the date when the definition was last changed. The format of the date is YYYY-MM-DD, padded with two trailing blanks to make the length 12 bytes (for example, 1992-09-23¬¬, where ¬¬ represents two blank characters).

The values of certain attributes (for example, *CurrentQDepth*) change as the queue manager operates. Changes to these attributes do not affect *AlterationDate*.

To determine the value of this attribute, use the CAALTD selector with the MQINQ call. The length of this attribute is given by LNDATE.

IBM i *AlterationTime (8-byte character string) on IBM i*

Time when definition was last changed.

Table 756. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	

This is the time when the definition was last changed. The format of the time is HH.MM.SS using the 24-hour clock, with a leading zero if the hour is less than 10 (for example 09.10.20). The time is local time.

The values of certain attributes (for example, *CurrentQDepth*) change as the queue manager operates. Changes to these attributes do not affect *AlterationTime*.

To determine the value of this attribute, use the CAALTT selector with the MQINQ call. The length of this attribute is given by LNTIME.

IBM i *BackoutRequeueQName (48-byte character string) on IBM i*

Excessive backout requeue queue name.

Table 757. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

Applications running inside WebSphere Application Server and those that use the IBM MQ Application Server Facilities use this attribute to determine where messages that have been backed out should go. For all other applications, apart from allowing its value to be queried, the queue manager takes no action based on the value of the attribute.

To determine the value of this attribute, use the CABRQN selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i *BackoutThreshold (10-digit signed integer) on IBM i*

Backout threshold.

Table 758. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

Applications running inside WebSphere Application Server and those that use the IBM MQ Application Server Facilities use this attribute to determine if a message should be backed out. For all other applications, apart from allowing its value to be queried, the queue manager takes no action based on the value of the attribute.

To determine the value of this attribute, use the IABTHR selector with the MQINQ call.

IBM i *BaseQName (48-byte character string) on IBM i*

The queue name to which the alias resolves.

Table 759. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
		X		

This is the name of a queue that is defined to the local queue manager. (For more information about queue names, see the description of the *ODON* field in MQOD. The queue is one of the following types:

QTLOC
Local queue.

QTREM
Local definition of a remote queue.

QTCLUS
Cluster queue.

To determine the value of this attribute, use the CABASQ selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i *BaseType (integer parameter structure) on IBM i*

The type of object to which the alias resolves.

Table 760. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
		X		

This attribute can have one of the following values:

OTQ
Base object type is a queue

OTTOP
Base object type is a topic

IBM i *CFStrucName (12-byte character string) on IBM i*

Coupling-facility structure name.

Table 761. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the name of the coupling-facility structure where the messages on the queue are stored. The first character of the name is in the range A through Z, and the remaining characters are in the range A through Z, 0 through 9, or blank.

The full name of the structure in the coupling facility is obtained by suffixing the value of the **QSGName** queue manager attribute with the value of the **CFStrucName** queue attribute.

This attribute applies only to shared queues; it is ignored if *QSGDisp* does not have the value QSGDSH.

To determine the value of this attribute, use the CACFSN selector with the MQINQ call. The length of this attribute is given by LNCFSN.

z/OS This attribute is supported only on z/OS.

ClusterChannelName (20-byte character string)

ClusterChannelName is the generic name of the cluster-sender channels that use this queue as a transmission queue. The attribute specifies which cluster-sender channels send messages to a cluster-receiver channel from this cluster transmission queue.

Table 762. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

The default queue manager configuration is for all cluster-sender channels to send messages from a single transmission queue, SYSTEM.CLUSTER.TRANSMIT.QUEUE. The default configuration can be changed by modified by changing the queue manager attribute, **DefClusterXmitQueueType**. The default value of the attribute is SCTQ. You can change the value to CHANNEL. If you set the **DefClusterXmitQueueType** attribute to CHANNEL, each cluster-sender channel defaults to using a specific cluster transmission queue, SYSTEM.CLUSTER.TRANSMIT.*ChannelName*.

You can also set the transmission queue attribute ClusterChannelName attribute to a cluster-sender channel manually. Messages that are destined for the queue manager connected by the cluster-sender channel are stored in the transmission queue that identifies the cluster-sender channel. They are not stored in the default cluster transmission queue. If you set the ClusterChannelName attribute to blanks, the channel switches to the default cluster transmission queue when the channel restarts. The default queue is either SYSTEM.CLUSTER.TRANSMIT.*ChannelName* or SYSTEM.CLUSTER.TRANSMIT.QUEUE, depending on the value of the queue manager DefClusterXmitQueueType attribute.

By specifying asterisks, "*", in **ClusterChannelName**, you can associate a transmission queue with a set of cluster-sender channels. The asterisks can be at the beginning, end, or any number of places in the middle of the channel name string. **ClusterChannelName** is limited to a length of 20 characters: MQ_CHANNEL_NAME_LENGTH.

IBM i *ClusterName (48-byte character string) on IBM i*

Name of cluster to which queue belongs.

Table 763. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	

This is the name of the cluster to which the queue belongs. If the queue belongs to more than one cluster, *ClusterNamelist* specifies the name of a namelist object that identifies the clusters, and *ClusterName* is blank. At least one of *ClusterName* and *ClusterNamelist* must be blank.

To determine the value of this attribute, use the CACLN selector with the MQINQ call. The length of this attribute is given by LNCLUN.

IBM i *ClusterNamelist (48-byte character string) on IBM i*

Name of namelist object containing names of clusters to which queue belongs.

Table 764. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	

This is the name of a namelist object that contains the names of clusters to which this queue belongs. If the queue belongs to only one cluster, the namelist object contains only one name. Alternatively, *ClusterName* can be used to specify the name of the cluster, in which case *ClusterNamelist* is blank. At least one of *ClusterName* and *ClusterNamelist* must be blank.

To determine the value of this attribute, use the CACLNL selector with the MQINQ call. The length of this attribute is given by LNNLN.

IBM i *CreationDate (12-byte character string) on IBM i*

Date when queue was created.

Table 765. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

This is the date when the queue was created. The format of the date is `YYYY-MM-DD`, padded with two trailing blanks to make the length 12 bytes (for example, `1992-09-23¬¬`, where `¬¬` represents two blank characters).

- On IBM i, the creation date of a queue might differ from that of the underlying operating system entity (file or userspace) that represents the queue.

To determine the value of this attribute, use the CACRTD selector with the MQINQ call. The length of this attribute is given by LNCRTD.

IBM i *CreationTime (8-byte character string) on IBM i*

Time when queue was created.

Table 766. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

This is the time when the queue was created. The format of the time is `HH.MM.SS` using the 24-hour clock, with a leading zero if the hour is less than 10 (for example `09.10.20`). The time is local time.

- On IBM i, the creation time of a queue might differ from that of the underlying operating system entity (file or user space) that represents the queue.

To determine the value of this attribute, use the CACRTT selector with the MQINQ call. The length of this attribute is given by LNCRTT.

IBM i *CurrentQDepth (10-digit signed integer) on IBM i*

Current queue depth.

Table 767. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

This is the number of messages currently on the queue. It is incremented during an MQPUT call, and during backout of an MQGET call. It is decremented during a nonbrowse MQGET call, and during backout of an MQPUT call. The effect of this is that the count includes messages that have been put on the queue within a unit of work, but which have not yet been committed, even though they are not eligible to be retrieved by the MQGET call. Similarly, it excludes messages that have been retrieved within a unit of work using the MQGET call, but which have yet to be committed.

The count also includes messages which have passed their expiry time but have not yet been discarded, although these messages are not eligible to be retrieved. See the *MDEXP* field described in "MQMD (Message descriptor) on IBM i" on page 1097.

Unit-of-work processing and the segmentation of messages can both cause *CurrentQDepth* to exceed *MaxQDepth*. However, this does not affect the retrievability of the messages - *all* messages on the queue can be retrieved using the MQGET call in the normal way.

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the IACDEP selector with the MQINQ call.

IBM i *DefBind (10-digit signed integer) on IBM i*

Default binding.

Table 768. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X		X	X	X

This attribute is the default binding that is used when OOBNDQ is specified on the MQOPEN call and the queue is a cluster queue. DefBind can have one of the following values:

BNDOPN
Binding fixed by MQOPEN call.

BNDNOT
Binding not fixed.

BNDGRP
Binding is not fixed by the MQOPEN call, but is fixed on MQPUT for all messages in a logical group.

To determine the value of this attribute, use the IADBND selector with the MQINQ call.

IBM i *DefinitionType (10-digit signed integer) on IBM i*

Queue definition type.

Table 769. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This indicates how the queue was defined. The value is one of the following:

QDPRE
: Predefined permanent queue.

  The queue is a permanent queue created by the system administrator; only the system administrator can delete it.

  Predefined queues are created using the `DEFINE` MQSC command, and can be deleted only by using the `DELETE` MQSC command. Predefined queues cannot be created from model queues.

  Commands can be issued either by an operator, or by an authorized user sending a command message to the command input queue (see the **CommandInputQName** attribute described in "Attributes for the queue manager on IBM i" on page 1384).

QDPERM
: Dynamically defined permanent queue.

  The queue is a permanent queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value QDPERM for the **DefinitionType** attribute.

  This type of queue can be deleted using the MQCLOSE call. See "MQCLOSE (Close object) on IBM i" on page 1254 for more details.

  The value of the **QSGDisp** attribute for a permanent dynamic queue is QSGDQM.

QDTEMP
: Dynamically defined temporary queue.

  The queue is a temporary queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value QDTEMP for the **DefinitionType** attribute.

  This type of queue is deleted automatically by the MQCLOSE call when it is closed by the application that created it.

  The value of the **QSGDisp** attribute for a temporary dynamic queue is QSGDQM.

QDSHAR
: Dynamically defined shared queue.

  The queue is a shared permanent queue that was created by an application issuing an MQOPEN call with the name of a model queue specified in the object descriptor MQOD. The model queue definition had the value QDSHAR for the **DefinitionType** attribute.

  This type of queue can be deleted using the MQCLOSE call. See "MQCLOSE (Close object) on IBM i" on page 1254 for more details.

  The value of the **QSGDisp** attribute for a shared dynamic queue is QSGDSH.

This attribute in a model queue definition does not indicate how the model queue was defined, because model queues are always predefined. Instead, the value of this attribute in the model queue is used to determine the *DefinitionType* of each of the dynamic queues created from the model queue definition using the MQOPEN call.

To determine the value of this attribute, use the IADEFT selector with the MQINQ call.

IBM i DefInputOpenOption (10-digit signed integer) on IBM i

Default input open option.

Table 770. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This is the default way in which the queue should be opened for input. It applies if the OOINPQ option is specified on the MQOPEN call when the queue is opened. This can have one of the following values:

OOINPX
Open queue to get messages with exclusive access.

The queue is opened for use with subsequent MQGET calls. The call fails with reason code RC2042 if the queue is currently open by this or another application for input of any type (OOINPS or OOINPX).

OOINPS
Open queue to get messages with shared access.

The queue is opened for use with subsequent MQGET calls. The call can succeed if the queue is currently open by this or another application with OOINPS, but fails with reason code RC2042 if the queue is currently open with OOINPX.

To determine the value of this attribute, use the IADINP selector with the MQINQ call.

IBM i DefPersistence (10-digit signed integer) on IBM i

Default message persistence.

Table 771. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

This is the default persistence of messages on the queue. It applies if PEQDEF is specified in the message descriptor when the message is put.

If there is more than one definition in the queue-name resolution path, the default persistence is taken from the value of this attribute in the *first* definition in the path at the time of the MQPUT or MQPUT1 call. This could be:

- An alias queue
- A local queue
- A local definition of a remote queue
- A queue manager alias
- A transmission queue (for example, the `DefXmitQName` queue)

This can have one of the following values:

PEPER
Message is persistent.

This means that the message survives system failures and restarts of the queue manager. Persistent messages cannot be placed on:

- Temporary dynamic queues
- Shared queues

Persistent messages can be placed on permanent dynamic queues, and predefined queues.

PENPER
Message is not persistent.

This means that the message does not normally survive system failures or restarts of the queue manager. This applies even if an intact copy of the message is found on auxiliary storage during restart of the queue manager.

In the special case of shared queues, nonpersistent messages *do* survive restarts of queue managers in the queue sharing group, but do not survive failures of the coupling facility used to store messages on the shared queues.

Both persistent and nonpersistent messages can exist on the same queue.

To determine the value of this attribute, use the IADPER selector with the MQINQ call.

IBM i *DefPriority (10-digit signed integer) on IBM i*

Default message priority.

Table 772. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X	X	X	X

This is the default priority for messages on the queue. This applies if PRQDEF is specified in the message descriptor when the message is put on the queue.

If there is more than one definition in the queue-name resolution path, the default priority for the message is taken from the value of this attribute in the *first* definition in the path at the time of the put operation. This could be:

- An alias queue
- A local queue
- A local definition of a remote queue
- A queue manager alias
- A transmission queue (for example, the *DefXmitQName* queue)

The way in which a message is placed on a queue depends on the value of the queue's **MsgDeliverySequence** attribute:

- If the **MsgDeliverySequence** attribute is MSPRIO, the logical position at which a message is placed on the queue is dependent on the value of the *MDPRI* field in the message descriptor.
- If the **MsgDeliverySequence** attribute is MSFIFO, messages are placed on the queue as though they had a priority equal to the *DefPriority* of the resolved queue, regardless of the value of the *MDPRI* field in the message descriptor. However, the *MDPRI* field retains the value specified by the application that put the message. See the **MsgDeliverySequence** attribute described in "Attributes for queues" on page 1353 for more information.

Priorities are in the range zero (lowest) through *MaxPriority* (highest); see the **MaxPriority** attribute described in "Attributes for the queue manager on IBM i" on page 1384.

To determine the value of this attribute, use the IADPRI selector with the MQINQ call.

IBM i DefReadAhead (10-digit signed integer) on IBM i

Specifies the default read ahead behavior for non-persistent messages delivered to the client.

Table 773. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X		

DefReadAhead can be set to one of the following values:

RAHNO
Non-persistent messages are not sent ahead to the client before an application requests them. A maximum of one non-persistent message can be lost if the client ends abnormally.

RAHYES
Non-persistent messages are sent ahead to the client before an application requests them. Non-persistent messages can be lost if the client ends abnormally or if the client does not consume all the messages it is sent.

RAHDIS
Read ahead of non-persistent messages in not enabled for this queue. Messages are not sent ahead to the client regardless of whether read ahead is requested by the client application.

To determine the value of this attribute, use the IADRAH selector with the MQINQ call.

IBM i DefPResp (10-digit signed integer) on IBM i

The default put response type (DEFPRESP) attribute defines the value used by applications when the PutResponseType within MQPMO has been set to PMRASQ. This attribute is valid for all queue types.

Table 774. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X	X	X

This can have one of the following values:

SYNC
The put operation is issued synchronously returning a response.

ASYNC
The put operation is issued asynchronously, returning a subset of MQMD fields.

To determine the value of this attribute, use the IADPRT selector with the MQINQ call.

IBM i DistLists (10-digit signed integer) on IBM i

Distribution list support.

Table 775. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This indicates whether distribution-list messages can be placed on the queue. The attribute is set by a message channel agent (MCA) to inform the local queue manager whether the queue manager at the other end of the channel supports distribution lists. This latter queue manager (called the "partnering queue manager") is the one which next receives the message, after it has been removed from the local transmission queue by a sending MCA.

The attribute is set by the sending MCA whenever it establishes a connection to the receiving MCA on the partnering queue manager. In this way, the sending MCA can cause the local queue manager to place on the transmission queue only messages which the partnering queue manager can process correctly.

This attribute is primarily for use with transmission queues, but the processing described is performed regardless of the usage defined for the queue (see the **Usage** attribute).

This can have one of the following values:

DLSUPP
Distribution lists supported.

This indicates that distribution-list messages can be stored on the queue, and transmitted to the partnering queue manager in that form. This reduces the amount of processing required to send the message to multiple destinations.

DLNSUP
Distribution lists not supported.

This indicates that distribution-list messages cannot be stored on the queue, because the partnering queue manager does not support distribution lists. If an application puts a distribution-list message, and that message is to be placed on this queue, the queue manager splits the distribution-list message and places the individual messages on the queue instead. This increases the amount of processing required to send the message to multiple destinations, but ensures that the messages will be processed correctly by the partnering queue manager.

To determine the value of this attribute, use the IADIST selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i *HardenGetBackout (10-digit signed integer) on IBM i*

Whether to maintain an accurate backout count.

Table 776. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

For each message, a count is kept of the number of times that the message is retrieved by an MQGET call within a unit of work, and that unit of work later backed out. This count is available in the *MDBOC* field in the message descriptor after the MQGET call has completed.

The message backout count survives when the queue manager restarts. However, to ensure that the count is accurate, information has to be "hardened" (recorded on disk or other permanent storage device) each time a message is retrieved by an MQGET call within a unit of work for this queue. If this is not done, and a failure of the queue manager occurs together with backout of the MQGET call, the count might not be incremented.

Hardening information for each MQGET call within a unit of work, however, imposes a performance cost, and the **HardenGetBackout** attribute should be set to QABH only if the count has to be accurate.

- On IBM i, the message backout count is always hardened, regardless of the setting of this attribute.

The following values are possible:

QABH
Backout count remembered.

Hardening is used to ensure that the backout count for messages on this queue is accurate.

QABNH
Backout count might not be remembered.

Hardening is not used to ensure that the backout count for messages on this queue is accurate. The count might therefore be lower than it should be.

To determine the value of this attribute, use the IAHGB selector with the MQINQ call.

IBM i InhibitGet (10-digit signed integer) on IBM i

Controls whether get operations for this queue are allowed.

Table 777. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X		

If the queue is an alias queue, get operations must be allowed for both the alias and the base queue at the time of the get operation, in order for the MQGET call to succeed. The value is one of the following:

QAGETI
Get operations are inhibited.

MQGET calls fail with reason code RC2016. This includes MQGET calls that specify GMBRWF or GMBRWN.

Note: If an MQGET call operating within a unit of work completes successfully, changing the value of the **InhibitGet** attribute after to QAGETI does not prevent the unit of work being committed.

QAGETA
Get operations are allowed.

To determine the value of this attribute, use the IAIGET selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i InhibitPut (10-digit signed integer) on IBM i

Controls whether put operations for this queue are allowed.

Table 778. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X	X	X

If there is more than one definition in the queue-name resolution path, put operations must be allowed for *every* definition in the path (including any queue manager alias definitions) at the time of the put operation, in order for the MQPUT or MQPUT1 call to succeed. This can have one of the following values:

QAPUTI
Put operations are inhibited.

MQPUT and MQPUT1 calls fail with reason code RC2051.

Note: If an MQPUT call operating within a unit of work completes successfully, changing the value of the **InhibitPut** attribute later to QAPUTI does not prevent the unit of work being committed.

QAPUTA
Put operations are allowed.

To determine the value of this attribute, use the IAIPUT selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i *InitiationQName (48-byte character string) on IBM i*

Name of initiation queue.

Table 779. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the name of a queue defined on the local queue manager; the queue must be of type QTLOC. The queue manager sends a trigger message to the initiation queue when application startup is required as a result of a message arriving on the queue to which this attribute belongs. The initiation queue must be monitored by a trigger monitor application which will start the appropriate application after receipt of the trigger message.

To determine the value of this attribute, use the CAINIQ selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i *MaxMsgLength (10-digit signed integer) on IBM i*

Maximum message length in bytes.

Table 780. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is an upper limit for the length of the longest *physical* message that can be placed on the queue. However, because the **MaxMsgLength** queue attribute can be set independently of the **MaxMsgLength** queue manager attribute, the actual upper limit for the length of the longest physical message that can be placed on the queue is the lesser of those two values.

If the queue manager supports segmentation, it is possible for an application to put a *logical* message that is longer than the lesser of the two **MaxMsgLength** attributes, but only if the application specifies the MFSEGA flag in MQMD. If that flag is specified, the upper limit for the length of a logical message is 999 999 999 bytes, but typically, resource constraints imposed by the operating system or by the environment in which the application is running, results in a lower limit.

An attempt to place on the queue a message that is too long fails with reason code:

- RC2030 if the message to too large for the queue
- RC2031 if the message to too large for the queue manager, but not too large for the queue

The lower limit for the **MaxMsgLength** attribute is zero. The upper limit is determined by the environment:

- On IBM i, the maximum message length is 100 MB (104 857 600 bytes).

For more information, see the **BUFLEN** parameter described in "MQPUT (Put message) on IBM i" on page 1318.

To determine the value of this attribute, use the IAMLEN selector with the MQINQ call.

IBM i *MaxQDepth (10-digit signed integer) on IBM i*

Maximum queue depth.

Table 781. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the defined upper limit for the number of physical messages that can exist on the queue at any one time. An attempt to put a message on a queue that already contains *MaxQDepth* messages, fails with reason code RC2053.

Unit-of-work processing and the segmentation of messages can both cause the actual number of physical messages on the queue to exceed *MaxQDepth*. However, this does not affect the retrievability of the messages - *all* messages on the queue can be retrieved using the MQGET call in the normal way.

The value of this attribute is zero or greater. The upper limit is determined by the environment.

Note: It is possible for the storage space available to the queue to be exhausted even if there are fewer than *MaxQDepth* messages on the queue.

To determine the value of this attribute, use the IAMDEP selector with the MQINQ call.

IBM i *MediaLog (10-digit signed integer) on IBM i*

Identity of the log extent (or journal receiver on IBM i) needed for media recovery of a particular queue.

Table 782. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

On queue managers where circular logging is in use, the value is returned as a null string.

IBM i *MsgDeliverySequence (10-digit signed integer) on IBM i*

Message delivery sequence.

Table 783. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This determines the order in which messages are returned to the application by the MQGET call:

MSFIFO
: Messages are returned in FIFO order (first in, first out).

  This means that an MQGET call will return the *first* message that satisfies the selection criteria specified on the call, regardless of the priority of the message.

MSPRIO
: Messages are returned in priority order.

  This means that an MQGET call will return the *highest-priority* message that satisfies the selection criteria specified on the call. Within each priority level, messages are returned in FIFO order (first in, first out).

If the relevant attributes are changed while there are messages on the queue, the delivery sequence is as follows:

- The order in which messages are returned by the MQGET call is determined by the values of the **MsgDeliverySequence** and **DefPriority** attributes in force for the queue at the time the message arrives on the queue:
  - If *MsgDeliverySequence* is MSFIFO when the message arrives, the message is placed on the queue as though its priority were *DefPriority*. This does not affect the value of the *MDPRI* field in the message descriptor of the message; that field retains the value it had when the message was first put.
  - If *MsgDeliverySequence* is MSPRIO when the message arrives, the message is placed on the queue at the place appropriate to the priority given by the *MDPRI* field in the message descriptor.

  If the value of the **MsgDeliverySequence** attribute is changed while there are messages on the queue, the order of the messages on the queue is not changed.

  If the value of the **DefPriority** attribute is changed while there are messages on the queue, the messages will not necessarily be delivered in FIFO order, even though the **MsgDeliverySequence** attribute is set to MSFIFO; those that were placed on the queue at the higher priority are delivered first.

To determine the value of this attribute, use the IAMDS selector with the MQINQ call.

IBM i *OpenInputCount (10-digit signed integer) on IBM i*

Number of opens for input.

Table 784. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

This is the number of handles that are currently valid for removing messages from the queue with the MQGET call. It is the total number of such handles known to the *local* queue manager. If the queue is a shared queue, the count does not include opens for input that were performed for the queue at other queue managers in the queue sharing group to which the local queue manager belongs.

The count includes handles where an alias queue which resolves to this queue was opened for input. The count does not include handles where the queue was opened for actions which did not include input (for example, a queue opened only for browse).

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the IAOIC selector with the MQINQ call.

IBM i *OpenOutputCount (10-digit signed integer) on IBM i*

Number of opens for output.

Table 785. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X				

This is the number of handles that are currently valid for adding messages to the queue with the MQPUT call. It is the total number of such handles known to the *local* queue manager; it does not include opens for output that were performed for this queue at remote queue managers. If the queue is a shared queue, the count does not include opens for output that were performed for the queue at other queue managers in the queue sharing group to which the local queue manager belongs.

The count includes handles where an alias queue which resolves to this queue was opened for output. The count does not include handles where the queue was opened for actions which did not include output (for example, a queue opened only for inquire).

The value of this attribute fluctuates as the queue manager operates.

To determine the value of this attribute, use the IAOOC selector with the MQINQ call.

IBM i *ProcessName (48-byte character string) on IBM i*

Process name.

Table 786. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the name of a process object that is defined on the local queue manager. The process object identifies a program that can service the queue.

To determine the value of this attribute, use the CAPRON selector with the MQINQ call. The length of this attribute is given by LNPRON.

IBM i *QDepthHighEvent (10-digit signed integer) on IBM i*

Controls whether Queue Depth High events are generated.

Table 787. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

A Queue Depth High event indicates that an application has put a message on a queue, which has caused the number of messages on the queue to become greater than or equal to the queue depth high threshold (see the **QDepthHighLimit** attribute).

Note: The value of this attribute can change dynamically.

QDepthHighEvent can have one of two values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAQDHE selector with the MQINQ call.

IBM i *QDepthHighLimit (10-digit signed integer) on IBM i*

High limit for queue depth.

Table 788. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the threshold against which the queue depth is compared to generate a Queue Depth High event. This event indicates that an application has put a message on a queue, and this has caused the number of messages on the queue to become greater than or equal to the queue depth high threshold. See the **QDepthHighEvent** attribute.

The value is expressed as a percentage of the maximum queue depth (**MaxQDepth** attribute), and is in the range zero through 100. The default value is 80.

To determine the value of this attribute, use the IAQDHL selector with the MQINQ call.

IBM i *QDepthLowEvent (10-digit signed integer) on IBM i*

Controls whether Queue Depth Low events are generated.

Table 789. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

A Queue Depth Low event indicates that an application has retrieved a message from a queue, which has caused the number of messages on the queue to become less than or equal to the queue depth low threshold (see the **QDepthLowLimit** attribute).

Note: The value of this attribute can change dynamically.

QDepthLowEvent can have one of the following values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAQDLE selector with the MQINQ call.

IBM i *QDepthLowLimit (10-digit signed integer) on IBM i*

Low limit for queue depth.

Table 790. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This is the threshold against which the queue depth is compared to generate a Queue Depth Low event. This event indicates that an application has retrieved a message from a queue, and this has caused the number of messages on the queue to become less than or equal to the queue depth low threshold. See the **QDepthLowEvent** attribute.

The value is expressed as a percentage of the maximum queue depth (**MaxQDepth** attribute), and is in the range zero through 100. The default value is 20.

To determine the value of this attribute, use the IAQDLL selector with the MQINQ call.

IBM i *QDepthMaxEvent (10-digit signed integer) on IBM i*

Controls whether Queue Full events are generated.

Table 791. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

A Queue Full event indicates that a put to a queue has been rejected because the queue is full, that is, the queue depth has already reached its maximum value.

Note: The value of this attribute can change dynamically.

This can have one of the following values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAQDME selector with the MQINQ call.

IBM i *QDesc (64-byte character string) on IBM i*

Queue description.

Table 792. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X	X	X	X

This is a field that can be used for descriptive commentary. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contains only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, the field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the CAQD selector with the MQINQ call. The length of this attribute is given by LNQD.

IBM i *QName (48-byte character string) on IBM i*

Queue name.

Table 793. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	X

This is the name of a queue defined on the local queue manager. For more information about queue names, see Rules for naming IBM MQ objects. All queues defined on a queue manager share the same queue namespace. Therefore, a QTLOC queue and a QTALS queue cannot have the same name.

To determine the value of this attribute, use the CAQN selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i QServiceInterval (10-digit signed integer) on IBM i

Target for queue service interval.

Table 794. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the service interval used for comparison to generate Service Interval High and Service Interval OK events. See the **QServiceIntervalEvent** attribute.

The value is in units of milliseconds, and is in the range zero through 999 999 999.

To determine the value of this attribute, use the IAQSI selector with the MQINQ call.

IBM i QServiceIntervalEvent (10-digit signed integer) on IBM i

Controls whether Service Interval High or Service Interval OK events are generated.

Table 795. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

- A Service Interval High event is generated when a check indicates that no messages have been retrieved from the queue for at least the time indicated by the **QServiceInterval** attribute.
- A Service Interval OK event is generated when a check indicates that messages have been retrieved from the queue within the time indicated by the **QServiceInterval** attribute.

Note: The value of this attribute can change dynamically.

This attribute can have one of the following values:

QSIEHI
: Queue Service Interval High events enabled.
  - Queue Service Interval High events are **enabled** and
  - Queue Service Interval OK events are **disabled**.

QSIEOK
: Queue Service Interval OK events enabled.
  - Queue Service Interval High events are **disabled** and
  - Queue Service Interval OK events are **enabled**.

QSIENO
: No queue service interval events enabled.
  - Queue Service Interval High events are **disabled** and
  - Queue Service Interval OK events are also **disabled**.

For shared queues, the value of this attribute is ignored; the value QSIENO is assumed.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAQSIE selector with the MQINQ call.

IBM i QSGDisp (10-digit signed integer) on IBM i

Queue sharing group disposition.

Table 796. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	

This specifies the disposition of the queue. The value is one of the following:

QSGDQM
Queue manager disposition.

The object has queue manager disposition. This means that the object definition is known only to the local queue manager; the definition is not known to other queue managers in the queue sharing group.

It is possible for each queue manager in the queue sharing group to have an object with the same name and type as the current object, but these are separate objects and there is no correlation between them. Their attributes are not constrained to be the same as each other.

QSGDCP
Copied-object disposition.

The object is a local copy of a master object definition that exists in the shared repository. Each queue manager in the queue sharing group can have its own copy of the object. Initially, all copies have the same attributes, but by using MQSC commands each copy can be altered so that its attributes differ from those of the other copies. The attributes of the copies are resynchronized when the master definition in the shared repository is altered.

QSGDSH
Shared disposition.

The object has shared disposition. This means that there exists in the shared repository a single instance of the object that is known to all queue managers in the queue sharing group. When a queue manager in the group accesses the object, it accesses the single shared instance of the object.

To determine the value of this attribute, use the IAQSGD selector with the MQINQ call.

z/OS This attribute is supported only on z/OS.

IBM i QType (10-digit signed integer) on IBM i

Queue type.

Table 797. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	X

This attribute has one of the following values:

QTALS
Alias queue definition.

QTCLUS
Cluster queue.

QTLOC
Local queue.

QTREM
: Local definition of a remote queue.

To determine the value of this attribute, use the IAQTYP selector with the MQINQ call.

IBM i *RemoteQMgrName (48-byte character string) on IBM i*

Name of remote queue manager.

Table 798. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
			X	

This is the name of the remote queue manager on which the queue *RemoteQName* is defined. If the *RemoteQName* queue has a *QSGDisp* value of QSGDCP or QSGDSH, *RemoteQMgrName* can be the name of the queue sharing group that owns *RemoteQName*.

If an application opens the local definition of a remote queue, *RemoteQMgrName* must not be blank and must not be the name of the local queue manager. If *XmitQName* is blank, the local queue with same name as *RemoteQMgrName* is used as the transmission queue. If there is no queue with the name *RemoteQMgrName*, the queue identified by the **DefXmitQName** queue manager attribute is used.

If this definition is used for a queue manager alias, *RemoteQMgrName* is the name of the queue manager that is being aliased. It can be the name of the local queue manager. Otherwise, if *XmitQName* is blank when the open occurs, there must be a local queue with the same name as *RemoteQMgrName* ; this queue is used as the transmission queue.

If this definition is used for a reply-to alias, this name is the name of the queue manager which is to be the *MDRM*.

Note: No validation is performed on the value specified for this attribute when the queue definition is created or modified.

To determine the value of this attribute, use the CARQMN selector with the MQINQ call. The length of this attribute is given by LNQMN.

IBM i *RemoteQName (48-byte character string) on IBM i*

Name of remote queue.

Table 799. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
			X	

This is the name of the queue as it is known on the remote queue manager *RemoteQMgrName*.

If an application opens the local definition of a remote queue, when the open occurs *RemoteQName* must not be blank.

If this definition is used for a queue manager alias definition, when the open occurs *RemoteQName* must be blank.

If the definition is used for a reply-to alias, this name is the name of the queue that is to be the *MDRQ*.

Note: No validation is performed on the value specified for this attribute when the queue definition is created or modified.

To determine the value of this attribute, use the CARQN selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i RetentionInterval (10-digit signed integer) on IBM i

Retention interval.

Table 800. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the time which the queue should be retained. After this time has elapsed, the queue is eligible for deletion.

The time is measured in hours, counting from the date and time when the queue was created. The creation date of the queue is recorded in the *CreationDate* and the create time of the queue is recorded in the **CreationTime** attribute.

This information is provided to enable a housekeeping application or the operator to identify and delete queues that are no longer required.

Note: The queue manager never tries to delete queues based on this attribute, or to prevent the deletion of queues with a retention interval that has not expired; it is the user's responsibility to cause any required action to be taken.

A realistic retention interval should be used to prevent the accumulation of permanent dynamic queues (see *DefinitionType*). However, this attribute can also be used with predefined queues.

To determine the value of this attribute, use the IARINT selector with the MQINQ call.

IBM i Scope (10-digit signed integer) on IBM i

Controls whether an entry for this queue also exists in a cell directory.

Table 801. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X		X	X	

A cell directory is provided by an installable Name service. This can have one of the following values:

SCOQM
Queue manager scope.

The queue definition has queue manager scope. This means that the definition of the queue does not extend beyond the queue manager which owns it. To open the queue for output from some other queue manager, either the name of the owning queue manager must be specified, or the other queue manager must have a local definition of the queue.

SCOCEL
Cell scope.

The queue definition has cell scope. This means that the queue definition is also placed in a cell directory available to all of the queue managers in the cell. The queue can be opened for output from any of the queue managers in the cell merely by specifying the name of the queue; the name of the queue manager which owns the queue need not be specified. However, the queue definition is not available to any queue manager in the cell which also has a local definition of a queue with that name, as the local definition takes precedence.

A cell directory is provided by an installable name service such as LDAP (Lightweight Directory Access Protocol. Note that IBM MQ no longer supports the DCE (Distributed Computing Environment) name service that was formerly used for inserting queue definitions into a DCE directory (also no longer supported).

Model and dynamic queues cannot have cell scope.

This value is only valid if a name service supporting a cell directory has been configured.

To determine the value of this attribute, use the IASCOP selector with the MQINQ call.

Support for this attribute is subject to the following restrictions:

- On IBM i, the attribute is supported, but only SCOQM is valid.

IBM i *Shareability (10-digit signed integer) on IBM i*

Whether queue can be shared for input.

Table 802. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This indicates whether the queue can be opened for input multiple times concurrently. This can have one of the following values:

QASHR
Queue is shareable.

Multiple opens with the OOINPS option are allowed.

QANSHR
Queue is not shareable.

An MQOPEN call with the OOINPS option is treated as OOINPX.

To determine the value of this attribute, use the IASHAR selector with the MQINQ call.

IBM i *TriggerControl (10-digit signed integer) on IBM i*

Trigger control.

Table 803. Queue types to which this attribute applies

Local	Model	Alias	Remote	Cluster
X	X			

This controls whether trigger messages are written to an initiation queue, in order to cause an application to be started to service the queue. This is one of the following:

TCOFF
Trigger messages not required.

No trigger messages are to be written for this queue. The value of `TriggerType` is irrelevant in this case.

TCON
Trigger messages required.

Trigger messages are to be written for this queue, when the appropriate trigger events occur.

To determine the value of this attribute, use the IATRGC selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i TriggerData (64-byte character string) on IBM i

Trigger data.

Table 804. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is free-format data that the queue manager inserts into the trigger message when a message arriving on this queue causes a trigger message to be written to the initiation queue.

The content of this data is of no significance to the queue manager. It is meaningful either to the trigger-monitor application which processes the initiation queue, or to the application which is started by the trigger monitor.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the CATRGD selector with the MQINQ call. To change the value of this attribute, use the MQSET call. The length of this attribute is given by LNTRGD.

IBM i TriggerDepth (10-digit signed integer) on IBM i

Trigger depth.

Table 805. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the number of messages of priority *TriggerMsgPriority* or greater that must be on the queue before a trigger message is written. This applies when *TriggerType* is set to TTDPTH. The value of *TriggerDepth* is one or greater. This attribute is not used otherwise.

To determine the value of this attribute, use the IATRGD selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i TriggerMsgPriority (10-digit signed integer) on IBM i

Threshold message priority for triggers on IBM MQ for IBM i.

Table 806. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This is the message priority below which messages do not contribute to the generation of trigger messages (that is, the queue manager ignores these messages when determining whether a trigger message should be generated). *TriggerMsgPriority* can be in the range zero (lowest) through *MaxPriority* (highest; see "Attributes for the queue manager on IBM i" on page 1384); a value of zero causes all messages to contribute to the generation of trigger messages.

To determine the value of this attribute, use the IATRGP selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i TriggerType (10-digit signed integer) on IBM i

Trigger type.

Table 807. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This controls the conditions under which trigger messages are written as a result of messages arriving on this queue. The value is one of the following:

TTNONE
No trigger messages.

No trigger messages are written as a result of messages on this queue. This has the same effect as setting *TriggerControl* to TCOFF.

TTFRST
Trigger message when queue depth goes from 0 to 1.

A trigger message is written whenever the number of messages of priority *TriggerMsgPriority* or greater on the queue changes from 0 to 1.

TTEVRY
Trigger message for every message.

A trigger message is written whenever a message of priority *TriggerMsgPriority* or greater arrives on the queue.

TTDPTH
Trigger message when depth threshold exceeded.

A trigger message is written whenever the number of messages of priority *TriggerMsgPriority* or greater on the queue equals or exceeds *TriggerDepth*. After the trigger message has been written, *TriggerControl* is set to TCOFF to prevent further triggering until it is explicitly turned on again.

To determine the value of this attribute, use the IATRGT selector with the MQINQ call. To change the value of this attribute, use the MQSET call.

IBM i Usage (10-digit signed integer) on IBM i

Queue usage.

Table 808. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
X	X			

This indicates what the queue is used for. The value is one of the following:

USNORM
Normal usage.

This is a queue that normal applications use when putting and getting messages; the queue is not a transmission queue.

USTRAN
Transmission queue.

This is a queue used to hold messages destined for remote queue managers. When a normal application sends a message to a remote queue, the local queue manager stores the message

temporarily on the appropriate transmission queue in a special format. A message channel agent then reads the message from the transmission queue, and transports the message to the remote queue manager. For more information about transmission queues, see Transmission queues.

Only privileged applications can open a transmission queue for OOOUT to put messages on it directly. Only utility applications would normally be expected to do this. Care must be taken that the message data format is correct (see “MQXQH (Transmission-queue header) on IBM i” on page 1231), otherwise errors might occur during the transmission process. Context is not passed or set unless one of the PM* context options is specified.

To determine the value of this attribute, use the IAUSAG selector with the MQINQ call.

IBM i *XmitQName (48-byte character string) on IBM i*

Transmission queue name.

Table 809. Queue types to which this attribute applies				
Local	**Model**	**Alias**	**Remote**	**Cluster**
			X	

If this attribute is nonblank when an open occurs, either for a remote queue or for a queue manager alias definition, it specifies the name of the local transmission queue to be used for forwarding the message.

If *XmitQName* is blank, the local queue with the same name as *RemoteQMgrName* is used as the transmission queue. If there is no queue with the name *RemoteQMgrName*, the queue identified by the **DefXmitQName** queue manager attribute is used.

This attribute is ignored if the definition is being used as a queue manager alias and *RemoteQMgrName* is the name of the local queue manager. It is also ignored if the definition is used as a reply-to queue alias definition.

To determine the value of this attribute, use the CAXQN selector with the MQINQ call. The length of this attribute is given by LNQN.

Attributes for namelists

This topic summarizes the attributes that are specific to namelists. The attributes are described in alphabetical order.

Note: The names of the attributes shown are the names used with the MQINQ and MQSET calls.

Attribute descriptions

A namelist object has the following attributes:

AlterationDate (12-byte character string)

Date when definition was last changed.

This is the date when the definition was last changed. The format of the date is YYYY-MM-DD, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the CAALTD selector with the MQINQ call. The length of this attribute is given by LNDATE.

AlterationTime (8-byte character string)

Time when definition was last changed.

This is the time when the definition was last changed. The format of the time is HH.MM.SS.

To determine the value of this attribute, use the CAALTT selector with the MQINQ call. The length of this attribute is given by LNTIME.

NameCount (10-digit signed integer)

Number of names in namelist.

This is greater than or equal to zero. The following value is defined:

NCMXNL
Maximum number of names in a namelist.

To determine the value of this attribute, use the IANAMC selector with the MQINQ call.

NamelistDesc (64-byte character string)

Namelist description.

This is a field that might be used for descriptive commentary; its value is established by the definition process. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contains only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, this field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the CALSTD selector with the MQINQ call.

The length of this attribute is given by LNNLD.

NamelistName (48-byte character string)

Namelist name.

This is the name of a namelist that is defined on the local queue manager.

Each namelist has a name that is different from the names of other namelists belonging to the queue manager, but might duplicate the names of other queue manager objects of different types (for example, queues).

To determine the value of this attribute, use the CALSTN selector with the MQINQ call.

The length of this attribute is given by LNNLN.

Names (48-byte character string x NameCount)

A list of *NameCount* names.

Each name is the name of an object that is defined to the local queue manager. For more information about object names, see Naming IBM MQ objects.

To determine the value of this attribute, use the CANAMS selector with the MQINQ call.

The length of each name in the list is given by LNOBJN.

IBM i Attributes for process definitions on IBM i

This topic summarizes the attributes that are specific to process definitions. The attributes are described in alphabetical order.

Note: The names of the attributes shown are the names used with the MQINQ and MQSET calls. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for details.

Attribute descriptions

A process-definition object has the following attributes:

AlterationDate (12-byte character string)

Date when definition was last changed.

This is the date when the definition was last changed. The format of the date is `YYYY-MM-DD`, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the CAALTD selector with the MQINQ call. The length of this attribute is given by LNDATE.

AlterationTime (8-byte character string)

Time when definition was last changed.

This is the time when the definition was last changed. The format of the time is `HH.MM.SS`.

To determine the value of this attribute, use the CAALTT selector with the MQINQ call. The length of this attribute is given by LNTIME.

ApplId (256-byte character string)

Application identifier.

This is a character string that identifies the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

The meaning of *ApplId* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ requires *ApplId* to be the name of an executable program.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the CAAPPI selector with the MQINQ call. The length of this attribute is given by LNPROA.

ApplType (10-digit signed integer)

Application type.

This identifies the nature of the program to be started in response to the receipt of a trigger message. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

ApplType can have any value. You can use the following values for standard types; user-defined application types are restricted to values in the range ATUFST through ATULST:

ATCICS
CICS transaction.

AT400
IBM i application.

ATUFST
Lowest value for user-defined application type.

ATULST
Highest value for user-defined application type.

To determine the value of this attribute, use the IAAPPT selector with the MQINQ call.

EnvData (128-byte character string)

Environment data.

This is a character string that contains environment-related information pertaining to the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue; the information is sent to the initiation queue as part of the trigger message.

The meaning of *EnvData* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ appends *EnvData* to the parameter list passed to the started application. The parameter list consists of the MQTMC2 structure, followed by one blank, followed by *EnvData* with trailing blanks removed.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the CAENVD selector with the MQINQ call. The length of this attribute is given by LNPROE.

ProcessDesc (64-byte character string)

Process description.

This is a field that can be used for descriptive commentary. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, the field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

To determine the value of this attribute, use the CAPROD selector with the MQINQ call.

The length of this attribute is given by LNPROD.

ProcessName (48-byte character string)

Process name.

This is the name of a process definition that is defined on the local queue manager.

Each process definition has a name that is different from the names of other process definitions belonging to the queue manager. But the name of the process definition can be the same as the names of other queue manager objects of different types (for example, queues).

To determine the value of this attribute, use the CAPRON selector with the MQINQ call.

The length of this attribute is given by LNPRON.

UserData (128-byte character string)

User data.

This is a character string that contains user information pertaining to the application to be started. This information is for use by a trigger-monitor application that processes messages on the initiation queue, or the application which is started by the trigger monitor. The information is sent to the initiation queue as part of the trigger message.

The meaning of *UserData* is determined by the trigger-monitor application. The trigger monitor provided by IBM MQ passes *UserData* to the started application as part of the parameter list. The parameter list consists of the MQTMC2 structure (containing *UserData*), followed by one blank, followed by *EnvData* with trailing blanks removed.

The character string cannot contain any nulls. It is padded to the right with blanks if necessary.

To determine the value of this attribute, use the CAUSRD selector with the MQINQ call. The length of this attribute is given by LNPROU.

IBM i Attributes for the queue manager on IBM i

A summary of queue manager attributes.

Some queue manager attributes are fixed for particular implementations, while others can be changed by using the MQSC command `ALTER QMGR`. The attributes can also be displayed by using the command `DISPLAY QMGR`. Most queue manager attributes can be inquired by opening a special OTQM object, and using the MQINQ call with the handle returned.

The following table summarizes the attributes that are specific to the queue manager. The attributes are described in alphabetical order.

Note: The names of the attributes shown in this section are the names used with the MQINQ and MQSET calls. When MQSC commands are used to define, alter, or display attributes, alternative short names are used; see MQSC commands for more information.

Table 810. Attributes for the queue manager

Attribute	Description
AlterationDate	Date when definition was last changed
AlterationTime	Time when definition was last changed
AuthorityEvent	Controls whether authorization (Not Authorized) events are generated
BridgeEvent	Controls whether IMS bridge events are generated
ChannelAutoDef	Controls whether automatic channel definition is permitted
ChannelAutoDefEvent	Controls whether channel automatic-definition events are generated
ChannelAutoDefExit	Name of user exit for automatic channel definition
ChannelEvent	Controls whether channel events are generated
ClusterCacheType	Controls whether the cluster cache is fixed in size or dynamically sized
ClusterWorkloadData	User data for cluster workload exit
ClusterWorkloadExit	Name of user exit for cluster workload management
ClusterWorkloadLength	Maximum length of message data passed to cluster workload exit
CodedCharSetId	Coded character set identifier
CommandEvent	Controls whether command event messages are queued
CommandInputQName	Command input queue name
CommandLevel	Command level
ConfigurationEvent	Configuration event
DeadLetterQName	Name of dead-letter queue
DefClusterXmitQueueType	Default cluster transmission queue type
DefXmitQName	Default transmission queue name
DistLists	Distribution list support
InhibitEvent	Controls whether inhibit (Inhibit Get and Inhibit Put) events are generated
LocalEvent	Controls whether local error events are generated
LoggerEvent	Controls whether recovery log events are generated
MaxHandles	Maximum number of handles
MaxMsgLength	Maximum message length in bytes
MaxPriority	Maximum priority
MaxUncommittedMsgs	Maximum number of uncommitted messages within a unit of work
PerformanceEvent	Controls whether performance-related events are generated
Platform	Platform on which the queue manager is running

Attribute	Description
PubSubMode	Whether the publish/subscribe engine and queued publish/subscribe interface are running
QMgrDesc	Queue manager description
QMgrIdentifier	Unique internally-generated identifier of queue manager
QMgrName	Queue manager name
RemoteEvent	Controls whether remote error events are generated
RepositoryName	Name of cluster for which this queue manager provides repository services
RepositoryNamelist	Name of namelist object containing names of clusters for which this queue manager provides repository services
SSLCRLNamelist	Name of namelist object containing names of authentication information objects (See Note 1)
SSLEvent	Controls whether TLS events are generated
SSLKeyRepository	Location of TLS key repository (See Note 1)
SSLKeyResetCount	Determines the number of non-encrypted bytes sent and received within a TLS conversation before the encryption key is renegotiated
StartStopEvent	Controls whether start and stop events are generated
SyncPoint	Syncpoint availability
TraceRouteRecording	Controls the recording of trace route information for messages
TreeLifeTime	The lifetime, in seconds, of non-administrative topics
TriggerInterval	Trigger-message interval

Table 810. Attributes for the queue manager (continued)

Notes:

1. This attribute cannot be inquired using the MQINQ call, and is not described in this section. For more information about this attribute, see Change Queue Manager.

IBM i *AlterationDate (12-byte character string) on IBM i*

Date when definition was last changed.

This is the date when the definition was last changed. The format of the date is `YYYY-MM-DD`, padded with two trailing blanks to make the length 12 bytes.

To determine the value of this attribute, use the CAALTD selector with the MQINQ call. The length of this attribute is given by LNDATE.

IBM i *AlterationTime (8-byte character string) on IBM i*

Time when definition was last changed.

This is the time when the definition was last changed. The format of the time is `HH.MM.SS`.

To determine the value of this attribute, use the CAALTT selector with the MQINQ call. The length of this attribute is given by LNTIME.

IBM i AuthorityEvent (10-digit signed integer) on IBM i

Controls whether authorization (Not Authorized) events are generated.

The AuthorityEvent attribute must be set to one of the following values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAAUTE selector with the MQINQ call.

IBM i BridgeEvent (character string) on IBM i

This attribute determines whether IMS bridge event messages are put onto the SYSTEM.ADMIN.CHANNEL.EVENT queue. It is only supported on z/OS.

IBM i ChannelAutoDef (10-digit signed integer) on IBM i

Controls whether automatic channel definition is permitted.

This attribute controls the automatic definition of channels of type CTRCVR and CTSVCN. Note that the automatic definition of CTCLSD channels is always enabled. This can have one of the following values:

CHADDI
Channel auto-definition disabled.

CHADEN
Channel auto-definition enabled.

To determine the value of this attribute, use the IACAD selector with the MQINQ call.

IBM i ChannelAutoDefEvent (10-digit signed integer) on IBM i

Controls whether channel automatic-definition events are generated.

This applies to channels of type CTRCVR, CTSVCN, and CTCLSD. This can have one of the following values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Monitoring and performance.

To determine the value of this attribute, use the IACADE selector with the MQINQ call.

IBM i ChannelAutoDefExit (20-byte character string) on IBM i

Name of user exit for automatic channel definition.

If this name is nonblank, and *ChannelAutoDef* has the value CHADEN, the exit is called each time that the queue manager is about to create a channel definition. This applies to channels of type CTRCVR, CTSVCN, and CTCLSD. The exit can then do one of the following:

- Allow the creation of the channel definition to proceed without change.
- Modify the attributes of the channel definition that is created.
- Suppress creation of the channel entirely.

To determine the value of this attribute, use the CACADX selector with the MQINQ call. The length of this attribute is given by LNEXN.

IBM i *ChannelEvent (character string) on IBM i*

Determines whether channel event messages are generated.

This attribute determines whether channel event messages are put onto the SYSTEM.ADMIN.CHANNEL.EVENT queue, and if so, what type of messages are queued (for example 'channel started', 'channel stopped', 'channel not activated'). Before the implementation of this attribute, the only way of preventing channel event messages from being queued was to delete the target queue.

This attribute also allows you to collect IMS bridge events only (because you can now switch off channel events, they do not get put onto the same queue). The same applies to TLS events which can also be collected without having to collect channel events as well.

This attribute also allows you to collect significant events only (for example when channels have errors, not when they start and stop normally).

The value for the ChannelEvent attribute can be one of the following:

- EVREXP (only the following channel events are generated: RC2279, RC2283, RC2284, RC2295, RC2296).
- EVRENA (all channel events are generated; that is, in addition to the events generated by EVREXP, the RC2282, and RC2283 events are also generated).
- EVRDIS (no channel events are generated; this is the queue manager initial default value).

To determine the value of this attribute, use the IACHNE selector with the MQINQ call.

IBM i *ClusterCacheType (32-byte character string) on IBM i*

Controls whether cluster cache is fixed size, or is dynamically sized.

This is a user-defined 32-byte character string that is passed to the cluster workload exit when it is called. If there is no data to pass to the exit, the string is blank.

To determine the value of this attribute, use the CACLWD selector with the MQINQ call.

IBM i *ClusterWorkloadData (32-byte character string) on IBM i*

User data for cluster workload exit.

This is a user-defined 32-byte character string that is passed to the cluster workload exit when it is called. If there is no data to pass to the exit, the string is blank.

To determine the value of this attribute, use the CACLWD selector with the MQINQ call.

IBM i *ClusterWorkloadExit (20-byte character string) on IBM i*

Name of user exit for cluster workload management.

If this name is not blank, the exit is called each time that a message is put to a cluster queue or moved from one cluster-sender queue to another. The exit can then either accept the queue instance selected by the queue manager as the destination for the message, or select another queue instance.

To determine the value of this attribute, use the CACLWX selector with the MQINQ call. The length of this attribute is given by LNEXN.

IBM i *ClusterWorkloadLength (10-digit signed integer) on IBM i*

Maximum length of message data passed to cluster workload exit.

This is the maximum length of message data that is passed to the cluster workload exit. The actual length of data passed to the exit is the minimum of the following:

- The length of the message.
- The queue manager's **MaxMsgLength** attribute.
- The **ClusterWorkloadLength** attribute.

To determine the value of this attribute, use the IACLWL selector with the MQINQ call.

IBM i CodedCharSetId (10-digit signed integer) on IBM i

Coded character set identifier.

This defines the character set used by the queue manager for all character string fields defined in the MQI such as the names of objects, and queue creation date and time. The character set must be one that has single-byte characters for the characters that are valid in object names. It does not apply to application data carried in the message. The value depends on the environment:

- On IBM i, the value is that which is set in the environment when the queue manager is first created.

To determine the value of this attribute, use the IACCSI selector with the MQINQ call.

IBM i CommandEvent (integer) on IBM i

Controls whether messages are put onto a local queue when commands are issued.

This controls whether messages are written to a new event queue, SYSTEM.ADMIN.COMMAND.EVENT, whenever commands are issued. This feature is useful for command tracking notification, and for problem diagnosis. To inquire about the CommandEvent queue manager attribute, use the new attribute selector iacev with one of the following values:

- EVRENA - command event messages are generated and put onto the queue for all successful commands.
- EVND - command event messages are generated and put onto the queue for all successful commands other than the DISPLAY (MQSC) command, and the Inquire (PCF) command.
- EVRDIS - command event messages are not generated or put onto the queue (this is the queue manager's initial default value).

To determine the value of this attribute, use the CMDEV selector with the MQINQ call.

IBM i CommandInputQName (48-byte character string) on IBM i

Command input queue name.

CommandInputQName is the name of the command input queue defined on the local queue manager. It is a queue to which users can send commands, if authorized to do so. The name of the queue depends on the environment:

- On IBM i, the name of the queue is SYSTEM.ADMIN.COMMAND.QUEUE, and only PCF commands can be sent to it. However, an MQSC command can be sent to this queue if the MQSC command is enclosed within a PCF command of type CMESC. For more information about the Escape command, see Escape.

To determine the value of this attribute, use the CACMDQ selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i CommandLevel (10-digit signed integer) on IBM i

Command Level. This indicates the level of system control commands supported by the queue manager.

The level is one of the following values:

CML800

Level 800 of system control commands.

This value is returned by the following applications:

- IBM MQ for IBM i
  - Version 8.0

CML900

Level 900 of system control commands.

This value is returned by the following applications:

- IBM MQ for IBM i

- Version 9.0

CML910
: Level 910 of system control commands.

  This value is returned by the following applications:

  - IBM MQ for IBM i
    - Version 9.1

The set of system control commands that corresponds to a particular value of the **CommandLevel** attribute varies according to the value of the **Platform** attribute; both must be used to decide which system control commands are supported.

To determine the value of this attribute, use the IACMDL selector with the MQINQ call.

IBM i *ConfigurationEvent on IBM i*

Controls whether configuration events are generated and sent to the SYSTEM.ADMIN.CONFIG.EVENT queue default object.

The ConfigurationEvent attribute can be one of the following values:

- EVRENA
- EVRDIS

If the ConfigurationEvent attribute is set to EVRENA, and certain commands are successfully issued by runmqsc or PCF, configuration events are generated and sent to the SYSTEM.ADMIN.CONFIG.EVENT queue. Events for the following commands are issued, even if an alter command does not change the object involved. The commands for which configuration events are generated and sent are:

- DEFINE/ALTER AUTHINFO
- DEFINE/ALTER CHANNEL
- DEFINE/ALTER NAMELIST
- DEFINE/ALTER PROCESS
- DEFINE/ALTER QLOCAL (unless it is a temporary dynamic queue)
- DEFINE/ALTER QMODEL/QALIAS/QREMOTE
- DELETE AUTHINFO
- DELETE CHANNEL
- DELETE NAMELIST
- DELETE PROCESS
- DELETE QLOCAL (unless it is a temporary dynamic queue)
- DELETE QMODEL/QALIAS/QREMOTE
- ALTER QMGR (unless the CONFIGEV attribute is disabled and is not changed to enabled)
- REFRESH QMGR
- An MQSET call, other than for a temporary dynamic queue.

Events are not generated (if enabled) in the following circumstances:

- The command or MQSET call fails.
- The queue manager cannot put the event message on the event queue. The command should still complete successfully.
- Temporary dynamic queues.
- Internal attribute changes done directly or implicitly (not by MQSET or command); this affects TRIGGER, CURDEPTH, IPPROCS, OPPROCS, QDPHIEV, QDPLOEV, QDPMAXEV, QSVCIEV.
- When the configuration event queue is changed, although it an event message will be generated for that change when a Refresh is requested.

- Clustering changes by the commands REFRESH/RESET CLUSTER and RESUME/SUSPEND QMGR.
- Creating or deleting a queue manager.

IBM i *DeadLetterQName (48-byte character string) on IBM i*

Name of dead-letter (undelivered-message) queue.

This is the name of a queue defined on the local queue manager. Messages are sent to this queue if they cannot be routed to their correct destination.

For example, messages are put on this queue when:

- A message arrives at a queue manager, destined for a queue that is not yet defined on that queue manager
- A message arrives at a queue manager, but the queue for which it is destined cannot receive it because, possibly:
  - The queue is full
  - Put requests are inhibited
  - The sending node does not have authority to put messages on the queue

Applications can also put messages on the dead-letter queue.

Report messages are treated in the same way as ordinary messages; if the report message cannot be delivered to its destination queue (typically the queue specified by the *MDRQ* field in the message descriptor of the original message), the report message is placed on the dead-letter (undelivered-message) queue.

Note: Messages that have passed their expiry time (see the *MDEXP* field described in "MQMD (Message descriptor) on IBM i" on page 1097) are **not** transferred to this queue when they are discarded. However, an expiration report message (ROEXP) is still generated and sent to the *MDRQ* queue, if requested by the sending application.

Messages are not put on the dead-letter (undelivered-message) queue when the application that issued the put request has been notified synchronously of the problem with the reason code returned by the MQPUT or MQPUT1 call (for example, a message put on a local queue for which put requests are inhibited).

Messages on the dead-letter (undelivered-message) queue sometimes have their application message data prefixed with an MQDLH structure. This structure contains extra information that indicates why the message was placed on the dead-letter (undelivered-message) queue. See "MQDLH (Dead-letter header) on IBM i" on page 1052 for more details of this structure.

This queue must be a local queue, with a **Usage** attribute of USNORM.

If a dead-letter (undelivered-message) queue is not supported by a queue manager, or one has not been defined, the name is all blanks. All IBM MQ queue managers support a dead-letter (undelivered-message) queue, but by default it is not defined.

If the dead-letter (undelivered-message) queue is not defined, or it is full, or unusable for some other reason, a message which would have been transferred to it by a message channel agent is retained instead on the transmission queue.

To determine the value of this attribute, use the CADLQ selector with the MQINQ call. The length of this attribute is given by LNQN.

DefClusterXmitQueueType (10-digit signed integer)

The `DefClusterXmitQueueType` attribute controls which transmission queue is selected by default by cluster-sender channels to get messages from, to send the messages to cluster-receiver channels.

The values of **DefClusterXmitQueueType** are `MQCLXQ_SCTQ` or `MQCLXQ_CHANNEL`.

MQCLXQ_SCTQ

All cluster-sender channels send messages from SYSTEM.CLUSTER.TRANSMIT.QUEUE. The correlID of messages placed on the transmission queue identifies which cluster-sender channel the message is destined for.

SCTQ is set when a queue manager is defined. This behavior is implicit in versions of IBM WebSphere MQ, earlier than IBM WebSphere MQ 7.5. In earlier versions, the queue manager attribute DefClusterXmitQueueType was not present.

MQCLXQ_CHANNEL

Each cluster-sender channel sends messages from a different transmission queue. Each transmission queue is created as a permanent dynamic queue from the model queue SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE.

If the queue manager attribute, DefClusterXmitQueueType, is set to CHANNEL, the default configuration is changed to cluster-sender channels being associated with individual cluster transmission queues. The transmission queues are permanent-dynamic queues created from the model queue SYSTEM.CLUSTER.TRANSMIT.MODEL.QUEUE. Each transmission queue is associated with one cluster-sender channel. As one cluster-sender channel services a cluster transmission queue, the transmission queue contains messages for only one queue manager in one cluster. You can configure clusters so that each queue manager in a cluster contains only one cluster queue. In this case, the message traffic from a queue manager to each cluster queue is transferred separately from messages to other queues.

To query the value, call MQINQ, or send an Inquire Queue Manager (MQCMD_INQUIRE_Q_MGR) PCF command, setting the MQIA_DEF_CLUSTER_XMIT_Q_TYPE selector. To change the value, send a Change Queue Manager (MQCMD_CHANGE_Q_MGR) PCF command, setting the MQIA_DEF_CLUSTER_XMIT_Q_TYPE selector.

Related reference

Change Queue Manager

Inquire Queue Manager

“MQINQ (Inquire about object attributes) on IBM i” on page 1291

The MQINQ call returns an array of integers and a set of character strings containing the attributes of an object.

IBM i *DefXmitQName (48-byte character string) on IBM i*

Default transmission queue name.

This is the name of the transmission queue that is used for the transmission of messages to remote queue managers, if there is no other indication of which transmission queue to use.

If there is no default transmission queue, the name is entirely blank. The initial value of this attribute is blank.

To determine the value of this attribute, use the CADXQN selector with the MQINQ call. The length of this attribute is given by LNQN.

IBM i *DistLists (10-digit signed integer) on IBM i*

Distribution list support.

This indicates whether the local queue manager supports distribution lists on the MQPUT and MQPUT1 calls. This can have one of the following values:

DLSUPP

Distribution lists supported.

DLNSUP

Distribution lists not supported.

To determine the value of this attribute, use the IADIST selector with the MQINQ call.

IBM i *InhibitEvent (10-digit signed integer) on IBM i*

Controls whether inhibit (Inhibit Get and Inhibit Put) events are generated.

This can have one of the following values:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Monitoring and performance.

To determine the value of this attribute, use the IAINHE selector with the MQINQ call.

IBM i *LocalEvent (10-digit signed integer) on IBM i*

Controls whether local error events are generated.

The value is one of the following:

EVRDIS
Event reporting disabled.

EVRENA
Event reporting enabled.

For more information about events, see Event monitoring

To determine the value of this attribute, use the IALCLE selector with the MQINQ call.

IBM i *LoggerEvent (10-digit signed integer) on IBM i*

Controls whether recovery logger events are generated.

This can have one of the following values:

ENABLED
Logger events are generated.

DISABLED
Logger events are not generated. This is the queue managers initial default value.

For more information about events, see Monitoring and performance.

IBM i *MaxHandles (10-digit signed integer) on IBM i*

Maximum number of handles.

This is the maximum number of open handles that any one task can use concurrently. Each successful MQOPEN call for a single queue (or for an object that is not a queue) uses one handle. That handle becomes available for reuse when the object is closed. However, when a distribution list is opened, each queue in the distribution list is allocated a separate handle, and so that MQOPEN call uses as many handles as there are queues in the distribution list. This must be taken into account when deciding on a suitable value for *MaxHandles*.

The MQPUT1 call performs an MQOPEN call as part of its processing; as a result, MQPUT1 uses as many handles as MQOPEN would, but the handles are used only for the duration of the MQPUT1 call itself.

The value is in the range 1 through 999 999 999. On IBM i, the default value is 256.

To determine the value of this attribute, use the IAMHND selector with the MQINQ call.

IBM i *MaxMsgLength (10-digit signed integer) on IBM i*

Maximum message length in bytes.

This is the length of the longest *physical* message that can be handled by the queue manager. However, because the **MaxMsgLength** queue manager attribute can be set independently of the **MaxMsgLength**

queue attribute, the longest physical message that can be placed on a queue is the lesser of those two values.

If the queue manager supports segmentation, it is possible for an application to put a *logical* message that is longer than the lesser of the two **MaxMsgLength** attributes, but only if the application specifies the MFSEGA flag in MQMD. If that flag is specified, the upper limit for the length of a logical message is 999 999 999 bytes, but typically, resource constraints imposed by the operating system or by the environment in which the application is running, will result in a lower limit.

The lower limit for the **MaxMsgLength** attribute is 32 KB (32 768 bytes). On IBM i, the maximum message length is 100 MB (104 857 600 bytes).

To determine the value of this attribute, use the IAMLEN selector with the MQINQ call.

IBM i *MaxPriority (10-digit signed integer) on IBM i*

Maximum priority.

This is the maximum message priority supported by the queue manager. Priorities range from zero (lowest) to *MaxPriority* (highest).

To determine the value of this attribute, use the IAMPRI selector with the MQINQ call.

IBM i *MaxUncommittedMsgs (10-digit signed integer) on IBM i*

Maximum number of uncommitted messages within a unit of work.

This is the maximum number of uncommitted messages that can exist within a unit of work. The number of uncommitted messages is the sum of the following since the start of the current unit of work:

- Messages put by the application with the PMSYP option
- Messages retrieved by the application with the GMSYP option
- Trigger messages and COA report messages generated by the queue manager for messages put with the PMSYP option
- COD report messages generated by the queue manager for messages retrieved with the GMSYP option

The following messages are not counted as uncommitted:

- Messages put or retrieved by the application outside a unit of work
- Trigger messages or COA/COD report messages generated by the queue manager as a result of messages put or retrieved outside a unit of work
- Expiration report messages generated by the queue manager (even if the call causing the expiration report message specified GMSYP)
- Event messages generated by the queue manager (even if the call causing the event message specified PMSYP or GMSYP)

Note:

1. Exception report messages are generated by the Message Channel Agent (MCA), or by the application, and so are treated in the same way as ordinary messages put or retrieved by the application.
2. When a message or segment is put with the PMSYP option, the number of uncommitted messages is incremented by one regardless of how many physical messages actually result from the put. (More than one physical message might result if the queue manager needs to subdivide the message or segment.)
3. When a distribution list is put with the PMSYP option, the number of uncommitted messages is incremented by one *for each physical message that is generated*. This can be as small as one, or as great as the number of destinations in the distribution list.

The lower limit for this attribute is 1; the upper limit is 999 999 999.

To determine the value of this attribute, use the IAMUNC selector with the MQINQ call.

IBM i PerformanceEvent (10-digit signed integer) on IBM i

Controls whether performance-related events are generated.

PerformanceEvent can have one of the following values:

EVRDIS
: Event reporting disabled.

EVRENA
: Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IAPFME selector with the MQINQ call.

IBM i Platform (10-digit signed integer) on IBM i

Platform on which the queue manager is running.

This indicates the operating system on which the queue manager is running. The value is:

PL400
: IBM i.

IBM i PubSubMode (10-digit signed integer) on IBM i

Whether the publish/subscribe engine and the queued publish/subscribe interface are running, therefore allowing applications to publish/subscribe by using the application programming interface and the queues that are being monitored by the queued publish/subscribe interface.

This can have one of the following values:

PSMCP
: The publish/subscribe engine is running. It is therefore possible to publish/subscribe by using the application programming interface. The queued publish/subscribe interface is not running, therefore any message that is put to the queues that are monitored by the queued publish/subscribe interface is not acted on. This setting is used for compatibility with WebSphere Message Broker V6 or earlier versions using this queue manager, because it must read the same queues from which the queued publish/subscribe interface normally reads.

PSMDS
: The publish/subscribe engine and the queued publish/subscribe interface are not running. It is therefore not possible to publish/subscribe by using the application programming interface. Any publish/subscribe messages that are put to the queues that are monitored by the queued publish/subscribe interface are not acted on.

PSMEN
: The publish/subscribe engine and the queued publish/subscribe interface are running. It is therefore possible to publish/subscribe by using the application programming interface and the queues that are being monitored by the queued publish/subscribe interface. This is the queue manager's initial default value.

To determine the value of this attribute, use the PSMODE selector with the MQINQ call.

IBM i QMgrDesc (64-byte character string) on IBM i

Queue manager description.

This is a field that can be used for descriptive commentary. The content of the field is of no significance to the queue manager, but the queue manager might require that the field contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, this field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the queue manager's character set (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

On IBM i, the default value is blanks.

To determine the value of this attribute, use the CAQMD selector with the MQINQ call. The length of this attribute is given by LNQMD.

IBM i *QMgrIdentifier (48-byte character string) on IBM i*

Unique internally-generated identifier of queue manager.

This is an internally-generated unique name for the queue manager.

To determine the value of this attribute, use the CAQMID selector with the MQINQ call. The length of this attribute is given by LNQMID.

IBM i *QMgrName (48-byte character string) on IBM i*

Queue manager name.

This is the name of the local queue manager, that is, the name of the queue manager to which the application is connected.

The first 12 characters of the name are used to construct a unique message identifier (see the *MDMID* field described in "MQMD (Message descriptor) on IBM i" on page 1097). Queue managers that can intercommunicate must therefore have names that differ in the first 12 characters, in order for message identifiers to be unique in the queue manager network.

To determine the value of this attribute, use the CAQMN selector with the MQINQ call. The length of this attribute is given by LNQMN.

IBM i *RemoteEvent (10-digit signed integer) on IBM i*

Controls whether remote error events are generated.

The value is one of the following:

EVRDIS
: Event reporting disabled.

EVRENA
: Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IARMTE selector with the MQINQ call.

IBM i *RepositoryName (48-byte character string) on IBM i*

Name of cluster for which this queue manager provides repository services.

This is the name of a cluster for which this queue manager provides a repository-manager service. If the queue manager provides this service for more than one cluster, *RepositoryNamelist* specifies the name of a namelist object that identifies the clusters, and *RepositoryName* is blank. At least one of *RepositoryName* and *RepositoryNamelist* must be blank.

To determine the value of this attribute, use the CARPN selector with the MQINQ call. The length of this attribute is given by LNQMN.

IBM i *RepositoryNamelist (48-byte character string) on IBM i*

Name of namelist object containing names of clusters for which this queue manager provides repository services.

This is the name of a namelist object that contains the names of clusters for which this queue manager provides a repository-manager service. If the queue manager provides this service for only one cluster, the namelist object contains only one name. Alternatively, *RepositoryName* can be used to specify the name of the cluster, in which case *RepositoryNamelist* is blank. At least one of *RepositoryName* and *RepositoryNamelist* must be blank.

To determine the value of this attribute, use the CARPNL selector with the MQINQ call. The length of this attribute is given by LNNLN.

IBM i *SSLEvent (character string) on IBM i*

Determines whether TLS events are generated.

The value is one of the following:

- EVRENA (MQINQ/PCF/config event) ENABLED (MQSC): TLS events are generated (that is, the RC2371 event is generated).
- EVRDIS (MQINQ/PCF/config event) DISABLED (MQSC): TLS events are not generated. This is the queue manager's initial default value.

To determine the value of this attribute, use the IASSLE selector with the MQINQ call.

IBM i *SSLKeyResetCount (integer) on IBM i*

Determines the total number of non-encrypted bytes that are sent and received within a TLS conversation, before the secret key is renegotiated. The number of bytes includes control information sent by the message channel agent (MCA).

This value is only used by TLS channel MCAs which initiate communication from this queue manager (that is, the sender channel MCA in a sender and receiver channel pairing).

If the value of this attribute is greater than 0, and channel heartbeats are enabled for a channel, the secret key is also renegotiated before data is sent or received following a channel heartbeat. The count of bytes until the next secret key renegotiation is reset after each successful renegotiation occurs.

The value can be in the range 0 through 999 999 999. A value of 0 for this attribute indicates that the secret key is never renegotiated. If you specify a TLS secret key reset count in the range 1 byte through 32 KB, TLS channels will use a secret key reset count of 32 KB. This is to avoid the processing cost of excessive key resets which would occur for small TLS secret key reset values.

When the SSL server is an IBM MQ queue manager, and both secret key reset and channel heartbeats are enabled, renegotiation occurs immediately after each channel heartbeat.

To determine the value of this attribute, use the IASSRC selector with the MQINQ call.

IBM i *StartStopEvent (10-digit signed integer) on IBM i*

Controls whether start and stop events are generated.

This attribute can have one of the following values:

EVRDIS
: Event reporting disabled.

EVRENA
: Event reporting enabled.

For more information about events, see Event monitoring.

To determine the value of this attribute, use the IASSE selector with the MQINQ call.

IBM i *SyncPoint (10-digit signed integer) on IBM i*

Syncpoint availability.

This indicates whether the local queue manager supports units of work and syncpointing with the MQGET, MQPUT, and MQPUT1 calls.

SPAVL
: Units of work and syncpointing available.

SPNAVL
: Units of work and syncpointing not available.

To determine the value of this attribute, use the IASYNC selector with the MQINQ call.

IBM i TraceRouteRecording (10-digit signed integer) on IBM i

This controls whether information about messages is recorded as they flow through a queue manager.

The value is one of the following:

- RECDD: no appending to trace route messages is allowed
- RECDQ: messages are put onto a fixed named queue
- RECDM: determine using message (this is the initial default setting)

To prevent the trace route message from remaining in the system, set an expiry value on it that is greater than zero, and specify the RODISC report option. To prevent report or reply messages remaining in the system, set the report option ROPDAE. For more information, see "Report options and message flags on IBM i" on page 1418.

To determine the value of this attribute, use the IATRGI selector with the MQINQ call.

IBM i TreeLifeTime (10-digit signed integer) on IBM i

The lifetime, in seconds, of non-administrative topics.

Non-administrative topics are those created when an application publishes to, or subscribes as, a topic string that does not exist as an administrative node. When this non-administrative node no longer has any active subscriptions, this parameter determines how long the queue manager will wait before removing that node. Only non-administrative topics that are in use by a durable subscription remain after the queue manager is recycled.

Specify a value in the range 0 through 604 000. A value of 0 means that non-administrative topics are not removed by the queue manager. The queue manager's initial default value is 1800.

To determine the value of this attribute, use the IATRLFT selector with the MQINQ call.

IBM i TriggerInterval (10-digit signed integer) on IBM i

Trigger-message interval.

This is a time interval (in milliseconds) used to restrict the number of trigger messages. This is relevant only when the `TriggerType` is TTFRST. In this case, trigger messages are normally generated only when a suitable message arrives on the queue, and the queue was previously empty. Under certain circumstances, however, an additional trigger message can be generated with TTFRST triggering even if the queue was not empty. These additional trigger messages are not generated more often than every `TriggerInterval` milliseconds.

For more information about triggering, see Triggering channels.

The value is in the range zero through 999 999 999. The default value is 999 999 999.

To determine the value of this attribute, use the IATRGI selector with the MQINQ call.

Applications

This information describes the sample programs delivered with IBM MQ for IBM i for RPG. Also, learn how to build executable applications from the programs you write.

Building your application

The IBM i publications describe how to build executable applications from the programs you write. This topic describes the additional tasks, and the changes to the standard tasks, you must perform when building IBM MQ for IBM i applications to run under IBM i.

In addition to coding the MQI calls in your source code, you must add the appropriate language statements to include the IBM MQ for IBM i copy files for the RPG language. You should make yourself

familiar with the contents of these files; their names, and a brief description of their contents are given in the following text.

IBM i IBM MQ copy files on IBM i

IBM MQ for IBM i provides copy files to assist you with writing your applications in the RPG programming language. They are suitable for use with the WebSphere Development toolset (5722 WDS) ILE RPG 4 Compiler.

The copy files that IBM MQ for IBM i provides to assist with the writing of channel exits are described in Channel-exit programs for messaging channels.

The names of the IBM MQ for IBM i copy files for RPG have the prefix CMQ. They have a suffix of G or H. There are separate copy files containing the named constants, and one file for each of the structures. The copy files are listed in “Language considerations” on page 998.

Note: For ILE RPG/400, they are supplied as members of file QRPGLESRC in library QMQM.

The structure declarations do not contain DS statements. This allows the application to declare a data structure (or a multiple-occurrence data structure) by coding the DS statement and using the /COPY statement to copy in the remainder of the declaration:

For ILE RPG/400 the statement is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7
D* Declare an MQMD data structure
D MQMD       DS
D/COPY CMQMDG
```

Preparing your programs to run

To create an executable IBM MQ for IBM i application, you have to compile the source code you have written.

To do this for ILE RPG/400, you can use the typical IBM i commands, CRTRPGMOD and CRTPGM.

After creating your *MODULE, you need to specify BNDSRVPGM(QMQM/LIBMQM) in the CRTPGM command. This includes the various IBM MQ procedures in your program.

Make sure that the library containing the copy files (QMQM) is in the library list when you perform the compilation.

For further information concerning programming considerations, including client modes, see “Language considerations” on page 998.

Interfaces to the IBM i external syncpoint manager

IBM MQ for IBM i uses native IBM i commitment control as an external syncpoint coordinator.

See the *IBM i Programming: Backup and Recovery Guide* for more information about the commitment control capabilities of IBM i.

To start the IBM i commitment control facilities, use the STRCMTCTL system command. To end commitment control, use the ENDCMTCTL system command.

Note: The default value of *Commitment definition scope* is *ACTGRP. This must be defined as *JOB for IBM MQ for IBM i. For example:

```
STRCMTCTL LCKLVL(*ALL) CMTSCOPE(*JOB)
```

If you call MQPUT, MQPUT1, or MQGET, specifying PMSYP or GMSYP, after starting commitment control, IBM MQ for IBM i adds itself as an API commitment resource to the commitment definition. This is typically the first such call in a job. While there are any API commitment resources registered under a particular commitment definition, you cannot end commitment control for that definition.

IBM MQ for IBM i removes its registration as an API commitment resource when you disconnect from the queue manager, provided there are no pending MQI operations in the current unit of work.

If you disconnect from the queue manager while there are pending MQPUT, MQPUT1, or MQGET operations in the current unit of work, IBM MQ for IBM i remains registered as an API commitment resource so that it is notified of the next commit or rollback. When the next syncpoint is reached, IBM MQ commits or rolls back the changes as required. It is possible for an application to disconnect and reconnect to a queue manager during an active unit of work and perform further MQGET and MQPUT operations inside the same unit of work (this is a pending disconnect).

If you attempt to issue an ENDCMTCTL system command for that commitment definition, message CPF8355 is issued, indicating that pending changes were active. This message also appears in the job log when the job ends. To avoid this, ensure that you commit or roll back all pending IBM MQ operations, and that you disconnect from the queue manager. Thus, using COMMIT or ROLLBACK commands before ENDCMTCTL should enable end-commitment control to complete successfully.

When IBM i commitment control is used as an external syncpoint coordinator, MQCMIT, MQBACK, and MQBEGIN calls might not be issued. Calls to these functions fail with the reason code RC2012.

To commit or roll back (that is, to back out) your unit of work, use one of the programming languages that supports the commitment control. For example:

- CL commands: COMMIT and ROLLBACK
- ILE C Programming Functions: _Rcommit and _Rrollback
- RPG/400: COMMIT and ROLBK
- COBOL/400®: COMMIT and ROLLBACK

Syncpoints in CICS for IBM i applications

IBM MQ for IBM i participates in units of work with CICS. You can use the MQI within a CICS application to put and get messages inside the current unit of work.

You can use the EXEC CICS SYNCPOINT command to establish a syncpoint that includes the IBM MQ for IBM i operations. To back out all changes up to the previous syncpoint, you can use the EXEC CICS SYNCPOINT ROLLBACK command.

If you use MQPUT, MQPUT1, or MQGET with the PMSYP, or GMSYP , option set in a CICS application, you cannot log off CICS until IBM MQ for IBM i has removed its registration as an API commitment resource. Therefore, you should commit or back out any pending put or get operations before you disconnect from the queue manager. This will allow you to log off CICS.

Sample programs on IBM i

This topic describes the sample programs delivered with IBM MQ for IBM i for RPG. The samples demonstrate typical uses of the Message Queue Interface (MQI).

The samples are not intended to demonstrate general programming techniques, so some error checking that you may want to include in a production program has been omitted. However, these samples are suitable for use as a base for your own message queuing programs.

The source code for all the samples is provided with the product; this source includes comments that explain the message queuing techniques demonstrated in the programs.

There is one set of ILE sample programs:

1. **Programs using prototyped calls to the MQI (static bound calls)**

   The source exists in QMQMSAMP/QRPGLESRC. The members are named AMQ3xxx4, where xxx indicates the sample function. Copy members exist in QMQM/QRPGLESRC. Each member name has a suffix of G or H.

Table 811 on page 1401 gives a complete list of the sample programs delivered with IBM MQ for IBM i, and shows the names of the programs in each of the supported programming languages. Notice that

their names all start with the prefix AMQ, the fourth character in the name indicates the programming language.

Table 811. Names of the sample programs	
	RPG (ILE)
Put samples	AMQ3PUT4
Browse samples	AMQ3GBR4
Get samples	AMQ3GET4
Request samples	AMQ3REQ4
Echo samples	AMQ3ECH4
Inquire samples	AMQ3INQ4
Set samples	AMQ3SET4
Trigger Monitor sample	AMQ3TRG4
Trigger Server sample	AMQ3SRV4

In addition to these, the IBM MQ for IBM i sample option includes a sample data file, AMQSDATA, which can be used as input to certain sample programs and sample CL programs that demonstrate administration tasks. The CL samples are described in Administering IBM i . You could use the sample CL program to create queues to use with the sample programs described in this topic.

For information about how to run the sample programs, see “Preparing and running the sample programs on IBM i” on page 1402.

Features demonstrated in the sample programs on IBM i

A table that shows the techniques demonstrated by the IBM MQ for IBM i sample programs.

Some techniques occur in more than one sample program, but only one program is listed in the table. All the samples open and close queues using the MQOPEN and MQCLOSE calls, so these techniques are not listed separately in the table.

Table 812. Sample programs demonstrating use of the MQI	
Technique	**RPG (ILE)**
Using the MQCONN and MQDISC calls	AMQ3ECH4 or AMQ3INQ4
Implicitly connecting and disconnecting	AMQ3PUT4
Putting messages using the MQPUT call	AMQ3PUT4
Putting a single message using the MQPUT1 call	AMQ3ECH4 or AMQ3INQ4
Replying to a request message	AMQ3INQ4
Getting messages (no wait)	AMQ3GBR4
Getting messages (wait with a time limit)	AMQ3GET4
Getting messages (with data conversion)	AMQ3ECH4
Browsing a queue	AMQ3GBR4
Using a shared input queue	AMQ3INQ4
Using an exclusive input queue	AMQ3REQ4

Table 812. Sample programs demonstrating use of the MQI (continued)	
Technique	**RPG (ILE)**
Using the MQINQ call	AMQ3INQ4
Using the MQSET call	AMQ3SET4
Using a reply-to queue	AMQ3REQ4
Requesting exception messages	AMQ3REQ4
Accepting a truncated message	AMQ3GBR4
Using a resolved queue name	AMQ3GBR4
Trigger processing	AMQ3SRV4 or AMQ3TRG4

Note: All the sample programs produce a spool file that contains the results of the processing.

Preparing and running the sample programs on IBM i

Before you can run the IBM MQ for IBM i sample programs, you must compile them as you would any other IBM MQ for IBM i applications. To do so, you can use the IBM i commands CRTRPGMOD and CRTPGM.

When you create the AMQ3xxx4 programs, you must specify BNDSRVPGM(QMQM/LIBMQM) in the CRTPGM command. Doing so includes the various IBM MQ procedures in your program.

The sample programs are provided in library QMQMSAMP as members of QRPGLESRC. They use the copy files provided in library QMQM, so make sure that this library is in the library list when you compile them. The RPG compiler gives information messages because the samples do not use many of the variables that are declared in the copy files.

Running the sample programs

You can use your own queues when you run the samples, or you can compile and run AMQSAMP4 to create some sample queues. The source for this program is shipped in file QCLSRC in library QMQMSAMP. It can be compiled using the CRTCLPGM command.

To call one of the sample programs, use a command like:

```
CALL PGM(QMQMSAMP/AMQ3PUT4) PARM('Queue_Name','Queue_Manager_Name')
```

Where `Queue_Name` and `Queue_Manager_Name` must be 48 characters in length, which you achieve by padding the `Queue_Name` and `Queue_Manager_Name` with the required number of blanks.

For the Inquire and Set sample programs, the sample definitions created by AMQSAMP4 cause the C versions of these samples to be triggered. If you want to trigger the RPG versions, you must change the process definitions SYSTEM.SAMPLE.ECHOPROCESS and SYSTEM.SAMPLE.INQPROCESS and SYSTEM.SAMPLE.SETPROCESS. You can use the CHGMQMPRC command (described in Change MQ Process (CHGMQMPRC)) to do so, or edit and run AMQSAMP4 with the alternative definition.

The Put sample program on IBM i

The Put sample program, AMQ3PUT4, puts messages on a queue using the MQPUT call.

To start the program, call the program and give the name of your target queue as a program parameter. The program puts a set of fixed messages on the queue; these messages are taken from the data block at the end of the program source code. A sample put program is AMQ3PUT4 in library QMQMSAMP.

Using this example program, the command is:

```
CALL PGM(QMQMSAMP/AMQ3PUT4) PARM('Queue_Name','Queue_Manager_Name')
```

Where `Queue_Name` and `Queue_Manager_Name` must be 48 characters in length, which you achieve by padding the `Queue_Name` and `Queue_Manager_Name` with the required number of blanks.

Design of the Put sample program

The program uses the MQOPEN call with the OOOUT option to open the target queue for putting messages. The results are output to a spool file. If it cannot open the queue, the program writes an error message containing the reason code returned by the MQOPEN call. To keep the program simple, on this and on subsequent MQI calls, the program uses default values for many of the options.

For each line of data contained in the source code, the program reads the text into a buffer and uses the MQPUT call to create a datagram message containing the text of that line. The program continues until either it reaches the end of the input or the MQPUT call fails. If the program reaches the end of the input, it closes the queue using the MQCLOSE call.

The Browse sample program on IBM i

The Browse sample program, AMQ3GBR4, browses messages on a queue using the MQGET call.

The program retrieves copies of all the messages on the queue you specify when you call the program; the messages remain on the queue. You could use the supplied queue SYSTEM.SAMPLE.LOCAL; run the Put sample program first to put some messages on the queue. You could use the queue SYSTEM.SAMPLE.ALIAS, which is an alias name for the same local queue. The program continues until it reaches the end of the queue or an MQI call fails.

An example of a command to call the RPG program is:

```
CALL PGM(QMQMSAMP/AMQ3GBR4) PARM('Queue_Name','Queue_Manager_Name')
```

Where `Queue_Name` and `Queue_Manager_Name` must be 48 characters in length, which you achieve by padding the `Queue_Name` and `Queue_Manager_Name` with the required number of blanks. Therefore, if you are using SYSTEM.SAMPLE.LOCAL as your target queue, you will need 29 blank characters.

Design of the Browse sample program

The program opens the target queue using the MQOPEN call with the OOBRW option. If it cannot open the queue, the program writes an error message to its spool file, containing the reason code returned by the MQOPEN call.

For each message on the queue, the program uses the MQGET call to copy the message from the queue, then displays the data contained in the message. The MQGET call uses these options:

GMBRWN
: After the MQOPEN call, the browse cursor is positioned logically before the first message in the queue, so this option causes the *first* message to be returned when the call is first made.

GMNWT
: The program does not wait if there are no messages on the queue.

GMATM
: The MQGET call specifies a buffer of fixed size. If a message is longer than this buffer, the program displays the truncated message, together with a warning that the message has been truncated.

The program demonstrates how you must clear the *`MDMID`* and *`MDCID`* fields of the MQMD structure after each MQGET call because the call sets these fields to the values contained in the message it retrieves. Clearing these fields means that successive MQGET calls retrieve messages in the order in which the messages are held in the queue.

The program continues to the end of the queue; here, the MQGET call returns the RC2033 (no message available) reason code and the program displays a warning message. If the MQGET call fails, the program writes an error message that contains the reason code in its spool file.

The program then closes the queue using the MQCLOSE call.

The Get sample program on IBM i

The Get sample program, AMQ3GET4, gets messages from a queue using the MQGET call.

When the program is called, it removes messages from the specified queue. You could use the supplied queue SYSTEM.SAMPLE.LOCAL; run the Put sample program first to put some messages on the queue. You could use the SYSTEM.SAMPLE.ALIAS queue, which is an alias name for the same local queue. The program continues until the queue is empty or an MQI call fails.

An example of a command to call the RPG program is:

```
CALL PGM(QMQMSAMP/AMQ3GET4) PARM('Queue_Name','Queue_Manager_Name')
```

where `Queue_Name` and `Queue_Manager_Name` must be 48 characters in length, which you achieve by padding the `Queue_Name` and `Queue_Manager_Name` with the required number of blanks. Therefore, if you are using SYSTEM.SAMPLE.LOCAL as your target queue, you will need 29 blank characters.

Design of the Get sample program

The program opens the target queue for getting messages; it uses the MQOPEN call with the OOINPQ option. If it cannot open the queue, the program writes an error message containing the reason code returned by the MQOPEN call in its spool file.

For each message on the queue, the program uses the MQGET call to remove the message from the queue; it then displays the data contained in the message. The MQGET call uses the GMWT option, specifying a wait interval (*GMWI*) of 15 seconds, so that the program waits for this period if there is no message on the queue. If no message arrives before this interval expires, the call fails and returns the RC2033 (no message available) reason code.

The program demonstrates how you must clear the *MDMID* and *MDCID* fields of the MQMD structure after each MQGET call because the call sets these fields to the values contained in the message it retrieves. Clearing these fields means that successive MQGET calls retrieve messages in the order in which the messages are held in the queue.

The MQGET call specifies a buffer of fixed size. If a message is longer than this buffer, the call fails and the program stops.

The program continues until either the MQGET call returns the RC2033 (no message available) reason code or the MQGET call fails. If the call fails, the program displays an error message that contains the reason code.

The program then closes the queue using the MQCLOSE call.

The Request sample program on IBM i

The Request sample program, AMQ3REQ4, demonstrates client/server processing. The sample is the client that puts request messages on a queue that is processed by a server program. It waits for the server program to put a reply message on a reply-to queue.

The Request sample puts a series of request messages on a queue using the MQPUT call. These messages specify SYSTEM.SAMPLE.REPLY as the reply-to queue. The program waits for reply messages, then displays them. Replies are sent only if the target queue (which we will call the *server queue*) is being processed by a server application, or if an application is triggered for that purpose (the Inquire and Set sample programs are designed to be triggered). The sample waits 5 minutes for the first reply to arrive (to allow time for a server application to be triggered) and 15 seconds for subsequent replies, but it can end without getting any replies.

To start the program, call the program and give the name of your target queue as a program parameter. The program puts a set of fixed messages on the queue; these messages are taken from the data block at the end of the program source code.

Design of the Request sample program

The program opens the server queue so that it can put messages. It uses the MQOPEN call with the OOOUT option. If it cannot open the queue, the program displays an error message containing the reason code returned by the MQOPEN call.

The program then opens the reply-to queue called SYSTEM.SAMPLE.REPLY so that it can get reply messages. For this, the program uses the MQOPEN call with the OOINPX option. If it cannot open the queue, the program displays an error message containing the reason code returned by the MQOPEN call.

For each line of input, the program then reads the text into a buffer and uses the MQPUT call to create a request message containing the text of that line. On this call the program uses the ROEXCD report option to request that any report messages sent about the request message will include the first 100 bytes of the message data. The program continues until either it reaches the end of the input or the MQPUT call fails.

The program then uses the MQGET call to remove reply messages from the queue, and displays the data contained in the replies. The MQGET call uses the GMWT option, specifying a wait interval (*GMWI*) of 5 minutes for the first reply (to allow time for a server application to be triggered) and 15 seconds for subsequent replies. The program waits for these periods if there is no message on the queue. If no message arrives before this interval expires, the call fails and returns the RC2033 (no message available) reason code. The call also uses the GMATM option, so messages longer than the declared buffer size are truncated.

The program demonstrates how you must clear the *MDMID* and *MDCOD* fields of the MQMD structure after each MQGET call because the call sets these fields to the values contained in the message it retrieves. Clearing these fields means that successive MQGET calls retrieve messages in the order in which the messages are held in the queue.

The program continues until either the MQGET call returns the RC2033 (no message available) reason code or the MQGET call fails. If the call fails, the program displays an error message that contains the reason code.

The program then closes both the server queue and the reply-to queue using the MQCLOSE call. Table 813 on page 1405 shows the changes to the Echo sample program that are necessary to run the Inquire and Set sample programs.

Note: The details for the Echo sample program are included as a reference.

Table 813. Client/Server sample program details

Program name	SYSTEM/SAMPLE queue	Program started
Echo	ECHO	AMQ3ECH4
Inquire	INQ	AMQ3INQ4
Set	SET	AMQ3SET4

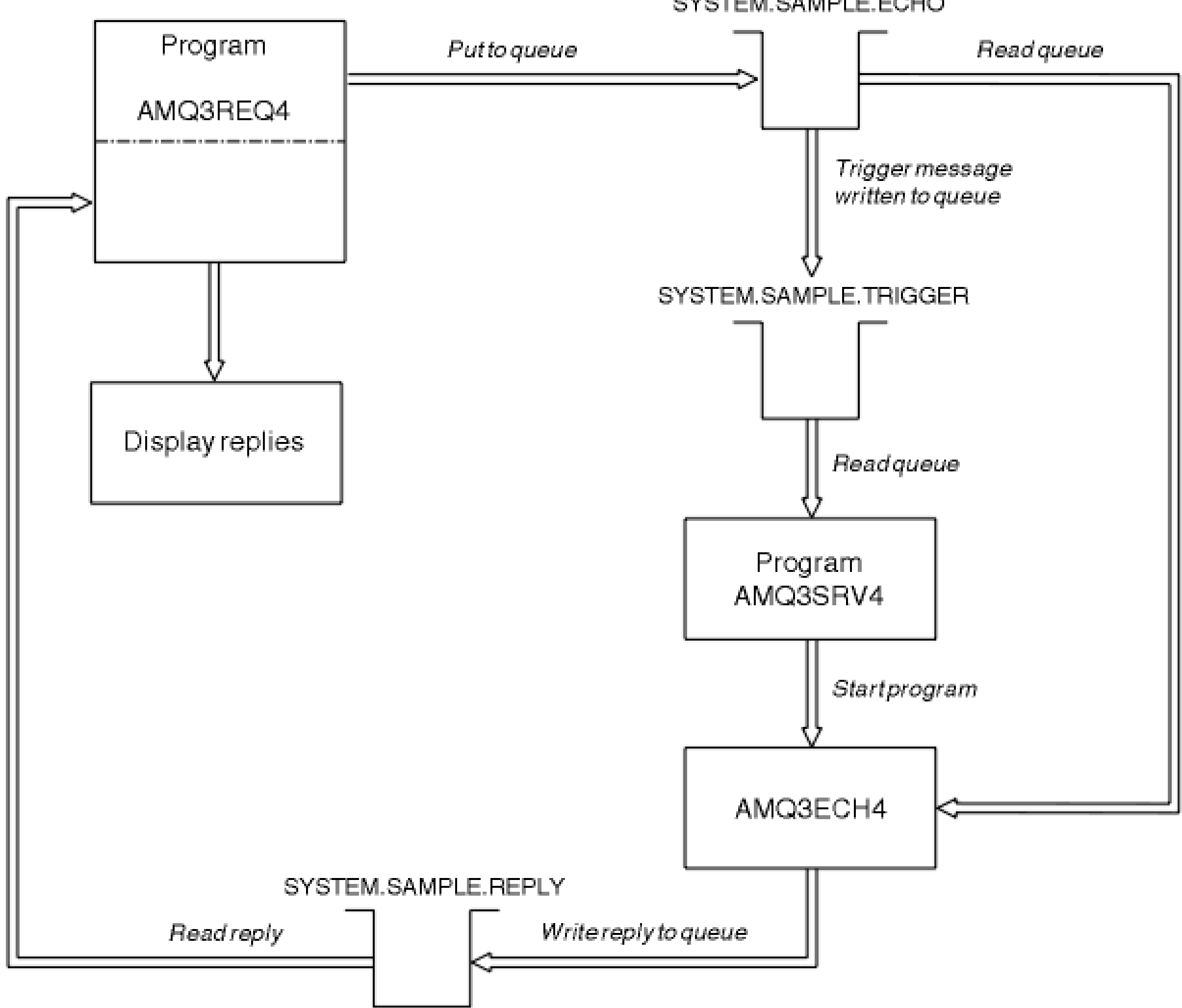


Figure 9. Sample Client/Server (Echo) program flowchart

IBM i *Using triggering with the Request sample on IBM i*

To run the sample using triggering, start the trigger server program, AMQ3SRV4, against the required initiation queue in one job, then start AMQ3REQ4 in another job.

This means that the trigger server is ready when the Request sample program sends a message.

Note:

1. The samples use the SYSTEM SAMPLE TRIGGER queue as the initiation queue for SYSTEM.SAMPLE.ECHO, SYSTEM.SAMPLE.INQ, or SYSTEM.SAMPLE.SET local queues. Alternatively, you can define your own initiation queue.
2. The sample definitions created by AMQSAMP4 cause the C version of the sample to be triggered. If you want to trigger the RPG version, you must change the process definitions SYSTEM.SAMPLE.ECHOPROCESS and SYSTEM.SAMPLE.INQPROCESS and SYSTEM.SAMPLE.SETPROCESS. You can use the CHGMQMPRC command (see Change MQ Process (CHGMQMPRC) for more details) to do this, or edit and run your own version of AMQSAMP4.
3. You must compile the trigger server program from the source provided in QMQMSAMP/QRPGLESRC.

Depending on the trigger process you want to run, AMQ3REQ4 should be called with the parameter specifying request messages to be placed on one of these sample server queues:

- SYSTEM.SAMPLE.ECHO (for the Echo sample programs)
- SYSTEM.SAMPLE.INQ (for the Inquire sample programs)

- SYSTEM.SAMPLE.SET (for the Set sample programs)

A flow chart for the SYSTEM.SAMPLE.ECHO program is shown in Figure 9 on page 1406. Using the example the command to issue the RPG program request to this server is:

```
CALL PGM(QMQMSAMP/AMQ3REQ4) PARM('SYSTEM.SAMPLE.ECHO
+ 30 blank characters','Queue_Manager_Name')
```

because the queue name and queue manager name must be 48 characters in length.

Note: This sample queue has a trigger type of FIRST, so if there are already messages on the queue before you run the Request sample, server applications are not triggered by the messages you send.

If you want to attempt further examples, you can try the following variations:

- Use AMQ3TRG4 instead of AMQ3SRV4 to submit the job instead, but potential job submission delays could make it less easy to follow what is happening.
- Use the SYSTEM.SAMPLE.INQ and SYSTEM.SAMPLE.SET sample queues. Using the example data file, the commands to issue the RPG program requests to these servers are:

  ```
  CALL PGM(QMQMSAMP/AMQ3INQ4) PARM('SYSTEM.SAMPLE.INQ
  + 31 blank characters')
  CALL PGM(QMQMSAMP/AMQ3SET4) PARM('SYSTEM.SAMPLE.SET
  + 31 blank characters')
  ```

  because the queue name must be 48 characters in length.

  These sample queues also have a trigger type of FIRST.

The Echo sample program on IBM i

The Echo sample programs return the message send to a reply queue. The program is named AMQ3ECH4

For the triggering process to work, you must ensure that the Echo sample program you want to use is triggered by messages arriving on queue SYSTEM.SAMPLE.ECHO. To do this, specify the name of the Echo sample program you want to use in the *ApplId* field of the process definition SYSTEM.SAMPLE.ECHOPROCESS. (For this, you can use the CHGMQMPRC command, described in Administering IBM i .) The sample queue has a trigger type of FIRST, so if there are already messages on the queue before you run the Request sample, the Echo sample is not triggered by the messages you send.

When you have set the definition correctly, first start AMQ3SRV4 in one job, then start AMQ3REQ4 in another. You could use AMQ3TRG4 instead of AMQ3SRV4, but potential job submission delays could make it less easy to follow what is happening.

Use the Request sample programs to send messages to queue SYSTEM.SAMPLE.ECHO. The Echo sample programs send a reply message containing the data in the request message to the reply-to queue specified in the request message.

Design of the Echo sample program

When the program is triggered, it explicitly connects to the default queue manager using the MQCONN call. Although this is not necessary on IBM i, this means you could use the same program on other platforms without changing the source code.

The program then opens the queue named in the trigger message structure it was passed when it started. (For clarity, we will call this the *request queue*.) The program uses the MQOPEN call to open this queue for shared input.

The program uses the MQGET call to remove messages from this queue. This call uses the GMATM and GMWT options, with a wait interval of 5 seconds. The program tests the descriptor of each message to see if it is a request message; if it is not, the program discards the message and displays a warning message.

For each request message removed from the request queue, the program uses the MQPUT call to put a reply message on the reply-to queue. This message contains the contents of the request message.

When there are no messages remaining on the request queue, the program closes that queue and disconnects from the queue manager.

This program can also respond to messages sent to the queue from platforms other than IBM i, although no sample is supplied for this situation. To make the ECHO program work, you:

- Write a program, correctly specifying the *Format*, *Encoding*, and *CCSID* fields, to send text request messages.

  The ECHO program requests the queue manager to perform message data conversion, if this is needed.
- Specify CONVERT(*YES) on the IBM MQ for IBM i sending channel, if the program you have written does not provide similar conversion for the reply.

The Inquire sample program on IBM i

The Inquire sample program, AMQ3INQ4, inquires about some of the attributes of a queue using the MQINQ call.

The program is intended to run as a triggered program, so its only input is an MQTMC (trigger message) structure. This structure contains the name of a target queue with attributes that are to be inquired upon.

For the triggering process to work, you must ensure that the Inquire sample program is triggered by messages arriving on queue SYSTEM.SAMPLE.INQ. To do ao, specify the name of the Inquire sample program in the *ApplId* field of the SYSTEM.SAMPLE.INQPROCESS process definition. (For this, you can use the CHGMQMPRC command, described in Change MQ Process (CHGMQMPRC)). The sample queue has a trigger type of FIRST, so if there are already messages on the queue before you run the Request sample, the Inquire sample is not triggered by the messages you send.

When you have set the definition correctly, first start AMQ3SRV4 in one job, then start AMQ3REQ4 in another. You could use AMQ3TRG4 instead of AMQ3SRV4, but potential job submission delays might make it less easy to follow what is happening.

Use the Request sample program to send request messages, each containing just a queue name, to queue SYSTEM.SAMPLE.INQ. For each request message, the Inquire sample program sends a reply message containing information about the queue specified in the request message. The replies are sent to the reply-to queue specified in the request message.

Design of the Inquire sample program

When the program is triggered, it explicitly connects to the default queue manager using the MQCONN call. Although not necessary on IBM i, this design feature means you could use the same program on other platforms without changing the source code.

The program then opens the queue named in the trigger message structure it was passed when it started. (For clarity, we will call this the *request queue*.) The program uses the MQOPEN call to open this queue for shared input.

The program uses the MQGET call to remove messages from this queue. This call uses the GMATM and GMWT options, with a wait interval of 5 seconds. The program tests the descriptor of each message to see if it is a request message; if it is not, the program discards the message, and displays a warning message.

For each request message removed from the request queue, the program reads the name of the queue (which we will call the *target queue*) contained in the data and opens that queue using the MQOPEN call with the OOINQ option. The program then uses the MQINQ call to inquire about the values of the **InhibitGet**, **CurrentQDepth**, and **OpenInputCount** attributes of the target queue.

If the MQINQ call is successful, the program uses the MQPUT call to put a reply message on the reply-to queue. This message contains the values of the three attributes.

If the MQOPEN or MQINQ call is unsuccessful, the program uses the MQPUT call to put a *report* message on the reply-to queue. In the *MDFB* field of the message descriptor of this report message is the reason code returned by either the MQOPEN or MQINQ call, depending on which one failed.

After the MQINQ call, the program closes the target queue using the MQCLOSE call.

When there are no messages remaining on the request queue, the program closes that queue and disconnects from the queue manager.

The Set sample program on IBM i

The Set sample program, AMQ3SET4, inhibits put operations on a queue by using the MQSET call to change the queue's **InhibitPut** attribute.

The program is intended to run as a triggered program, so its only input is an MQTMC (trigger message) structure that contains the name of a target queue with attributes that are to be inquired upon.

For the triggering process to work, you must ensure that the Set sample program is triggered by messages arriving on queue SYSTEM.SAMPLE.SET. To do this, specify the name of the Set sample program in the *ApplId* field of the process definition SYSTEM.SAMPLE.SETPROCESS. (For this, you can use the CHGMQMPRC command, described in the Administering IBM i .) The sample queue has a trigger type of FIRST, so if there are already messages on the queue before you run the Request sample, the Set sample is not triggered by the messages you send.

When you have set the definition correctly, first start AMQ3SRV4 in one job, then start AMQ3REQ4 in another. You could use AMQ3TRG4 instead of AMQ3SRV4, but potential job submission delays could make it less easy to follow what is happening.

Use the Request sample program to send request messages, each containing just a queue name, to queue SYSTEM.SAMPLE.SET. For each request message, the Set sample program sends a reply message containing a confirmation that put operations have been inhibited on the specified queue. The replies are sent to the reply-to queue specified in the request message.

Design of the Set sample program

When the program is triggered, it explicitly connects to the default queue manager using the MQCONN call. Although not necessary on IBM i, this means you could use the same program on other platforms without changing the source code.

The program then opens the queue named in the trigger message structure it was passed when it started. (For clarity, we will call this the *request queue*.) The program uses the MQOPEN call to open this queue for shared input.

The program uses the MQGET call to remove messages from this queue. This call uses the GMATM and GMWT options, with a wait interval of 5 seconds. The program tests the descriptor of each message to see if it is a request message; if it is not, the program discards the message and displays a warning message.

For each request message removed from the request queue, the program reads the name of the queue (which we will call the *target queue*) contained in the data and opens that queue using the MQOPEN call with the OOSET option. The program then uses the MQSET call to set the value of the **InhibitPut** attribute of the target queue to QAPUTI.

If the MQSET call is successful, the program uses the MQPUT call to put a reply message on the reply-to queue. This message contains the string `PUT inhibited`.

If the MQOPEN or MQSET call is unsuccessful, the program uses the MQPUT call to put a *report* message on the reply-to queue. In the *MDFB* field of the message descriptor of this report message is the reason code returned by either the MQOPEN or MQSET call, depending on which one failed.

After the MQSET call, the program closes the target queue using the MQCLOSE call.

When there are no messages remaining on the request queue, the program closes that queue and disconnects from the queue manager.

The Triggering sample programs on IBM i

IBM MQ for IBM i supplies two Triggering sample programs that are written in ILE/RPG.

The programs are:

AMQ3TRG4
: This is a trigger monitor for the IBM i environment. It submits an IBM i job for the application to be started, but this means that there is additional processing cost associated with each trigger message.

AMQ3SRV4
: This is a trigger server for the IBM i environment. For each trigger message, this server runs the start command in its own job to start the specified application. The trigger server can call CICS transactions.

C language versions of these samples are also available as executable programs in library QMQM, called AMQSTRG4 and AMQSERV4.

The AMQ3TRG4 sample trigger monitor on IBM i
AMQ3TRG4 is a trigger monitor. It takes one parameter: the name of the initiation queue it is to serve. AMQSAMP4 defines a sample initiation queue, SYSTEM.SAMPLE.TRIGGER, that you can use when you try the sample programs.

AMQ3TRG4 submits an IBM i job for each valid trigger message it gets from the initiation queue.

Design of the trigger monitor

The trigger monitor opens the initiation queue and gets messages from the queue, specifying an unlimited wait interval.

The trigger monitor submits an IBM i job to start the application specified in the trigger message, and passes an MQTMC (a character version of the trigger message) structure. The environment data in the trigger message is used as job submission parameters.

Finally, the program closes the initiation queue.

The AMQ3SRV4 sample trigger server
AMQ3SRV4 is a trigger server. It takes one parameter: the name of the initiation queue it is to serve. AMQSAMP4 defines a sample initiation queue, SYSTEM.SAMPLE.TRIGGER, that you can use when you try the sample programs.

For each trigger message, AMQ3SRV4 runs a start command in its own job to start the specified application.

Using the example trigger queue the command to issue is:

```
CALL PGM(QMQM/AMQ3SRV4) PARM('Queue Name')
```

Where `Queue Name` must be 48 characters in length, which you achieve by padding the queue name with the required number of blanks. Therefore, if you are using SYSTEM.SAMPLE.TRIGGER as your target queue, you will need 28 blank characters.

Design of the trigger server

The design of the trigger server is like that of the trigger monitor, except the trigger server:

- Allows CICS as well as IBM i applications
- Does not use the environment data from the trigger message
- Calls IBM i applications in its own job (or uses STRCICSUSR to start CICS applications) rather than submitting an IBM i job
- Opens the initiation queue for shared input, so many trigger servers can run at the same time

Note: Programs started by AMQ3SRV4 must not use the MQDISC call because this will stop the trigger server. If programs started by AMQ3SRV4 use the MQCONN call, they will get the RC2002 reason code.

Ending the Triggering sample programs on IBM i
A trigger monitor program can be ended by the sysrequest option 2 (ENDRQS) or by inhibiting gets from the trigger queue.

If the sample trigger queue is used the command is:

```
CHGMQMQ QNAME('SYSTEM.SAMPLE.TRIGGER') GETENBL(*NO)
```

Note: To start triggering again on this queue, you must enter the command:

```
CHGMQMQ QNAME('SYSTEM.SAMPLE.TRIGGER') GETENBL(*YES)
```

Running the samples using remote queues on IBM i

You can demonstrate remote queuing by running the samples on connected message queue managers.

Program AMQSAMP4 provides a local definition of a remote queue (SYSTEM.SAMPLE.REMOTE) that uses a remote queue manager named OTHER. To use this sample definition, change OTHER to the name of the second message queue manager you want to use. You must also set up a message channel between your two message queue managers; for information about how to do so, see Channel-exit programs for messaging channels.

The Request sample program puts its own local queue manager name in the *MDRM* field of messages it sends. The Inquire and Set samples send reply messages to the queue and message queue manager named in the *MDRQ* and *MDRM* fields of the request messages they process.

Return codes for IBM i (ILE RPG)

This information describes the return codes associated with the MQI and MQAI.

The return codes associated with:

- Programmable Command Format (PCF) commands are listed in Programmable command formats reference.
- C++ calls are listed in Using C++.

For each call, a completion code and a reason code are returned by the queue manager or by an exit routine, to indicate the success or failure of the call.

Applications must not depend upon errors being checked for in a specific order, except where specifically noted. If more than one completion code or reason code could arise from a call, the particular error reported depends on the implementation.

Completion codes for IBM i (ILE RPG)

The completion code parameter (*CMPCOD*) allows the caller to see quickly whether the call completed successfully, completed partially, or failed.

CCOK

(MQCC_OK on other platforms)

Successful completion.

The call completed fully; all output parameters have been set. The **REASON** parameter always has the value RCNONE in this case.

CCWARN

(MQCC_WARN on other platforms)

Warning (partial completion).

The call completed partially. Some output parameters might have been set in addition to the *CMPCOD* and *REASON* output parameters. The **REASON** parameter gives additional information about the partial completion.

CCFAIL
(MQCC_FAIL on other platforms)

Call failed.

The processing of the call did not complete, and the state of the queue manager is normally unchanged; exceptions are specifically noted. The *CMPCOD* and *REASON* output parameters have been set; other parameters are unchanged, except where noted.

The reason might be a fault in the application program, or it might be a result of some situation external to the program, for example the user's authority might have been revoked. The **REASON** parameter gives additional information about the error.

Reason codes for IBM i (ILE RPG)

The reason code parameter (*REASON*) is a qualification to the completion code parameter (*CMPCOD*).

If there is no special reason to report, RCNONE is returned. A successful call returns CCOK and RCNONE.

If the completion code is either CCWARN or CCFAIL, the queue manager always reports a qualifying reason; details are given under each call description.

Where user exit routines set completion codes and reasons, they should adhere to these rules. In addition, any special reason values defined by user exits should be less than zero, to ensure that they do not conflict with values defined by the queue manager. Exits can set reasons already defined by the queue manager, where these are appropriate.

Reason codes also occur in:

- The *DLREA* field of the MQDLH structure
- The *MDFB* field of the MQMD structure

For the full list of reason codes, see API completion and reason codes.

To find your IBM i reason code in that list, remove the "RC" from the front, for example RC2002 becomes 2002. Also the completion codes there are shown as they are on other platforms:

Table 814. Reason code names on IBM i and on other platforms

IBM i	Other platforms
CCOK	MQCC_OK
CCWARN	MQCC_WARN
CCFAIL	MQCC_FAIL

Rules for validating MQI options for IBM i (ILE RPG)

This topic gives information about the situations that produce an RC2046 reason code from an MQOPEN, MQPUT, MQPUT1, MQGET, or MQCLOSE call.

MQOPEN call on IBM i

For the options of the MQOPEN call:

- *At least one* of the following must be specified:
  - OOBRW
  - OOINPQ

- OOINPX
- OOINPS
- OOINQ
- OOOUT
- OOSET

- Only *one* of the following is allowed:
  - OOINPQ
  - OOINPX
  - OOINPS
- Only *one* of the following is allowed:
  - OOBNDO
  - OOBNDN
  - OOBNDQ

  Note: The options listed previously are mutually exclusive. However, because the value of OOBNDQ is zero, specifying it with either of the other two bind options does not result in reason code RC2046. OOBNDQ is provided to aid program documentation.
- If OOSAVA is specified, one of the OOINP* options must also be specified.
- If one of the OOSET* or OOPAS* options is specified, OOOUT must also be specified.

MQPUT call on IBM i

For the put-message options:

- The combination of PMSYP and PMNSYP is not allowed.
- Only *one* of the following is allowed:
  - PMDEFC
  - PMNOC
  - PMPASA
  - PMPASI
  - PMSETA
  - PMSETI
- PMALTU is not allowed (it is valid only on the MQPUT1 call).

MQPUT1 call on IBM i

For the put-message options, the rules are the same as for the MQPUT call, except for the following options:

- PMALTU is allowed.
- PMLOGO is not allowed.

MQGET call on IBM i

For the get-message options:

- Only *one* of the following options is allowed:
  - GMNSYP
  - GMSYP
  - GMPSYP

- Only *one* of the following options is allowed:
  - GMBRWF
  - GMBRWC
  - GMBRWN
  - GMMUC
- GMSYP is not allowed with any of the following options:
  - GMBRWF
  - GMBRWC
  - GMBRWN
  - GMLK
  - GMUNLK
- GMPSYP is not allowed with any of the following options:
  - GMBRWF
  - GMBRWC
  - GMBRWN
  - GMCMPM
  - GMUNLK
- If GMLK is specified, one of the following options must also be specified:
  - GMBRWF
  - GMBRWC
  - GMBRWN
- If GMUNLK is specified, only the following options are allowed:
  - GMNSYP
  - GMNWT

MQCLOSE call on IBM i

- For the options of the MQCLOSE call. The combination of CODEL and COPURG is not allowed.
- Only one of the following is allowed:
  - COKPSB
  - CORMSB

MQSUB call on IBM i

For the options of the MQSUB call:

- At least one of the following must be specified:
- At least one of the following must be specified:
  - SOALT
  - SORES
  - SOCRT
- Only one of the following is allowed:
  - SODUR
  - SONDUR

Note: The options listed previously are mutually exclusive. However, as the value of SOnDUR is zero, specifying it with SODUR does not result in reason code RC2046. SONDUR is provided to aid program documentation.

- The combination of SOGRP and SOMAN is not allowed.
- SOGRP requires SOSCID to be specified.
- Only one of the following is allowed: SOAUID SOFUID
- The combination of SONEWP and SOPUBR is not allowed.
- SONEWP is only allowed in combination with SOCRT.
- Only one of the following is allowed:
  - SOWCHR
  - SOWTOP

Machine encodings on IBM i

Use this information to learn about the structure of the *MDENC* field in the message descriptor.

For more information about the message descriptor, see "MQMD (Message descriptor) on IBM i" on page 1097.

The *MDENC* field is a 32-bit integer that is divided into four separate subfields; these subfields identify:

- The encoding used for binary integers
- The encoding used for packed-decimal integers
- The encoding used for floating-point numbers
- Reserved bits

Each subfield is identified by a bit mask which has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined:

ENIMSK
Mask for binary-integer encoding.

This subfield occupies bit positions 28 through 31 within the *MDENC* field.

ENDMSK
Mask for packed-decimal-integer encoding.

This subfield occupies bit positions 24 through 27 within the *MDENC* field.

ENFMSK
Mask for floating-point encoding.

This subfield occupies bit positions 20 through 23 within the *MDENC* field.

ENRMSK
Mask for reserved bits.

This subfield occupies bit positions 0 through 19 within the *MDENC* field.

IBM i Binary-integer encoding on IBM i

Valid values for binary-integer encoding.

The following values are valid for the binary-integer encoding:

ENIUND
Undefined integer encoding.

Binary integers are represented using an encoding that is undefined.

ENINOR
Normal integer encoding.

Binary integers are represented in the conventional way:

- The least significant byte in the number has the highest address of any of the bytes in the number; the most significant byte has the lowest address.
- The least significant bit in each byte is next to the byte with the next higher address; the most significant bit in each byte is next to the byte with the next lower address.

ENIREV
Reversed integer encoding.

Binary integers are represented in the same way as ENINOR, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as ENINOR.

IBM i Packed-decimal-integer encoding on IBM i

Valid values for packed-decimal-integer encoding

The following values are valid for the packed-decimal-integer encoding:

ENDUND
Undefined packed-decimal encoding.

Packed-decimal integers are represented using an encoding that is undefined.

ENDNOR
Normal packed-decimal encoding.

Packed-decimal integers are represented in the conventional way:

- Each decimal digit in the printable form of the number is represented in packed decimal by a single hexadecimal digit in the range X'0' through X'9'. Each hexadecimal digit occupies 4 bits, and so each byte in the packed decimal number represents two decimal digits in the printable form of the number.
- The least significant byte in the packed-decimal number is the byte which contains the least significant decimal digit. Within that byte, the most significant 4 bits contain the least significant decimal digit, and the least significant 4 bits contain the sign. The sign is either X'C' (positive), X'D' (negative), or X'F' (unsigned).
- The least significant byte in the number has the highest address of any of the bytes in the number; the most significant byte has the lowest address.
- The least significant bit in each byte is next to the byte with the next higher address; the most significant bit in each byte is next to the byte with the next lower address.

ENDREV
Reversed packed-decimal encoding.

Packed-decimal integers are represented in the same way as ENDNOR, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as ENDNOR.

IBM i Floating-point encoding on IBM i

Valid values for floating-point encoding

The following values are valid for the floating-point encoding:

ENFUND
Undefined floating-point encoding.

Floating-point numbers are represented using an encoding that is undefined.

ENFNOR
Normal IEEE (The Institute of Electrical and Electronics Engineers) float encoding.

Floating-point numbers are represented using the standard IEEE floating-point format, with the bytes arranged as follows:

- The least significant byte in the mantissa has the highest address of any of the bytes in the number; the byte containing the exponent has the lowest address
- The least significant bit in each byte is next to the byte with the next higher address; the most significant bit in each byte is next to the byte with the next lower address

Details of the IEEE float encoding might be found in IEEE Standard 754.

ENFREV
Reversed IEEE float encoding.

Floating-point numbers are represented in the same way as ENFNOR, but with the bytes arranged in reverse order. The bits within each byte are arranged in the same way as ENFNOR.

ENF390
System/390 architecture float encoding.

Floating-point numbers are represented using the standard System/390 floating-point format; this is also used by System/370.

IBM i Constructing encodings on IBM i

To construct a value for the *MDENC* field in MQMD, the relevant constants that describe the required encodings should be added.

Be sure to combine only one of the ENI* encodings with one of the END* encodings and one of the ENF* encodings.

IBM i Analyzing encodings on IBM i

The *MDENC* field contains subfields; because of this, applications that need to examine the integer, packed decimal, or float encoding should use the technique described in this topic.

Using arithmetic

The following steps should be performed using integer arithmetic:

1. Select one of the following values, according to the type of encoding required:
   - 1 for the binary integer encoding
   - 16 for the packed decimal integer encoding
   - 256 for the floating point encoding

   Call the value A.
2. Divide the value of the *MDENC* field by A ; call the result B.
3. Divide B by 16; call the result C.
4. Multiply C by 16 and subtract from B ; call the result D.
5. Multiply D by A ; call the result E.
6. E is the encoding required, and can be tested for equality with each of the values that is valid for that type of encoding.

IBM i Summary of machine architecture encodings on IBM i

A table summarizing encodings for machine architectures.

Encodings for machine architectures are shown in Table 815 on page 1418.

Table 815. Summary of encodings for machine architectures			
Machine architecture	**Binary integer encoding**	**Packed-decimal integer encoding**	**Floating-point encoding**
IBM i	normal	normal	IEEE normal
Intel x86	reversed	reversed	IEEE reversed
PowerPC	normal	normal	IEEE normal
System/390	normal	normal	System/390

IBM i Report options and message flags on IBM i

This topic concerns the *MDREP* and *MDMFL* fields that are part of the message descriptor MQMD specified on the MQGET, MQPUT, and MQPUT1 calls.

For more information about the message descriptor, see "MQMD (Message descriptor) on IBM i" on page 1097. This information describes:

- The structure of the report field and how the queue manager processes it
- How an application should analyze the report field
- The structure of the message-flags field

Structure of the report field

The *MDREP* field is a 32-bit integer that is divided into three separate subfields.

These subfields identify:

- Report options that are rejected if the local queue manager does not recognize them
- Report options that are always accepted, even if the local queue manager does not recognize them
- Report options that are accepted only if certain other conditions are satisfied

Each subfield is identified by a bit mask which has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. Note that the bits in a subfield are not necessarily adjacent. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined to identify the subfields:

RORUM

Mask for unsupported report options that are rejected.

This mask identifies the bit positions within the *MDREP* field where report options which are not supported by the local queue manager will cause the MQPUT or MQPUT1 call to fail with completion code CCFAIL and reason code RC2061.

This subfield occupies bit positions 3, and 11 through 13.

ROAUM

Mask for unsupported report options that are accepted.

This mask identifies the bit positions within the *MDREP* field where report options which are not supported by the local queue manager will nevertheless be accepted on the MQPUT or MQPUT1 calls. Completion code CCWARN with reason code RC2104 are returned in this case.

This subfield occupies bit positions 0 through 2, 4 through 10, and 24 through 31.

The following report options are included in this subfield:

- ROCMTC
- RODLQ
- RODISC
- ROEXC

- ROEXCD
- ROEXCF
- ROEXP
- ROEXPD
- ROEXPF
- RONAN
- RONMI
- RONONE
- ROPAN
- ROPCI
- ROPMI

ROAUXM

Mask for unsupported report options that are accepted only in certain circumstances.

This mask identifies the bit positions within the *MDREP* field where report options which are not supported by the local queue manager will nevertheless be accepted on the MQPUT or MQPUT1 calls *provided* that both of the following conditions are satisfied:

- The message is destined for a remote queue manager.
- The application is not putting the message directly on a local transmission queue (that is, the queue identified by the *ODMN* and *ODON* fields in the object descriptor specified on the MQOPEN or MQPUT1 call is not a local transmission queue).

Completion code CCWARN with reason code RC2104 are returned if these conditions are satisfied, and CCFAIL with reason code RC2061 if not.

This subfield occupies bit positions 14 through 23.

The following report options are included in this subfield:

- ROCOA
- ROCOAD
- ROCOAF
- ROCOD
- ROCODD
- ROCODF

If there are any options specified in the *MDREP* field which the queue manager does not recognize, the queue manager checks each subfield in turn by using the bitwise AND operation to combine the *MDREP* field with the mask for that subfield. If the result of that operation is not zero, the completion code and reason codes described previously are returned.

If CCWARN is returned, it is not defined which reason code is returned if other warning conditions exist.

The ability to specify and have accepted report options which are not recognized by the local queue manager is useful when it is necessary to send a message with a report option which will be recognized and processed by a *remote* queue manager.

IBM i Analyzing the report field on IBM i

The MDREP field contains subfields. Because of this, some applications need to check whether the sender of the message requested a particular report. Those applications should use the technique described in this topic.

Using arithmetic

The following steps should be performed using integer arithmetic:

1. Select one of the following values, according to the type of report to be checked:
   - ROCOA for COA report
   - ROCOD for COD report
   - ROEXC for exception report
   - ROEXP for expiration report

   Call the value A.
2. Divide the *MDREP* field by A ; call the result B.
3. Divide B by 8 ; call the result C.
4. Multiply C by 8 and subtract from B ; call the result D.
5. Multiply D by A ; call the result E.
6. Test E for equality with each of the values that is possible for that type of report.

   For example, if A is ROEXC, test E for equality with each of the following to determine what was specified by the sender of the message:
   - RONONE
   - ROEXC
   - ROEXCD
   - ROEXCF

   The tests can be performed in whatever order is most convenient for the application logic.

The following pseudocode illustrates this technique for exception report messages:

```
A = ROEXC
B = Report/A
C = B/8
D = B - C*8
E = D*A
```

A similar method can be used to test for the ROPMI or ROPCI options; select as the value A whichever of these two constants is appropriate, and then proceed as described previously, but replacing the value 8 in the previous steps by the value 2.

IBM i Structure of the message-flags field on IBM i

The *MDMFL* field is a 32-bit integer that is divided into three separate subfields.

These subfields identify:

- Message flags that are rejected if the local queue manager does not recognize them
- Message flags that are always accepted, even if the local queue manager does not recognize them
- Message flags that are accepted only if certain other conditions are satisfied

Note: All subfields in *MDMFL* are reserved for use by the queue manager.

Each subfield is identified by a bit mask which has 1-bits in the positions corresponding to the subfield, and 0-bits elsewhere. The bits are numbered such that bit 0 is the most significant bit, and bit 31 the least significant bit. The following masks are defined to identify the subfields:

MFRUM
Mask for unsupported message flags that are rejected.

This mask identifies the bit positions within the *MDMFL* field where message flags which are not supported by the local queue manager will cause the MQPUT or MQPUT1 call to fail with completion code CCFAIL and reason code RC2249.

This subfield occupies bit positions 20 through 31.

The following message flags are included in this subfield:

- MFLMIG
- MFLSEG
- MFMIG
- MFSEG
- MFSEGA
- MFSEGI

MFAUM
Mask for unsupported message flags that are accepted.

This mask identifies the bit positions within the *MDMFL* field where message flags which are not supported by the local queue manager will nevertheless be accepted on the MQPUT or MQPUT1 calls. The completion code is CCOK.

This subfield occupies bit positions 0 through 11.

MFAUXM
Mask for unsupported message flags that are accepted only in certain circumstances.

This mask identifies the bit positions within the *MDMFL* field where message flags which are not supported by the local queue manager will nevertheless be accepted on the MQPUT or MQPUT1 calls *provided* that both of the following conditions are satisfied:

- The message is destined for a remote queue manager.
- The application is not putting the message directly on a local transmission queue (that is, the queue identified by the *ODMN* and *ODON* fields in the object descriptor specified on the MQOPEN or MQPUT1 call is not a local transmission queue).

Completion code CCOK is returned if these conditions are satisfied, and CCFAIL with reason code RC2249 if not.

This subfield occupies bit positions 12 through 19.

If there are flags specified in the *MDMFL* field that the queue manager does not recognize, the queue manager checks each subfield in turn by using the bitwise AND operation to combine the *MDMFL* field with the mask for that subfield. If the result of that operation is not zero, the completion code and reason codes described previously are returned.

IBM i Data conversion on IBM i

This topic describes the interface to the data-conversion exit, and the processing performed by the queue manager when data conversion is required.

The data-conversion exit is invoked as part of the processing of the MQGET call. It is used to convert the application message data to the representation required by the receiving application. Conversion of the application message data is optional, and requires the GMCONV option to be specified on the MQGET call.

The following aspects of data conversion are described:

- The processing performed by the queue manager in response to the GMCONV option; see "Conversion processing on IBM i" on page 1422.
- Processing conventions used by the queue manager when processing a built-in format; these conventions are recommended for user-written exits too. See "Processing conventions on IBM i" on page 1423.
- Special considerations for the conversion of report messages; see "Conversion of report messages on IBM i" on page 1427.
- The parameters passed to the data-conversion exit; see "MQCONVX (Data conversion exit) on IBM i" on page 1437.
- A call that can be used from the exit in order to convert character data between different representations; see "MQXCNVC (Convert characters) on IBM i" on page 1433.
- The data-structure parameter which is specific to the exit; see "MQDXP (Data-conversion exit parameter) on IBM i" on page 1428.

IBM i Conversion processing on IBM i

This information describes the processing performed by the queue manager in response to the GMCONV option.

The queue manager performs the following actions if the GMCONV option is specified on the MQGET call, and there is a message to be returned to the application:

1. If one or more of the following is true, no conversion is necessary:

   - The message data is already in the character set and encoding required by the application issuing the MQGET call. The application must set the *MDCSI* and *MDENC* fields in the **MSGDSC** parameter of the MQGET call to the values required, before issuing the call.
   - The length of the message data is zero.
   - The length of the **BUFFER** parameter of the MQGET call is zero.

   In these cases the message is returned without conversion to the application issuing the MQGET call; the *MDCSI* and *MDENC* values in the **MSGDSC** parameter are set to the values in the control information in the message, and the call completes with one of the following combinations of completion code and reason code:

   Completion code
       Reason code

   CCOK
       RCNONE

   CCWARN
       RC2079

   CCWARN
       RC2080

The following steps are performed only if the character set or encoding of the message data differs from the corresponding value in the **MSGDSC** parameter, and there is data to be converted:

1. If the *MDFMT* field in the control information in the message has the value FMNONE, the message is returned unconverted, with completion code CCWARN and reason code RC2110.

   In all other cases conversion processing continues.
2. The message is removed from the queue and placed in a temporary buffer which is the same size as the **BUFFER** parameter. For browse operations, the message is copied into the temporary buffer, instead of being removed from the queue.
3. If the message has to be truncated to fit in the buffer, the following is done:

   - If the GMATM option was not specified, the message is returned unconverted, with completion code CCWARN and reason code RC2080.

- If the GMATM option *was* specified, the completion code is set to CCWARN, the reason code is set to RC2079, and conversion processing continues.

4. If the message can be accommodated in the buffer without truncation, or the GMATM option was specified, the following is done:

   - If the format is a built-in format, the buffer is passed to the queue manager's data-conversion service.
   - If the format is not a built-in format, the buffer is passed to a user-written exit which has the same name as the format. If the exit cannot be found, the message is returned unconverted, with completion code CCWARN and reason code RC2110.

   If no error occurs, the output from the data-conversion service or from the user-written exit is the converted message, plus the completion code and reason code to be returned to the application issuing the MQGET call.

5. If the conversion is successful, the queue manager returns the converted message to the application. In this case, the completion code and reason code returned by the MQGET call will typically be one of the following combinations:

   Completion code
      Reason code

   CCOK
      RCNONE

   CCWARN
      RC2079

   However, if the conversion is performed by a user-written exit, other reason codes can be returned, even when the conversion is successful.

   If the conversion fails (for whatever reason), the queue manager returns the unconverted message to the application, with the *MDCSI* and *MDENC* fields in the **MSGDSC** parameter set to the values in the control information in the message, and with completion code CCWARN.

IBM i Processing conventions on IBM i

When converting a built-in format, the queue manager follows the processing conventions described in this topic.

Consider applying these conventions to user-written exits, although this is not enforced by the queue manager. The built-in formats converted by the queue manager are as follows:

- FMADMN
- FMMDE
- FMCICS
- FMPCF
- FMCMD1
- FMRMH
- FMCMD2
- FMRFH
- FMDLH
- FMRFH2
- FMDH
- FMSTR
- FMEVNT
- FMTM
- FMIMS

- FMXQH
- FMIMVS

1. If the message expands during conversion, and exceeds the size of the **BUFFER** parameter, the following is done:
   - If the GMATM option was not specified, the message is returned unconverted, with completion code CCWARN and reason code RC2120.
   - If the GMATM option *was* specified, the message is truncated, the completion code is set to CCWARN, the reason code is set to RC2079, and conversion processing continues.
2. If truncation occurs (either before or during conversion), it is possible for the number of valid bytes returned in the **BUFFER** parameter to be *less than* the length of the buffer.

   This can occur, for example, if a 4-byte integer or a DBCS character straddles the end of the buffer. The incomplete element of information is not converted, and so those bytes in the returned message do not contain valid information. This can also occur if a message that was truncated before conversion shrinks during conversion.

   If the number of valid bytes returned is less than the length of the buffer, the unused bytes at the end of the buffer are set to nulls.
3. If an array or string straddles the end of the buffer, as much of the data as possible is converted; only the particular array element or DBCS character which is incomplete is not converted - preceding array elements or characters are converted.
4. If truncation occurs (either before or during conversion), the length returned for the **DATLEN** parameter is the length of the *unconverted* message before truncation.
5. When strings are converted between single-byte character sets (SBCS), double-byte character sets (DBCS), or multi-byte character sets (MBCS), the strings can expand or contract.
   - In the PCF formats FMADMN, FMEVNT, and FMPCF, the strings in the MQCFST and MQCFSL structures expand or contract as necessary to accommodate the string after conversion.

     For the string-list structure MQCFSL, the strings in the list might expand or contract by different amounts. If this happens, the queue manager pads the shorter strings with blanks to make them the same length as the longest string after conversion.
   - In the format FMRMH, the strings addressed by the RMSEO, RMSNO, RMDEO, and RMDNO fields expand or contract as necessary to accommodate the strings after conversion.
   - In the format FMRFH, the RFNVS field expands or contracts as necessary to accommodate the name-value pairs after conversion.
   - In structures with fixed field sizes, the queue manager allows strings to expand or contract within their fixed fields, if no significant information is lost. In this regard, trailing blanks and characters following the first null character in the field are treated as insignificant.
     - If the string expands, but only insignificant characters need to be discarded to accommodate the converted string in the field, the conversion succeeds and the call completes with CCOK and reason code RCNONE (assuming no other errors).
     - If the string expands, but the converted string requires significant characters to be discarded in order to fit in the field, the message is returned unconverted and the call completes with CCWARN and reason code RC2190.

       Note: Reason code RC2190 results in this case whether the GMATM option was specified.
     - If the string contracts, the queue manager pads the string with blanks to the length of the field.
6. For messages consisting of one or more IBM MQ header structures followed by user data, it is possible for one or more of the header structures to be converted, while the remainder of the message is not. However, with two exceptions, the MDCSI and MDENC fields in each header structure always correctly indicate the character set and encoding of the data that follows the header structure.

The two exceptions are the MQCIH and MQIIH structures, where the values in the MDCSI and MDENC fields in those structures are not significant. For those structures, the data following the structure is in the same character set and encoding as the MQCIH or MQIIH structure itself.

7. If the MDCSI or MDENC fields in the control information of the message being retrieved, or in the **MSGDSC** parameter, specify values which are undefined or not supported, the queue manager might ignore the error if the undefined or unsupported value does not need to be used in converting the message.

   For example, if the MDENC field in the message specifies an unsupported float encoding, but the message contains only integer data, or contains floating-point data which does not require conversion (because the source and target float encodings are identical), the error might or might not be diagnosed.

   If the error is diagnosed, the message is returned unconverted, with completion code CCWARN and one of the RC2111, RC2112, RC2113, RC2114 or RC2115, RC2116, RC2117, RC2118 reason codes (as appropriate); the MDCSI and MDENC fields in the **MSGDSC** parameter are set to the values in the control information in the message.

   If the error is not diagnosed and the conversion completes successfully, the values returned in the MDCSI and MDENC fields in the **MSGDSC** parameter, are those specified by the application issuing the MQGET call.

8. In all cases, if the message is returned to the application unconverted the completion code is set to CCWARN, and the MDCSI and MDENC fields in the **MSGDSC** parameter are set to the values appropriate to the unconverted data. This is done for FMNONE also.

   The **REASON** parameter is set to a code that indicates why the conversion could not be carried out, unless the message also had to be truncated; reason codes related to truncation take precedence over reason codes related to conversion. (To determine if a truncated message was converted, check the values returned in the MDCSI and MDENC fields in the **MSGDSC** parameter.)

   When an error is diagnosed, either a specific reason code is returned, or the general reason code RC2119. The reason code returned depends on the diagnostic capabilities of the underlying data-conversion service.

9. If completion code CCWARN is returned, and more than one reason code is relevant, the order of precedence is as follows:

   a. The following reason takes precedence over all others:

      - RC2079

   b. Next in precedence is the following reason:

      - RC2110

   c. The order of precedence within the remaining reason codes is not defined.

10. On completion of the MQGET call:

    - The following reason code indicates that the message was converted successfully:

      – RCNONE

    - The following reason code indicates that the message *may* have been converted successfully (check the MDCSI and MDENC fields in the **MSGDSC** parameter to find out):

      – RC2079

    - All other reason codes indicate that the message was not converted.

The following processing is specific to the built-in formats; it is not applicable to user-defined formats:

1. Except for the following formats:

   - FMADMN
   - FMEVNT
   - FMIMVS

- FMPCF
- FMSTR

none of the built-in formats can be converted from or to character sets that do not have SBCS characters for the characters that are valid in queue names. If an attempt is made to perform such a conversion, the message is returned unconverted, with completion code CCWARN and reason code RC2111 or RC2115, as appropriate.

The Unicode character set UTF-16 is an example of a character set that does not have SBCS characters for the characters that are valid in queue names.

2. If the message data for a built-in format is truncated, fields within the message which contain lengths of strings, or counts of elements or structures, are not adjusted to reflect the length of the data returned to the application; the values returned for such fields within the message data are the values applicable to the message before truncation.

   When processing messages such as a truncated FMADMN message, care must be taken to ensure that the application does not attempt to access data beyond the end of the data returned.

3. If the format name is FMDLH, the message data begins with an MQDLH structure, and this may be followed by zero or more bytes of application message data. The format, character set, and encoding of the application message data are defined by the `DLFMT`, `DLCSI`, and `DLENC` fields in the MQDLH structure at the start of the message. Since the MQDLH structure and application message data can have different character sets and encodings, it is possible for one, other, or both of the MQDLH structure and application message data to require conversion.

   The queue manager converts the MQDLH structure first, as necessary. If conversion is successful, or the MQDLH structure does not require conversion, the queue manager checks the `DLCSI` and `DLENC` fields in the MQDLH structure to see if conversion of the application message data is required. If conversion is required, the queue manager invokes the user-written exit with the name given by the `DLFMT` field in the MQDLH structure, or performs the conversion itself (if `DLFMT` is the name of a built-in format).

   If the MQGET call returns a completion code of CCWARN, and the reason code is one of those indicating that conversion was not successful, one of the following applies:

   - The MQDLH structure could not be converted. In this case the application message data will not have been converted either.
   - The MQDLH structure was converted, but the application message data was not.

   The application can examine the values returned in the `MDCSI` and `MDENC` fields in the **MSGDSC** parameter, and those in the MQDLH structure, in order to determine which of the previous applies.

4. If the format name is FMXQH, the message data begins with an MQXQH structure, and this may be followed by zero or more bytes of additional data. This additional data is typically the application message data (which may be of zero length), but there can also be one or more further IBM MQ header structures present, at the start of the additional data.

   The MQXQH structure must be in the character set and encoding of the queue manager. The format, character set, and encoding of the data following the MQXQH structure are given by the `MDFMT`, `MDCSI`, and `MDENC` fields in the MQMD structure contained within the MQXQH. For each subsequent IBM MQ header structure present, the `MDFMT`, `MDCSI`, and `MDENC` fields in the structure describe the data that follows that structure; that data is either another IBM MQ header structure, or the application message data.

   If the GMCONV option is specified for an FMXQH message, the application message data and certain of the MQ header structures are converted, but the data in the MQXQH structure is not. On return from the MQGET call, therefore:

   - The values of the `MDFMT`, `MDCSI`, and `MDENC` fields in the **MSGDSC** parameter, describe the data in the MQXQH structure, and not the application message data; the values will therefore not be the same as those specified by the application that issued the MQGET call.

The effect of this is that an application which repeatedly gets messages from a transmission queue with the GMCONV option specified must reset the `MDCSI` and `MDENC` fields in the **MSGDSC** parameter to the values necessary for the application message data, before each MQGET call.

- The values of the `MDFMT`, `MDCSI`, and `MDENC` fields in the last MQ header structure present describe the application message data. If there are no other IBM MQ header structures present, the application message data is described by these fields in the MQMD structure within the MQXQH structure. If conversion is successful, the values will be the same as those specified in the **MSGDSC** parameter by the application that issued the MQGET call.

If the message is a distribution-list message, the MQXQH structure is followed by an MQDH structure (plus its arrays of MQOR and MQPMR records), which in turn may be followed by zero or more further IBM MQ header structures and zero or more bytes of application message data. Like the MQXQH structure, the MQDH structure must be in the character set and encoding of the queue manager, and it is not converted on the MQGET call, even if the GMCONV option is specified.

The processing of the MQXQH and MQDH structures described previously are primarily intended for use by message channel agents when they get messages from transmission queues.

IBM i Conversion of report messages on IBM i

A report message can contain varying amounts of application message data, according to the report options specified by the sender of the original message.

In particular, a report message can contain either:

1. No application message data
2. Some of the application message data from the original message

   This occurs when the sender of the original message specifies RO*D and the message is longer than 100 bytes.
3. All of the application message data from the original message

   This occurs when the sender of the original message specifies RO*F, or specifies RO*D and the message is 100 bytes or shorter.

When the queue manager or message channel agent generates a report message, it copies the format name from the original message into the *MDFMT* field in the control information in the report message. The format name in the report message might therefore imply a length of data which is different from the length present in the report message (cases 1 and 2 described previously).

If the GMCONV option is specified when the report message is retrieved:

- For case 1 described previously, the data-conversion exit will not be invoked (because the report message will have no data).
- For case 3 described previously, the format name correctly implies the length of the message data.
- But for case 2 described previously, the data-conversion exit will be invoked to convert a message which is *shorter* than the length implied by the format name.

  In addition, the reason code passed to the exit will typically be RCNONE (that is, the reason code will not indicate that the message has been truncated). This happens because the message data was truncated by the *sender* of the report message, and not by the receiver's queue manager in response to the MQGET call.

Because of these possibilities, the data-conversion exit should not use the format name to deduce the length of data passed to it; instead the exit should check the length of data provided, and be prepared to convert less data than the length implied by the format name. If the data can be converted successfully, completion code CCOK and reason code RCNONE should be returned by the exit. The length of the message data to be converted is passed to the exit as the **INLEN** parameter.

Product-sensitive programming interface

If a report message contains information about an activity that has taken place, it is known as an activity report. Examples of activities are:

- an MCA sending a message from a queue down a channel
- an MCA receiving a message from a channel and putting it onto a queue
- an MCA dead-letter queuing an undeliverable message
- an MCA getting a message off a queue and discarding it
- a dead-letter handler placing a message back on a queue
- the command server processing a PCF request - a broker processing a publish request
- a user application getting a message from a queue - a user application browsing a message on a queue

Any application, including the queue manager, can add some of the message data to the activity report following the report header. The amount of data that should be supplied if some is sent is not fixed, and is decided by the application. The information returned should be useful to the application processing the activity report. Queue manager activity reports will return with them any standard IBM MQ header structures (beginning 'MQH') contained in the original message. This includes, for example, any MQRFH2 headers that were included in the original message. Also the queue manager will return an MQCFH header found, but not the PCF parameters associated with it. This gives monitoring applications an idea of what the message was about.

IBM i MQDXP (Data-conversion exit parameter) on IBM i

Data-conversion exit parameter block.

Overview

Purpose: The MQDXP structure is a parameter that the queue manager passes to the data-conversion exit when the exit is invoked to convert the message data as part of the processing of the MQGET call. See the description of the MQCONVX call for details of the data conversion exit.

Character set and encoding: Character data in MQDXP is in the character set of the local queue manager; this is given by the **CodedCharSetId** queue manager attribute. Numeric data in MQDXP is in the native machine encoding; this is given by ENNAT.

Usage: Only the *DXLEN*, *DXCC*, *DXREA* and *DXRES* fields in MQDXP might be changed by the exit; changes to other fields are ignored. However, the *DXLEN* field cannot be changed if the message being converted is a segment that contains only part of a logical message.

When control returns to the queue manager from the exit, the queue manager checks the values returned in MQDXP. If the values returned are not valid, the queue manager continues processing as though the exit had returned XRFAIL in *DXRES* ; however, the queue manager ignores the values of the *DXCC* and *DXREA* fields returned by the exit in this case, and uses instead the values those fields had on *input* to the exit. The following values in MQDXP cause this processing to occur:

- *DXRES* field not XROK and not XRFAIL
- *DXCC* field not CCOK and not CCWARN
- *DXLEN* field less than zero, or *DXLEN* field changed when the message being converted is a segment that contains only part of a logical message.

- "Fields" on page 1428
- "RPG declaration (copy file CMQDXPH)" on page 1432

Fields

The MQDXP structure contains the following fields; the fields are described in **alphabetical order**:

DXAOP (10-digit signed integer)

Application options.

This is a copy of the *GMOPT* field of the MQGMO structure specified by the application issuing the MQGET call. The exit may need to examine these to ascertain whether the GMATM option was specified.

This is an input field to the exit.

DXCC (10-digit signed integer)

Completion code.

When the exit is invoked, this contains the completion code that will be returned to the application that issued the MQGET call, if the exit chooses to do nothing. It is always CCWARN, because either the message was truncated, or the message requires conversion and this has not yet been done.

On output from the exit, this field contains the completion code to be returned to the application in the **CMPCOD** parameter of the MQGET call; only CCOK and CCWARN are valid. See the description of the *DXREA* field for suggestions on how the exit should set this field on output.

This is an input/output field to the exit.

DXCSI (10-digit signed integer)

Character set required by application.

This is the coded character-set identifier of the character set required by the application issuing the MQGET call; see the *MDCSI* field in the MQMD structure for more details. If the application specifies the special value CSQM on the MQGET call, the queue manager changes this to the actual character-set identifier of the character set used by the queue manager, before invoking the exit.

If the conversion is successful, the exit should copy this to the *MDCSI* field in the message descriptor.

This is an input field to the exit.

DXENC (10-digit signed integer)

Numeric encoding required by application.

This is the numeric encoding required by the application issuing the MQGET call; see the *MDENC* field in the MQMD structure for more details.

If the conversion is successful, the exit should copy this to the *MDENC* field in the message descriptor.

This is an input field to the exit.

DXHCN (10-digit signed integer)

Connection handle.

This is a connection handle which can be used on the MQXCNVC call. This handle is not necessarily the same as the handle specified by the application which issued the MQGET call.

DXLEN (10-digit signed integer)

Length in bytes of message data.

When the exit is invoked, this field contains the original length of the application message data. If the message was truncated in order to fit into the buffer provided by the application, the size of the message provided to the exit will be *smaller* than the value of *DXLEN*. The size of the message provided to the exit is always given by the **INLEN** parameter of the exit, irrespective of any truncation that may have occurred.

Truncation is indicated by the *DXREA* field having the value RC2079 on input to the exit.

Most conversions will not need to change this length, but an exit can do so if necessary; the value set by the exit is returned to the application in the **DATLEN** parameter of the MQGET call. However, this length cannot be changed if the message being converted is a segment that contains only part of a logical message. This is because changing the length would cause the offsets of later segments in the logical message to be incorrect.

Note that, if the exit wants to change the length of the data, be aware that the queue manager has already decided whether the message data will fit into the application's buffer, based on the length of the *unconverted* data. This decision determines whether the message is removed from the queue (or the browse cursor moved, for a browse request), and is not affected by any change to the data length caused by the conversion. For this reason it is recommended that conversion exits do not cause a change in the length of the application message data.

If character conversion does imply a change of length, a string can be converted into another string with the same length in bytes, truncating trailing blanks, or padding with blanks as necessary.

The exit is not invoked if the message contains no application message data; hence *DXLEN* is always greater than zero.

This is an input/output field to the exit.

DXREA (10-digit signed integer)

Reason code qualifying *DXCC*.

When the exit is invoked, this contains the reason code that will be returned to the application that issued the MQGET call, if the exit chooses to do nothing. Among possible values are RC2079, indicating that the message was truncated in order fit into the buffer provided by the application, and RC2119, indicating that the message requires conversion but that this has not yet been done.

On output from the exit, this field contains the reason to be returned to the application in the **REASON** parameter of the MQGET call; the following is recommended:

- If *DXREA* had the value RC2079 on input to the exit, the *DXREA* and *DXCC* fields should not be altered, irrespective of whether the conversion succeeds or fails.

  (If the *DXCC* field is not CCOK, the application which retrieves the message can identify a conversion failure by comparing the returned *MDENC* and *MDCSI* values in the message descriptor with the values requested; in contrast, the application cannot distinguish a truncated message from a message that just fitted the buffer. For this reason, RC2079 should be returned in preference to any of the reasons that indicate conversion failure.)
- If *DXREA* had any other value on input to the exit:
  - If the conversion succeeds, *DXCC* should be set to CCOK and *DXREA* set to RCNONE.
  - If the conversion fails, or the message expands and has to be truncated to fit in the buffer, *DXCC* should be set to CCWARN (or left unchanged), and *DXREA* set to one of the values i the following list, to indicate the nature of the failure.

    Note that, if the message after conversion is too big for the buffer, it should be truncated only if the application that issued the MQGET call specified the GMATM option:

    - If it did specify that option, reason RC2079 should be returned.
    - If it did not specify that option, the message should be returned unconverted, with reason code RC2120.

The reason codes in the following list are recommended for use by the exit to indicate the reason that conversion failed, but the exit can return other values from the set of RC* codes if deemed appropriate. In addition, the range of values RC0900 through RC0999 are allocated for use by the exit to indicate conditions that the exit wants to communicate to the application issuing the MQGET call.

Note: If the message cannot be converted successfully, the exit must return XRFAIL in the *DXRES* field, in order to cause the queue manager to return the unconverted message. This is true regardless of the reason code returned in the *DXREA* field.

RC0900
(900, X'384') Lowest value for application-defined reason code.

RC0999
(999, X'3E7') Highest value for application-defined reason code.

RC2120
(2120, X'848') Converted data too big for buffer.

RC2119
(2119, X'847') Message data not converted.

RC2111
(2111, X'83F') Source coded character set identifier not valid.

RC2113
(2113, X'841') Packed-decimal encoding in message not recognized.

RC2114
(2114, X'842') Floating-point encoding in message not recognized.

RC2112
(2112, X'840') Source integer encoding not recognized.

RC2115
(2115, X'843') Target coded character set identifier not valid.

RC2117
(2117, X'845') Packed-decimal encoding specified by receiver not recognized.

RC2118
(2118, X'846') Floating-point encoding specified by receiver not recognized.

RC2116
(2116, X'844') Target integer encoding not recognized.

RC2079
(2079, X'81F') Truncated message returned (processing completed).

This is an input/output field to the exit.

DXRES (10-digit signed integer)

Response from exit.

This is set by the exit to indicate the success or otherwise of the conversion. It must be one of the following:

XROK
Conversion was successful.

If the exit specifies this value, the queue manager returns the following to the application that issued the MQGET call:

- The value of the *DXCC* field on output from the exit
- The value of the *DXREA* field on output from the exit
- The value of the *DXLEN* field on output from the exit
- The contents of the exit's output buffer *OUTBUF*. The number of bytes returned is the lesser of the exit's **OUTLEN** parameter, and the value of the *DXLEN* field on output from the exit

If the *MDENC* and *MDCSI* fields in the exit's message descriptor parameter are *both* unchanged, the queue manager returns:

- The value of the *MDENC* and *MDCSI* fields in the MQDXP structure on *input* to the exit

If one or both of the *MDENC* and *MDCSI* fields in the exit's message descriptor parameter has been changed, the queue manager returns:

- The value of the *MDENC* and *MDCSI* fields in the exit's message descriptor parameter on output from the exit
-

XRFAIL
Conversion was unsuccessful.

If the exit specifies this value, the queue manager returns the following to the application that issued the MQGET call:

- The value of the *DXCC* field on output from the exit
- The value of the *DXREA* field on output from the exit
- The value of the *DXLEN* field on *input* to the exit
- The contents of the exit's input buffer *INBUF*. The number of bytes returned is given by the **INLEN** parameter

If the exit has altered *INBUF*, the results are undefined.

DXRES is an output field from the exit.

DXSID (4-byte character string)

Structure identifier.

The value must be:

DXSIDV
Identifier for data conversion exit parameter structure.

This is an input field to the exit.

DXVER (10-digit signed integer)

Structure version number.

The value must be:

DXVER1
Version number for data-conversion exit parameter structure.

The following constant specifies the version number of the current version:

DXVERC
Current version of data-conversion exit parameter structure.

Note: When a new version of this structure is introduced, the layout of the existing part is not changed. The exit should therefore check that the *DXVER* field is equal to or greater than the lowest version which contains the fields that the exit needs to use.

This is an input field to the exit.

DXXOP (10-digit signed integer)

Reserved.

This is a reserved field; its value is 0.

RPG declaration (copy file CMQDXPH)

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
D* MQDXP Structure
D*
D* Structure identifier
D  DXSID                  1      4
D* Structure version number
D  DXVER                  5      8I 0
D* Reserved
D  DXXOP                  9     12I 0
D* Application options
D  DXAOP                 13     16I 0
D* Numeric encoding required by application
D  DXENC                 17     20I 0
D* Character set required by application
D  DXCSI                 21     24I 0
D* Length in bytes of message data
D  DXLEN                 25     28I 0
D* Completion code
```

```
     D  DXCC                  29     32I 0
     D* Reason code qualifying DXCC
     D  DXREA                 33     36I 0
     D* Response from exit
     D  DXRES                 37     40I 0
     D* Connection handle
     D  DXHCN                 41     44I 0
```

IBM i MQXCNVC (Convert characters) on IBM i

The MQXCNVC call converts characters from one character set to another.

This call is part of the IBM MQ Data Conversion Interface (DCI), which is one of the IBM MQ framework interfaces. Note: This call can be used only from a data-conversion exit.

- "Syntax" on page 1433
- "Parameters" on page 1433
- "RPG invocation (ILE)" on page 1437

Syntax

MQXCNVC HCONN, OPTS, SRCCSI, SRCLEN, SRCBUF, TGTCSI, TGTLEN,
TGTBUF, DATLEN, CMPCOD, REASON)

Parameters

The MQXCNVC call has the following parameters:

HCONN (10-digit signed integer) - input

Connection handle.

This handle represents the connection to the queue manager. It should normally be the handle passed to the data-conversion exit in the DXHCN field of the MQDXP structure; this handle is not necessarily the same as the handle specified by the application which issued the MQGET call.

On IBM i, the following special value can be specified for HCONN:

HCDEFH
Default connection handle.

OPTS (10-digit signed integer) - input

Options that control the action of MQXCNVC.

Zero or more of the options described later in this section can be specified. If more than one is required, the values can be added (do not add the same constant more than once).

Default-conversion option: The following option controls the use of default character conversion:

DCCDEF
Default conversion.

This option specifies that default character conversion can be used if one or both of the character sets specified on the call is not supported. This allows the queue manager to use an installation-specified default character set that approximates the specified character set, when converting the string.

Note: The result of using an approximate character set to convert the string is that some characters may be converted incorrectly. This can be avoided by using in the string only characters which are common to both the specified character set and the default character set.

The default character sets are defined by a configuration option when the queue manager is installed or restarted.

If DCCDEF is not specified, the queue manager uses only the specified character sets to convert the string, and the call fails if one or both of the character sets is not supported.

Padding option: The following option allows the queue manager to pad the converted string with blanks or discard insignificant trailing characters, in order to make the converted string fit the target buffer:

DCCFIL

Fill target buffer.

This option requests that conversion take place in such a way that the target buffer is filled completely:

- If the string contracts when it is converted, trailing blanks are added in order to fill the target buffer.
- If the string expands when it is converted, trailing characters that are not significant are discarded to make the converted string fit the target buffer. If this can be done successfully, the call completes with CCOK and reason code RCNONE.

  If there are too few insignificant trailing characters, as much of the string as will fit is placed in the target buffer, and the call completes with CCWARN and reason code RC2120.

  Insignificant characters are:

  - Trailing blanks
  - Characters following the first null character in the string (but excluding the first null character itself)
- If the string, `TGTCSI` , and `TGTLEN` are such that the target buffer cannot be set completely with valid characters, the call fails with CCFAIL and reason code RC2144. This can occur when `TGTCSI` is a pure DBCS character set (such as UTF-16), but `TGTLEN` specifies a length that is an odd number of bytes.
- `TGTLEN` can be less than or greater than `SRCLEN`. On return from MQXCNVC, `DATLEN` has the same value as `TGTLEN`.

If this option is not specified:

- The string is allowed to contract or expand within the target buffer as required. Insignificant trailing characters are not added or discarded.

  If the converted string fits in the target buffer, the call completes with CCOK and reason code RCNONE.

  If the converted string is too large for the target buffer, as much of the string as will fit is placed in the target buffer, and the call completes with CCWARN and reason code RC2120. Note that fewer than *TGTLEN* bytes can be returned in this case.
- `TGTLEN` can be less than or greater than `SRCLEN`. On return from MQXCNVC, `DATLEN` is less than or equal to `TGTLEN`.

Encoding options: The following options can be used to specify the integer encodings of the source and target strings. The relevant encoding is used only when the corresponding character set identifier indicates that the representation of the character set in main storage is dependent on the encoding used for binary integers. This affects only certain multibyte character sets (for example, UTF-16 character sets).

The encoding is ignored if the character set is a single-byte character set (SBCS), or a multibyte character set with representation in main storage that is not dependent on the integer encoding.

Only one of the DCCS* values should be specified, combined with one of the DCCT* values:

DCCSNA

Source encoding is the default for the environment and programming language.

DCCSNO

Source encoding is normal.

DCCSRE
Source encoding is reversed.

DCCSUN
Source encoding is undefined.

DCCTNA
Target encoding is the default for the environment and programming language.

DCCTNO
Target encoding is normal.

DCCTRE
Target encoding is reversed.

DCCTUN
Target encoding is undefined.

The encoding values defined previously can be added directly to the OPTS field. However, if the source or target encoding is obtained from the MDENC field in the MQMD or other structure, the following processing must be done:

1. The integer encoding must be extracted from the MDENC field by eliminating the float and packed-decimal encodings; see "Analyzing encodings on IBM i" on page 1417 for details of how to do this.
2. The integer encoding resulting from step 1 must be multiplied by the appropriate factor before being added to the OPTS field. These factors are:

   DCCSFA
   Factor for source encoding

   DCCTFA
   Factor for target encoding

If not specified, the encoding options default to undefined (DCC*UN). In most cases, this does not affect the successful completion of the MQXCNVC call. However, if the corresponding character set is a multibyte character set with representation that is dependent on the encoding (for example, a UTF-16 character set), the call fails with reason code RC2112 or RC2116 as appropriate.

Default option: If none of the options described previously is specified, the following option can be used:

DCCNON
No options specified.

DCCNON is defined to aid program documentation. It is not intended that this option be used with any other, but as its value is zero, such use cannot be detected.

SRCCSI (10-digit signed integer) - input

Coded character set identifier of string before conversion.

This is the coded character set identifier of the input string in SRCBUF.

SRCLEN (10-digit signed integer) - input

Length of string before conversion.

This is the length in bytes of the input string in SRCBUF ; it must be zero or greater.

SRCBUF (1-byte character string x SRCLEN) - input

String to be converted.

This is the buffer containing the string to be converted from one character set to another.

TGTCSI (10-digit signed integer) - input

Coded character set identifier of string after conversion.

This is the coded character set identifier of the character set to which SRCBUF is to be converted.

TGTLEN (10-digit signed integer) - input

Length of output buffer.

This is the length in bytes of the output buffer TGTBUF ; it must be zero or greater. It can be less than or greater than SRCLEN.

TGTBUF (1-byte character string x TGTLEN) - output

String after conversion.

This is the string after it has been converted to the character set defined by TGTCSI. The converted string can be shorter or longer than the unconverted string. The **DATLEN** parameter indicates the number of valid bytes returned.

DATLEN (10-digit signed integer) - output

Length of output string.

This is the length of the string returned in the output buffer TGTBUF. The converted string can be shorter or longer than the unconverted string.

CMPCOD (10-digit signed integer) - output

Completion code.

It is one of the following:

CCOK
Successful completion.

CCWARN
Warning (partial completion).

CCFAIL
Call failed.

REASON (10-digit signed integer) - output

Reason code qualifying CMPCOD.

If CMPCOD is CCOK:

RCNONE
(0, X'000') No reason to report.

If CMPCOD is CCWARN:

RC2120
(2120, X'848') Converted data too large for buffer.

If CMPCOD is CCFAIL:

RC2010
(2010, X'7DA') Data length parameter not valid.

RC2150
(2150, X'866') DBCS string not valid.

RC2018
(2018, X'7E2') Connection handle not valid.

RC2046
(2046, X'7FE') Options not valid or not consistent.

RC2102
(2102, X'836') Insufficient system resources available.

RC2145
(2145, X'861') Source buffer parameter not valid.

RC2111
(2111, X'83F') Source coded character set identifier not valid.

RC2112
(2112, X'840') Source integer encoding not recognized.

RC2143
(2143, X'85F') Source length parameter not valid.

RC2071
(2071, X'817') Insufficient storage available.

RC2146
(2146, X'862') Target buffer parameter not valid.

RC2115
(2115, X'843') Target coded character set identifier not valid.

RC2116
(2116, X'844') Target integer encoding not recognized.

RC2144
(2144, X'860') Target length parameter not valid.

RC2195
(2195, X'893') Unexpected error occurred.

For more information about these reason codes, see “Return codes for IBM i (ILE RPG)” on page 1411.

RPG invocation (ILE)

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     MQXCNVC(HCONN : OPTS : SRCCSI :
C                                       SRCLEN : SRCBUF : TGTCSI :
C                                       TGTLEN : TGTBUF : DATLEN :
C                                       CMPCOD : REASON)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
DMQXCNVC          PR                  EXTPROC('MQXCNVC')
D* Connection handle
D HCONN                         10I 0 VALUE
D* Options that control the action of MQXCNVC
D OPTS                          10I 0 VALUE
D* Coded character set identifier of string before conversion
D SRCCSI                        10I 0 VALUE
D* Length of string before conversion
D SRCLEN                        10I 0 VALUE
D* String to be converted
D SRCBUF                          *   VALUE
D* Coded character set identifier of string after conversion
D TGTCSI                        10I 0 VALUE
D* Length of output buffer
D TGTLEN                        10I 0 VALUE
D* String after conversion
D TGTBUF                          *   VALUE
D* Length of output string
D DATLEN                        10I 0
D* Completion code
D CMPCOD                        10I 0
D* Reason code qualifying CMPCOD
D REASON                        10I 0
```

IBM i MQCONVX (Data conversion exit) on IBM i

This call definition describes the parameters that are passed to the data-conversion exit.

No entry point called MQCONVX is provided by the queue manager (see usage note “11” on page 1439).

This definition is part of the IBM MQ Data Conversion Interface (DCI), which is one of the IBM MQ framework interfaces.

- “Syntax” on page 1438
- “Usage notes” on page 1438
- “Parameters” on page 1439
- “RPG invocation (ILE)” on page 1441

Syntax

MQCONVX *(MQDXP, MQMD, INLEN, INBUF, OUTLEN, OUTBUF)*

Usage notes

1. A data-conversion exit is a user-written exit which receives control during the processing of an MQGET call. The function performed by the data-conversion exit is defined by the provider of the exit; however, the exit must conform to the rules described here, and in the associated parameter structure MQDXP.

   The programming languages that can be used for a data-conversion exit are determined by the environment.
2. The exit is invoked only if *all* of the following statements are true:
   - The GMCONV option is specified on the MQGET call
   - The *MDFMT* field in the message descriptor is not FMNONE
   - The message is not already in the required representation; that is, one or both of the message's *MDCSI* and *MDENC* is different from the value specified by the application in the message descriptor supplied on the MQGET call
   - The queue manager has not already done the conversion successfully
   - The length of the application's buffer is greater than zero
   - The length of the message data is greater than zero
   - The reason code so far during the MQGET operation is RCNONE or RC2079
3. When an exit is being written, consideration should be given to coding the exit in a way that will allow it to convert messages that have been truncated. Truncated messages can arise in the following ways:
   - The receiving application provides a buffer that is smaller than the message, but specifies the GMATM option on the MQGET call.

     In this case, the *DXREA* field in the **MQDXP** parameter on input to the exit will have the value RC2079.
   - The sender of the message truncated it before sending it. This can happen with report messages, for example (see “Conversion of report messages on IBM i” on page 1427 for more details).

     In this case, the *DXREA* field in the **MQDXP** parameter on input to the exit will have the value RCNONE (if the receiving application provided a buffer that was large enough for the message).

   Thus the value of the *DXREA* field on input to the exit cannot always be used to decide whether the message has been truncated.

   The distinguishing characteristic of a truncated message is that the length provided to the exit in the **INLEN** parameter will be *less than* the length implied by the format name contained in the *MDFMT* field in the message descriptor. The exit should therefore check the value of *INLEN* before attempting to convert any of the data; the exit *should not* assume that the full amount of data implied by the format name has been provided.

   If the exit has not been written to convert truncated messages, and **INLEN** is less than the value expected, the exit should return XRFAIL in the *DXRES* field of the **MQDXP** parameter, with the *DXCC* field set to CCWARN and the *DXREA* field set to RC2110.

If the exit *has* been written to convert truncated messages, the exit should convert as much of the data as possible (see next usage note), taking care not to attempt to examine or convert data beyond the end of *INBUF*. If the conversion completes successfully, the exit should leave the *DXREA* field in the **MQDXP** parameter unchanged. This returns RC2079 if the message was truncated by the receiver's queue manager, and RCNONE if the message was truncated by the sender of the message.

It is also possible for a message to expand *during* conversion, to the point where it is bigger than *OUTBUF*. In this case the exit must decide whether to truncate the message; the *DXAOP* field in the **MQDXP** parameter will indicate whether the receiving application specified the GMATM option.

4. Generally it is recommended that all of the data in the message provided to the exit in *INBUF* is converted, or that none of it is. An exception to this, however, occurs if the message is truncated, either before conversion or during conversion; in this case there may be an incomplete item at the end of the buffer (for example: one byte of a double-byte character, or 3 bytes of a 4-byte integer). In this situation it is recommended that the incomplete item should be omitted, and unused bytes in *OUTBUF* set to nulls. However, complete elements or characters within an array or string *should* be converted.
5. When an exit is needed for the first time, the queue manager attempts to load an object that has the same name as the format (apart from extensions). The object loaded must contain the exit that processes messages with that format name. It is recommended that the exit name, and the name of the object that contain the exit, should be identical, although not all environments require this.
6. A new copy of the exit is loaded when an application attempts to retrieve the first message that uses that *MDFMT* since the application connected to the queue manager. A new copy might also be loaded at other times, if the queue manager has discarded a previously loaded copy. For this reason, an exit should not attempt to use static storage to communicate information from one invocation of the exit to the next - the exit may be unloaded between the two invocations.
7. If there is a user-supplied exit with the same name as one of the built-in formats supported by the queue manager, the user-supplied exit does not replace the built-in conversion routine. The only circumstances in which such an exit is invoked are:
   - If the built-in conversion routine cannot handle conversions to or from either the *MDCSI* or *MDENC* involved, or
   - If the built-in conversion routine has failed to convert the data (for example, because there is a field or character which cannot be converted).
8. The scope of the exit is environment-dependent. *MDFMT* names should be chosen so as to minimize the risk of clashes with other formats. It is recommended that they start with characters that identify the application defining the format name.
9. The data-conversion exit runs in an environment like that of the program which issued the MQGET call; environment includes address space and user profile (where applicable). The program could be a message channel agent sending messages to a destination queue manager that does not support message conversion. The exit cannot compromise the queue manager's integrity, since it does not run in the queue manager's environment.
10. The only MQI call which can be used by the exit is MQXCNVC; attempting to use other MQI calls fails with reason code RC2219, or other unpredictable errors.
11. No entry point called MQCONVX is provided by the queue manager. The name of the exit should be the same as the format name (the name contained in the *MDFMT* field in MQMD), although this is not required in all environments.

Parameters

The MQCONVX call has the following parameters:

MQDXP (MQDXP) - input/output

Data-conversion exit parameter block.

This structure contains information relating to the invocation of the exit. The exit sets information in this structure to indicate the outcome of the conversion. See "MQDXP (Data-conversion exit parameter) on IBM i" on page 1428 for details of the fields in this structure.

MQMD (MQMD) - input/output

Message descriptor.

On input to the exit, this is the message descriptor that would be returned to the application if no conversion were performed. It therefore contains the *MDFMT*, *MDENC*, and *MDCSI* of the unconverted message contained in *INBUF*.

Note: The **MQMD** parameter passed to the exit is always the most recent version of MQMD supported by the queue manager which invokes the exit. If the exit is intended to be portable between different environments, the exit should check the *MDVER* field in *MQMD* to verify that the fields that the exit needs to access are present in the structure.

On IBM i, the exit is passed a version-2 MQMD.

On output, the exit should change the *MDENC* and *MDCSI* fields to the values requested by the application, if conversion was successful; these changes will be reflected back to the application. Any other changes that the exit makes to the structure are ignored; they are not reflected back to the application.

If the exit returns XROK in the *DXRES* field of the MQDXP structure, but does not change the *MDENC* or *MDCSI* fields in the message descriptor, the queue manager returns for those fields the values that the corresponding fields in the MQDXP structure had on input to the exit.

INLEN (10-digit signed integer) - input

Length in bytes of *INBUF*.

This is the length of the input buffer *INBUF*, and specifies the number of bytes to be processed by the exit. *INLEN* is the lesser of the length of the message data before conversion, and the length of the buffer provided by the application on the MQGET call.

The value is always greater than zero.

INBUF (1-byte bit string x INLEN) - input

Buffer containing the unconverted message.

This contains the message data before conversion. If the exit is unable to convert the data, the queue manager returns the contents of this buffer to the application after the exit has completed.

Note: The exit should not alter *INBUF* ; if this parameter is altered, the results are undefined.

OUTLEN (10-digit signed integer) - input

Length in bytes of *OUTBUF*.

This is the length of the output buffer *OUTBUF*, and is the same as the length of the buffer provided by the application on the MQGET call.

The value is always greater than zero.

OUTBUF (1-byte bit string x OUTLEN) - output

Buffer containing the converted message.

On output from the exit, if the conversion was successful (as indicated by the value XROK in the *DXRES* field of the **MQDXP** parameter), **OUTBUF** contains the message data to be delivered to the application, in the requested representation. If the conversion was unsuccessful, any changes that the exit has made to this buffer are ignored.

RPG invocation (ILE)

```
C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
C                     CALLP     exitname(MQDXP : MQMD : INLEN :
C                                        INBUF : OUTLEN : OUTBUF)
```

The prototype definition for the call is:

```
D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
Dexitname         PR                   EXTPROC('exitname')
D* Data-conversion exit parameter block
D MQDXP                         44A
D* Message descriptor
D MQMD                         364A
D* Length in bytes of INBUF
D INLEN                         10I 0 VALUE
D* Buffer containing the unconverted message
D INBUF                           *   VALUE
D* Length in bytes of OUTBUF
D OUTLEN                        10I 0 VALUE
D* Buffer containing the converted message
D OUTBUF                          *   VALUE
```

End of product-sensitive programming interface

User exits, API exits, and installable services reference

Use the linformation in this section to help you develop your User exits, API exits, and installable services applications:

- “MQIEP structure” on page 1441
- “Data-conversion exit reference” on page 1445
- “MQ_PUBLISH_EXIT - Publish exit” on page 1449
- “Channel-exit calls and data structures” on page 1457
- “API exit reference” on page 1545
- “Installable services interface reference information” on page 1605

Related concepts

User exits, API exits, and IBM MQ installable services

Related tasks

Extending queue manager facilities

MQIEP structure

The MQIEP structure contains an entry point for each function call that exits are permitted to make.

Fields

StrucId

Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQIEP_STRUC_ID

Version

Type: MQLONG - input

Structure version number. The value is as follows:

MQIEP_VERSION_1

Version 1 structure version number.

MQIEP_CURRENT_VERSION
Current version of the structure.

StrucLength
Type: MQLONG

Size of the MQIEP structure in bytes. The value is as follows:

MQIEP_LENGTH_1

Flags
Type: MQLONG

Provides information about the function addresses. A flag to indicate if the library is threaded can be used with a flag to indicate if the library is a client or server library.

The following value is used to specify no library information:

MQIEPF_NONE

One of the following values is used to specify if the shared library is threaded or non-threaded:

MQIEPF_NON_THREADED_LIBRARY
A non-threaded shared library

MQIEPF_THREADED_LIBRARY
A threaded shared library

One of the following values is used to specify if the shared library is a client or a server shared library:

MQIEPF_CLIENT_LIBRARY
A client shared library

MQIEPF_LOCAL_LIBRARY
A server shared library

Reserved
Type: MQPTR

MQBACK_Call
Type: PMQ_BACK_CALL

Address of the MQBACK call.

MQBEGIN_Call
Type: PMQ_BEGIN_CALL

Address of the MQBEGIN call.

MQBUFMH_Call
Type: PMQ_BUFMH_CALL

Address of the MQBUFMH call.

MQCB_Call
Type: PMQ_CB_CALL

Address of the MQCB call.

MQCLOSE_Call
Type: PMQ_CLOSE_CALL

Address of the MQCLOSE call.

MQCMIT_Call
Type: PMQ_CMIT_CALL

Address of the MQCMIT call.

MQCONN_Call
Type: PMQ_CONN_CALL

Address of the MQCONN call.

MQCONNX_Call
Type: PMQ_CONNX_CALL

Address of the MQCONNX call.

MQCRTMH_Call
Type: PMQ_CRTMH_CALL

Address of the MQCRTMH call.

MQCTL_Call
Type: PMQ_CTL_CALL

Address of the MQCTL call.

MQDISC_Call
Type: PMQ_DISC_CALL

Address of the MQDISC call.

MQDLTMH_Call
Type: PMQ_DLTMH_CALL

Address of the MQDLTMH call.

MQDLTMP_Call
Type: PMQ_DLTMP_CALL

Address of the MQDLTMP call.

MQGET_Call
Type: PMQ_GET_CALL

Address of the MQGET call.

MQINQ_Call
Type: PMQ_INQ_CALL

Address of the MQINQ call.

MQINQMP_Call
Type: PMQ_INQMP_CALL

Address of the MQINQMP call.

MQMHBUF_Call
Type: PMQ_MHBUF_CALL

Address of the MQMHBUF call.

MQOPEN_Call
Type: PMQ_OPEN_CALL

Address of the MQOPEN call.

MQPUT_Call
Type: PMQ_PUT_CALL

Address of the MQPUT call.

MQPUT1_Call
Type: PMQ_PUT1_CALL

Address of the MQPUT1 call.

MQSET_Call
Type: PMQ_SET_CALL

Address of the MQSET call.

MQSETMP_Call
Type: PMQ_SETMP_CALL

Address of the MQSETMP call.

MQSTAT_Call
Type: PMQ_STAT_CALL

Address of the MQSTAT call.

MQSUB_Call
Type: PMQ_SUB_CALL

Address of the MQSUB call.

MQSUBRQ_Call
Type: PMQ_SUBRQ_CALL

Address of the MQSUBRQ call.

MQXCNVC_Call
Type: PMQ_XCNVC_CALL

Address of the MQXCNVC call.

MQXCLWLN_Call
Type: PMQ_XCLWLN_CALL

Address of the MQXCLWLN call.

MQXDX_Call
Type: PMQ_XDX_CALL

Address of the MQXDX call.

MQXEP_Call
Type: PMQ_XEP_CALL

Address of the MQXEP call.

MQZEP_Call
Type: PMQ_ZEP_CALL

Address of the MQZEP call.

C Declaration

```
struct tagMQIEP {
   MQCHAR4          StrucId;          /* Structure identifier */
   MQLONG           Version;          /* Structure version number */
   MQLONG           StrucLength;      /* Structure length */
   MQLONG           Flags;            /* Flags */
   MQPTR            Reserved;         /* Reserved */
   PMQ_BACK_CALL    MQBACK_Call;      /* Address of MQBACK */
   PMQ_BEGIN_CALL   MQBEGIN_Call;     /* Address of MQBEGIN */
   PMQ_BUFMH_CALL   MQBUFMH_Call;     /* Address of MQBUFMH */
   PMQ_CB_CALL      MQCB_Call;        /* Address of MQCB */
   PMQ_CLOSE_CALL   MQCLOSE_Call;     /* Address of MQCLOSE */
   PMQ_CMIT_CALL    MQCMIT_Call;      /* Address of MQCMIT */
   PMQ_CONN_CALL    MQCONN_Call;      /* Address of MQCONN */
   PMQ_CONNX_CALL   MQCONNX_Call;     /* Address of MQCONNX */
   PMQ_CRTMH_CALL   MQCRTMH_Call;     /* Address of MQCRTMH */
   PMQ_CTL_CALL     MQCTL_Call;       /* Address of MQCTL */
   PMQ_DISC_CALL    MQDISC_Call;      /* Address of MQDISC */
   PMQ_DLTMH_CALL   MQDLTMH_Call;     /* Address of MQDLTMH */
   PMQ_DLTMP_CALL   MQDLTMP_Call;     /* Address of MQDLTMP */
   PMQ_GET_CALL     MQGET_Call;       /* Address of MQGET */
   PMQ_INQ_CALL     MQINQ_Call;       /* Address of MQINQ */
   PMQ_INQMP_CALL   MQINQMP_Call;     /* Address of MQINQMP */
   PMQ_MHBUF_CALL   MQMHBUF_Call;     /* Address of MQMHBUF */
   PMQ_OPEN_CALL    MQOPEN_Call;      /* Address of MQOPEN */
   PMQ_PUT_CALL     MQPUT_Call;       /* Address of MQPUT */
   PMQ_PUT1_CALL    MQPUT1_Call;      /* Address of MQPUT1 */
```

```
    PMQ_SET_CALL     MQSET_Call;       /* Address of MQSET */
    PMQ_SETMP_CALL   MQSETMP_Call;     /* Address of MQSETMP */
    PMQ_STAT_CALL    MQSTAT_Call;      /* Address of MQSTAT */
    PMQ_SUB_CALL     MQSUB_Call;       /* Address of MQSUB */
    PMQ_SUBRQ_CALL   MQSUBRQ_Call;     /* Address of MQSUBRQ */
    PMQ_XCLWLN_CALL  MQXCLWLN_Call;    /* Address of MQXCLWLN */
    PMQ_XCNVC_CALL   MQXCNVC_Call;     /* Address of MQXCNVC */
    PMQ_XDX_CALL     MQXDX_Call;       /* Address of MQXDX */
    PMQ_XEP_CALL     MQXEP_Call;       /* Address of MQXEP */
    PMQ_ZEP_CALL     MQZEP_Call;       /* Address of MQZEP */
};
```

Data-conversion exit reference

For z/OS, you must write data-conversion exits in assembler language. For other platforms, it is recommended that you use the C programming language.

To help you to create a data-conversion exit program, the following resources are supplied:

- A skeleton source file
- A convert characters call
- A utility that creates a fragment of code that performs data conversion on data type structures This utility takes C input only. On z/OS, it produces assembler code.

For the procedure for writing the programs see:

- IBM i Writing a data-conversion exit program for IBM i
- z/OS Writing a data-conversion exit program for IBM MQ for z/OS
- Writing a data-conversion exit for IBM MQ on UNIX and Linux systems
- Writing a data-conversion exit for IBM MQ for Windows

Skeleton source file

These can be used as your starting point when writing a data-conversion exit program.

The files supplied are listed in Table 816 on page 1445.

Table 816. Skeleton source files

Platform	File
AIX AIX	amqsvfc0.c
IBM i IBM i	QMQMSAMP/QCSRC(AMQSVFC4)
Linux Linux	amqsvfc0.c
Solaris Solaris	amqsvfc0.c
Windows Windows systems	amqsvfc0.c
z/OS z/OS	CSQ4BAX8 (“1” on page 1446) CSQ4BAX9 (“2” on page 1446) CSQ4CAX9 (“3” on page 1446)

Table 816. Skeleton source files (continued)

Platform	File
Notes: 1. Illustrates the MQXCVNC call. 2. A wrapper for the code fragments generated by the utility for use in all environments except CICS. 3. A wrapper for the code fragments generated by the utility for use in the CICS environment.	

Convert characters call

Use the MQXCNVC (convert characters) call from within a data-conversion exit program to convert character message data from one character set to another. For certain multibyte character sets (for example, UTF-16 character sets), the appropriate options must be used.

No other MQI calls can be made from within the exit; an attempt to make such a call fails with reason code MQRC_CALL_IN_PROGRESS.

See "MQXCNVC - Convert characters" on page 906 for further information on the MQXCNVC call and appropriate options.

Utility for creating conversion-exit code

Use this information to learn more about creating conversion-exit code.

The commands for creating conversion-exit code are:

IBM i
: CVTMQMDTA (Convert IBM MQ Data Type)

Windows, UNIX and Linux systems
: `crtmqcvx` (Create IBM MQ conversion-exit)

z/OS
: CSQUCVX

The command for your platform produces a fragment of code that performs data conversion on data type structures, for use in your data-conversion exit program. The command takes a file containing one or more C language structure definitions. z/OS On z/OS, it then generates a data set containing assembler code fragments and conversion functions. On other platforms, it generates a file with a C function to convert each structure definition. On z/OS, the utility requires access to the LE/370 runtime library SCEERUN.

Invoking the CSQUCVX utility on z/OS

Figure 10 on page 1446 shows an example of the JCL used to invoke the CSQUCVX utility.

```
//CVX     EXEC PGM=CSQUCVX
//STEPLIB  DD DISP=SHR,DSN=thlqual.SCSQANLE
//         DD DISP=SHR,DSN=thlqual.SCSQLOAD
//         DD DISP=SHR,DSN=le370qual.SCEERUN
//SYSPRINT DD SYSOUT=*
//CSQUINP  DD DISP=SHR,DSN=MY.MQSERIES.FORMATS(MSG1)
//CSQUOUT  DD DISP=OLD,DSN=MY.MQSERIES.EXITS(MSG1)
```

Figure 10. Sample JCL used to invoke the CSQUCVX utility

z/OS data definition statements

The CSQUCVX utility requires DD statements with the following DD names:

Table 817. Data definition statement names and descriptions

DD statement	Description
SYSPRINT	Specifies a data set or print spool class for reports and error messages.
CSQUINP	Specifies the partitioned data set containing the definitions of the data structures to be converted.
CSQUOUT	Specifies the partitioned data set where the conversion code fragments are to be written. The logical record length (LRECL) must be 80 and the record format (RECFM) must be FB.

Error messages in Windows, UNIX and Linux systems

The `crtmqcvx` command returns messages in the range AMQ7953 through AMQ7970.

These messages are listed in Messages and reason codes *IBM MQ Messages*.

There are two main types of error:

- Major errors, such as syntax errors, when processing cannot continue.

  A message is displayed on the screen giving the line number of the error in the input file. The output file might have been partially created.
- Other errors when a message is displayed stating that a problem has been found but that parsing of the structure can continue.

  The output file has been created and contains error information about the problems that have occurred. This error information is prefixed by `#error` so that the code produced is not accepted by any compiler without intervention to rectify the problems.

Valid syntax

Your input file for the utility must conform to the C language syntax.

If you are unfamiliar with C, refer to the C example in this topic.

In addition, be aware of the following rules:

- typedef is recognized only before the struct keyword.
- A structure tag is required on your structure declarations.
- You can use empty square brackets [ ] to denote a variable length array or string at the end of a message.
- Multidimensional arrays and arrays of strings are not supported.
- The following additional data types are recognized:
  - MQBOOL
  - MQBYTE
  - MQCHAR
  - MQFLOAT32
  - MQFLOAT64
  - MQSHORT
  - MQLONG

- MQINT8
- MQUINT8
- MQINT16
- MQUINT16
- MQINT32
- MQUINT32
- MQINT64
- MQUINT64

MQCHAR fields are code page converted, but MQBYTE, MQINT8 and MQUINT8 are left untouched. If the encoding is different, MQSHORT, MQLONG, MQINT16, MQUINT16, MQINT32, MQUINT32, MQINT64, MQUINT64, MQFLOAT32, MQFLOAT64 and MQBOOL are converted accordingly.

- Do not use the following types of data:
  - double
  - pointers
  - bit-fields

  This is because the utility for creating conversion-exit code does not provide the facility to convert these data types. To overcome this, you can write your own routines and call them from the exit.

Other points to note:

- Do not use sequence numbers in the input data set.
- If there are fields for which you want to provide your own conversion routines, declare them as MQBYTE, and then replace the generated CMQXCFBA macros with your own conversion code.

C example

```
struct TEST { MQLONG    SERIAL_NUMBER;
              MQCHAR    ID[5];
              MQINT16   VERSION;
              MQBYTE    CODE[4];
              MQLONG    DIMENSIONS[3];
              MQCHAR    NAME[24];
            } ;
```

This corresponds to the following declarations in other programming languages:

COBOL

```
     10 TEST.
      15 SERIAL-NUMBER  PIC S9(9) BINARY.
      15 ID             PIC X(5).
      15 VERSION        PIC S9(4) BINARY.
    * CODE IS NOT TO BE CONVERTED
      15 CODE           PIC X(4).
      15 DIMENSIONS     PIC S9(9) BINARY OCCURS 3 TIMES.
      15 NAME           PIC X(24).
```

System/390

```
TEST            EQU *
SERIAL_NUMBER   DS  F
ID              DS  CL5
VERSION         DS  H
CODE            DS  XL4
DIMENSIONS      DS  3F
NAME            DS  CL24
```

PL/I

Supported on z/OS only

```
DCL 1 TEST,
      2 SERIAL_NUMBER  FIXED BIN(31),
      2 ID             CHAR(5),
      2 VERSION        FIXED BIN(15),
      2 CODE           CHAR(4),        /* not to be converted */
      2 DIMENSIONS(3)  FIXED BIN(31),
      2 NAME           CHAR(24);
```

MQ_PUBLISH_EXIT - Publish exit

The MQ_PUBLISH_EXIT call can inspect and alter messages delivered to subscribers.

Purpose

Use the publish exit to inspect and alter messages delivered to subscribers:

- Examine the contents of a message published to each subscriber
- Modify the contents of a message published to each subscriber
- Alter the queue to which a message is put
- Stop the delivery of a message to a subscriber

This exit is not available on IBM MQ for z/OS.

Syntax

MQ_PUBLISH_EXIT (*ExitParms*, *PubContext*, *SubContext*)

Parameters

***ExitParms* (MQPSXP)- Input/Output**
: *ExitParms* contains information about the invocation of the exit.

***PubContext* (MQPBC) - Input**
: *PubContext* contains contextual information about the publisher of the publication.

***SubContext* (MQSBC) - Input/Output**
: *SubContext* contains contextual information about the subscriber receiving the publication.

MQPSXP - Publish exit data structure

The MQPSXP structure describes the information that is passed to and returned from the publish exit.

Table 818 on page 1449 summarizes the fields in the structure:

Table 818. Fields in MQPSXP

Field	Description
StrucID	Structure identifier
Version	Structure version number
ExitId	Type of exit that is being called
ExitReason	Reason for calling the exit
ExitResponse	Response from the exit
ExitResponse2	Secondary response from exit
Feedback	Feedback code

Table 818. Fields in MQPSXP (continued)

Field	Description
ExitUserArea	Exit user area
ExitData	Exit data
QMgrName	Name of local queue manager
Hconn	Connection handle
MsgDescPtr	Address of message descriptor (MQMD)
MsgHandle	Handle to message properties (MQHMSG)
MsgInPtr	Address of input message
MsgInLength	Length of input message
MsgOutPtr	Address of output message
MsgOutLength	Length of output message
pEntryPoints	Address of the MQIEP structure

Fields

***StrucID* (MQCHAR4)**

StrucID is the structure identifier. The value is as follows:

MQPSXP_STRUCID

MQPSXP_STRUCID is the identifier for the publish exit parameter structure. For the C programming language, the constant MQPSXP_STRUC_ID_ARRAY is also defined; it has the same value as MQPSXP_STRUC_ID, but is an array of characters instead of a string.

StrucID is an input field to the exit.

***Version* (MQLONG)**

Version is the structure version number. The value is as follows:

MQPSXP_VERSION_1

MQPSXP_VERSION_1 is the Version 1 publish exit parameter structure. The constant MQPSXP_CURRENT_VERSION is also defined with the same value.

Version is an input field to the exit.

***ExitId* (MQLONG)**

ExitId is the type of exit that is being called. The value is as follows:

MQXT_PUBLISH_EXIT

Publish exit.

ExitId is an input field to the exit.

***ExitReason* (MQLONG)**

ExitReason is the reason for calling the exit. The possible values are:

MQXR_INIT

The exit for this connection is called for initialization. The exit might acquire and initialize the resources that it needs; for example, main storage.

MQXR_TERM

The exit for this connection is called because the exit is about to be stopped. The exit must free any resources that it has acquired since it was initialized; for example, main storage.

MQXR_PUBLICATION
The exit is called by the queue manager before it puts a publication onto a message queue of a subscriber. The exit can change the message, not put the message on the queue, or halt publication.

ExitReason is an input field to the exit.

***ExitResponse* (MQLONG)**
Set *ExitResponse* in the exit to specify how processing must continue. *ExitResponse* is one of the following values:

MQXCC_OK
Set MQXCC_OK to continue processing normally. Set MQXCC_OK in response to any values of ExitReason.

If ExitReason has the value MQXR_PUBLICATION, the *DestinationQName* and *DestinationQMgrName* fields of the MQSBC structure identify the destination to which the message is sent.

MQXCC_FAILED
Set MQXCC_FAILED to stop the publish operation. The completion code MQCC_FAILED and reason code 2557 (09FD) (RC2557): MQRC_PUBLISH_EXIT_ERROR is set on return from the exit.

MQXCC_SUPPRESS_FUNCTION
Set MQXCC_SUPPRESS_FUNCTION to stop normal processing of the message. Only set MQXCC_SUPPRESS_FUNCTION if *ExitReason* has the value MQXR_PUBLICATION.

The message continues to be processed by the queue manager according to the MQRO_DISCARD_MSG option in the *Report* field in the message descriptor of the message.

- If the MQRO_DISCARD_MSG option is specified, the message is not delivered to the subscriber.
- If the MQRO_DISCARD_MSG option is not specified, the message is placed on the dead-letter queue. If there is no dead-letter queue, or the message cannot be placed successfully on the dead-letter queue, the publication is not delivered to the subscriber. The delivery of the publication to other subscribers depends on the values of the PMSGDLV and NPMSGDLV topic object attributes. For an explanation of these attributes, see the parameter descriptions for the DEFINE TOPIC command.

ExitResponse is an output field from the exit.

***ExitResponse2* (MQLONG)**
ExitResponse2 is reserved for future use.

***Feedback* (MQLONG)**
Feedback is the feedback code to be used if the exit returns MQXCC_SUPPRESS_FUNCTION in *ExitResponse*.

On input to the exit, *Feedback* always has the value MQFB_NONE. If the exit returns MQXCC_SUPPRESS_FUNCTION, set *Feedback* to the value to be used for the message when the queue manager places it on the dead-letter queue. On return from the exit, if *Feedback* has the original value MQFB_NONE, the queue manager sets *Feedback* to MQFB_STOPPED_BY_PUBSUB_EXIT.

Feedback is an input/output field to the exit.

***ExitUserArea* (MQBYTE16)**
ExitUserArea is a field that is available for the exit to use. Each connection has a separate *ExitUserArea*. The length of *ExitUserArea* is given by MQ_EXIT_USER_AREA_LENGTH.

The *ExitReason* field has the value MQXR_INIT on the first invocation of the exit. *ExitUserArea* is initialized to MQXUA_NONE on the first invocation of the exit for a connection. Subsequent changes to *ExitUserArea* are preserved across invocations of the exit.

ExitUserArea is an input/output field to the exit.

ExitData **(MQCHAR32)**

ExitData is fixed exit data defined by the **PublishExitData** parameter of the stanza in the initialization file of the queue manager. The data is padded with blanks to the full length of the field. If there is no fixed exit data defined in the initialization file, *ExitData* is blank. The length of *ExitData* is given by MQ_EXIT_DATA_LENGTH.

ExitData is an input field to the exit.

QMgrName **(MQCHAR48)**

QMgrName is the name of the local queue manager. The name is padded with blanks to the full length of the field. The length of this field is given by MQ_Q_MGR_NAME_LENGTH.

QMgrName is an input field to the exit.

Hconn **(MQHCONN)**

Hconn is the handle representing a connection to the queue manager. Only use *Hconn* as a parameter to the MQSETMP, MQINQMMP, or MQDLTMP message property function calls to work with message properties.

Hconn is an input field to the exit.

MsgDescPtr **(PMQMD)**

MsgDescPtr is the address of message descriptor (MQMD) of the message being processed, and is a copy of the MQMD returned from the MQPUT call. The exit can change the contents of the message descriptor. Any change to the contents of the message descriptor must be done with care. In particular, in the case where the *SubType* field of the MQSBC structure is of value MQSUBTYPE_PROXY, the *CorrelId* field in the message descriptor must not be changed.

No message descriptor is passed to the exit if *ExitReason* is MQXR_INIT or MQXR_TERM ; in these cases, *MsgDescPtr* is the null pointer.

MsgDescPtr is an input field to the exit.

MsgHandle **(MQHMSG)**

MsgHandle is the handle to message properties. Only use *MsgHandle* with the MQSETMP, MQINQMMP, or MQDLTMP message property function calls to work with message properties.

MsgHandle is an input field to the exit.

MsgInPtr **(PMQVOID)**

MsgInPtr is the address of the input message data. The contents of the buffer addressed by *MsgInPtr* can be modified by the exit; see *MsgOutPtr* .

MsgInPtr is an input field to the exit.

MsgInLength **(MQLONG)**

MsgInLength is the length in bytes of the message data passed to the exit. The address of the data is given by *MsgInPtr*.

MsgInLength is an input field to the exit.

MsgOutPtr **(PMQVOID)**

MsgOutPtr is the address of a buffer containing message data that is returned from the exit. On entry to the exit, *MsgOutPtr* is null. On return from the exit, if the value is still null, the queue manager sends the message specified by *MsgInPtr*, with the length given by *MsgInLength*.

If the exit modifies the message data, use one of the following procedures:

- If the length of the data does not change, the data can be modified in the buffer addressed by *MsgInPtr*. In this case, do not change *MsgOutPtr* and *MsgOutLength*.
- If the modified data is shorter than the original data, the data can be modified in the buffer addressed by *MsgInPtr*. In this case *MsgOutPtr* must be set to the address of the input message buffer, and *MsgOutLength* set to the new length of the message data.
- If the modified data is, or might be, longer than the original data, the exit must obtain a new message buffer. Copy the modified data into it. Set *MsgOutPtr* to the address of the new buffer, and

set *MsgOutLength* to the length of the new message data. The exit is responsible for freeing the buffer addressed by *MsgOutPtr* when the exit is next called.

Note: *MsgOutPtr* is always the null pointer on input to the exit, and not the address of a previously obtained message buffer. To free the previously obtained buffer, the exit must save its address and length. Save the information either in *ExitUserArea*, or in a control block that has its address saved in *ExitUserArea*.

MsgOutPtr is an input/output field to the exit.

***MsgOutLength* (MQLONG)**

MsgOutLength is the length in bytes of the message data returned by the exit. On input to the exit, this field is always zero. On return from the exit, this field is ignored if *MsgOutPtr* is null. See *MsgOutPtr* for information about modifying the message data.

MsgOutLength is an input/output field to the exit.

***pEntryPoints* (PMQIEP)**

pEntryPoints is the address of an MQIEP structure through which MQI and DCI calls can be made.

C language declaration - MQPSXP

```
typedef struct tagMQPSXP {
    MQCHAR4    StrucId;            /* Structure identifier */
    MQLONG     Version;            /* Structure version number */
    MQLONG     ExitId;             /* Type of exit */
    MQLONG     ExitReason;         /* Reason for invoking exit */
    MQLONG     ExitResponse;       /* Response from exit */
    MQLONG     ExitResponse2;      /* Reserved */
    MQLONG     Feedback;           /* Feedback code */
    MQBYTE16   ExitUserArea;       /* Exit user area */
    MQCHAR32   ExitData;           /* Exit data */
    MQCHAR48   QMgrName;           /* Name of local queue manager */
    MQHCONN    Hconn;              /* Connection handle */
    MQHMSG     MsgHandle;          /* Handle to message properties */
    PMQMD      MsgDescPtr;         /* Address of message descriptor */
    PMQVOID    MsgInPtr;           /* Address of input message data */
    MQLONG     MsgInLength;        /* Length of input message data */
    PMQVOID    MsgOutPtr;          /* Address of output message data */
    MQLONG     MsgOutLength;       /* Length of output message data */
    /* Ver:1 */
    PMQIEP     pEntryPoints;       /* Address of the MQIEP structure */
    /* Ver:2 */
}    MQPSXP;
```

MQPBC - Publication context data structure

The MQPBC structure contains the contextual information, relating to the publisher of the publication, that is passed to the publish exit.

Table 819 on page 1453 summarizes the fields in the structure:

Table 819. Fields in MQPBC

Field	Description
StrucID	Structure identifier
Version	Structure version number
PubTopicString	Publish topic string
MsgDescPtr	Address of message descriptor (MQMD)

Fields

***StrucID* (MQCHAR4)**

StrucID is the structure identifier. The value is as follows:

MQPBC_STRUCID
MQPBC_STRUCID is the identifier for the publication context structure. For the C programming language, the constant MQPBC_STRUC_ID_ARRAY is also defined; it has the same value as MQPBC_STRUC_ID, but is an array of characters instead of a string.

StrucID is an input field to the exit.

***Version* (MQLONG)**
Version is the structure version number. The value is as follows:

MQPBC_VERSION_1
MQPBC_VERSION_1 is the Version 1 publish exit parameter structure.

MQPBC_VERSION_2
MQPBC_VERSION_2 is the Version 2 publish exit parameter structure. The constant MQPBC_CURRENT_VERSION is also defined with the same value.

Version is an input field to the exit.

***PubTopicString* (MQCHARV)**
PubTopicString is the topic string being published to.

PubTopicString is an input field to the exit.

***MsgDescPtr* (PMQMD)**
MsgDescPtr is the address of a copy of the message descriptor (MQMD) for the message being processed.

MsgDescPtr is an input field to the exit.

C language declaration - MQPBC

```
typedef struct tagMQPBC {
  MQCHAR4    StrucId;              /* Structure identifier */
  MQLONG     Version;              /* Structure version number */
  MQCHARV    PubTopicString;       /* Publish topic string */
  PMQMD      MsgDescPtr;           /* Address of message descriptor */
} MQPBC;
```

MQSBC - Subscription context data structure

The MQSBC structure contains the contextual information, relating to the subscriber that is receiving the publication, that is passed to the publish exit.

Table 820 on page 1454 summarizes the fields in the structure:

Table 820. Fields in MQSBC

Field	Description
StrucID	Structure identifier
Version	Structure version number
DestinationQMgrName	Name of destination queue manager
DestinationQName	Name of destination queue
SubType	Type of subscription
SubOptions	Subscription options
ObjectName	Object name
ObjectString	Object string
SubTopicString	Subscription topic string

Table 820. Fields in MQSBC (continued)	
Field	**Description**
SubName	Subscription name
SubId	Subscription identifier
SelectionString	Address of selection string
SubLevel	Subscription level
PSProperties	Publish/subscribe properties

Fields

***StrucID* (MQCHAR4)**
Structure identifier. The value is as follows:

MQSBC_STRUCID
MQSBC_STRUCID is the identifier for the publish exit parameter structure. For the C programming language, the constant MQSBC_STRUC_ID_ARRAY is also defined; MQSBC_STRUC_ID_ARRAY has the same value as MQSBC_STRUC_ID, but is an array of characters instead of a string.

StrucID is an input field to the exit.

***Version* (MQLONG)**
Structure version number. The value is as follows:

MQSBC_VERSION_1
Version 1 publish exit parameter structure. The constant MQSBC_CURRENT_VERSION is also defined with the same value.

Version is an input field to the exit.

***DestinationQMgrName* (MQCHAR48)**
DestinationQMgrName is the name of the queue manager to which the message is being sent. The name is padded with blanks to the full length of the field. The name can be altered by the exit. The length of this field is given by MQ_Q_MGR_NAME_LENGTH.

DestinationQMgrName is an input/output field to the exit; see note.

***DestinationQName* (MQCHAR48)**
DestinationQName is the name of the queue to which the message is being sent. The name is padded with blanks to the full length of the field. The name can be altered by the exit. The length of this field is given by MQ_Q_NAME_LENGTH.

DestinationQName is an input/output field to the exit; see note.

***SubType* (MQLONG)**
SubType indicates how the subscription was created. Valid values are MQSUBTYPE_API, MQSUBTYPE_ADMIN and MQSUBTYPE_PROXY ; see Inquire Subscription Status (Response).

SubType is an input field to the exit.

***SubOptions* (MQLONG)**
SubOptions are the subscription options; see “Options (MQLONG)” on page 562 for a description of values this field can take.

SubOptions is an input field to the exit.

***ObjectName* (MQCHAR48)**
ObjectName is the name of the topic object as defined on the local queue manager. The length of this field is given by MQ_TOPIC_NAME_LENGTH. The object name is the name of the administrative topic object that the queue manager has associated with the topic string. Even if the subscriber provided a topic object as part of the subscription, the *ObjectName* might be a different topic

object. The association of a topic object with a subscription depends upon the full resolution of *SubTopicString*.

ObjectName is an input field to the exit.

***ObjectString* (MQCHARV)**
ObjectString is the full topic string of the publication that was subscribed to. Any wildcards in the original subscription string are resolved. It is different to the MQSD subscription *ObjectString* field described in "ObjectString (MQCHARV)" on page 571, which might contain wildcards, and is exclusive of any object name provided by the subscriber.

ObjectString is an input field to the exit.

***SubTopicString* (MQCHARV)**
SubTopicString is the complete topic string as supplied by the subscriber. *SubTopicString* is the combination of the topic string defined in a topic object, and a topic string. A subscriber must provide either a topic object, a topic string, or both. If the subscriber provides a topic string, it might contain wildcards.

SubTopicString is an input field to the exit.

***SubName* (MQCHARV)**
SubName is the subscription name that is provided either by the subscriber, or is a generated name.

SubName is an input field to the exit.

***SubId* (MQBYTE 24)**
SubId is the unique internal subscription identifier.

SubId is an input field to the exit.

***SelectionString* (MQCHARV)**
SelectionString is the selection criteria used when subscribing for messages from a topic; see Selectors.

SelectionString is an input field to the exit.

***SubLevel* (MQLONG)**
SubLevel is the interception level associated with the subscription; see "SubLevel (MQLONG)" on page 575 for further details.

SubLevel is an input field to the exit.

***PSProperties* (MQLONG)**
PSProperties are the publish/subscribe properties. They specify how publish/subscribe related message properties are added to messages sent to this subscription. Possible values are MQPSPROP_NONE, MQPSPROP_COMPAT, MQPSPROP_RFH2, MQPSPROP_MSGPROP. See Optional parameters (Change, Copy, and Create Subscription) for a description of these values.

PSProperties is an input field to the exit.

Note: Authorization checks are only performed on the original values of *DestinationQMgrName* and *DestinationQName* before they are passed to the publish exit. No new authorization checks are performed when the exit changes the destination queue, either by changing *DestinationQMgrName* or *DestinationQName*.

C language declaration - MQSBC

```
typedef struct tagMQSBC {
  MQCHAR4    StrucId;             /* Structure identifier */
  MQLONG     Version;             /* Structure version number */
  MQCHAR48   DestinationQMgrName; /* Destination queue manager */
  MQCHAR48   DestinationQName;    /* Destination queue name */
  MQLONG     SubType;             /* Type of subscription */
  MQLONG     SubOptions;          /* Subscription options */
  MQCHAR48   ObjectName;          /* Object name */
  MQCHARV    ObjectString;        /* Object string */
```

```
   MQCHARV    SubTopicString;       /* Subscription topic string */
   MQCHARV    SubName;              /* Subscription name */
   MQBYTE24   SubId;                /* Subscription identifier */
   MQCHARV    SelectionString;      /* Subscription selection string */
   MQLONG     SubLevel;             /* Subscription level */
   MQLONG     PSProperties;         /* Publish/subscribe properties */
 } MQSBC;
```

Channel-exit calls and data structures

This collection of topics provide reference information about the special IBM MQ calls and data structures that you can use when you write channel exit programs.

This information is product-sensitive programming interface information. You can write IBM MQ user exits in the following programming languages:

Table 821. IBM MQ user exits: platforms and programming languages

Platform	Programming languages
IBM MQ for z/OS	Assembler and C (which must conform to the C system programming environment for system exits, described in the *z/OS C/C++ Programming Guide*.)
IBM MQ for IBM i	ILE C, ILE COBOL, and ILE RPG
All other IBM MQ platforms	C

You can also write user exits in Java for use only with Java and JMS applications. For more information about creating and using channel exits with the IBM MQ classes for Java, see Using channel exits in IBM MQ classes for Java and for IBM MQ classes for JMS, see Using channel exits with IBM MQ classes for JMS.

You cannot write IBM MQ user exits in TAL or Visual Basic. However, a declaration for the MQCD structure is provided in Visual Basic for use on the MQCONNX call from an IBM MQ MQI client program.

In a number of cases in the descriptions that follow, parameters are arrays or character strings with a size that is not fixed. For these parameters, a lowercase "n" is used to represent a numeric constant. When the declaration for that parameter is coded, the "n" must be replaced by the numeric value required. For further information about the conventions used in these descriptions, see the “Elementary data types” on page 234.

Data definition files

Data definition files are supplied with IBM MQ for each of the supported programming languages. For details of these files, see Copy, header, include, and module files.

MQ_CHANNEL_EXIT - Channel exit

The MQ_CHANNEL_EXIT call describes the parameters that are passed to each of the channel exits called by the Message Channel Agent.

No entry point called MQ_CHANNEL_EXIT is provided by the queue manager; the name MQ_CHANNEL_EXIT is of no special significance since the names of the channel exits are provided in the channel definition MQCD.

There are five types of channel exit:

- Channel security exit
- Channel message exit
- Channel send exit
- Channel receive exit

- Channel message-retry exit

The parameters are similar for each type of exit, and the description given here applies to all of them, except where specifically noted.

Syntax

MQ_CHANNEL_EXIT *(ChannelExitParms, ChannelDefinition, DataLength,*
AgentBufferLength, AgentBuffer, ExitBufferLength, ExitBufferAddr)

Parameters

The MQ_CHANNEL_EXIT call has the following parameters.

ChannelExitParms (MQCXP) - input/output

Channel exit parameter block.

This structure contains additional information relating to the invocation of the exit. The exit sets information in this structure to indicate how the MCA proceeds.

ChannelDefinition (MQCD) - input/output

Channel definition.

This structure contains parameters set by the administrator to control the behavior of the channel.

DataLength (MQLONG) - input/output

Length of data.

The data depends on the type of exit:

- For a channel security exit, when the exit is invoked this parameter contains the length of any security message in the *AgentBuffer* field, if *ExitReason* is MQXR_SEC_MSG. It is zero if there is no message. The exit must set this field to the length of any security message to be sent to its partner if it sets *ExitResponse* to MQXCC_SEND_SEC_MSG or MQXCC_SEND_AND_REQUEST_SEC_MSG. The message data is in either *AgentBuffer* or *ExitBufferAddr*.

  The content of security messages is the sole responsibility of the security exits.
- For a channel message exit, when the exit is invoked this parameter contains the length of the message (including the transmission queue header). The exit must set this field to the length of the message in either *AgentBuffer* or *ExitBufferAddr* that is to proceed. This must be greater than or equal to the length of the transmission queue header (MQXQH).
- For a channel send or channel receive exit, when the exit is invoked this parameter contains the length of the transmission. The exit must set this field to the length of the transmission in either *AgentBuffer* or *ExitBufferAddr* that is to proceed.

If a security exit sends a message, and there is no security exit at the other end of the channel, or the other end sets an *ExitResponse* of MQXCC_OK, the initiating exit is re-invoked with MQXR_SEC_MSG and a null response (*DataLength* =0).

AgentBufferLength (MQLONG) - input

Length of agent buffer.

This parameter can be greater than *DataLength* on invocation.

For channel message, send, and receive exits, any unused space on invocation can be used by the exit to expand the data in place. If this is done, the **DataLength** parameter must be set appropriately by the exit.

In the C programming language, this parameter is passed by address.

AgentBuffer (MQBYTE x AgentBufferLength) - input/output

Agent buffer.

The contents of this parameter depend upon the exit type:

- For a channel security exit, on invocation of the exit it contains a security message if *ExitReason* is MQXR_SEC_MSG. To send a security message back, the exit can either use this buffer or its own buffer (*ExitBufferAddr*).
- For a channel message exit, on invocation of the exit this parameter contains:
  - The transmission queue header (MQXQH), which includes the message descriptor (which itself contains the context information for the message), immediately followed by
  - The message data

  If the message is to proceed, the exit can do one of the following:

  - Leave the contents of the buffer untouched
  - Modify the contents in place (returning the new length of the data in *DataLength* ; this must not be greater than *AgentBufferLength*)
  - Copy the contents to the *ExitBufferAddr*, making any required changes

  Any changes that the exit makes to the transmission queue header are not checked; however, erroneous modifications might mean that the message cannot be put at the destination.
- For a channel send or receive exit, on invocation of the exit this contains the transmission data. The exit can do one of the following:
  - Leave the contents of the buffer untouched
  - Modify the contents in place (returning the new length of the data in *DataLength* ; this must not be greater than *AgentBufferLength*)
  - Copy the contents to the *ExitBufferAddr*, making any required changes

  The first 8 bytes of the data must not be changed by the exit.

ExitBufferLength (MQLONG) - input/output

Length of exit buffer.

On the first invocation of the exit, this parameter is set to zero. Thereafter whatever value is passed back by the exit, on each invocation, is presented to the exit next time it is invoked. The value is not used by the MCA.

Note: This parameter must not be used by exits written in programming languages which do not support the pointer data type.

ExitBufferAddr (MQPTR) - input/output

Address of exit buffer.

This parameter is a pointer to the address of a buffer of storage managed by the exit, where it can choose to return message or transmission data (depending upon the type of exit) to the agent if the buffer of the agent is or might not be large enough, or if it is more convenient for the exit to do so.

On the first invocation of the exit, the address passed to the exit is null. Thereafter whatever address is passed back by the exit, on each invocation, is presented to the exit the next time it is invoked.

If ExitBufferAddr is null the data used is taken from the AgentBuffer parameter.

If ExitBufferAddr is not null the data used is taken from the buffer pointed to by the ExitBufferAddr parameter.

Note: This parameter must not be used by exits written in programming languages that do not support the pointer data type.

C invocation

```
exitname (&ChannelExitParms, &ChannelDefinition,
&DataLength, &AgentBufferLength, AgentBuffer,
&ExitBufferLength, &ExitBufferAddr);
```

The parameters passed to the exit are declared as follows:

```
MQCXP   ChannelExitParms;   /* Channel exit parameter block */
MQCD    ChannelDefinition;  /* Channel definition */
MQLONG  DataLength;         /* Length of data */
MQLONG  AgentBufferLength;  /* Length of agent buffer */
MQBYTE  AgentBuffer[n];     /* Agent buffer */
MQLONG  ExitBufferLength;   /* Length of exit buffer */
MQPTR   ExitBufferAddr;     /* Address of exit buffer */
```

COBOL invocation

```
     CALL 'exitname' USING CHANNELEXITPARMS, CHANNELDEFINITION,
                           DATALENGTH, AGENTBUFFERLENGTH, AGENTBUFFER,
                           EXITBUFFERLENGTH, EXITBUFFERADDR.
```

The parameters passed to the exit are declared as follows:

```
**   Channel exit parameter block
 01  CHANNELEXITPARMS.
     COPY CMQCXPV.
**   Channel definition
 01  CHANNELDEFINITION.
     COPY CMQCDV.
**   Length of data
 01  DATALENGTH         PIC S9(9) BINARY.
**   Length of agent buffer
 01  AGENTBUFFERLENGTH  PIC S9(9) BINARY.
**   Agent buffer
 01  AGENTBUFFER        PIC X(n).
**   Length of exit buffer
 01  EXITBUFFERLENGTH   PIC S9(9) BINARY.
**   Address of exit buffer
 01  EXITBUFFERADDR     POINTER.
```

RPG invocation (ILE)

```
     C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     C                     CALLP     exitname(MQCXP : MQCD : DATLEN :
     C                                        ABUFL : ABUF : EBUFL :
     C                                        EBUF)
```

The prototype definition for the call is:

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     Dexitname         PR                  EXTPROC('exitname')
     D* Channel exit parameter block
     D MQCXP                        160A
     D* Channel definition
     D MQCD                        1328A
     D* Length of data
     D DATLEN                        10I 0
     D* Length of agent buffer
     D ABUFL                         10I 0
     D* Agent buffer
     D ABUF                            *   VALUE
     D* Length of exit buffer
     D EBUFL                         10I 0
     D* Address of exit buffer
     D EBUF                            *
```

System/390 assembler invocation

```
         CALL EXITNAME,(CHANNELEXITPARMS,CHANNELDEFINITION,DATALENGTH, X
               AGENTBUFFERLENGTH,AGENTBUFFER,EXITBUFFERLENGTH,         X
               EXITBUFFERADDR)
```

The parameters passed to the exit are declared as follows:

```
CHANNELEXITPARMS   CMQCXPA  ,      Channel exit parameter block
CHANNELDEFINITION  CMQCDA   ,      Channel definition
DATALENGTH         DS       F      Length of data
AGENTBUFFERLENGTH  DS       F      Length of agent buffer
AGENTBUFFER        DS       CL(n)  Agent buffer
EXITBUFFERLENGTH   DS       F      Length of exit buffer
EXITBUFFERADDR     DS       F      Address of exit buffer
```

Usage notes

1. The function performed by the channel exit is defined by the provider of the exit. The exit, however, must conform to the rules defined here and in the associated control block, the MQCXP.
2. The **ChannelDefinition** parameter passed to the channel exit might be one of several versions. See the *Version* field in the MQCD structure for more information.
3. If the channel exit receives an MQCD structure with the *Version* field set to a value greater than MQCD_VERSION_1, the exit must use the *ConnectionName* field in MQCD, in preference to the *ShortConnectionName* field.
4. In general, channel exits are allowed to change the length of message data. This can arise as a result of the exit adding data to the message, or removing data from the message, or compressing or encrypting the message. However, special restrictions apply if the message is a segment that contains only part of a logical message. In particular, there must be no net change in the length of the message as a result of the actions of complementary sending and receiving exits.

   For example, it is permissible for a sending exit to shorten the message by compressing it, but the complementary receiving exit must restore the original length of the message by decompressing it, so that there is no net change in the length of the message.

   This restriction arises because changing the length of a segment would cause the offsets of later segments in the message to be incorrect, and this would inhibit the ability of the queue manager to recognize that the segments formed a complete logical message.

MQ_CHANNEL_AUTO_DEF_EXIT - Channel auto-definition exit

The MQ_CHANNEL_AUTO_DEF_EXIT call describes the parameters that are passed to the channel auto-definition exit called by the Message Channel Agent.

No entry point called MQ_CHANNEL_AUTO_DEF_EXIT is provided by the queue manager; the name MQ_CHANNEL_AUTO_DEF_EXIT is of no special significance because the names of the auto-definition exits are provided in the queue manager.

Syntax

MQ_CHANNEL_AUTO_DEF_EXIT *(ChannelExitParms, ChannelDefinition)*

Parameters

The MQ_CHANNEL_AUTO_DEF_EXIT call has the following parameters.

ChannelExitParms (MQCXP) - input/output

Channel exit parameter block.

This structure contains additional information relating to the invocation of the exit. The exit sets information in this structure to indicate how the MCA proceeds.

ChannelDefinition (MQCD) - input/output

Channel definition.

This structure contains parameters set by the administrator to control the behavior of channels which are created automatically. The exit sets information in this structure to modify the default behavior set by the administrator.

The MQCD fields listed must not be altered by the exit:

- *ChannelName*
- *ChannelType*
- *StrucLength*
- *Version*

If other fields are changed, the value set by the exit must be valid. If the value is not valid, an error message is written to the error log file or displayed on the console (as appropriate to the environment).

Attention: Auto-defined channels created by a channel automatic definition (CHAD) exit cannot set the certificate label, because the TLS handshake has occurred by the time the channel is created. Setting the certificate label in a CHAD exit for inbound channels has no effect.

C invocation

```
exitname (&ChannelExitParms, &ChannelDefinition);
```

The parameters passed to the exit are declared as follows:

```
MQCXP  ChannelExitParms;   /* Channel exit parameter block */
MQCD   ChannelDefinition;  /* Channel definition */
```

COBOL invocation

```
     CALL 'exitname' USING CHANNELEXITPARMS, CHANNELDEFINITION.
```

The parameters passed to the exit are declared as follows:

```
**   Channel exit parameter block
 01  CHANNELEXITPARMS.
     COPY CMQCXPV.
**   Channel definition
 01  CHANNELDEFINITION.
     COPY CMQCDV.
```

RPG invocation (ILE)

```
     C*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     C                     CALLP     exitname(MQCXP : MQCD)
```

The prototype definition for the call is:

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     Dexitname         PR                  EXTPROC('exitname')
     D* Channel exit parameter block
     D MQCXP                        160A
```

```
     D* Channel definition
     D MQCD                        1328A
```

System/390 assembler invocation

```
         CALL EXITNAME,(CHANNELEXITPARMS,CHANNELDEFINITION)
```

The parameters passed to the exit are declared as follows:

```
CHANNELEXITPARMS   CMQCXPA  ,  Channel exit parameter block
CHANNELDEFINITION  CMQCDA   ,  Channel definition
```

Usage notes

1. The function performed by the channel exit is defined by the provider of the exit. The exit, however, must conform to the rules defined here and in the associated control block, the MQCXP.
2. The **ChannelExitParms** parameter passed to the channel auto-definition exit is an MQCXP structure. The version of MQCXP passed depends on the environment in which the exit is running; see the description of the *Version* field in "MQCXP - Channel exit parameter" on page 1504 for details.
3. The **ChannelDefinition** parameter passed to the channel auto-definition exit is an MQCD structure. The version of MQCD passed depends on the environment in which the exit is running; see the description of the *Version* field in "MQCD - Channel definition" on page 1464 for details.

MQXWAIT - Wait in exit

The MQXWAIT call waits for an event to occur. It can be used only from a channel exit on z/OS.

The use of MQXWAIT helps to avoid performance problems that might otherwise occur if a channel exit does something that causes a wait. The event MQXWAIT is waiting on is signaled by an MVS ECB (event control block). The ECB is described in the MQXWD control block description.

z/OS For more information about the use of MQXWAIT and writing channel-exit programs, see Writing channel exit programs on z/OS

Syntax

MQXWAIT *(Hconn, WaitDesc, CompCode, Reason)*

Parameters

The MQXWAIT call has the following parameters.

Hconn (MQHCONN) - input

Connection handle.

This handle represents the connection to the queue manager. The value of *Hconn* was returned by a previous MQCONN call issued in the same or earlier invocation of the exit.

WaitDesc (MQXWD) - input/output

Wait descriptor.

This parameter describes the event to wait for. See "MQXWD - Exit wait descriptor" on page 1518 for details of the fields in this structure.

CompCode (MQLONG) - output

Completion code.

It is one of the following codes:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

MQRC_ADAPTER_NOT_AVAILABLE
(2204, X'89C') Adapter not available.

MQRC_OPTIONS_ERROR
(2046, X'7FE') Options not valid or not consistent.

MQRC_XWAIT_CANCELED
(2107, X'83B') MQXWAIT call canceled.

MQRC_XWAIT_ERROR
(2108, X'83C') Invocation of MQXWAIT call not valid.

C invocation

```
MQXWAIT (Hconn, &WaitDesc, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONN  Hconn;     /* Connection handle */
MQXWD    WaitDesc;  /* Wait descriptor */
MQLONG   CompCode;  /* Completion code */
MQLONG   Reason;    /* Reason code qualifying CompCode */
```

System/390 assembler invocation

```
         CALL MQXWAIT,(HCONN,WAITDESC,COMPCODE,REASON)
```

Declare the parameters as follows:

```
HCONN     DS       F  Connection handle
WAITDESC  CMQXWDA  ,  Wait descriptor
COMPCODE  DS       F  Completion code
REASON    DS       F  Reason code qualifying COMPCODE
```

MQCD - Channel definition

The MQCD structure contains the parameters which control execution of a channel. It is passed to each channel exit that is called from a Message Channel Agent (MCA).

For more information about channel exits, see "MQ_CHANNEL_EXIT - Channel exit" on page 1457. The description in this topic relates both to message channels and to MQI channels.

Exit name fields

When an exit is called, the relevant field from *SecurityExit*, *MsgExit*, *SendExit*, *ReceiveExit*, and *MsgRetryExit* contains the name of the exit currently being invoked. The meaning of the name in these fields depends on the environment in which the MCA is running. Except where noted, the name is

left-aligned within the field, with no embedded blanks; the name is padded with blanks to the length of the field. In the descriptions that follow, square brackets ([ ]) denote optional information:

UNIX
: The exit name is the name of a dynamically loadable module or library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses. The library name can optionally be prefixed with a directory path:

```
[ path ] library ( function )
```

The name is limited to a maximum of 128 characters.

z/OS
: The exit name is the name of a load module that is valid for specification on the EP parameter of the LINK or LOAD macro. The name is limited to a maximum of eight characters.

Windows
: The exit name is the name of a dynamic-link library, suffixed with the name of a function residing in that library. The function name must be enclosed in parentheses. The library name can optionally be prefixed with a directory path and drive:

```
[d:][ path ] library ( function )
```

The name is limited to a maximum of 128 characters.

IBM i
: The exit name is a 10 byte program name followed by a 10 byte library name. If the names are less than 10 bytes long, each name is padded with blanks to make it 10 bytes. The library name can be `*LIBL` except when calling a channel auto-definition exit, in which case a fully qualified name is required.

Changing MQCD fields in a channel exit

A channel exit can change fields in the MQCD. The changed value remains in the MQCD and is passed to any remaining exits in an exit chain and to any conversation sharing the channel instance. The changed MQCD is also used by the MCA for its normal processing during the continuing lifetime of the channel.

The following MQCD fields must not be altered by the exit:

- ChannelName
- ChannelType
- StrucLength
- Version

Related reference

"Fields" on page 1466
This topic lists all the fields in the MQCD structure and describes each field.

"C declaration" on page 1491
This declaration is the C declaration for the MQCD structure.

"COBOL declaration" on page 1493
This declaration is the COBOL declaration for the MQCD structure.

"RPG declaration (ILE)" on page 1495
This declaration is the RPG declaration for the MQCD structure.

"System/390 assembler declaration" on page 1498
This declaration is the System/390 assembler declaration for the MQCD structure.

"Visual Basic declaration" on page 1500

This declaration is the Visual Basic declaration of the MQCD structure.

"Changing MQCD fields in a channel exit" on page 1501
A channel exit can change fields in the MQCD. However, these changes are not typically acted on, except in the circumstances listed.

Fields

This topic lists all the fields in the MQCD structure and describes each field.

BatchDataLimit (MQLONG)
This field specifies the the limit, in kilobytes, of the amount of data that can be sent through a channel before taking a sync point.

A sync point is taken after the message that caused the limit to be reached has flowed across the channel.

The batch is terminated when one of the following conditions is met:

- **BatchSize** messages have been sent.
- **BatchDataLimit** bytes have been sent.
- The transmission queue is empty and **BatchInterval** is exceeded.

The value must be in the range 0 - 999999. The default value is 5000.

A value of zero in this attribute means that no data limit is applied to batches over this channel.

This parameter only applies to channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSRCVR, or MQCHT_CLUSSDR.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_11.

BatchHeartbeat (MQLONG)
This field specifies the time interval that is used to trigger a batch heartbeat for the channel.

Batch heartbeating allows sender channels to determine whether the remote channel instance is still active before going indoubt. A batch heartbeat occurs if a sender channel has not communicated with the remote channel instance within the specified time interval.

The value is in the range 0 through 999 999; the units are milliseconds. A value of zero indicates that batch heartbeating is not enabled.

This field is relevant only for channels that have a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_7.

BatchInterval (MQLONG)
This field specifies the approximate time in milliseconds that a channel keeps a batch open, if fewer than *BatchSize* messages have been transmitted in the current batch.

If *BatchInterval* is greater than zero, the batch is terminated by whichever of the following events occur first:

- *BatchSize* messages have been sent, or
- *BatchInterval* milliseconds have elapsed since the start of the batch.

If *BatchInterval* is zero, the batch is terminated by whichever of the following events occur first:

- *BatchSize* messages have been sent, or
- the transmission queue becomes empty.

BatchInterval must be in the range zero through 999 999 999.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

This is an input field to the exit. The field is not present when *Version* is less than MQCD_VERSION_4.

BatchSize (MQLONG)
This field specifies the maximum number of messages that can be sent through a channel before synchronizing the channel.

This field is not relevant for channels with a *ChannelType* of MQCHT_SVRCONN or MQCHT_CLNTCONN.

CertificateLabel (MQCHAR64)
This field gives details of the certificate label being used.

IBM MQ initializes the default value for the *CertificateLabel* field as blanks.

This is interpreted at runtime as the default value, and is backwards compatible.

For example, specifying a MQCD version less than 11, or using the default value of blanks for the *CertificateLabel* field, means that this field is ignored.

The length of this field is given by MQ_CERT_LABEL_LENGTH.

ChannelMonitoring (MQLONG)
This field specifies the current level of monitoring data collection for the channel.

This field is not relevant for channels with a ChannelType of MQCHT_CLNTCONN.

It is one of the following values:

- MQMON_OFF
- MQMON_LOW
- MQMON_MEDIUM
- MQMON_HIGH

This is an input field to the exit. It is not present if *Version* is less than MQCD_VERSION_8.

ChannelName (MQCHAR20)
This field specifies the channel definition name.

There must be a channel definition of the same name at the remote machine to be able to communicate.

The name must use only the characters:

- Uppercase A-Z
- Lowercase a-z
- Numerics 0-9
- Period (.)
- Forward slash (/)
- Underscore (_)
- Percent sign (%)

and be padded to the right with blanks. Leading or embedded blanks are not allowed.

The length of this field is given by MQ_CHANNEL_NAME_LENGTH.

ChannelStatistics (MQLONG)
This field specifies the current level of statistics data collection for the channel.

This field is not relevant for channels with a ChannelType of MQCHT_CLNTCONN or MQCHT_SVRCONN.

It is one of the following values:

- MQMON_OFF
- MQMON_LOW
- MQMON_MEDIUM
- MQMON_HIGH

This is an input field to the exit. It is not present if *Version* is less than MQCD_VERSION_8.

ChannelType (MQLONG)
This field specifies the type of channel.

It is one of the following values:

MQCHT_SENDER
Sender.

MQCHT_SERVER
Server.

MQCHT_RECEIVER
Receiver.

MQCHT_REQUESTER
Requester.

MQCHT_CLNTCONN
Client connection.

MQCHT_SVRCONN
Server-connection (for use by clients).

MQCHT_CLUSSDR
Cluster sender.

MQCHT_CLUSRCVR
Cluster receiver.

ClientChannelWeight (MQLONG)
This field specifies a weighting to influence which client-connection channel definition is used.

The ClientChannelWeight attribute is used so that client channel definitions can be selected at random based on their weighting when more than one suitable definition is available. When a client issues an MQCONN requesting connection to a queue manager group, by specifying a queue manager name starting with an asterisk, and more than one suitable channel definition is available in the client channel definition table (CCDT), the definition to use is randomly selected based on the weighting, with any applicable ClientChannelWeight(0) definitions selected first in alphabetical order.

Specify a value in the range 0 - 99. The default is 0.

A value of 0 indicates that no load balancing is performed and applicable definitions are selected in alphabetical order. To enable load balancing choose a value in the range 1 - 99 where 1 is the lowest weighting and 99 is the highest. The distribution of messages between two or more channels with non-zero weightings is proportional to the ratio of those weightings. For example, three channels with ClientChannelWeight values of 2, 4, and 14 are selected approximately 10%, 20%, and 70% of the time. This distribution is not guaranteed.

This attribute is valid for the client-connection channel type only.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_9.

ClusterPtr (MQPTR)
This field specifies the address a list of cluster names.

If *ClustersDefined* is greater than zero, this address is the address of a list of cluster names. The channel belongs to each cluster listed.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLUSSDR or MQCHT_CLUSRCVR.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_5.

ClustersDefined (MQLONG)
This field specifies the number of clusters to which the channel belongs.

This field is the number of cluster names pointed to by *ClusterPtr*. It is zero or greater.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLUSSDR or MQCHT_CLUSRCVR.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_5.

CLWLChannelPriority (MQLONG)
This field specifies the cluster workload channel priority.

The workload manager choose algorithm selects a destination with the highest priority from the set of destinations selected based on rank. If there are two possible destination queue managers, this attribute can be used to make one queue manager failover onto the other queue manager. All the messages go to the queue manager with the highest priority until that ends, then the messages go to the queue manager with the next highest priority.

The value is in the range 0 through 9. The default is 0.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_8.

For further information, see Configuring a queue manager cluster.

CLWLChannelRank (MQLONG)
This field specifies the cluster workload channel rank.

The workload manager choose algorithm selects a destination with the highest rank. When the final destination is a queue manager on a different cluster, you can set the rank of intermediate gateway queue managers (at the intersection of neighboring clusters) so the choose algorithm correctly chooses a destination queue manager nearer the final destination.

The value is in the range 0 through 9. The default is 0.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_8.

For further information, see Configuring a queue manager cluster.

CLWLChannelWeight (MQLONG)
This field specifies the cluster workload channel weight.

Cluster workload channel weight.

The workload manager choose algorithm uses the "weight" attribute of the channel to the skew the destination choice so that more messages can be sent to a particular machine. For example, you can give a channel on a large UNIX server a larger "weight" than another channel on small desktop PC, and the choose algorithm chooses the UNIX server more frequently than the PC.

The value is in the range 1 through 99. The default is 50.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_8.

For further information, see Configuring a queue manager cluster.

ConnectionAffinity (MQLONG)
This field specifies whether client applications that connect multiple times using the same queue manager name, use the same client channel.

Use this attribute when multiple applicable channel definitions are available.

The value is one of the following:

MQCAFTY_PREFERRED
The first connection in a process reading a client channel definition table (CCDT) creates a list of applicable definitions based on the weighting with any applicable CLNTWGHT(0) definitions first and in alphabetical order. Each connection in the process attempts to connect using the first definition in the list. If a connection is unsuccessful the next definition is used. Unsuccessful definitions with CLNTWGHT values other than 0 are moved to the end of the list. CLNTWGHT(0) definitions remain at the start of the list and are selected first for each connection.

Each client process with the same host name always creates the same list.

For client applications written in C, C++, or the .NET programming framework (including fully managed .NET) the list is updated if the CCDT has been modified since the list was created.

This value is the default value.

MQCAFTY_NONE
The first connection in a process reading a CCDT creates a list of applicable definitions. All connections in a process select an applicable definition based on the weighting with any applicable CLNTWGHT(0) definitions selected first in alphabetical order.

For client applications written in C, C++, or the .NET programming framework (including fully managed .NET) the list is updated if the CCDT has been modified since the list was created.

This attribute is valid for the client-connection channel type only.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_9.

ConnectionName (MQCHAR264)
This field specifies the connection name for the channel.

For cluster-receiver channels (when specified) CONNAME relates to the local queue manager, and for other channels it relates to the target queue manager. The value you specify depends on the transmission protocol (*TransportType*) to be used:

- For MQXPT_LU62, it is the fully-qualified name of the partner Logical Unit.
- For MQXPT_NETBIOS, it is the NetBIOS name defined on the remote machine.
- For MQXPT_TCP, it is either the host name, the network address of the remote machine specified in IPv4 dotted decimal or IPv6 hexadecimal format, or the local machine for cluster-receiver channels.
- For MQXPT_SPX, it is an SPX-style address comprising a 4 byte network address, a 6 byte node address, and a 2 byte socket number.

When defining a channel, this field is not relevant for channels with a *ChannelType* of MQCHT_SVRCONN or MQCHT_RECEIVER. However, when the channel definition is passed to an exit, this field contains the address of the partner, whatever the channel type.

The length of this field is given by MQ_CONN_NAME_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_2.

DataConversion (MQLONG)
This field specifies whether the sending message channel agent attempts conversion of the application message data if the receiving message channel agent is unable to perform this conversion.

This field applies only to messages that are not segments of logical messages; the MCA never attempts to convert messages which are segments.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR. It is one of the following:

MQCDC_SENDER_CONVERSION
Conversion by sender.

MQCDC_NO_SENDER_CONVERSION
No conversion by sender.

DefReconnect (MQLONG)
The DefReconnect channel attribute sets the default reconnection attribute value for a client connection channel.

The default automatic client reconnection option. You can configure an IBM MQ MQI client to automatically reconnect a client application. The IBM MQ MQI client tries to reconnect to a queue manager after a connection failure. It tries to reconnect without the application client issuing an MQCONN or MQCONNX MQI call.

Reconnection is an MQCONNX option. By using the DefReconnect channel attribute you can add reconnection behavior to existing applications that use MQCONN. You can also change the reconnection behavior of applications that use MQCONNX.

You can also set the DefRecon value from the mqclient.ini file to set or modify reconnection behavior. The DefRecon value from the mqclient.ini file takes precedence over the DefReconnect channel attribute.

Syntax

DefReconnect (MQRCN_NO (default) |MQRCN_YES|MQRCN_Q_MGR|MQRCN_DISABLED)

Parameters

MQRCN_NO
MQRCN_NO is the default value.

Unless overridden by **MQCONNX**, the client is not reconnected automatically.

MQRCN_YES
Unless overridden by **MQCONNX**, the client reconnects automatically.

MQRCN_Q_MGR
Unless overridden by **MQCONNX**, the client reconnects automatically, but only to the same queue manager. The QMGR option has the same effect as MQCNO_RECONNECT_Q_MGR.

MQRCN_DISABLED
Reconnection is disabled, even if requested by the client program using the **MQCONNX** MQI call.

Automatic client reconnection is not supported by IBM MQ classes for Java.

Table 822. Automatic reconnection depends on the values set in the application and in the channel definition

DefReconnect	**Reconnection options set in the application**			
	MQCNO_RECONNECT	MQCNO_RECONNECT_Q_MGR	MQCNO_RECONNECT_AS_DEF	MQCNO_RECONNECT_DISABLED
MQRCN_NO	YES	QMGR	NO	NO
MQRCN_YES	YES	QMGR	YES	NO
MQRCN_Q_MGR	YES	QMGR	QMGR	NO
MQRCN_DISABLED	NO	NO	NO	NO

Related concepts
Automatic client reconnection
Channel and client reconnection
CHANNELS stanza of the client configuration file
Related reference
"Options (MQLONG)" on page 318
Options that control the action of MQCONNX.

Desc (MQCHAR64)
This field can be used for descriptive commentary.

The content of the field is of no significance to Message Channel Agents. However, it must contain only characters that can be displayed. It cannot contain any null characters; if necessary, it is padded to the right with blanks. In a DBCS installation, the field can contain DBCS characters (subject to a maximum field length of 64 bytes).

Note: If this field contains characters that are not in the character set of the queue manager (as defined by the **CodedCharSetId** queue manager attribute), those characters might be translated incorrectly if this field is sent to another queue manager.

The length of this field is given by MQ_CHANNEL_DESC_LENGTH.

DiscInterval (MQLONG)
This field specifies the maximum time in seconds for which the channel waits for a message to arrive on the transmission queue, before terminating the channel.

In other words, it specifies the disconnect interval.

The A value of zero causes the MCA to wait indefinitely.

For server-connection channels using the TCP protocol, the interval represents the client inactivity disconnect value, specified in seconds. If a server-connection has received no communication from its partner client for this duration, it terminates the connection. The server-connection inactivity interval only applies between IBM MQ API calls from a client, so no client is disconnected during a long-running MQGET with wait call.

This attribute is not applicable for server-connection channels using protocols other than TCP.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, MQCHT_CLUSRCVR, or MQCHT_SVRCONN.

ExitDataLength (MQLONG)
This field specifies length in bytes of each of the user data items in the lists of exit user data items addressed by the *MsgUserDataPtr*, *SendUserDataPtr*, and *ReceiveUserDataPtr* fields.

This length is not necessarily the same as MQ_EXIT_DATA_LENGTH.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

ExitNameLength (MQLONG)
This field specifies the length in bytes of each of the names in the lists of exit names addressed by the *MsgExitPtr*, *SendExitPtr*, and *ReceiveExitPtr* fields.

This length is not necessarily the same as MQ_EXIT_NAME_LENGTH.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

HdrCompList [2] (MQLONG)
This field specifies the list of header data compression techniques which are supported by the channel.

The list contains one or more of the following values:

MQCOMPRESS_NONE
No header data compression is performed.

MQCOMPRESS_SYSTEM
Header data compression is performed.

Unused values in the array are set to MQCOMPRESS_NOT_AVAILABLE.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_8.

HeartbeatInterval (MQLONG)
This field specifies the time in seconds between heartbeat flows.

The interpretation of this field depends on the channel type, as follows:

- For a channel type of MQCHT_SENDER, MQCHT_SERVER, MQCHT_RECEIVER MQCHT_REQUESTER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR, this field is the time in seconds between heartbeat flows passed from the sending MCA when there are no messages on the transmission queue. This gives the receiving MCA the opportunity to quiesce the channel. To be useful, *HeartbeatInterval* must be less than *DiscInterval*.

- For a channel type of MQCHT_CLNTCONN or MQCHT_SVRCONN with the MQCD Sharing Conversations field set to zero, this field is the time in seconds between heartbeat flows passed from the server MCA when that MCA has issued an MQGET call with the MQGMO_WAIT option on behalf of a client application. This allows the server MCA to handle situations where the client connection fails during an MQGET with MQGMO_WAIT.
- For a channel type of MQCHT_CLNTCONN or MQCHT_SVRCONN with the MQCD Sharing Conversations field set to a non-zero value, this field is the time in seconds between heartbeat flow when there are no data flows sent or received. This allows the channel to be quiesced efficiently.

The value is in the range 0 through 999 999. The value that is used is the larger of the values specified at the sending side and receiving side unless a value of 0 is specified at either side, in which case no heartbeat exchange occurs.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

KeepAliveInterval (MQLONG)
This field specifies the value passed to the communications stack for keepalive timing for the channel.

The value is applicable for the TCP/IP and SPX communications protocols, though not all implementations support this parameter.

The value is in the range 0 through 99 999; the units are seconds. A value of zero indicates that channel keepalive is not enabled, although keepalive might still occur if TCP/IP keepalive (rather than channel keepalive) is enabled. The following special value is also valid:

MQKAI_AUTO
Automatic.

This value indicates that the keepalive interval is calculated from the negotiated heartbeat interval, as follows:

- If the negotiated heartbeat interval is greater than zero, the keepalive interval that is used is the heartbeat interval plus 60 seconds.
- If the negotiated heartbeat interval is zero, the keepalive interval that is used is zero.

- On z/OS, TCP/IP keepalive occurs when TCPKEEP(YES) is specified on the queue manager object.
- In other environments, TCP/IP keepalive occurs when the **KEEPALIVE=YES** parameter is specified in the TCP stanza in the distributed queuing configuration file.

This field is relevant only for channels that have a *TransportType* of MQXPT_TCP or MQXPT_SPX.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_7.

LocalAddress (MQCHAR48)
This field specifies the local TCP/IP address defined for the channel for outbound communications.

This field is blank if no specific address is defined for outbound communications. The address can optionally include a port number or range of port numbers. The format of this address is:

```
[ip-addr][(low-port[,high-port])]
```

where square brackets ([ ]) denote optional information, `ip-addr` is specified in IPv4 dotted decimal, IPv6 hexadecimal, or alphanumeric form, and `low-port` and `high-port` are port numbers enclosed in parentheses. All are optional.

A specific IP address, port, or port range for outbound communications is useful in recovery scenarios where a channel is restarted on a different TCP/IP stack.

LocalAddress is similar in form to *ConnectionName*, but must not be confused with it. *LocalAddress* specifies the characteristics of the local communications, whereas *ConnectionName* specifies how to reach a remote queue manager.

V 9.1.0.8 From IBM MQ 9.1.0 Fix Pack 8, the Java Message Queueing Interface (JMQI) has been updated to ensure that the local address field is set on an MQCD object after a channel instance has been created and is connected to a queue manager. This means that when a channel exit written in Java calls the method `MQCD.getLocalAddress()`, the method returns the local address that the channel instance is using. Before IBM MQ 9.1.0 Fix Pack 8, the channel security exit was unable to access the local address being used by the channel instance and the method `MQCD.getLocalAddress()` returned null.

This field is relevant only for channels with a *TransportType* of MQXPT_TCP, and a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_REQUESTER, MQCHT_CLNTCONN, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

The length of this field is given by MQ_LOCAL_ADDRESS_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_7.

LongMCAUserIdLength (MQLONG)
This field specifies the length in bytes of the full MCA user identifier pointed to by *LongMCAUserIdPtr*.

This field is not relevant for channels with a *ChannelType* of MQCHT_CLNTCONN.

This is an input/output field to the exit. The field is not present if *Version* is less than MQCD_VERSION_6.

LongMCAUserIdPtr (MQPTR)
This field specifies the address of the long MCA user identifier.

If *LongMCAUserIdLength* is greater than zero, this field is the address of the full MCA user identifier. The length of the full identifier is given by *LongMCAUserIdLength*. The first 12 bytes of the MCA user identifier are also contained in the field *MCAUserIdentifier*.

See the description of the *MCAUserIdentifier* field for details of the MCA user identifier.

This field is not relevant for channels with a *ChannelType* of MQCHT_SDR, MQCHT_SVR, MQCHT_CLNTCONN, or MQCHT_CLUSSDR.

This is an input/output field to the exit. The field is not present if *Version* is less than MQCD_VERSION_6.

LongRemoteUserIdLength (MQLONG)
This field specifies the length in bytes of the full remote user identifier pointed to by *LongRemoteUserIdPtr*.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLNTCONN or MQCHT_SVRCONN.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_6.

LongRemoteUserIdPtr (MQPTR)
This field specifies the address of the long remote user identifier.

If *LongRemoteUserIdLength* is greater than zero, this flag is the address of the full remote user identifier. The length of the full identifier is given by *LongRemoteUserIdLength*. The first 12 bytes of the remote user identifier are also contained in the field *RemoteUserIdentifier*.

See the description of the *RemoteUserIdentifier* field for details of the remote user identifier.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLNTCONN or MQCHT_SVRCONN.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_6.

LongRetryCount (MQLONG)
This field specifies the count used after the count specified by the *ShortRetryCount* has been exhausted.

It specifies the maximum number of further attempts that are made to connect to the remote machine, at intervals specified by *LongRetryInterval*, before logging an error to the operator.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

LongRetryInterval (MQLONG)
This field specifies the maximum number of seconds to wait before reattempting connection to the remote machine.

The interval between retries can be extended if the channel has to wait to become active.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

MaxInstances (MQLONG)
This field specifies the maximum number of simultaneous instances of an individual server-connection channel that can be started.

This field is used only on server-connection channels.

The field can have a value in the range 0 - 999 999 999. A value of zero prevents all client access.

The default value of this field is 999 999 999.

If the value of this field is reduced to a number that is less than the number of instances of the server-connection channel that are currently running, then those running instances are not affected. However, new instances cannot start until sufficient existing instances have ceased to run so that the number of currently running instances is less than the value of the field.

MaxInstancesPerClient (MQLONG)
This field specifies the maximum number of simultaneous instances of an individual server-connection channel that can be started from a single client.

In this context, connections that originate from the same remote network address are regarded as coming from the same client.

This field is used only on server-connection channels.

The field can have a value in the range 0 - 999 999 999. A value of zero prevents all client access.

The default value of this field is 999 999 999.

If the value of this field is reduced to a number that is less than the number of instances of the server-connection channel that are currently running from individual clients, then those running instances are not affected. However, new instances from any of those clients cannot start until sufficient existing instances have ceased to run such that the number of currently running instances, originating from the client attempting to start a new one, is less than the value of the field.

MaxMsgLength (MQLONG)
This field specifies the maximum message length that can be transmitted on the channel.

This is compared with the value for the remote channel and the actual maximum is the lower of the two values.

MCAName (MQCHAR20)
This field is a reserved field.

The value of this field is blank.

The length of this field is given by MQ_MCA_NAME_LENGTH.

MCASecurityId (MQBYTE40)
This field specifies the security identifier for the MCA.

This field is not relevant for channels with a *ChannelType* of MQCHT_CLNTCONN.

The following special value indicates that there is no security identifier:

MQSID_NONE
No security identifier specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQSID_NONE_ARRAY is also defined; this constant has the same value as MQSID_NONE, but is an array of characters instead of a string.

This is an input/output field to the exit. The length of this field is given by MQ_SECURITY_ID_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_6.

MCAType (MQLONG)
This field specifies the type of message channel agent program.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_REQUESTER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

The value is one of the following:

MQMCAT_PROCESS
Process.

The message channel agent runs as a separate process.

MQMCAT_THREAD
Thread (IBM i, UNIX, and Windows).

The message channel agent runs as a separate thread.

This field is not present when *Version* is less than MQCD_VERSION_2.

MCAUserIdentifier (MQCHAR12)
This field specifies the user identifier for the message channel agent (MCA).

This field uses the first 12 bytes of the MCA user identifier, and can be set by a security agent.

There are two fields that contain the MCA user identifier:

- *MCAUserIdentifier* contains the first 12 bytes of the MCA user identifier, and is padded with blanks if the identifier is shorter than 12 bytes. *MCAUserIdentifier* can be blank.
- *LongMCAUserIdPtr* points to the full MCA user identifier, which can be longer than 12 bytes. Its length is given by *LongMCAUserIdLength*. The full identifier contains no trailing blanks, and is not null-terminated. If the identifier is blank, *LongMCAUserIdLength* is zero, and the value of *LongMCAUserIdPtr* is undefined.

Note: *LongMCAUserIdPtr* is not present if *Version* is less than MQCD_VERSION_6.

If the MCA user identifier is nonblank, it specifies the user identifier to be used by the message channel agent for authorization to access IBM MQ resources. For channel types MQCHT_REQUESTER, MQCHT_RECEIVER, and MQCHT_CLUSRCVR, if PutAuthority is MQPA_DEFAULT this is the user identifier used for authorization checks for the put operation to destination queues.

If the MCA user identifier is blank, the message channel agent uses its default user identifier.

The MCA user identifier can be set by a security exit to indicate the user identifier that the message channel agent must use. The exit can change either *MCAUserIdentifier*, or the string pointed at by *LongMCAUserIdPtr*. If both are changed but differ from each other, the MCA uses *LongMCAUserIdPtr* in preference to *MCAUserIdentifier*. If the exit changes the length of the string addressed by *LongMCAUserIdPtr*, *LongMCAUserIdLength* must be set correspondingly. If the exit increases the length of the identifier, the exit must allocate storage of the required length, set that storage to the required identifier, and place the address of that storage in *LongMCAUserIdPtr*. The exit is responsible for freeing that storage when the exit is later invoked with the MQXR_TERM reason.

For channels with a *ChannelType* of MQCHT_SVRCONN, if *MCAUserIdentifier* in the channel definition is blank, any user identifier transferred from the client is copied into it. This user identifier (after

any modification by the security exit at the server) is the one which the client application is assumed to be running under.

The MCA user identifier is not relevant for channels with a *ChannelType* of MQCHT_SDR, MQCHT_SVR, MQCHT_CLNTCONN, MQCHT_CLUSSDR.

This is an input/output field to the exit. The length of this field is given by MQ_USER_ID_LENGTH. This field is not present when *Version* is less than MQCD_VERSION_2.

ModeName (MQCHAR8)
This field specifies the LU 6.2 mode name.

This field is relevant only if the transmission protocol (*TransportType*) is MQXPT_LU62, and the *ChannelType* is not MQCHT_SVRCONN or MQCHT_RECEIVER.

This field is always blank. The information is contained in the communications Side Object instead.

The length of this field is given by MQ_MODE_NAME_LENGTH.

MsgCompList [16] (MQLONG)
This field specifies the list of message data compression techniques which are supported by the channel.

The list contains one or more of the following values:

MQCOMPRESS_NONE
No message data compression is performed.

MQCOMPRESS_RLE
Message data compression is performed using run-length encoding.

MQCOMPRESS_ZLIBFAST
Message data compression is performed using the zlib compression technique. A fast compression time is preferred.

MQCOMPRESS_ZLIBHIGH
Message data compression is performed using the zlib compression technique. A high level of compression is preferred.

Unused values in the array are set to MQCOMPRESS_NOT_AVAILABLE.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_8.

MsgExit (MQCHARn)
This field specifies the channel message exit name.

If this name is nonblank, the exit is called at the following times:

- Immediately after a message has been retrieved from the transmission queue (sender or server), or immediately before a message is put to a destination queue (receiver or requester).

  The exit is given the entire application message and transmission queue header for modification.
- At initialization and termination of the channel.

This field is not relevant for channels with a *ChannelType* of MQCHT_SVRCONN or MQCHT_CLNTCONN; a message exit is never invoked for such channels.

See "MQCD - Channel definition" on page 1464 for a description of the content of this field in various environments.

The length of this field is given by MQ_EXIT_NAME_LENGTH.

Note: The value of this constant is environment-specific.

MsgExitPtr (MQPTR)
This field specifies the address of the first *MsgExit* field.

If *MsgExitsDefined* is greater than zero, this address is the address of the list of names of each channel message exit in the chain.

Each name is in a field of length *ExitNameLength*, padded to the right with blanks. There are *MsgExitsDefined* fields adjoining one another - one for each exit.

Any changes made to these names by an exit are preserved, although the message channel exit takes no explicit action - it does not change which exits are invoked.

If *MsgExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

MsgExitsDefined (MQLONG)
This field specifies the number of channel message exits defined in the chain.

It is greater than or equal to zero.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

MsgRetryCount (MQLONG)
This field specifies the number of times MCA tries to put the message, after the first attempt has failed.

This field indicates the number of times that the MCA tries the open or put operation, if the first MQOPEN or MQPUT fails with completion code MQCC_FAILED. The effect of this attribute depends on whether *MsgRetryExit* is blank or nonblank:

- If *MsgRetryExit* is blank, the **MsgRetryCount** attribute controls whether the MCA attempts retries. If the attribute value is zero, no retries are attempted. If the attribute value is greater than zero, the retries are attempted at intervals given by the **MsgRetryInterval** attribute.

  Retries are attempted only for the following reason codes:

  - MQRC_PAGESET_FULL
  - MQRC_PUT_INHIBITED
  - MQRC_Q_FULL

  For other reason codes, the MCA proceeds immediately to its normal failure processing, without retrying the failing message.
- If *MsgRetryExit* is nonblank, the **MsgRetryCount** attribute does not affect the MCA; instead it is the message retry exit that determines how many times the retry is attempted, and at what intervals; the exit is invoked even if the **MsgRetryCount** attribute is zero.

  The **MsgRetryCount** attribute is made available to the exit in the MQCD structure, but the exit it not required to honor it - retries continue indefinitely until the exit returns MQXCC_SUPPRESS_FUNCTION in the *ExitResponse* field of MQCXP.

This field is relevant only for channels with a *ChannelType* of MQCHT_REQUESTER, MQCHT_RECEIVER, or MQCHT_CLUSRCVR.

This field is not present when *Version* is less than MQCD_VERSION_3.

MsgRetryExit (MQCHARn)
This field specifies the channel message retry exit name.

The message retry exit is an exit that is invoked by the MCA when the MCA receives a completion code of MQCC_FAILED from an MQOPEN or MQPUT call. The purpose of the exit is to specify a time interval for which the MCA waits before trying the MQOPEN or MQPUT operation again. Alternatively, the exit can be set to not try the operation again.

The exit is invoked for all reason codes that have a completion code of MQCC_FAILED - the settings of the exit determine which reason codes it wants the MCA to try again, for how many attempts, and at what time intervals.

When the operation is not to be attempted any more, the MCA performs its normal failure processing; this processing includes generating an exception report message (if specified by the sender), and

either placing the original message on the dead-letter queue or discarding the message (according to whether the sender specified MQRO_DEAD_LETTER_Q or MQRO_DISCARD_MSG). Failures involving the dead-letter queue (for example, dead-letter queue full) do not cause the message-retry exit to be invoked.

If the exit name is nonblank, the exit is called at the following times:

- Immediately before performing the wait before trying to deliver a message again
- At initialization and termination of the channel

See "MQCD - Channel definition" on page 1464 for a description of the content of this field in various environments.

This field is relevant only for channels with a *ChannelType* of MQCHT_REQUESTER, MQCHT_RECEIVER, or MQCHT_CLUSRCVR.

The length of this field is given by MQ_EXIT_NAME_LENGTH.

Note: The value of this constant is environment-specific.

This field is not present when *Version* is less than MQCD_VERSION_3.

MsgRetryInterval (MQLONG)
This field specifies the minimum interval in milliseconds after which the open or put operation is retried.

The effect of this attribute depends on whether *MsgRetryExit* is blank or nonblank:

- If *MsgRetryExit* is blank, the **MsgRetryInterval** attribute specifies the minimum period that the MCA waits before retrying a message, if the first MQOPEN or MQPUT fails with completion code MQCC_FAILED. A value of zero means that the retry will be performed as soon as possible after the previous attempt. Retries are performed only if *MsgRetryCount* is greater than zero.

  This attribute is also used as the wait time if the message-retry exit returns an invalid value in the *MsgRetryInterval* field in MQCXP.
- If *MsgRetryExit* is not blank, the **MsgRetryInterval** attribute does not affect the MCA; instead it is the message-retry exit which determines how long the MCA waits. The **MsgRetryInterval** attribute is made available to the exit in the MQCD structure, but the exit it not required to honor it.

The value is in the range 0 through 999 999 999.

This field is relevant only for channels with a *ChannelType* of MQCHT_REQUESTER, MQCHT_RECEIVER, or MQCHT_CLUSRCVR.

This field is not present when *Version* is less than MQCD_VERSION_3.

The following fields in this structure are not present if *Version* is less than MQCD_VERSION_4.

MsgRetryUserData (MQCHAR32)
This field specifies the channel message retry exit user data.

This data is passed to the channel message-retry exit in the *ExitData* field of the **ChannelExitParms** parameter (see MQ_CHANNEL_EXIT).

This field initially contains the data that was set in the channel definition. However, during the lifetime of this MCA instance, any changes made to the contents of this field by an exit of any type are preserved by the MCA, and made visible to subsequent invocations of exits (regardless of type) for this MCA instance. Such changes do not affect the channel definition used by other MCA instances. Any characters (including binary data) can be used.

This field is relevant only for channels with a *ChannelType* of MQCHT_REQUESTER, MQCHT_RECEIVER, or MQCHT_CLUSRCVR.

The length of this field is given by MQ_EXIT_DATA_LENGTH. This field is not present when *Version* is less than MQCD_VERSION_3.

This field is not relevant in IBM MQ for IBM i.

MsgUserData (MQCHAR32)
This field specifies channel message exit user data.

This data is passed to the channel message exit in the *ExitData* field of the **ChannelExitParms** parameter (see MQ_CHANNEL_EXIT).

This field initially contains the data that was set in the channel definition. However, during the lifetime of this MCA instance, any changes made to the contents of this field by an exit of any type are preserved by the MCA, and made visible to subsequent invocations of exits (regardless of type) for this MCA instance. Such changes do not affect the channel definition used by other MCA instances. Any characters (including binary data) can be used.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

This field is not relevant in IBM MQ for IBM i.

MsgUserDataPtr (MQPTR)
This field specifies the address of the first *MsgUserData* field.

If *MsgExitsDefined* is greater than zero, this address is the address of the list of user data items for each channel message exit in the chain.

Each user data item is in a field of length *ExitDataLength*, padded to the right with blanks. There are *MsgExitsDefined* fields adjoining one another - one for each exit. If the number of user data items defined is less than the number of exit names, undefined user data items are set to blanks. Conversely, if the number of user data items defined is greater than the number of exit names, the excess user data items are ignored and not presented to the exit.

Any changes made to these values by an exit are preserved. This allows one exit to pass information to another exit. No validation is carried out on any changes so, for example, binary data can be written to these fields if required.

If *MsgExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

NetworkPriority (MQLONG)
This field specifies the priority of the network connection for the channel.

When multiple paths to a particular destination are available, the path with the highest priority is chosen. The value is in the range 0 through 9; 0 is the lowest priority.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLUSSDR or MQCHT_CLUSRCVR.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_5.

The following fields in this structure are not present if *Version* is less than MQCD_VERSION_6.

NonPersistentMsgSpeed (MQLONG)
This field specifies the speed at which nonpersistent messages travel through the channel.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_RECEIVER, MQCHT_REQUESTER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

The value is one of the following:

MQNPMS_NORMAL
Normal speed.

If a channel is defined to be MQNPMS_NORMAL, nonpersistent messages travel through the channel at normal speed. This has the advantage that these messages are not lost if there is a channel failure. Also, persistent and nonpersistent messages on the same transmission queue maintain their order relative to each other.

MQNPMS_FAST
Fast speed.

If a channel is defined to be MQNPMS_FAST, nonpersistent messages travel through the channel at fast speed. This improves the throughput of the channel, but means that nonpersistent messages are lost if there is a channel failure. Also, it is possible for nonpersistent messages to jump ahead of persistent messages waiting on the same transmission queue, that is, the order of nonpersistent messages is not maintained relative to persistent messages. However the order of nonpersistent messages relative to each other is maintained. Similarly, the order of persistent messages relative to each other is maintained.

Password (MQCHAR12)
This field specifies the password used by the message channel agent when attempting to initiate a secure SNA session with a remote message channel agent.

This field can be nonblank only on UNIX, and Windows, and is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_REQUESTER, or MQCHT_CLNTCONN. On z/OS, this field is not relevant.

The length of this field is given by MQ_PASSWORD_LENGTH. However, only the first 10 characters are used.

This field is not present if *Version* is less than MQCD_VERSION_2.

PropertyControl (MQLONG)
This field specifies what happens to properties of messages when the message is about to be sent to a V6 or prior queue manager (a queue manager that does not understand the concept of a property descriptor).

The value can be any of the following values:

MQPROP_COMPATIBILITY
If the message contains a property with a prefix of **mcd.**, **jms.**, **usr.**, or **mqext.**, all message properties are delivered to the application in an MQRFH2 header. Otherwise all properties of the message, except those properties contained in the message descriptor (or extension), are discarded and are no longer accessible to the application.

This value is the default value; it allows applications, which expect JMS-related properties to be in an MQRFH2 header in the message data, to continue to work unmodified.

MQPROP_NONE
All properties of the message, except those properties in the message descriptor (or extension), are removed from the message before the message is sent to the remote queue manager.

MQPROP_ALL
All properties of the message are included with the message when it is sent to the remote queue manager. The properties, except those properties in the message descriptor (or extension), are placed in one or more MQRFH2 headers in the message data.

This attribute is applicable to Sender, Server, Cluster Sender, and Cluster Receiver channels.

"MQIA_* (Integer Attribute Selectors)" on page 128
"MQPROP_* (Queue and Channel Property Control Values and Maximum Properties Length)" on page 167

PutAuthority (MQLONG)
This field specifies whether the user identifier in the context information associated with a message is used to establish authority to put the message to the destination queue.

This field is relevant only for channels with a *ChannelType* of MQCHT_REQUESTER, MQCHT_RECEIVER, or MQCHT_CLUSRCVR. It is one of the following:

MQPA_DEFAULT
Default user identifier is used.

MQPA_CONTEXT
Context user identifier is used.

MQPA_ALTERNATE_OR_MCA
The user ID from the UserIdentifier field of the message descriptor is used. Any user ID received from the network is not used. This value is supported only on z/OS.

MQPA_ONLY_MCA
The default user ID is used. Any user ID received from the network is not used. This value is supported only on z/OS.

QMgrName (MQCHAR48)
This field specifies the name of the queue manager that an exit can connect to.

For channels with a *ChannelType* other than MQCHT_CLNTCONN, this field is the name of the queue manager that an exit can connect to, which on UNIX, Linux, and Windows, is always nonblank.

The length of this field is given by MQ_Q_MGR_NAME_LENGTH.

ReceiveExit (MQCHARn)
This field specifies the channel receive exit name.

If this name is nonblank, the exit is called at the following times:

- Immediately before the received network data is processed.

  The exit is given the complete transmission buffer as received. The contents of the buffer can be modified as required.
- At initialization and termination of the channel.

See “MQCD - Channel definition” on page 1464 for a description of the content of this field in various environments.

The length of this field is given by MQ_EXIT_NAME_LENGTH.

Note: The value of this constant is environment-specific.

ReceiveExitPtr (MQPTR)
This field specifies the address of the first *ReceiveExit* field.

If *ReceiveExitsDefined* is greater than zero, this address is the address of the list of names of each channel receive exit in the chain.

Each name is in a field of length *ExitNameLength*, padded to the right with blanks. There are *ReceiveExitsDefined* fields adjoining one another - one for each exit.

Any changes made to these names by an exit are preserved, although the message channel exit takes no explicit action - it does not change which exits are invoked.

If *ReceiveExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

ReceiveExitsDefined (MQLONG)
This field specifies the number of channel receive exits defined in the chain.

It is greater than or equal to zero.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

ReceiveUserData (MQCHAR32)
This channel specifies channel receive exit user data.

This data is passed to the channel receive exit in the *ExitData* field of the **ChannelExitParms** parameter (see MQ_CHANNEL_EXIT).

This field initially contains the data that was set in the channel definition. However, during the lifetime of this MCA instance, any changes made to the contents of this field by an exit of any type are preserved by the MCA, and made visible to subsequent invocations of exits (regardless of type) for this MCA instance. This applies to exits on different conversations. Such changes do not affect the channel definition used by other MCA instances. Any characters (including binary data) can be used.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

This field is not relevant in IBM MQ for IBM i.

The following fields in this structure are not present if *Version* is less than MQCD_VERSION_2.

ReceiveUserDataPtr (MQPTR)
This field specifies the address of the first *ReceiveUserData* field.

If *ReceiveExitsDefined* is greater than zero, this address is the address of the list of user data item for each channel receive exit in the chain.

Each user data item is in a field of length *ExitDataLength*, padded to the right with blanks. There are *ReceiveExitsDefined* fields adjoining one another - one for each exit. If the number of user data items defined is less than the number of exit names, undefined user data items are set to blanks. Conversely, if the number of user data items defined is greater than the number of exit names, the excess user data items are ignored and not presented to the exit.

Any changes made to these values by an exit are preserved. This allows one exit to pass information to another exit. No validation is carried out on any changes so, for example, binary data can be written to these fields if required.

If *ReceiveExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

The following fields in this structure are not present if *Version* is less than MQCD_VERSION_5.

RemotePassword (MQCHAR12)
This field specifies the password from a partner.

This field contains valid information only if *ChannelType* is MQCHT_CLNTCONN or MQCHT_SVRCONN.

- For a security exit at an MQCHT_CLNTCONN channel, this password is a password which has been obtained from the environment. The exit can choose to send it to the security exit at the server.
- For a security exit at an MQCHT_SVRCONN channel, this field might contain a password which has been obtained from the environment at the client, if there is no client security exit. The exit can use this password to validate the user identifier in *RemoteUserIdentifier*.

  If there is a security exit at the client, then this information can be obtained in a security flow from the client.

The length of this field is given by MQ_PASSWORD_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_2.

RemoteSecurityId (MQBYTE40)
This field specifies the security identifier for the remote user.

This field is relevant only for channels with a *ChannelType* of MQCHT_CLNTCONN or MQCHT_SVRCONN.

The following special value indicates that there is no security identifier:

MQSID_NONE
No security identifier specified.

The value is binary zero for the length of the field.

For the C programming language, the constant MQSID_NONE_ARRAY is also defined; this constant has the same value as MQSID_NONE, but is an array of characters instead of a string.

This is an input field to the exit. The length of this field is given by MQ_SECURITY_ID_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_6.

The following fields in this structure are not present if *Version* is less than MQCD_VERSION_7.

RemoteUserIdentifier (MQCHAR12)
This field specifies the first 12 bytes of a user identifier from a partner.

There are two fields that contain the remote user identifier:

- *RemoteUserIdentifier* contains the first 12 bytes of the remote user identifier, and is padded with blanks if the identifier is shorter than 12 bytes. *RemoteUserIdentifier* can be blank.
- *LongRemoteUserIdPtr* points to the full remote user identifier, which can be longer than 12 bytes. Its length is given by *LongRemoteUserIdLength*. The full identifier contains no trailing blanks, and is not null-terminated. If the identifier is blank, *LongRemoteUserIdLength* is zero, and the value of *LongRemoteUserIdPtr* is undefined.

  LongRemoteUserIdPtr is not present if *Version* is less than MQCD_VERSION_6.

The remote user identifier is relevant only for channels with a *ChannelType* of MQCHT_CLNTCONN or MQCHT_SVRCONN.

- For a security exit on an MQCHT_CLNTCONN channel, this value is a user identifier that has been obtained from the environment. The exit can choose to send it to the security exit at the server.
- For a security exit on an MQCHT_SVRCONN channel, this field might contain a user identifier which has been obtained from the environment at the client, if there is no client security exit. The exit might validate this user ID (possibly with the password in *RemotePassword*) and update the value in *MCAUserIdentifier*.

  If there is a security exit at the client, then this information can be obtained in a security flow from the client.

The length of this field is given by MQ_USER_ID_LENGTH. This field is not present if *Version* is less than MQCD_VERSION_2.

SecurityExit (MQCHARn)
This field specifies the channel security exit name.

If this name is nonblank, the exit is called at the following times:

- Immediately after establishing a channel.

  Before any messages are transferred, the exit is given the opportunity to instigate security flows to validate connection authorization.
- Upon receipt of a response to a security message flow.

  Any security message flows received from the remote processor on the remote machine are given to the exit.
- At initialization and termination of the channel.

See “MQCD - Channel definition” on page 1464 for a description of the content of this field in various environments.

The length of this field is given by MQ_EXIT_NAME_LENGTH.

Note: The value of this constant is environment-specific.

SecurityUserData (MQCHAR32)
This channel specifies the channel security exit user data.

This data is passed to the channel security exit in the *ExitData* field of the **ChannelExitParms** parameter (see MQ_CHANNEL_EXIT).

This field initially contains the data that was set in the channel definition. However, during the lifetime of this MCA instance, any changes made to the contents of this field by an exit of any type are preserved by the MCA, and made visible to subsequent invocations of exits (regardless of type) for this MCA instance. This applies to exits on different conversations. Such changes do not effect on the channel definition used by other MCA instances. Any characters (including binary data) can be used.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

This field is not relevant in IBM MQ for IBM i.

SendExit (MQCHARn)
This field specifies the channel send exit name.

If this name is nonblank, the exit is called at the following times:

- Immediately before data is sent out on the network.

  The exit is given the complete transmission buffer before it is transmitted. The contents of the buffer can be modified as required.

- At initialization and termination of the channel.

See "MQCD - Channel definition" on page 1464 for a description of the content of this field in various environments.

The length of this field is given by MQ_EXIT_NAME_LENGTH.

Note: The value of this constant is environment-specific.

SendExitPtr (MQPTR)
This field specifies the address of the first *SendExit* field.

If *SendExitsDefined* is greater than zero, this address is the address of the list of names of each channel send exit in the chain.

Each name is in a field of length *ExitNameLength*, padded to the right with blanks. There are *SendExitsDefined* fields adjoining one another - one for each exit.

Any changes made to these names by an exit are preserved, although the message send exit takes no explicit action - it does not change which exits are invoked.

If *SendExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

SendExitsDefined (MQLONG)
This field specifies the number of channel send exits defined in the chain.

It is greater than or equal to zero.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

SendUserData (MQCHAR32)
This field specifies the channel send exit user data.

This data is passed to the channel send exit in the *ExitData* field of the **ChannelExitParms** parameter (see MQ_CHANNEL_EXIT).

This field initially contains the data that was set in the channel definition. However, during the lifetime of this MCA instance, any changes made to the contents of this field by an exit of any type are preserved by the MCA, and made visible to subsequent invocations of exits (regardless of type) for this MCA instance. This applies to exits on different conversations. Such changes do not affect the channel definition used by other MCA instances. Any characters (including binary data) can be used.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

This field is not relevant in IBM MQ for IBM i.

SendUserDataPtr (MQPTR)
This field specifies the address of the *SendUserData* field.

If *SendExitsDefined* is greater than zero, this address is the address of the list of user data items for each channel message exit in the chain.

Each user data item is in a field of length *ExitDataLength*, padded to the right with blanks. There are *MsgExitsDefined* fields adjoining one another - one for each exit. If the number of user data items defined is less than the number of exit names, undefined user data items are set to blanks. Conversely, if the number of user data items defined is greater than the number of exit names, the excess user data items are ignored and not presented to the exit.

Any changes made to these values by an exit are preserved. This allows one exit to pass information to another exit. No validation is carried out on any changes so, for example, binary data can be written to these fields if required.

If *SendExitsDefined* is zero, this field is the null pointer.

On platforms where the programming language does not support the pointer data type, this field is declared as a byte string of the appropriate length.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_4.

SeqNumberWrap (MQLONG)
This field specifies the highest allowable message sequence number.

When this value is reached, sequence numbers wrap to start again at 1.

This value is non-negotiable and must match in both the local and remote channel definitions.

This field is not relevant for channels with a *ChannelType* of MQCHT_SVRCONN or MQCHT_CLNTCONN.

SharingConversations (MQLONG)
This field specifies the maximum number of conversations that can share a channel instance associated with this channel.

This field is used on client connection and server-connection channels.

A value of 0 means that the channel operates as it did in versions earlier than IBM WebSphere MQ 7.0 with respect to the following attributes:

- Conversation sharing
- Read ahead
- `STOP CHANNEL(`*channelname*`) MODE(QUIESCE)`
- Heartbeating
- Client asynchronous consumption

A value of 1 is the minimum value for IBM WebSphere MQ 7.0 behavior. Although only one conversation is allowed on the channel instance, read ahead, asynchronous consumption, and the IBM WebSphere MQ 7.0 behavior of `CLNTCONN-SVRCONN` heartbeating and quiescent channel stopping are available.

This is an input field to the exit. It is not present if *Version* is less than MQCD_VERSION_9.

The default value of this field is 10.

Note: *MaxInstances* and *MaxInstancesPerClient* limits applied to a channel restrict the number of channel instances, not the number of conversations that might be sharing those instances.

ShortConnectionName (MQCHAR20)
This field specifies the first 20 bytes of a connection name.

If the *Version* field is MQCD_VERSION_1, *ShortConnectionName* contains the full connection name.

If the *Version* field is MQCD_VERSION_2 or greater, *ShortConnectionName* contains the first 20 characters of the connection name. The full connection name is given by the *ConnectionName* field; *ShortConnectionName* and the first 20 characters of *ConnectionName* are identical.

See *ConnectionName* for details of the contents of this field.

Note: The name of this field was changed for MQCD_VERSION_2 and subsequent versions of MQCD; the field was previously called *ConnectionName*.

The length of this field is given by MQ_SHORT_CONN_NAME_LENGTH.

ShortRetryCount (MQLONG)
This field specifies the maximum number of attempts that are made to connect to a remote machine.

This field is the maximum number of attempts that are made to connect to the remote machine, at intervals specified by *ShortRetryInterval*, before the (normally longer) *LongRetryCount* and *LongRetryInterval* are used.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

ShortRetryInterval (MQLONG)
This field specifies the maximum number of seconds to wait before reattempting connection to the remote machine.

The interval between retries might be extended if the channel has to wait to become active.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_CLUSSDR, or MQCHT_CLUSRCVR.

z/OS V 9.1.3 *SPLProtection (MQLONG)*
This field specifies the value of the AMS security policy protection.

The value is one of the following:

MQSPL_PASSTHRU
Pass through, unchanged, any messages sent or received by the MCA for this channel.

This value is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_RECEIVER, or MQCHT_REQUESTER, and is the default value.

MQSPL_REMOVE
Remove any AMS protection from messages retrieved from the transmission queue by the MCA, and send the messages to the partner.

This value is relevant only for channels with a *ChannelType* of MQCHT_SENDER or MQCHT_SERVER.

MQSPL_ASPOLICY
Based on the policy defined for the target queue, apply AMS protection to inbound messages prior to putting them on to the target queue.

This value is relevant only for channels with a *ChannelType* of MQCHT_RECEIVER or MQCHT_REQUESTER.

This is an input field to the exit. This field is not present if *Version* is less than MQCD_VERSION_12.

SSLCipherSpec (MQCHAR32)
This field specifies the Cipher Spec that is in use when using TLS.

If SSLCipherSpec is blank, the channel is not using TLS. If it is not blank, this field contains a string specifying the CipherSpec in use.

This parameter is valid for all channel types. It is supported on the following platforms:

- AIX AIX
- IBM i IBM i

- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

It is valid only for channel types of a transport type (TRPTYPE) of TCP.

This is an input field to the exit. The length of this field is given by MQ_SSL_CIPHER_SPEC_LENGTH. The field is not present if *Version* is less than MQCD_VERSION_7.

SSLClientAuth (MQLONG)
This field specifies whether TLS client authentication is required.

This field is relevant only to SVRCONN channel definitions.

It is one of the following values:

MQSCA_REQUIRED
Client authentication required.

MQSCA_OPTIONAL
Client authentication optional.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_7.

SSLPeerNameLength (MQLONG)
This field specifies the length in bytes of the TLS peer name pointed to by *SSLPeerNamePtr*.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_7.

SSLPeerNamePtr (MQPTR)
This field specifies the address of the TLS peer name.

When a certificate is received during a successful TLS handshake, the Distinguished Name of the subject of the certificate is copied into the MQCD field accessed by SSLPeerNamePtr at the end of the channel which receives the certificate. It overwrites the SSLPeerName value for the channel if this value is present in the channel definition of the local user. If a security exit is specified at this end of the channel it receives the Distinguished Name from the peer certificate in the MQCD.

This is an input field to the exit. The field is not present if *Version* is less than MQCD_VERSION_7.

Note: Security exit applications constructed prior to the release of IBM WebSphere MQ 7.1 may require updating. For more information see Channel security exit programs.

StrucLength (MQLONG)
This field specifies the length in bytes of the MQCD structure.

The length does not include any of the strings addressed by pointer fields contained within the structure. The value is one of the following:

MQCD_LENGTH_4
Length of version-4 channel definition structure.

MQCD_LENGTH_5
Length of version-5 channel definition structure.

MQCD_LENGTH_6
Length of version-6 channel definition structure.

MQCD_LENGTH_7
Length of version-7 channel definition structure.

MQCD_LENGTH_8
Length of version-8 channel definition structure.

MQCD_LENGTH_9
Length of version-9 channel definition structure.

MQCD_LENGTH_10
Length of version-10 channel definition structure.

MQCD_LENGTH_11
Length of version-11 channel definition structure.

z/OS V 9.1.3 **MQCD_LENGTH_12**
Length of version-12 channel definition structure.

The following constant specifies the length of the current version:

MQCD_CURRENT_LENGTH
Length of current version of channel definition structure.

Note: These constants have values that are environment-specific.

The field is not present if *Version* is less than MQCD_VERSION_4.

TpName (MQCHAR64)
This field specifies the LU 6.2 transaction program name.

This field is relevant only if the transmission protocol (*TransportType*) is MQXPT_LU62, and the *ChannelType* is not MQCHT_SVRCONN or MQCHT_RECEIVER.

This field is always blank on platforms on which the information is contained in the communications Side Object instead.

The length of this field is given by MQ_TP_NAME_LENGTH.

TransportType (MQLONG)
This field specifies the transmission protocol to be used.

The value is not checked if the channel was initiated from the other end.

It is one of the following values:

MQXPT_LU62
LU 6.2 transport protocol.

MQXPT_TCP
TCP/IP transport protocol.

MQXPT_NETBIOS
NetBIOS transport protocol.

This value is supported in the following environments: Windows.

MQXPT_SPX
SPX transport protocol.

This value is supported in the following environments: Windows, plus IBM MQ clients connected to these systems.

UseDLQ (MQLONG)
This field specifies whether the dead-letter queue (or undelivered message queue) is used when messages cannot be delivered by channels.

It can contain one of the following values:

MQUSEDLQ_NO
Messages that cannot be delivered by a channel are treated as a failure. The channel either discards the message, or the channel ends, in accordance with the NPMSPEED setting.

MQUSEDLQ_YES
When the DEADQ queue manager attribute provides the name of a dead-letter queue, then it is used, else the behavior is as for NO. YES is the default value.

UserIdentifier (MQCHAR12)
This field specifies the user identifier used by the message channel agent when attempting to initiate a secure SNA session with a remote message channel agent.

This field can be nonblank only on UNIX and Windows, and is relevant only for channels with a *ChannelType* of MQCHT_SENDER, MQCHT_SERVER, MQCHT_REQUESTER, or MQCHT_CLNTCONN. On z/OS, this field is not relevant.

The length of this field is given by MQ_USER_ID_LENGTH. However, only the first 10 characters are used.

This field is not present when *Version* is less than MQCD_VERSION_2.

Version (MQLONG)
The Version field specifies the highest version number that you can set for the structure.

The value depends on the environment:

MQCD _VERSION_1
Version 1 channel definition structure.

MQCD _VERSION_2
Version 2 channel definition structure.

MQCD _VERSION_3
Version 3 channel definition structure.

MQCD _VERSION_4
Version 4 channel definition structure.

MQCD _VERSION_5
Version 5 channel definition structure.

MQCD _VERSION_6
Version 6 channel definition structure.

MQCD _VERSION_7
Version 7 channel definition structure.

MQCD _VERSION_8
Version 8 channel definition structure.

MQCD _VERSION_9
Version 9 channel definition structure.

Version 9 is the highest that you can set the field to on IBM WebSphere MQ 7.0 and IBM WebSphere MQ 7.0.1 on all platforms.

MQCD _VERSION_10
Version 10 channel definition structure.

Version 10 is the highest that you can set the field to on IBM WebSphere MQ 7.1 and IBM WebSphere MQ 7.5 on all platforms.

MQCD _VERSION_11
Version 11 channel definition structure.

Version 11 is the highest that you can set the field to on IBM MQ 8.0 on all platforms.

z/OS V 9.1.3 **MQCD _VERSION_12**
Version 12 channel definition structure.

Version 12 is the highest that you can set the field to on IBM MQ 9.1.3.

Fields that exist only in the more recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQCD_CURRENT_VERSION

The value set in MQCD_CURRENT_VERSION is the current version of the channel definition structure being used.

The value of MQCD_CURRENT_VERSION depends on the environment. It contains the highest value supported by the platform.

MQCD_CURRENT_VERSION is not used to initialize the default structures provided in the header, copy, and include files provided for different programming languages. The default initialization of Version depends on the platform and release.

For IBM WebSphere MQ 7.0 and later, the MQCD declarations in the header, copy, and include files are initialized to MQCD_VERSION_6. To use additional MQCD fields, applications must set the version number to MQCD_CURRENT_VERSION. If you are writing an application that is portable between several environments, you must choose a version that is supported in all the environments.

Tip: When a new version of the MQCD structure is introduced, the layout of the existing part is not changed. The exit must check the version number. It must be equal to or greater than the lowest version that contains the fields that the exit needs to use.

XmitQName (MQCHAR48)

This field specifies the name of the transmission queue from which messages are retrieved.

This field is relevant only for channels with a *ChannelType* of MQCHT_SENDER or MQCHT_SERVER.

The length of this field is given by MQ_Q_NAME_LENGTH.

C declaration

This declaration is the C declaration for the MQCD structure.

V 9.1.3

```
typedef struct tagMQCD MQCD;
typedef MQCD MQPOINTER PMQCD;
typedef PMQCD MQPOINTER PPMQCD;

 struct tagMQCD {
   MQCHAR    ChannelName[20];          /* Channel definition name */
   MQLONG    Version;                  /* Structure version number */
   MQLONG    ChannelType;              /* Channel type */
   MQLONG    TransportType;            /* Transport type */
   MQCHAR    Desc[64];                 /* Channel description */
   MQCHAR    QMgrName[48];             /* Queue manager name */
   MQCHAR    XmitQName[48];            /* Transmission queue name */
   MQCHAR    ShortConnectionName[20];  /* First 20 bytes of */
                                       /* connection name */
   MQCHAR    MCAName[20];              /* Reserved */
   MQCHAR    ModeName[8];              /* LU 6.2 Mode name */
   MQCHAR    TpName[64];               /* LU 6.2 transaction program */
                                       /* name */
   MQLONG    BatchSize;                /* Batch size */
   MQLONG    DiscInterval;             /* Disconnect interval */
   MQLONG    ShortRetryCount;          /* Short retry count */
   MQLONG    ShortRetryInterval;       /* Short retry wait interval */
   MQLONG    LongRetryCount;           /* Long retry count */
   MQLONG    LongRetryInterval;        /* Long retry wait interval */
   MQCHAR    SecurityExit[128];        /* Channel security exit name */
   MQCHAR    MsgExit[128];             /* Channel message exit name */
   MQCHAR    SendExit[128];            /* Channel send exit name */
   MQCHAR    ReceiveExit[128];         /* Channel receive exit name */
   MQLONG    SeqNumberWrap;            /* Highest allowable message */
                                       /* sequence number */
   MQLONG    MaxMsgLength;             /* Maximum message length */
   MQLONG    PutAuthority;             /* Put authority */
   MQLONG    DataConversion;           /* Data conversion */
   MQCHAR    SecurityUserData[32];     /* Channel security exit user */
                                       /* data */
   MQCHAR    MsgUserData[32];          /* Channel message exit user */
                                       /* data */
   MQCHAR    SendUserData[32];         /* Channel send exit user */
                                       /* data */
   MQCHAR    ReceiveUserData[32];      /* Channel receive exit user */
                                       /* data */
   /* Ver:1 */
```

```
MQCHAR    UserIdentifier[12];         /* User identifier */
MQCHAR    Password[12];               /* Password */
MQCHAR    MCAUserIdentifier[12];      /* First 12 bytes of MCA user */
                                      /* identifier */
MQLONG    MCAType;                    /* Message channel agent type */
MQCHAR    ConnectionName[264];        /* Connection name */
MQCHAR    RemoteUserIdentifier[12];   /* First 12 bytes of user */
                                      /* identifier from partner */
MQCHAR    RemotePassword[12];         /* Password from partner */
/* Ver:2 */
MQCHAR    MsgRetryExit[128];          /* Channel message retry exit */
                                      /* name */
MQCHAR    MsgRetryUserData[32];       /* Channel message retry exit */
                                      /* user data */
MQLONG    MsgRetryCount;              /* Number of times MCA will */
                                      /* try to put the message, */
                                      /* after first attempt has */
                                      /* failed */
MQLONG    MsgRetryInterval;           /* Minimum interval in */
                                      /* milliseconds after which */
                                      /* the open or put operation */
                                      /* will be retried */
/* Ver:3 */
MQLONG    HeartbeatInterval;          /* Time in seconds between */
                                      /* heartbeat flows */
MQLONG    BatchInterval;              /* Batch duration */
MQLONG    NonPersistentMsgSpeed;      /* Speed at which */
                                      /* nonpersistent messages are */
                                      /* sent */
MQLONG    StrucLength;                /* Length of MQCD structure */
MQLONG    ExitNameLength;             /* Length of exit name */
MQLONG    ExitDataLength;             /* Length of exit user data */
MQLONG    MsgExitsDefined;            /* Number of message exits */
                                      /* defined */
MQLONG    SendExitsDefined;           /* Number of send exits */
                                      /* defined */
MQLONG    ReceiveExitsDefined;        /* Number of receive exits */
                                      /* defined */
MQPTR     MsgExitPtr;                 /* Address of first MsgExit */
                                      /* field */
MQPTR     MsgUserDataPtr;             /* Address of first */
                                      /* MsgUserData field */
MQPTR     SendExitPtr;                /* Address of first SendExit */
                                      /* field */
MQPTR     SendUserDataPtr;            /* Address of first */
                                      /* SendUserData field */
MQPTR     ReceiveExitPtr;             /* Address of first */
                                      /* ReceiveExit field */
MQPTR     ReceiveUserDataPtr;         /* Address of first */
                                      /* ReceiveUserData field */
/* Ver:4 */
MQPTR     ClusterPtr;                 /* Address of a list of */
                                      /* cluster names */
MQLONG    ClustersDefined;            /* Number of clusters to */
                                      /* which the channel belongs */
MQLONG    NetworkPriority;            /* Network priority */
/* Ver:5 */
MQLONG    LongMCAUserIdLength;        /* Length of long MCA user */
                                      /* identifier */
MQLONG    LongRemoteUserIdLength;     /* Length of long remote user */
                                      /* identifier */
MQPTR     LongMCAUserIdPtr;           /* Address of long MCA user */
                                      /* identifier */
MQPTR     LongRemoteUserIdPtr;        /* Address of long remote */
                                      /* user identifier */
MQBYTE40  MCASecurityId;              /* MCA security identifier */
MQBYTE40  RemoteSecurityId;           /* Remote security identifier */
/* Ver:6 */
MQCHAR    SSLCipherSpec[32];          /* TLS CipherSpec */
MQPTR     SSLPeerNamePtr;             /* Address of TLS peer name */
MQLONG    SSLPeerNameLength;          /* Length of TLS peer name */
MQLONG    SSLClientAuth;              /* Whether TLS client */
                                      /* authentication is required */
MQLONG    KeepAliveInterval;          /* Keepalive interval */
MQCHAR    LocalAddress[48];           /* Local communications */
                                      /* address */
MQLONG    BatchHeartbeat;             /* Batch heartbeat interval */
/* Ver:7 */
MQLONG    HdrCompList[2];             /* Header data compression */
                                      /* list */
MQLONG    MsgCompList[16];            /* Message data compression */
                                      /* list */
```

```
    MQLONG    CLWLChannelRank;            /* Channel rank */
    MQLONG    CLWLChannelPriority;        /* Channel priority */
    MQLONG    CLWLChannelWeight;          /* Channel weight */
    MQLONG    ChannelMonitoring;          /* Channel monitoring */
    MQLONG    ChannelStatistics;          /* Channel statistics */
    /* Ver:8 */
    MQLONG    SharingConversations;       /* Limit on sharing */
                                          /* conversations */
    MQLONG    PropertyControl;            /* Message property control */
    MQLONG    MaxInstances;               /* Limit on SVRCONN channel */
                                          /* instances */
    MQLONG    MaxInstancesPerClient;      /* Limit on SVRCONN channel */
                                          /* instances per client */
    MQLONG    ClientChannelWeight;        /* Client channel weight */
    MQLONG    ConnectionAffinity;         /* Connection affinity */
    /* Ver:9 */
    MQLONG    BatchDataLimit;             /* Batch data limit */
    MQLONG    UseDLQ;                     /* Use Dead Letter Queue */
    MQLONG    DefReconnect;               /* Default client reconnect */
                                          /* option */
    /* Ver:10 */
    MQCHAR64  CertificateLabel;           /* Certificate label */
  /* Ver:11 */
    MQLONG    SPLProtection               /* AMS Security policy protection */
  /* Ver:12 */
 };
```

COBOL declaration

This declaration is the COBOL declaration for the MQCD structure.

V 9.1.3

```
** MQCD structure
       10  MQCD.
      ** Channel definition name
       15  MQCD-CHANNELNAME PIC X(20).
      ** Structure version number
       15  MQCD-VERSION PIC S9(9) BINARY.
      ** Channel type
       15  MQCD-CHANNELTYPE PIC S9(9) BINARY.
      ** Transport type
       15  MQCD-TRANSPORTTYPE PIC S9(9) BINARY.
      ** Channel description
       15  MQCD-DESC PIC X(64).
      ** Queue manager name
       15  MQCD-QMGRNAME PIC X(48).
      ** Transmission queue name
       15  MQCD-XMITQNAME PIC X(48).
      ** First 20 bytes of connection name
       15  MQCD-SHORTCONNECTIONNAME PIC X(20).
      ** Reserved
       15  MQCD-MCANAME PIC X(20).
      ** LU 6.2 Mode name
       15  MQCD-MODENAME PIC X(8).
      ** LU 6.2 transaction program name
       15  MQCD-TPNAME PIC X(64).
      ** Batch size
       15  MQCD-BATCHSIZE PIC S9(9) BINARY.
      ** Disconnect interval
       15  MQCD-DISCINTERVAL PIC S9(9) BINARY.
      ** Short retry count
       15  MQCD-SHORTRETRYCOUNT PIC S9(9) BINARY.
      ** Short retry wait interval
       15  MQCD-SHORTRETRYINTERVAL PIC S9(9) BINARY.
      ** Long retry count
       15  MQCD-LONGRETRYCOUNT PIC S9(9) BINARY.
      ** Long retry wait interval
       15  MQCD-LONGRETRYINTERVAL PIC S9(9) BINARY.
      ** Channel security exit name
       15  MQCD-SECURITYEXIT PIC X(20).
      ** Channel message exit name
       15  MQCD-MSGEXIT PIC X(20).
      ** Channel send exit name
       15  MQCD-SENDEXIT PIC X(20).
      ** Channel receive exit name
       15  MQCD-RECEIVEEXIT PIC X(20).
      ** Highest allowable message sequence number
       15  MQCD-SEQNUMBERWRAP PIC S9(9) BINARY.
      ** Maximum message length
```

```
     15  MQCD-MAXMSGLENGTH PIC S9(9) BINARY.
    ** Put authority
     15  MQCD-PUTAUTHORITY PIC S9(9) BINARY.
    ** Data conversion
     15  MQCD-DATACONVERSION PIC S9(9) BINARY.
    ** Channel security exit user data
     15  MQCD-SECURITYUSERDATA PIC X(32).
    ** Channel message exit user data
     15  MQCD-MSGUSERDATA PIC X(32).
    ** Channel send exit user data
     15  MQCD-SENDUSERDATA PIC X(32).
    ** Channel receive exit user data
     15  MQCD-RECEIVEUSERDATA PIC X(32).
    ** Ver:1 **
    ** User identifier
     15  MQCD-USERIDENTIFIER PIC X(12).
    ** Password
     15  MQCD-PASSWORD PIC X(12).
    ** First 12 bytes of MCA user identifier
     15  MQCD-MCAUSERIDENTIFIER PIC X(12).
    ** Message channel agent type
     15  MQCD-MCATYPE PIC S9(9) BINARY.
    ** Connection name
     15  MQCD-CONNECTIONNAME PIC X(264).
    ** First 12 bytes of user identifier from partner
     15  MQCD-REMOTEUSERIDENTIFIER PIC X(12).
    ** Password from partner
     15  MQCD-REMOTEPASSWORD PIC X(12).
    ** Ver:2 **
    ** Channel message retry exit name
     15  MQCD-MSGRETRYEXIT PIC X(20).
    ** Channel message retry exit user data
     15  MQCD-MSGRETRYUSERDATA PIC X(32).
    ** Number of times MCA will try to put the message, after first
    ** attempt has failed
     15  MQCD-MSGRETRYCOUNT PIC S9(9) BINARY.
    ** Minimum interval in milliseconds after which the open or put
    ** operation will be retried
     15  MQCD-MSGRETRYINTERVAL PIC S9(9) BINARY.
    ** Ver:3 **
    ** Time in seconds between heartbeat flows
     15  MQCD-HEARTBEATINTERVAL PIC S9(9) BINARY.
    ** Batch duration
     15  MQCD-BATCHINTERVAL PIC S9(9) BINARY.
    ** Speed at which nonpersistent messages are sent
     15  MQCD-NONPERSISTENTMSGSPEED PIC S9(9) BINARY.
    ** Length of MQCD structure
     15  MQCD-STRUCLENGTH PIC S9(9) BINARY.
    ** Length of exit name
     15  MQCD-EXITNAMELENGTH PIC S9(9) BINARY.
    ** Length of exit user data
     15  MQCD-EXITDATALENGTH PIC S9(9) BINARY.
    ** Number of message exits defined
     15  MQCD-MSGEXITSDEFINED PIC S9(9) BINARY.
    ** Number of send exits defined
     15  MQCD-SENDEXITSDEFINED PIC S9(9) BINARY.
    ** Number of receive exits defined
     15  MQCD-RECEIVEEXITSDEFINED PIC S9(9) BINARY.
    ** Address of first MsgExit field
     15  MQCD-MSGEXITPTR POINTER.
    ** Address of first MsgUserData field
     15  MQCD-MSGUSERDATAPTR POINTER.
    ** Address of first SendExit field
     15  MQCD-SENDEXITPTR POINTER.
    ** Address of first SendUserData field
     15  MQCD-SENDUSERDATAPTR POINTER.
    ** Address of first ReceiveExit field
     15  MQCD-RECEIVEEXITPTR POINTER.
    ** Address of first ReceiveUserData field
     15  MQCD-RECEIVEUSERDATAPTR POINTER.
    ** Ver:4 **
    ** Address of a list of cluster names
     15  MQCD-CLUSTERPTR POINTER.
    ** Number of clusters to which the channel belongs
     15  MQCD-CLUSTERSDEFINED PIC S9(9) BINARY.
    ** Network priority
     15  MQCD-NETWORKPRIORITY PIC S9(9) BINARY.
    ** Ver:5 **
    ** Length of long MCA user identifier
     15  MQCD-LONGMCAUSERIDLENGTH PIC S9(9) BINARY.
    ** Length of long remote user identifier
     15  MQCD-LONGREMOTEUSERIDLENGTH PIC S9(9) BINARY.
```

```
      ** Address of long MCA user identifier
       15  MQCD-LONGMCAUSERIDPTR POINTER.
      ** Address of long remote user identifier
       15  MQCD-LONGREMOTEUSERIDPTR POINTER.
      ** MCA security identifier
       15  MQCD-MCASECURITYID PIC X(40).
      ** Remote security identifier
       15  MQCD-REMOTESECURITYID PIC X(40).
      ** Ver:6 **
      ** TLS CipherSpec
       15  MQCD-SSLCIPHERSPEC PIC X(32).
      ** Address of TLS peer name
       15  MQCD-SSLPEERNAMEPTR POINTER.
      ** Length of TLS peer name
       15  MQCD-SSLPEERNAMELENGTH PIC S9(9) BINARY.
      ** Whether TLS client authentication is required
       15  MQCD-SSLCLIENTAUTH PIC S9(9) BINARY.
      ** Keepalive interval
       15  MQCD-KEEPALIVEINTERVAL PIC S9(9) BINARY.
      ** Local communications address
       15  MQCD-LOCALADDRESS PIC X(48).
      ** Batch heartbeat interval
       15  MQCD-BATCHHEARTBEAT PIC S9(9) BINARY.
      ** Ver:7 **
      ** Header data compression list
       15  MQCD-HDRCOMPLIST PIC S9(9) BINARY.
      ** Message data compression list
       15  MQCD-MSGCOMPLIST PIC S9(9) BINARY.
      ** Channel rank
       15  MQCD-CLWLCHANNELRANK PIC S9(9) BINARY.
      ** Channel priority
       15  MQCD-CLWLCHANNELPRIORITY PIC S9(9) BINARY.
      ** Channel weight
       15  MQCD-CLWLCHANNELWEIGHT PIC S9(9) BINARY.
      ** Channel monitoring
       15  MQCD-CHANNELMONITORING PIC S9(9) BINARY.
      ** Channel statistics
       15  MQCD-CHANNELSTATISTICS PIC S9(9) BINARY.
      ** Ver:8 **
      ** Limit on sharing conversations
       15  MQCD-SHARINGCONVERSATIONS PIC S9(9) BINARY.
      ** Message property control
       15  MQCD-PROPERTYCONTROL PIC S9(9) BINARY.
      ** Limit on SVRCONN channel instances
       15  MQCD-MAXINSTANCES PIC S9(9) BINARY.
      ** Limit on SVRCONN channel instances per client
       15  MQCD-MAXINSTANCESPERCLIENT PIC S9(9) BINARY.
      ** Client channel weight
       15  MQCD-CLIENTCHANNELWEIGHT PIC S9(9) BINARY.
      ** Connection affinity
       15  MQCD-CONNECTIONAFFINITY PIC S9(9) BINARY.
      ** Ver:9 **
      ** Batch data limit
       15  MQCD-BATCHDATALIMIT PIC S9(9) BINARY.
      ** Use Dead Letter Queue
       15  MQCD-USEDLQ PIC S9(9) BINARY.
      ** Default client reconnect option
       15  MQCD-DEFRECONNECT PIC S9(9) BINARY.
      ** Ver:10 **
      ** Certificate Label
       15 MQCD-CERTLABL PIC X (64)
      ** Ver:11 **
      ** AMS Security policy protection
       15 MQCD-SPLPROTECTION PIC S9(9) BINARY
      ** Ver:12 **
```

RPG declaration (ILE)

This declaration is the RPG declaration for the MQCD structure.

```
D* MQCD Structure
     D*
     D* Channel definition name
     D  CDCHN                  1     20
     D* Structure version number
     D  CDVER                 21     24I 0
     D* Channel type
     D  CDCHT                 25     28I 0
     D* Transport type
```

```
     D  CDTRT                 29     32I 0
     D* Channel description
     D  CDDES                 33     96
     D* Queue manager name
     D  CDQM                  97    144
     D* Transmission queue name
     D  CDXQ                 145    192
     D* First 20 bytes of connection name
     D  CDSCN                193    212
     D* Reserved
     D  CDMCA                213    232
     D* LU 6.2 Mode name
     D  CDMOD                233    240
     D* LU 6.2 transaction program name
     D  CDTP                 241    304
     D* Batch size
     D  CDBS                 305    308I 0
     D* Disconnect interval
     D  CDDI                 309    312I 0
     D* Short retry count
     D  CDSRC                313    316I 0
     D* Short retry wait interval
     D  CDSRI                317    320I 0
     D* Long retry count
     D  CDLRC                321    324I 0
     D* Long retry wait interval
     D  CDLRI                325    328I 0
     D* Channel security exit name
     D  CDSCX                329    348
     D* Channel message exit name
     D  CDMSX                349    368
     D* Channel send exit name
     D  CDSNX                369    388
     D* Channel receive exit name
     D  CDRCX                389    408
     D* Highest allowable message sequence number
     D  CDSNW                409    412I 0
     D* Maximum message length
     D  CDMML                413    416I 0
     D* Put authority
     D  CDPA                 417    420I 0
     D* Data conversion
     D  CDDC                 421    424I 0
     D* Channel security exit user data
     D  CDSCD                425    456
     D* Channel message exit user data
     D  CDMSD                457    488
     D* Channel send exit user data
     D  CDSND                489    520
     D* Channel receive exit user data
     D  CDRCD                521    552
     D* Ver:1 **
     D* User identifier
     D  CDUID                553    564
     D* Password
     D  CDPW                 565    576
     D* First 12 bytes of MCA user identifier
     D  CDAUI                577    588
     D* Message channel agent type
     D  CDCAT                589    592I 0
     D* Connection name
     D  CDCON                593    848
     D  CDCN2                849    856
     D* First 12 bytes of user identifier from partner
     D  CDRUI                857    868
     D* Password from partner
     D  CDRPW                869    880
     D* Ver:2 **
     D* Channel message retry exit name
     D  CDMRX                881    900
     D* Channel message retry exit user data
     D  CDMRD                901    932
     D* Number of times MCA will try to put the message, after first
     D* attempt has failed
     D  CDMRC                933    936I 0
     D* Minimum interval in milliseconds after which the open or put
     D* operation will be retried
     D  CDMRI                937    940I 0
     D* Ver:3 **
     D* Time in seconds between heartbeat flows
     D  CDHBI                941    944I 0
     D* Batch duration
```

```
     D  CDBI                 945    948I 0
     D* Speed at which nonpersistent messages are sent
     D  CDNPM                949    952I 0
     D* Length of MQCD structure
     D  CDLEN                953    956I 0
     D* Length of exit name
     D  CDXNL                957    960I 0
     D* Length of exit user data
     D  CDXDL                961    964I 0
     D* Number of message exits defined
     D  CDMXD                965    968I 0
     D* Number of send exits defined
     D  CDSXD                969    972I 0
     D* Number of receive exits defined
     D  CDRXD                973    976I 0
     D* Address of first MsgExit field
     D  CDMXP                977    992*
     D* Address of first MsgUserData field
     D  CDMUP                993   1008*
     D* Address of first SendExit field
     D  CDSXP               1009   1024*
     D* Address of first SendUserData field
     D  CDSUP               1025   1040*
     D* Address of first ReceiveExit field
     D  CDRXP               1041   1056*
     D* Address of first ReceiveUserData field
     D  CDRUP               1057   1072*
     D* Ver:4 **
     D* Address of a list of cluster names
     D  CDCLP               1073   1088*
     D* Number of clusters to which the channel belongs
     D  CDCLD               1089   1092I 0
     D* Network priority
     D  CDNP                1093   1096I 0
     D* Ver:5 **
     D* Length of long MCA user identifier
     D  CDLML               1097   1100I 0
     D* Length of long remote user identifier
     D  CDLRL               1101   1104I 0
     D* Address of long MCA user identifier
     D  CDLMP               1105   1120*
     D* Address of long remote user identifier
     D  CDLRP               1121   1136*
     D* MCA security identifier
     D  CDMSI               1137   1176
     D* Remote security identifier
     D  CDRSI               1177   1216
     D* Ver:6 **
     D* TLS CipherSpec
     D  CDSCS               1217   1248
     D* Address of TLS peer name
     D  CDSPN               1249   1264*
     D* Length of TLS peer name
     D  CDSPL               1265   1268I 0
     D* Whether TLS client authentication is required
     D  CDSCA               1269   1272I 0
     D* Keepalive interval
     D  CDKAI               1273   1276I 0
     D* Local communications address
     D  CDLOA               1277   1324
     D* Batch heartbeat interval
     D  CDBHB               1325   1328I 0
     D* Ver:7 **
     D* Header data compression list
     D  CDHCL0
     D  CDHCL1              1329   1332I 0
     D  CDHCL2              1333   1336I 0
     D  CDHCL                        10I 0 DIM(2) OVERLAY(CDHCL0)
     D* Message data compression list
     D  CDMCL0
     D  CDMCL1              1337   1340I 0
     D  CDMCL2              1341   1344I 0
     D  CDMCL3              1345   1348I 0
     D  CDMCL4              1349   1352I 0
     D  CDMCL5              1353   1356I 0
     D  CDMCL6              1357   1360I 0
     D  CDMCL7              1361   1364I 0
     D  CDMCL8              1365   1368I 0
     D  CDMCL9              1369   1372I 0
     D  CDMCL10             1373   1376I 0
     D  CDMCL11             1377   1380I 0
     D  CDMCL12             1381   1384I 0
```

```
     D  CDMCL13              1385   1388I 0
     D  CDMCL14              1389   1392I 0
     D  CDMCL15              1393   1396I 0
     D  CDMCL16              1397   1400I 0
     D  CDMCL                         10I 0 DIM(16) OVERLAY(CDMCL0)
     D* Channel rank
     D  CDCWCR               1401   1404I 0
     D* Channel priority
     D  CDCWCP               1405   1408I 0
     D* Channel weight
     D  CDCWCW               1409   1412I 0
     D* Channel monitoring
     D  CDCHLMON             1413   1416I 0
     D* Channel statistics
     D  CDCHLST              1417   1420I 0
     D* Ver:8 **
     D* Limit on sharing conversations
     D  CDSHC                1421   1424I 0
     D* Message property control
     D  CDPRC                1425   1428I 0
     D* Limit on SVRCONN channel instances
     D  CDMXIN               1429   1432I 0
     D* Limit on SVRCONN channel instances per client
     D  CDMXIC               1433   1436I 0
     D* Client channel weight
     D  CDCLNCHLW            1437   1440I 0
     D* Connection affinity
     D  CDCONNAFF            1441   1444I 0
     D* Ver:9 **
     D* Batch data limit
     D  CDBDL                1445   1448I 0
     D* Use Dead Letter Queue
     D  CDUDLQ               1449   1452I 0
     D* Default client reconnect option
     D  CDDRCN               1453   1456I 0
     D* Ver:10 **
```

System/390 assembler declaration

This declaration is the System/390 assembler declaration for the MQCD structure.

V 9.1.3

```
MQCD                         DSECT
MQCD_CHANNELNAME             DS    CL20    Channel definition name
MQCD_VERSION                 DS    F       Structure version number
MQCD_CHANNELTYPE             DS    F       Channel type
MQCD_TRANSPORTTYPE           DS    F       Transport type
MQCD_DESC                    DS    CL64    Channel description
MQCD_QMGRNAME                DS    CL48    Queue manager name
MQCD_XMITQNAME               DS    CL48    Transmission queue name
MQCD_SHORTCONNECTIONNAME     DS    CL20    First 20 bytes of connection
*                                          name
MQCD_MCANAME                 DS    CL20    Reserved
MQCD_MODENAME                DS    CL8     LU 6.2 Mode name
MQCD_TPNAME                  DS    CL64    LU 6.2 transaction program name
MQCD_BATCHSIZE               DS    F       Batch size
MQCD_DISCINTERVAL            DS    F       Disconnect interval
MQCD_SHORTRETRYCOUNT         DS    F       Short retry count
MQCD_SHORTRETRYINTERVAL      DS    F       Short retry wait interval
MQCD_LONGRETRYCOUNT          DS    F       Long retry count
MQCD_LONGRETRYINTERVAL       DS    F       Long retry wait interval
MQCD_SECURITYEXIT            DS    CLn     Channel security exit name
MQCD_MSGEXIT                 DS    CLn     Channel message exit name
MQCD_SENDEXIT                DS    CLn     Channel send exit name
MQCD_RECEIVEEXIT             DS    CLn     Channel receive exit name
MQCD_SEQNUMBERWRAP           DS    F       Highest allowable message
*                                          sequence number
MQCD_MAXMSGLENGTH            DS    F       Maximum message length
MQCD_PUTAUTHORITY            DS    F       Put authority
MQCD_DATACONVERSION          DS    F       Data conversion
MQCD_SECURITYUSERDATA        DS    CL32    Channel security exit user data
MQCD_MSGUSERDATA             DS    CL32    Channel message exit user data
MQCD_SENDUSERDATA            DS    CL32    Channel send exit user data
MQCD_RECEIVEUSERDATA         DS    CL32    Channel receive exit user data
MQCD_USERIDENTIFIER          DS    CL12    User identifier
MQCD_PASSWORD                DS    CL12    Password
MQCD_MCAUSERIDENTIFIER       DS    CL12    First 12 bytes of MCA user
*                                          identifier
MQCD_MCATYPE                 DS    F       Message channel agent type
```

```
MQCD_CONNECTIONNAME          DS   CL264  Connection name
MQCD_REMOTEUSERIDENTIFIER    DS   CL12   First 12 bytes of user
*                                        identifier from partner
MQCD_REMOTEPASSWORD          DS   CL12   Password from partner
MQCD_MSGRETRYEXIT            DS   CLn    Channel message retry exit name
MQCD_MSGRETRYUSERDATA        DS   CL32   Channel message retry exit user
*                                        data
MQCD_MSGRETRYCOUNT           DS   F      Number of times MCA will try to
*                                        put the message, after the
*                                        first attempt has failed
MQCD_MSGRETRYINTERVAL        DS   F      Minimum interval in
*                                        milliseconds after which the
*                                        open or put operation will be
*                                        retried
MQCD_HEARTBEATINTERVAL       DS   F      Time in seconds between
*                                        heartbeat flows
MQCD_BATCHINTERVAL           DS   F      Batch duration
MQCD_NONPERSISTENTMSGSPEED   DS   F      Speed at which nonpersistent
*                                        messages are sent
MQCD_STRUCLENGTH             DS   F      Length of MQCD structure
MQCD_EXITNAMELENGTH          DS   F      Length of exit name
MQCD_EXITDATALENGTH          DS   F      Length of exit user data
MQCD_MSGEXITSDEFINED         DS   F      Number of message exits defined
MQCD_SENDEXITSDEFINED        DS   F      Number of send exits defined
MQCD_RECEIVEEXITSDEFINED     DS   F      Number of receive exits defined
MQCD_MSGEXITPTR              DS   F      Address of first MSGEXIT field
MQCD_MSGUSERDATAPTR          DS   F      Address of first MSGUSERDATA
*                                        field
MQCD_SENDEXITPTR             DS   F      Address of first SENDEXIT field
MQCD_SENDUSERDATAPTR         DS   F      Address of first SENDUSERDATA
*                                        field
MQCD_RECEIVEEXITPTR          DS   F      Address of first RECEIVEEXIT
*                                        field
MQCD_RECEIVEUSERDATAPTR      DS   F      Address of first
*                                        RECEIVEUSERDATA field
MQCD_CLUSTERPTR              DS   F      Address of a list of cluster
*                                        names
MQCD_CLUSTERSDEFINED         DS   F      Number of clusters to which the
*                                        channel belongs
MQCD_NETWORKPRIORITY         DS   F      Network priority
MQCD_LONGMCAUSERIDLENGTH     DS   F      Length of long MCA user
*                                        identifier
MQCD_LONGREMOTEUSERIDLENGTH  DS   F      Length of long remote user
*                                        identifier
MQCD_LONGMCAUSERIDPTR        DS   F      Address of long MCA user
*                                        identifier
MQCD_LONGREMOTEUSERIDPTR     DS   F      Address of long remote user
*                                        identifier
MQCD_MCASECURITYID           DS   XL40   MCA security identifier
MQCD_REMOTESECURITYID        DS   XL40   Remote security identifier
MQCD_SSLCIPHERSPEC           DS   CL32   TLS CipherSpec
MQCD_SSLPEERNAMEPTR          DS   F      Address of TLS peer name
MQCD_SSLPEERNAMELENGTH       DS   F      Length of TLS peer name
MQCD_SSLCLIENTAUTH           DS   F      Whether TLS client
*                                        authentication is required
MQCD_KEEPALIVEINTERVAL       DS   F      Keepalive interval
MQCD_LOCALADDRESS            DS   CL48   Local communications address
MQCD_BATCHHEARTBEAT          DS   F      Batch heartbeat interval
MQCD_HDRCOMPLIST             DS   CL2    Header data compression list
MQCD_MSGCOMPLIST             DS   CL16   Message data compression list
MQCD_CLWLCHANNELRANK         DS   F      Channel rank
MQCD_CLWLCHANNELPRIORITY     DS   F      Channel priority
MQCD_CLWLCHANNELWEIGHT       DS   F      Channel weight
MQCD_CHANNELMONITORING       DS   F      Channel monitoring
MQCD_CHANNELSTATISTICS       DS   F      Channel statistics
MQCD_SHARINGCONVERSATIONS    DS   F      Limit on sharing
*                                        conversations
MQCD_PROPERTYCONTROL         DS   F      Message property
*                                        control
MQCD_SHARINGCONVERSATIONS    DS   F      Limit on sharing conversations
MQCD_PROPERTYCONTROL         DS   F      Message property control
MQCD_MAXINSTANCES            DS   F      Limit on SVRCONN chl instances
MQCD_MAXINSTANCESPERCLIENT   DS   F      Limit on SVRCONN chl instances
                                         per client
MQCD_CLIENTCHANNELWEIGHT     DS   F      Channel weight
MQCD_CONNECTIONAFFINITY      DS   F      Connection Affinty
MQCD_BATCHDATALIMIT          DS   F      Batch data limit
MQCD_USEDLQ                  DS   F      Use dead-letter queue
MQCD_DEFRECONNECT            DS   F      Default client reconnect option
MQCD_CERTLABL                DS   F      Certificate label
MQCD_SPLPROTECTION           DS   F      AMS Security policy protection
MQCD_LENGTH                  EQU  *-MQCD
```

```
                              ORG   MQCD
MQCD_AREA                     DS    CL(MQCD_LENGTH)
```

Visual Basic declaration

This declaration is the Visual Basic declaration of the MQCD structure.

In Visual Basic, the MQCD structure can be used with the MQCNO structure on the MQCONNX call.

```
Type MQCD
  ChannelName             As String*20  'Channel definition name'
  Version                 As Long       'Structure version number'
  ChannelType             As Long       'Channel type'
  TransportType           As Long       'Transport type'
  Desc                    As String*64  'Channel description'
  QMgrName                As String*48  'Queue manager name'
  XmitQName               As String*48  'Transmission queue name'
  ShortConnectionName     As String*20  'First 20 bytes of connection'
                                        'name'
  MCAName                 As String*20  'Reserved'
  ModeName                As String*8   'LU 6.2 Mode name'
  TpName                  As String*64  'LU 6.2 transaction program name'
  BatchSize               As Long       'Batch size'
  DiscInterval            As Long       'Disconnect interval'
  ShortRetryCount         As Long       'Short retry count'
  ShortRetryInterval      As Long       'Short retry wait interval'
  LongRetryCount          As Long       'Long retry count'
  LongRetryInterval       As Long       'Long retry wait interval'
  SecurityExit            As String*128 'Channel security exit name'
  MsgExit                 As String*128 'Channel message exit name'
  SendExit                As String*128 'Channel send exit name'
  ReceiveExit             As String*128 'Channel receive exit name'
  SeqNumberWrap           As Long       'Highest allowable message'
                                        'sequence number'
  MaxMsgLength            As Long       'Maximum message length'
  PutAuthority            As Long       'Put authority'
  DataConversion          As Long       'Data conversion'
  SecurityUserData        As String*32  'Channel security exit user data'
  MsgUserData             As String*32  'Channel message exit user data'
  SendUserData            As String*32  'Channel send exit user data'
  ReceiveUserData         As String*32  'Channel receive exit user data'
  UserIdentifier          As String*12  'User identifier'
  Password                As String*12  'Password'
  MCAUserIdentifier       As String*12  'First 12 bytes of MCA user'
                                        'identifier'
  MCAType                 As Long       'Message channel agent type'
  ConnectionName          As String*264 'Connection name'
  RemoteUserIdentifier    As String*12  'First 12 bytes of user'
                                        'identifier from partner'
  RemotePassword          As String*12  'Password from partner'
  MsgRetryExit            As String*128 'Channel message retry exit name'
  MsgRetryUserData        As String*32  'Channel message retry exit user'
                                        'data'
  MsgRetryCount           As Long       'Number of times MCA will try to'
                                        'put the message, after the'
                                        'first attempt has failed'
  MsgRetryInterval        As Long       'Minimum interval in'
                                        'milliseconds after which the'
                                        'open or put operation will be'
                                        'retried'
  HeartbeatInterval       As Long       'Time in seconds between'
                                        'heartbeat flows'
  BatchInterval           As Long       'Batch duration'
  NonPersistentMsgSpeed   As Long       'Speed at which nonpersistent'
                                        'messages are sent'
  StrucLength             As Long       'Length of MQCD structure'
  ExitNameLength          As Long       'Length of exit name'
  ExitDataLength          As Long       'Length of exit user data'
  MsgExitsDefined         As Long       'Number of message exits defined'
  SendExitsDefined        As Long       'Number of send exits defined'
  ReceiveExitsDefined     As Long       'Number of receive exits defined'
  MsgExitPtr              As MQPTR      'Address of first MsgExit field'
  MsgUserDataPtr          As MQPTR      'Address of first MsgUserData'
                                        'field'
  SendExitPtr             As MQPTR      'Address of first SendExit field'
  SendUserDataPtr         As MQPTR      'Address of first SendUserData'
                                        'field'
  ReceiveExitPtr          As MQPTR      'Address of first ReceiveExit'
                                        'field'
```

```
  ReceiveUserDataPtr     As MQPTR      'Address of first'
                                       'ReceiveUserData field'
  ClusterPtr             As MQPTR      'Address of a list of cluster'
                                       'names'
  ClustersDefined        As Long       'Number of clusters to which the'
                                       'channel belongs'
  NetworkPriority        As Long       'Network priority'
  LongMCAUserIdLength    As Long       'Length of long MCA user'
                                       'identifier'
  LongRemoteUserIdLength As Long       'Length of long remote user'
                                       'identifier'
  LongMCAUserIdPtr       As MQPTR      'Address of long MCA user'
                                       'identifier'
  LongRemoteUserIdPtr    As MQPTR      'Address of long remote user'
                                       'identifier'
  MCASecurityId          As MQBYTE40   'MCA security identifier'
  RemoteSecurityId       As MQBYTE40   'Remote security identifier'
  SSLCipherSpec          As String*32  'TLS CipherSpec'
  SSLPeerNamePtr         As MQPTR      'Address of TLS peer name'
  SSLPeerNameLength      As Long       'Length of TLS peer name'
  SSLClientAuth          As Long       'Whether TLS client'
                                       'authentication is required'
  KeepAliveInterval      As Long       'Keepalive interval'
  LocalAddress           As String*48  'Local communications address'
  BatchHeartbeat         As Long       'Batch heartbeat interval'
  HdrCompList(0 to 1)    As Long2      'Header data compression list'
  MsgCompList(0 To 15)   As Long16     'Message data compression list'
  CLWLChannelRank        As Long       'Channel Rank'
  CLWLChannelPriority    As Long       'Channel priority'
  CLWLChannelWeight      As Long       'Channel Weight'
  ChannelMonitoring      As Long       'Channel Monitoring control'
  ChannelStatistics      As Long       'Channel Statistics'
 End Type
```

Changing MQCD fields in a channel exit

A channel exit can change fields in the MQCD. However, these changes are not typically acted on, except in the circumstances listed.

If a channel exit program changes a field in the MQCD data structure, the new value is typically ignored by the IBM MQ channel process. However, the new value remains in the MQCD and is passed to any remaining exits in an exit chain and to any conversation sharing the channel instance.

If SharingConversations is set to FALSE in the MQCXP structure, changes to certain fields can be acted on, depending on the type of exit program, the type of channel, and the exit reason code. The following table shows the fields that can be changed and affect the behavior of the channel, and in what circumstances. If an exit program changes one of these fields in any other circumstances, or any field not listed, the new value is ignored by the channel process. The new value remains in the MQCD and is passed to any remaining exits in an exit chain and to any conversation sharing the channel instance.

Any type of exit program when called for initialization (MQXR_INIT) can change the ChannelName field of any type of channel, as long as MQCXP SharingConverstions is set to FALSE. Only a security exit can change the MCAUserIdentifier field, regardless of the value of MQCXP SharingConverstions.

Table 823. Fields that can be changed and affect the behavior of the channel

Field	Exit reason code	Exit type	Channel type
ChannelName	MQXR_INIT	All	All
TransportType	MQXR_INIT	All	All
XmitQName	MQXR_INIT	All	SDR, RCVR
ModeName	MQXR_INIT	All	All
TpName	MQXR_INIT	All	All

Table 823. Fields that can be changed and affect the behavior of the channel (continued)

Field	Exit reason code	Exit type	Channel type
BatchSize	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
DiscInterval	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
ShortRetryCount	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
ShortRetryInterval	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
LongRetryCount	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
LongRetryInterval	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
SeqNumberWrap	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
MaxMsgLength	MQXR_INIT	All	All
PutAuthority	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
DataConversion	MQXR_INIT	All	All
MCAUserIdentifier	MQXR_INIT, MQXR_INIT_SEC, MQXR_SEC_MSG, MQXR_SEC_PARMS	Security	RCVR, RQSTR, SVRCONN, CLUSRCVR

Field	Exit reason code	Exit type	Channel type
ConnectionName	MQXR_INIT	All	SDR, SVR, RQSTR, CLNTCONN, CLUSSDR, CLUSRCVR
MsgRetryUserData	MQXR_INIT	All	RCVR, RQSTR, CLUSRCVR
MsgRetryCount	MQXR_INIT	All	RCVR, RQSTR, CLUSRCVR
MsgRetryInterval	MQXR_INIT	All	RCVR, RQSTR, CLUSRCVR
HeartbeatInterval	MQXR_INIT	All	All
BatchInterval	MQXR_INIT	All	SDR, SVR, CLUSSDR, CLUSRCVR
NonPersistentMsgSpeed	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
MCASecurityId	MQXR_INIT, MQXR_INIT_SEC, MQXR_SEC_MSG, MQXR_SEC_PARMS	Security	SDR, SVR, RCVR, RQSTR, SVRCONN, CLUSSDR, CLUSRCVR
SSLCipherSpec	MQXR_INIT	All	All
SSLPeerNamePtr	MQXR_INIT	All	All
SSLPeerNameLength	MQXR_INIT	All	All
SSLClientAuth	MQXR_INIT	All	SVR, RCVR, RQSTR, SVRCONN, CLUSRCVR
KeepAliveInterval	MQXR_INIT	All	All
LocalAddress	MQXR_INIT	All	SDR, SVR, RQSTR, CLNTCONN, CLUSSDR, CLUSRCVR
BatchHeartbeat	MQXR_INIT	All	SDR, SVR, CLUSSDR, CLUSRCVR

Table 823. Fields that can be changed and affect the behavior of the channel (continued)

Table 823. Fields that can be changed and affect the behavior of the channel (continued)			
Field	**Exit reason code**	**Exit type**	**Channel type**
HdrCompList	MQXR_INIT	All	All
MsgCompList	MQXR_INIT	All	All
ChannelMonitoring	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, SVRCONN, CLUSSDR, CLUSRCVR
ChannelStatistics	MQXR_INIT	All	SDR, SVR, RCVR, RQSTR, CLUSSDR, CLUSRCVR
SharingConversations	MQXR_INIT	All	SVRCONN, CLNTCONN
PropertyControl	MQXR_INIT	All	SDR, SVR, CLUSSDR, CLUSRCVR

MQCXP - Channel exit parameter

The MQCXP structure is passed to each type of exit called by a Message Channel Agent (MCA), client-connection channel, or server-connection channel.

See MQ_CHANNEL_EXIT.

The fields described as "input to the exit" in the descriptions that follow are ignored by the channel when the exit returns control to the channel. Any input fields that the exit changes in the channel exit parameter block will not be preserved for its next invocation. Changes made to input/output fields (for example, the *ExitUserArea* field), are preserved for invocations of that instance of the exit only. Such changes cannot be used to pass data between different exits defined on the same channel, or between the same exit defined on different channels.

Related reference

“Fields” on page 1504
This topic lists all the fields in the MQCXP structure and describes each field.

“C declaration” on page 1515
This declaration is the C declaration for the MQCXP structure.

“COBOL declaration” on page 1516
This declaration is the COBOL declaration for the MQCXP structure.

“RPG declaration (ILE)” on page 1517
This declaration is the RPG declaration for the MQCXP structure.

“System/390 assembler declaration” on page 1518
This declaration is the System/390 assembler declaration for the MQCXP structure.

Fields

This topic lists all the fields in the MQCXP structure and describes each field.

StrucId (MQCHAR4)
This field specifies the structure identifier.

The value must be:

MQCXP_STRUC_ID
Identifier for channel exit parameter structure.

For the C programming language, the constant MQCXP_STRUC_ID_ARRAY is also defined; this constant has the same value as MQCXP_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the exit.

Version (MQLONG)
This field specifies the structure version number.

The value depends on the environment:

MQCXP_VERSION_1
Version-1 channel exit parameter structure.

MQCXP_VERSION_3
Version-3 channel exit parameter structure.

UNIX The field has this value in UNIX systems not listed elsewhere.

MQCXP_VERSION_4
Version-4 channel exit parameter structure.

MQCXP_VERSION_5
Version-5 channel exit parameter structure.

MQCXP_VERSION_6
Version-6 channel exit parameter structure.

MQCXP_VERSION_8
Version-8 channel exit parameter structure.

z/OS The field has this value in z/OS.

MQCXP_VERSION_9
Version-9 channel exit parameter structure.

The field has this value in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows
- z/OS z/OS

Fields that exist only in the more-recent versions of the structure are identified as such in the descriptions of the fields. The following constant specifies the version number of the current version:

MQCXP_CURRENT_VERSION
Current version of channel exit parameter structure.

The value depends on the environment.

Note: When a new version of the MQCXP structure is introduced, the layout of the existing part is not changed. The exit must therefore check that the version number is equal to or greater than the lowest version which contains the fields that the exit needs to use.

This is an input field to the exit.

ExitId (MQLONG)
This field specifies the type of exit being called and is set on entry to the exit routine.

The following values are possible:

MQXT_CHANNEL_SEC_EXIT
Channel security exit.

MQXT_CHANNEL_MSG_EXIT
Channel message exit.

MQXT_CHANNEL_SEND_EXIT
Channel send exit.

MQXT_CHANNEL_RCV_EXIT
Channel receive exit.

MQXT_CHANNEL_MSG_RETRY_EXIT
Channel message-retry exit.

MQXT_CHANNEL_AUTO_DEF_EXIT
Channel auto-definition exit.

On z/OS, this type of exit is supported only for channels of type MQCHT_CLUSSDR and MQCHT_CLUSRCVR.

This is an input field to the exit.

ExitReason (MQLONG)
This field specifies the reason why the exit is being called and is set on entry to the exit routine.

It is not used by the auto-definition exit. The following values are possible:

MQXR_INIT
Exit initialization.

This value indicates that the exit is being invoked for the first time. It allows the exit to acquire and initialize any resources that it needs (for example: memory).

MQXR_TERM
Exit termination.

This value indicates that the exit is about to be terminated. The exit should free any resources that it has acquired since it was initialized (for example: memory).

MQXR_MSG
Process a message.

This value indicates that the exit is being invoked to process a message. This value occurs for channel message exits only.

MQXR_XMIT
Process a transmission.

This value occurs for channel send and receive exits only.

MQXR_SEC_MSG
Security message received.

This value occurs for channel security exits only.

MQXR_INIT_SEC
Initiate security exchange.

This value occurs for channel security exits only.

The security exit of the receiver is always invoked with this reason immediately after being invoked with MQXR_INIT, to give it the opportunity to initiate a security exchange.

If it declines the opportunity (by returning MQXCC_OK instead of MQXCC_SEND_SEC_MSG or MQXCC_SEND_AND_REQUEST_SEC_MSG), the security exit of the sender is invoked with MQXR_INIT_SEC.

If the security exit of the receiver does initiate a security exchange (by returning MQXCC_SEND_SEC_MSG or MQXCC_SEND_AND_REQUEST_SEC_MSG), the security exit of the sender is never invoked with MQXR_INIT_SEC; instead it is invoked with MQXR_SEC_MSG to process the message of the receiver. (In either case it is first invoked with MQXR_INIT.)

Unless one of the security exits requests termination of the channel (by setting *ExitResponse* to MQXCC_SUPPRESS_FUNCTION or MQXCC_CLOSE_CHANNEL), the security exchange must complete at the side that initiated the exchange. Therefore, if a security exit is invoked with MQXR_INIT_SEC and it does initiate an exchange, the next time the exit is invoked it will be with MQXR_SEC_MSG. This happens whether there is a security message for the exit to process or not. There is a security message if the partner returns MQXCC_SEND_SEC_MSG or MQXCC_SEND_AND_REQUEST_SEC_MSG, but not if the partner returns MQXCC_OK or there is no security exit at the partner. If there is no security message to process, the security exit at the initiating end is re-invoked with a *DataLength* of zero.

MQXR_RETRY
Retry a message.

This value occurs for message-retry exits only.

MQXR_AUTO_CLUSSDR
Automatic definition of a cluster-sender channel.

This value occurs for channel auto-definition exits only.

MQXR_AUTO_RECEIVER
Automatic definition of a receiver channel.

This value occurs for channel auto-definition exits only.

MQXR_AUTO_SVRCONN
Automatic definition of a server-connection channel.

This value occurs for channel auto-definition exits only.

MQXR_AUTO_CLUSRCVR
Automatic definition of a cluster-receiver channel.

This value occurs for channel auto-definition exits only.

MQXR_SEC_PARMS
Security parameters

This value applies to security exits only and indicates that an MQCSP structure is being passed to the exit. For more information, see “MQCSP - Security parameters” on page 330

Note:

1. If you have more than one exit defined for a channel, they are each invoked with MQXR_INIT when the MCA is initialized. Also, they are each invoked with MQXR_TERM when the MCA is terminated.
2. For the channel auto-definition exit, *ExitReason* is not set if *Version* is less than MQCXP_VERSION_4. The value MQXR_AUTO_SVRCONN is implied in this case.

This is an input field to the exit.

ExitResponse (MQLONG)
This field specifies the response from the exit.

This field is set by the exit to communicate with the MCA. It must be one of the following values:

MQXCC_OK
Exit completed successfully.

- For the channel security exit, this value indicates that message transfer can now proceed normally.
- For the channel message retry exit, this value indicates that the MCA must wait for the time interval returned by the exit in the *MsgRetryInterval* field in MQCXP, and then try the message again.

The *ExitResponse2* field might contain additional information.

MQXCC_SUPPRESS_FUNCTION
Suppress function.

- For the channel security exit, this value indicates that the channel must be terminated.
- For the channel message exit, this value indicates that the message is not to proceed any further towards its destination. Instead the MCA generates an exception report message (if one was requested by the sender of the original message), and places the message contained in the original buffer on the dead-letter queue (if the sender specified MQRO_DEAD_LETTER_Q), or discards it (if the sender specified MQRO_DISCARD_MSG).

  For persistent messages, if the sender specified MQRO_DEAD_LETTER_Q, but the put to the dead-letter queue fails, or there is no dead-letter queue, the original message is left on the transmission queue and the report message is not generated. The original message is also left on the transmission queue if the report message cannot be generated successfully.

  The *Feedback* field in the MQDLH structure at the start of the message on the dead-letter queue indicates why the message was put on the dead-letter queue; this feedback code is also used in the message descriptor of the exception report message (if one was requested by the sender).
- For the channel message retry exit, this value indicates that the MCA does not wait and try the message again; instead, the MCA continues immediately with its normal failure processing (the message is placed on the dead-letter queue or discarded, as specified by the sender of the message).
- For the channel auto-definition exit, either MQXCC_OK or MQXCC_SUPPRESS_FUNCTION must be specified. If neither of these values is specified, MQXCC_SUPPRESS_FUNCTION is assumed by default and the auto-definition is abandoned.

This response is not supported for the channel send and receive exits.

MQXCC_SEND_SEC_MSG
Send security message.

This value can be set only by a channel security exit. It indicates that the exit has provided a security message which must be transmitted to the partner.

MQXCC_SEND_AND_REQUEST_SEC_MSG
Send security message that requires a reply.

This value can be set only by a channel security exit. It indicates

- that the exit has provided a security message which can be transmitted to the partner, and
- that the exit requires a response from the partner. If no response is received, the channel must be terminated, because the exit has not yet decided whether communications can proceed.

MQXCC_SUPPRESS_EXIT
Suppress exit.

- This value can be set by all types of channel exit other than a security exit or an auto-definition exit. It suppresses any further invocation of that exit (as if its name had been blank in the channel definition), until termination of the channel, when the exit is again invoked with an *ExitReason* of MQXR_TERM.
- If a message retry exit returns this value, message retries for subsequent messages are controlled by the *MsgRetryCount* and *MsgRetryInterval* channel attributes as normal. For the current message, the MCA performs the number of outstanding retries, at intervals given by the *MsgRetryInterval* channel attribute, but only if the reason code is one that the MCA would normally retry (see the *MsgRetryCount* field described in "MQCD - Channel definition" on page 1464). The number of outstanding retries is the value of the **MsgRetryCount** attribute, less the

number of times the exit returned MQXCC_OK for the current message; if this number is negative, no further retries are performed by the MCA for the current message.

MQXCC_CLOSE_CHANNEL
Close channel.

This value can be set by any type of channel exit except an auto-definition exit.

If sharing conversations is not enabled, this value closes the channel.

If sharing conversations is enabled, this value ends the conversation. If this conversation is the only conversation on the channel, the channel also closes.

This field is an input/output field from the exit.

ExitResponse2 (MQLONG)
This field specifies the secondary response from the exit.

This field is set to zero on entry to the exit routine. It can be set by the exit to provide further information to the IBM MQ channel functions. It is not used by the auto-definition exit.

The exit can set one or more of the following values. If more than one is required, the values are added. Combinations that are not valid are noted; other combinations are allowed.

MQXR2_PUT_WITH_DEF_ACTION
Put with default action.

This value is set by the channel message exit of the receiver. It indicates that the message is to be put with the default action of the MCA, that is either the default user ID of the MCA, or the context *UserIdentifier* in the MQMD (message descriptor) of the message.

The value is zero, which corresponds to the initial value set when the exit is invoked. The constant is provided for documentation purposes.

MQXR2_PUT_WITH_DEF_USERID
Put with default user identifier.

This value can only be set by the channel message exit of the receiver. It indicates that the message is to be put with the default user identifier of the MCA.

MQXR2_PUT_WITH_MSG_USERID
Put with user identifier of the message.

This value can only be set by the channel message exit of the receiver. It indicates that the message is to be put with the context *UserIdentifier* in the MQMD (message descriptor) of the message (this might have been modified by the exit).

Only one of MQXR2_PUT_WITH_DEF_ACTION, MQXR2_PUT_WITH_DEF_USERID, and MQXR2_PUT_WITH_MSG_USERID should be set.

MQXR2_USE_AGENT_BUFFER
Use agent buffer.

This value indicates that any data to be passed on is in *AgentBuffer*, not *ExitBufferAddr*.

The value is zero, which corresponds to the initial value set when the exit is invoked. The constant is provided for documentation purposes.

MQXR2_USE_EXIT_BUFFER
Use exit buffer.

This value indicates that any data to be passed on is in *ExitBufferAddr*, not *AgentBuffer*.

Only one of MQXR2_USE_AGENT_BUFFER and MQXR2_USE_EXIT_BUFFER should be set.

MQXR2_DEFAULT_CONTINUATION
Default continuation.

Continuation with the next exit in the chain depends on the response from the last exit invoked:

- If MQXCC_SUPPRESS_FUNCTION or MQXCC_CLOSE_CHANNEL are returned, no further exits in the chain are called.
- Otherwise, the next exit in the chain is invoked.

MQXR2_CONTINUE_CHAIN
Continue with the next exit.

MQXR2_SUPPRESS_CHAIN
Skip remaining exits in chain.

This is an input/output field to the exit.

Feedback (MQLONG)
This field specifies the feedback code.

This field is set to MQFB_NONE on entry to the exit routine.

If a channel message exit sets the *ExitResponse* field to MQXCC_SUPPRESS_FUNCTION, the *Feedback* field specifies the feedback code that identifies why the message was put on the dead-letter (undelivered-message) queue, and is also used to send an exception report if one has been requested. In this case, if the *Feedback* field is MQFB_NONE, the following feedback code is used:

MQFB_STOPPED_BY_MSG_EXIT
Message stopped by channel message exit.

The value returned in this field by channel security, send, receive, and message-retry exits is not used by the MCA.

The value returned in this field by auto-definition exits is not used if *ExitResponse* is MQXCC_OK, but otherwise is used for the *AuxErrorDataInt1* parameter in the event message.

This is an input/output field from the exit.

MaxSegmentLength (MQLONG)
This field specifies the maximum length in bytes that can be sent in a single transmission.

It is not used by the auto-definition exit. It is of interest to a channel send exit, because this exit must ensure that it does not increase the size of a transmission segment to a value greater than *MaxSegmentLength*. The length includes the initial 8 bytes that the exit must not change. The value is negotiated between the IBM MQ channel functions when the channel is initiated. See Writing channel-exit programs for more information about segment lengths.

The value in this field is not meaningful if *ExitReason* is MQXR_INIT.

This is an input field to the exit.

ExitUserArea (MQBYTE16)
This field specifies the exit user area - a field available for the exit to use.

It is initialized to binary zero before the first invocation of the exit (which has an *ExitReason* set to MQXR_INIT), and thereafter any changes made to this field by the exit are preserved across invocations of the exit.

The following value is defined:

MQXUA_NONE
No user information.

The value is binary zero for the length of the field.

For the C programming language, the constant MQXUA_NONE_ARRAY is also defined; this constant has the same value as MQXUA_NONE, but is an array of characters instead of a string.

The length of this field is given by MQ_EXIT_USER_AREA_LENGTH. This is an input/output field to the exit.

ExitData (MQCHAR32)
This field specifies the exit data.

This field is set on entry to the exit routine to information that IBM MQ channel functions took from the channel definition. If no such information is available, this field is all blanks.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

This is an input field to the exit.

The following fields in this structure are not present if *Version* is less than MQCXP_VERSION_2.

MsgRetryCount (MQLONG)
This field specifies the number of times the message has been retried.

The first time the exit is invoked for a particular message, this field has the value zero (no retries yet attempted). On each subsequent invocation of the exit for that message, the value is incremented by one by the MCA.

This is an input field to the exit. The value in this field is not meaningful if *ExitReason* is MQXR_INIT. The field is not present if *Version* is less than MQCXP_VERSION_2.

MsgRetryInterval (MQLONG)
This field specifies the minimum interval in milliseconds after which the put operation is retried.

The first time the exit is invoked for a particular message, this field contains the value of the *MsgRetryInterval* channel attribute. The exit can leave the value unchanged, or modify it to specify a different time interval in milliseconds. If the exit returns MQXCC_OK in *ExitResponse*, the MCA waits for at least this time interval before retrying the MQOPEN or MQPUT operation. The time interval specified must be zero or greater.

The second and subsequent times the exit is invoked for that message, this field contains the value returned by the previous invocation of the exit.

If the value returned in the *MsgRetryInterval* field is less than zero or greater than 999 999 999, and *ExitResponse* is MQXCC_OK, the MCA ignores the *MsgRetryInterval* field in MQCXP and waits instead for the interval specified by the *MsgRetryInterval* channel attribute.

This is an input/output field to the exit. The value in this field is not meaningful if *ExitReason* is MQXR_INIT. The field is not present if *Version* is less than MQCXP_VERSION_2.

MsgRetryReason (MQLONG)
This field specifies the reason code from the previous attempt to put the message.

This field is the reason code from the previous attempt to put the message; it is one of the MQRC_* values.

This is an input field to the exit. The value in this field is not meaningful if *ExitReason* is MQXR_INIT. The field is not present if *Version* is less than MQCXP_VERSION_2.

The following fields in this structure are not present if *Version* is less than MQCXP_VERSION_3.

HeaderLength (MQLONG)
This field specifies the length of header information.

This field is relevant only for a message exit and a message-retry exit. The value is the length of the routing header structures at the start of the message data; these are the MQXQH structure, the MQMDE (message description extension header), and (for a distribution-list message) the MQDH structure and arrays of MQOR and MQPMR records that follow the MQXQH structure.

The message exit can examine this header information, and modify it if necessary, but the data that the exit returns must still be in the correct format. The exit must not, for example, encrypt or compress the header data at the sending end, even if the message exit at the receiving end makes compensating changes.

If the message exit modifies the header information in such a way as to change its length (for example, by adding another destination to a distribution-list message), it must change the value of *HeaderLength* correspondingly before returning.

This is an input/output field to the exit. The value in this field is not meaningful if *ExitReason* is MQXR_INIT. The field is not present if *Version* is less than MQCXP_VERSION_3.

PartnerName (MQCHAR48)
This field specifies the name of the partner.

The name of the partner, as follows:

- For SVRCONN channels, it is the logged-on user ID at the client.
- For all other types of channel, it is the queue manager name of the partner.

When the exit is initialized this field is blank because the queue manager does not know the name of the partner until after initial negotiation has taken place.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_3.

FAPLevel (MQLONG)
Negotiated Formats and Protocols level.

This is an input field to the exit. Changes to this field should only be made under the direction of IBM service. The field is not present if *Version* is less than MQCXP_VERSION_3.

CapabilityFlags (MQLONG)
You can set the capability flag to either `MQCF_NONE` or `MQCF_DIST_LISTS`.

You can set either of the following capability flags:

MQCF_NONE
No flags.

MQCF_DIST_LISTS
Distribution lists supported.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_3.

ExitNumber (MQLONG)
This field specifies the ordinal number of the exit.

The ordinal number of the exit, within the type defined in *ExitId*. For example, if the exit being invoked is the third message exit defined, this field contains the value 3. If the exit type is one for which a list of exits cannot be defined (for example, a security exit), this field has the value 1.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_3.

The following fields in this structure are not present if *Version* is less than MQCXP_VERSION_5.

ExitSpace (MQLONG)
This field specifies the number of bytes in the transmission buffer reserved for the exit to use.

This field is relevant only for a send exit. It specifies the amount of space in bytes that the IBM MQ channel functions reserve in the transmission buffer for the exit to use. This field allows the exit to add to the transmission buffer a small amount of data (typically not exceeding a few hundred bytes) for use by a complementary receive exit at the other end. The data added by the send exit must be removed by the receive exit.

The value is always zero on z/OS.

Note: This facility must not be used to send large amounts of data, as it might degrade performance, or even inhibit operation of the channel.

By setting *ExitSpace* the exit is guaranteed that there is always at least that number of bytes available in the transmission buffer for the exit to use. However, the exit can use less than the amount reserved, or

more than the amount reserved if there is space available in the transmission buffer. The exit space in the buffer is provided following the existing data.

ExitSpace can be set by the exit only when *ExitReason* has the value MQXR_INIT; in all other cases the value returned by the exit is ignored. On input to the exit, *ExitSpace* is zero for the MQXR_INIT call, and is the value returned by the MQXR_INIT call in other cases.

If the value returned by the MQXR_INIT call is negative, or there are fewer than 1024 bytes available in the transmission buffer for message data after reserving the requested exit space for all the send exits in the chain, the MCA outputs an error message and closes the channel. Similarly, if during data transfer the exits in the send exit chain allocate more user space than they reserved such that fewer than 1024 bytes remain in the transmission buffer for message data, the MCA outputs an error message and closes the channel. The limit of 1024 allows the control and administrative flows of the channel to be processed by the chain of send exits, without the need for the flows to be segmented.

This is an input/output field to the exit if *ExitReason* is MQXR_INIT, and an input field in all other cases. The field is not present if *Version* is less than MQCXP_VERSION_5.

SSLCertUserId (MQCHAR12)
This field specifies the UserId associated with the remote certificate.

It is blank on all platforms except z/OS

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_6.

SSLRemCertIssNameLength (MQLONG)
This field specifies the length in bytes of the full Distinguished Name of the issuer of the remote certificate pointed to by SSLCertRemoteIssuerNamePtr.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_6. The value is zero if it is not a TLS channel.

SSLRemCertIssNamePtr (PMQVOID)
This field specifies the address of the full Distinguished Name of the issuer of the remote certificate.

Its value is the null pointer if it is not a TLS channel.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_6.

Note: The behavior of channel security exits in determining the Subject Distinguished Name and the Issuer Distinguished Name is changed from IBM WebSphere MQ 7.1. For more information see Channel security exit programs.

SecurityParms (PMQCSP)
This field specifies the address of the MQCSP structure used to specify a user ID and password.

The initial value of this field is the null pointer.

This is an input/output field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_6.

The value in this field that is returned by the exit must be usable by IBM MQ until MQXR_TERM.

CurHdrCompression (MQLONG)
This field specifies which technique is currently being used to compress the header data.

It is set to one of the following:

MQCOMPRESS_NONE
No header data compression is performed.

MQCOMPRESS_SYSTEM
Header data compression is performed.

The value can be altered by a sending channel's message exit to one of the negotiated supported values accessed from the HdrCompList field of the MQCD. This enables the technique used to compress the

header data to be chosen for each message based on the content of the message. The altered value is used for the current message only. The channel ends if the attribute is altered to an unsupported value. The value is ignored if altered outside a sending channel's message exit.

This is an input/output field to the exit. The field is not present if `Version` is less than MQCXP_VERSION_6.

CurMsgCompression (MQLONG)
This field specifies which technique is currently being used to compress the message data.

It is set to one of the following:

MQCOMPRESS_NONE
No header data compression is performed.

MQCOMPRESS_RLE
Message data compression is performed using run-length encoding.

MQCOMPRESS_ZLIBFAST
Message data compression is performed using the zlib compression technique. A fast compression time is preferred.

MQCOMPRESS_ZLIBHIGH
Message data compression is performed using the zlib compression technique. A high level of compression is preferred.

The value can be altered by a sending channel's message exit to one of the negotiated supported values accessed from the MsgCompList field of the MQCD. This enables the technique used to compress the message data to be decided for each message based on the content of the message. The altered value is used for the current message only. The channel ends if the attribute is altered to an unsupported value. The value is ignored if altered outside a sending channel's message exit.

This is an input/output field to the exit. The field is not present if `Version` is less than MQCXP_VERSION_6.

Hconn (MQHCONN)
This field specifies the connection handle that the exit uses if it needs to make any MQI calls within the exit.

This field is not relevant to exits running on client-connection channels, where it contains the value MQHC_UNUSABLE_HCONN (-1).

This is an input field to the exit. The field is not present if `Version` is less than MQCXP_VERSION_7.

SharingConversations (MQBOOL)
This field specifies whether the conversation is the only one that can currently be running on this channel instance, or whether more than one conversation can currently be running on this channel instance.

It also indicates whether the exit program is subject to the risk of the MQCD being altered by another exit program running at the same time.

This field is only relevant for exit programs running on client-connection or server-connection channels.

It is set to one of the following:

FALSE
The exit instance is the only exit instance that can currently be running on this channel instance. This allows the exit to safely update the MQCD fields without contention from other exits running on other channel instances. Whether changes to the MQCD fields are acted upon by the channel is defined by the table of MQCD fields in "Changing MQCD fields in a channel exit" on page 1501.

TRUE
The exit instance is not the only exit instance that can currently be running on this channel instance. Any changes made to the MQCD are not acted upon by the channel, except for changes listed in the table of MQCD fields in "Changing MQCD fields in a channel exit" on page 1501 for Exit Reasons other than MQXR_INIT. If this exit updates the MQCD fields, ensure there is no contention from other exits

running on other conversations at the same time by providing serialization among the exits that run on this channel instance.

This is an input field to the exit. The field is not present if *Version* is less than MQCXP_VERSION_7.

MCAUserSource (MQLONG)
This field specifies the source of the provided MCA user ID.

It can contain one of the following values:

MQUSRC_MAP
The user ID is specified in the MCAUSER attribute.

MQUSRC_CHANNEL
The user ID is flowed from the inbound partner or specified in the MCAUSER field defined in the channel object.

This is an input field to the exit. The field is not present if Version is less than MQCXP_VERSION_8.

pEntryPoints (PMQIEP)
This field specifies the address of the interface entry point for the MQI or DCI call.

The field is not present if *Version* is less than MQCXP_VERSION_8.

RemoteProduct (MQCHAR4)
This field specifies the remote product name.

This field identifies the remote product of the client, for example, C or Java, as displayed in the **RPRODUCT** field of DISPLAY CHSATUS.

The field is not present if *Version* is less than MQCXP_VERSION_9.

RemoteVersion (MQCHAR8)
This field specifies the name of the remote version.

This field identifies the version of the client libraries, as displayed in the **RVERSION** field of DISPLAY CHSTATUS.

The field is not present if *Version* is less than MQCXP_VERSION_9.

C declaration

This declaration is the C declaration for the MQCXP structure.

```
typedef struct tagMQCXP MQCXP;
struct tagMQCXP {
  MQCHAR4   StrucId;           /* Structure identifier */
  MQLONG    Version;           /* Structure version number */
  MQLONG    ExitId;            /* Type of exit */
  MQLONG    ExitReason;        /* Reason for invoking exit */
  MQLONG    ExitResponse;      /* Response from exit */
  MQLONG    ExitResponse2;     /* Secondary response from exit */
  MQLONG    Feedback;          /* Feedback code */
  MQLONG    MaxSegmentLength;  /* Maximum segment length */
  MQBYTE16  ExitUserArea;      /* Exit user area */
  MQCHAR32  ExitData;          /* Exit data */
  MQLONG    MsgRetryCount;     /* Number of times the message has been
                                  retried */
  MQLONG    MsgRetryInterval;  /* Minimum interval in milliseconds after
                                  which the put operation should be
                                  retried */
  MQLONG    MsgRetryReason;    /* Reason code from previous attempt to
                                  put the message */
  MQLONG    HeaderLength;      /* Length of header information */
  MQCHAR48  PartnerName;       /* Partner Name */
  MQLONG    FAPLevel;          /* Negotiated Formats and Protocols
                                  level */
  MQLONG    CapabilityFlags;   /* Capability flags */
  MQLONG    ExitNumber;        /* Exit number */
  /* Ver:3 */
  /* Ver:4 */
  MQLONG    ExitSpace;         /* Number of bytes in transmission buffer
```

```
                                   reserved for exit to use */
  /* Ver:5 */
  MQCHAR12  SSLCertUserid;     /* User identifier associated
                                   with remote TLS certificate */
  MQLONG    SSLRemCertIssNameLength;   /* Length of
                                   distinguished name of issuer
                                   of remote TLS certificate */
  MQPTR     SSLRemCertIssNamePtr;      /* Address of
                                   distinguished name of issuer
                                   of remote TLS certificate */
  PMQVOID   SecurityParms;     /* Security parameters */
  MQLONG    CurHdrCompression; /* Header data compression
                                   used for current message */
  MQLONG    CurMsgCompression; /* Message data compression
                                   used for current message */
  /* Ver:6 */
  MQHCONN   Hconn;             /* Connection handle */
  MQBOOL    SharingConversations;      /* Multiple conversations
                                   possible on channel inst?  */
  /* Ver:7 */
  MQLONG    MCAUserSource;     /* Source of the provided MCA user ID */
  PMQIEP    pEntryPoints;      /* Address of the MQIEP structure */
  /* Ver:8 */
  MQCHAR4   RemoteProduct;     /* The identifier for the remote product */
  MQCHAR8   RemoteVersion;     /* The version of the remote product */
  /* Ver:9 */
};
```

COBOL declaration

This declaration is the COBOL declaration for the MQCXP structure.

```
**   MQCXP structure
  10 MQCXP.
**    Structure identifier
   15 MQCXP-STRUCID          PIC X(4).
**    Structure version number
   15 MQCXP-VERSION          PIC S9(9) BINARY.
**    Type of exit
   15 MQCXP-EXITID           PIC S9(9) BINARY.
**    Reason for invoking exit
   15 MQCXP-EXITREASON       PIC S9(9) BINARY.
**    Response from exit
   15 MQCXP-EXITRESPONSE     PIC S9(9) BINARY.
**    Secondary response from exit
   15 MQCXP-EXITRESPONSE2    PIC S9(9) BINARY.
**    Feedback code
   15 MQCXP-FEEDBACK         PIC S9(9) BINARY.
**    Maximum segment length
   15 MQCXP-MAXSEGMENTLENGTH PIC S9(9) BINARY.
**    Exit user area
   15 MQCXP-EXITUSERAREA     PIC X(16).
**    Exit data
   15 MQCXP-EXITDATA         PIC X(32).
**    Number of times the message has been retried
   15 MQCXP-MSGRETRYCOUNT    PIC S9(9) BINARY.
**    Minimum interval in milliseconds after which the put operation
**    should be retried
   15 MQCXP-MSGRETRYINTERVAL PIC S9(9) BINARY.
**    Reason code from previous attempt to put the message
   15 MQCXP-MSGRETRYREASON   PIC S9(9) BINARY.
**    Length of header information
   15 MQCXP-HEADERLENGTH     PIC S9(9) BINARY.
**    Partner Name
   15 MQCXP-PARTNERNAME      PIC X(48).
**    Negotiated Formats and Protocols level
   15 MQCXP-FAPLEVEL         PIC S9(9) BINARY.
**    Capability flags
   15 MQCXP-CAPABILITYFLAGS  PIC S9(9) BINARY.
**    Exit number
   15 MQCXP-EXITNUMBER       PIC S9(9) BINARY.
**    Number of bytes in transmission buffer reserved for exit to use
   15 MQCXP-EXITSPACE        PIC S9(9) BINARY.
**    User Id associated with remote certificate
   15  MQCXP-SSLCERTUSERID   PIC X(12).
** Length of distinguished name of issuer of remote TLS
** certificate
   15  MQCXP-SSLREMCERTISSNAMELENGTH PIC S9(9) BINARY.
** Address of distinguished name of issuer of remote TLS
```

```
** certificate
   15  MQCXP-SSLREMCERTISSNAMEPTR    POINTER.
** Security parameters
   15  MQCXP-SECURITYPARMS           PIC S9(18) BINARY.
** Header data compression used for current message
   15  MQCXP-CURHDRCOMPRESSION       PIC S9(9) BINARY.
** Message data compression used for current message
   15  MQCXP-CURMSGCOMPRESSION       PIC S9(9) BINARY.
** Connection handle
   15 MQCXP-HCONN                    PIC S9(9) BINARY.
** Multiple conversations possible on channel instance?
   15 MQCXP-SHARINGCONVERSATIONS     PIC S9(9) BINARY.
** Source of the provided MCA user ID
   15 MQCXP-MCAUSERSOURCE            PIC S9(9) BINARY.
** Identifier of the remote product
   15 MQCXP-RPRODUCT                 PIC X(4).
** Identifier of the remote version
   15 MQCXP-RVERSION                 PIC X(8).
```

RPG declaration (ILE)

This declaration is the RPG declaration for the MQCXP structure.

```
     D*..1....:....2....:....3....:....4....:....5....:....6....:....7..
     D* MQCXP Structure
     D*
     D* Structure identifier
     D  CXSID                  1      4
     D* Structure version number
     D  CXVER                  5      8I 0
     D* Type of exit
     D  CXXID                  9     12I 0
     D* Reason for invoking exit
     D  CXREA                 13     16I 0
     D* Response from exit
     D  CXRES                 17     20I 0
     D* Secondary response from exit
     D  CXRE2                 21     24I 0
     D* Feedback code
     D  CXFB                  25     28I 0
     D* Maximum segment length
     D  CXMSL                 29     32I 0
     D* Exit user area
     D  CXUA                  33     48
     D* Exit data
     D  CXDAT                 49     80
     D* Number of times the message has been retried
     D  CXMRC                 81     84I 0
     D* Minimum interval in milliseconds after which the put operation
     D* should be retried
     D  CXMRI                 85     88I 0
     D* Reason code from previous attempt to put the message
     D  CXMRR                 89     92I 0
     D* Length of header information
     D  CXHDL                 93     96I 0
     D* Partner Name
     D  CXPNM                 97    144
     D* Negotiated Formats and Protocols level
     D  CXFAP                145    148I 0
     D* Capability flags
     D  CXCAP                149    152I 0
     D* Exit number
     D  CXEXN                153    156I 0
     D* Number of bytes in transmission buffer reserved for exit to use
     D  CXHDL                157    160I 0
     D* User identifier associated with remote TLS certificate
     D  CXSSLCU              161    172
     D* Length of distinguished name of issuer of remote TLS certificate
     D  CXSRCINL             173    176I 0
     D* Address of distinguished name of issuer of remote TLS certificate
     D  CXSRCINP             177    192*
     D* Security parameters
     D  CXSECP               193    208*
     D* Header data compression used for current message
     D  CXCHC                209    212I 0
     D* Message data compression used for current message
     D  CXCMC                213    216I 0
     D* Connection handle
     D  CXHCONN               217    220I   0
```

```
      D* Multiple conversations possible on channel instance?
      D  CXSHARECONV           221    224I   0
      D* Source of the provided MCA user ID
      D  MCAUSERSOURCE         225    228I   0
      D* Identifer of the remote product
      D  CXRPRO                229    232I   0
      D* Identifier of the remote version
      D  CXRVER                233    240I   0
```

System/390 assembler declaration

This declaration is the System/390 assembler declaration for the MQCXP structure.

```
MQCXP                   DSECT
MQCXP_STRUCID           DS   CL4    Structure identifier
MQCXP_VERSION           DS   F      Structure version number
MQCXP_EXITID            DS   F      Type of exit
MQCXP_EXITREASON        DS   F      Reason for invoking exit
MQCXP_EXITRESPONSE      DS   F      Response from exit
MQCXP_EXITRESPONSE2     DS   F      Secondary response from exit
MQCXP_FEEDBACK          DS   F      Feedback code
MQCXP_MAXSEGMENTLENGTH  DS   F      Maximum segment length
MQCXP_EXITUSERAREA      DS   XL16   Exit user area
MQCXP_EXITDATA          DS   CL32   Exit data
MQCXP_MSGRETRYCOUNT     DS   F      Number of times the message has been
*                                   retried
MQCXP_MSGRETRYINTERVAL  DS   F      Minimum interval in milliseconds
*                                   after which the put operation should
*                                   be retried
MQCXP_MSGRETRYREASON    DS   F      Reason code from previous attempt to
*                                   put the message
MQCXP_HEADERLENGTH      DS   F      Length of header information
MQCXP_PARTNERNAME       DS   CL48   Partner Name
MQCXP_FAPLEVEL          DS   F      Negotiated Formats and Protocols
*                                   level
MQCXP_CAPABILITYFLAGS   DS   F      Capability flags
MQCXP_EXITNUMBER        DS   F      Exit number
MQCXP_EXITSPACE         DS   F      Number of bytes in transmission
*                                   buffer reserved for exit to use
MQCXP_SSLCERTUSERID     DS   CL12   User identifier associated with
*                                   remote TLS certificate
MQCXP_SSLREMCERTISSNAMELENGTH   DS   F      Length of distinguished name
*                                   of issuer of remote TLS certificate
MQCXP_SSLREMCERTISSNAMEPTR      DS   F      Address of distinguished name
*                                   of issuer of remote TLS certificate
MQCXP_SECURITYPARMS     DS   F    Address of security parameters
MQCXP_CURHDRCOMPRESSION         DS   F      Header data compression used for
*                                   current message
MQCXP_CURMSGCOMPRESSION         DS   F      Message data compression used for
*                                   current message
MQCXP_HCONN             DS   F Connection handle
MQCXP_SHARINGCONVERSATIONS      DS   F Multiple conversations possible on
*                                   channel inst?
MQCXP_MCAUSERSOURCE     DS   F    Source of the provided MCA user ID
MQCXP_RPRODUCT          DS   CL4  Identifer of the remote product
MQCXP_RVERSION          DS   CL8  Identifier of the remote version

MQCXP_LENGTH            EQU  *-MQCXP
                        ORG  MQCXP
MQCXP_AREA              DS   CL(MQCXP_LENGTH)
```

MQXWD - Exit wait descriptor

The MQXWD structure is an input/output parameter on the MQXWAIT call.

This structure is supported only on z/OS.

Related reference

“Fields” on page 1519
This topic lists all the fields in the MQXWD structure and describes each field.

“C declaration” on page 1519
This declaration is the C declaration for the MQXWD structure.

“System/390 assembler declaration” on page 1520

This declaration is the System/390 assembler declaration for the MQXWD structure.

Fields

This topic lists all the fields in the MQXWD structure and describes each field.

StrucId (MQCHAR4)
This field specifies the structure identifier.

The value must be:

MQXWD_STRUC_ID
Identifier for exit wait descriptor structure.

For the C programming language, the constant MQXWD_STRUC_ID_ARRAY is also defined; this constant has the same value as MQXWD_STRUC_ID, but is an array of characters instead of a string.

The initial value of this field is MQXWD_STRUC_ID.

Version (MQLONG)
This field specifies the structure version number.

The value must be:

MQXWD_VERSION_1
Version number for exit wait descriptor structure.

The initial value of this field is MQXWD_VERSION_1.

Reserved1 (MQLONG)
This field is reserved. Its value must be zero.

This is an input field.

Reserved2 (MQLONG)
This field is reserved. Its value must be zero.

This is an input field.

Reserved3 (MQLONG)
This field is reserved. Its value must be zero.

This is an input field.

ECB (MQLONG)
This field specifies the event control block to wait on.

This field is the event control block (ECB) to wait on. It must be set to zero before the MQXWAIT call is issued; on successful completion it contains the post code.

This field is an input/output field.

C declaration

This declaration is the C declaration for the MQXWD structure.

```
typedef struct tagMQXWD MQXWD;
struct tagMQXWD {
  MQCHAR4  StrucId;    /* Structure identifier */
  MQLONG   Version;    /* Structure version number */
  MQLONG   Reserved1;  /* Reserved */
  MQLONG   Reserved2;  /* Reserved */
  MQLONG   Reserved3;  /* Reserved */
  MQLONG   ECB;        /* Event control block to wait on */
};
```

System/390 assembler declaration

This declaration is the System/390 assembler declaration for the MQXWD structure.

```
MQXWD            DSECT
MQXWD_STRUCID    DS    CL4   Structure identifier
MQXWD_VERSION    DS    F     Structure version number
MQXWD_RESERVED1  DS    F     Reserved
MQXWD_RESERVED2  DS    F     Reserved
MQXWD_RESERVED3  DS    F     Reserved
MQXWD_ECB        DS    F     Event control block to wait on
*
MQXWD_LENGTH     EQU   *-MQXWD
                 ORG   MQXWD
MQXWD_AREA       DS    CL(MQXWD_LENGTH)
```

Cluster workload exit call and data structures

This section provides reference information for the cluster workload exit and the data structures. This is general-use programming interface information.

You can write cluster workload exits in the following programming languages:

- C
- System/390 assembler (IBM MQ for z/OS)

The call is described in:

- "MQ_CLUSTER_WORKLOAD_EXIT - Call description" on page 1521

The structure data types used by the exit are described in:

- "MQXCLWLN - Navigate Cluster workload records" on page 1522
- "MQWXP - Cluster workload exit parameter structure" on page 1526
- "MQWDR - Cluster workload destination record structure" on page 1534
- "MQWQR - Cluster workload queue record structure" on page 1538
- "MQWCR - Cluster workload cluster record structure" on page 1543

- z/OS Asynchronous behavior of CLUSTER commands on z/OS

Throughout this section, queue manager attributes and queue attributes are shown in full. The equivalent names that are used in the MQSC commands are shown below. For details of MQSC commands, see MQSC commands.

Table 824. Queue manager attributes

Full name	Name used in MQSC
ClusterWorkloadData	CLWLDATA
ClusterWorkloadExit	CLWLEXIT
ClusterWorkloadLength	CLWLLEN

Table 825. Queue attributes

Full name	Name used in MQSC
DefBind	DEFBIND
DefPersistence	DEFPSIST
DefPriority	DEFPRTY
InhibitPut	PUT

Table 825. Queue attributes (continued)	
Full name	**Name used in MQSC**
QDesc	DESCR

Related tasks

Writing and compiling cluster workload exits

MQ_CLUSTER_WORKLOAD_EXIT - Call description

The cluster workload exit is called by the queue manager to route a message to an available queue manager.

Note: No entry point called MQ_CLUSTER_WORKLOAD_EXIT is provided by the queue manager. Instead, the name of the cluster workload exit is defined by the ClusterWorkloadExit queue manager attribute.

The MQ_CLUSTER_WORKLOAD_EXIT exit is supported on all platforms.

Syntax

```
MQ_CLUSTER_WORKLOAD_EXIT (ExitParms)
```

Related reference

MQXCLWLN - Navigate Cluster workload records
The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

MQWXP - Cluster workload exit parameter structure
The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

MQWDR - Cluster workload destination record structure
The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

MQWQR - Cluster workload queue record structure
The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

MQWCR - Cluster workload cluster record structure
The following table summarizes the fields in the MQWCR cluster workload record structure.

Parameters for MQ_CLUSTER_WORKLOAD_EXIT

Description of the parameters in the MQ_CLUSTER_WORKLOAD_EXIT call.

***ExitParms* (MQWXP) - input/output**

Exit parameter block.

- The exit sets information in MQWXP to indicate how to manage the workload.

Related reference

Usage notes
The function performed by the cluster workload exit is defined by the provider of the exit. The exit, however, must conform to the rules defined in the associated control block MQWXP.

Language invocations for MQ_CLUSTER_WORKLOAD_EXIT

The MQ_CLUSTER_WORKLOAD_EXIT supports two languages, C and High Level Assembler.

Usage notes

The function performed by the cluster workload exit is defined by the provider of the exit. The exit, however, must conform to the rules defined in the associated control block MQWXP.

No entry point called MQ_CLUSTER_WORKLOAD_EXIT is provided by the queue manager. However, a typedef is provided for the name MQ_CLUSTER_WORKLOAD_EXIT in the C programming language. Use the typedef to declare the user-written exit, to ensure that the parameters are correct.

Related reference

Parameters for MQ_CLUSTER_WORKLOAD_EXIT
Description of the parameters in the MQ_CLUSTER_WORKLOAD_EXIT call.

Language invocations for MQ_CLUSTER_WORKLOAD_EXIT
The MQ_CLUSTER_WORKLOAD_EXIT supports two languages, C and High Level Assembler.

Language invocations for MQ_CLUSTER_WORKLOAD_EXIT

The MQ_CLUSTER_WORKLOAD_EXIT supports two languages, C and High Level Assembler.

C invocation

```
MQ_CLUSTER_WORKLOAD_EXIT (&ExitParms);
```

Replace *MQ_CLUSTER_WORKLOAD_EXIT* with the name of your cluster workload exit function.

Declare the **MQ_CLUSTER_WORKLOAD_EXIT** parameters as follows:

```
MQWXP ExitParms; /* Exit parameter block */
```

High Level Assembler invocation

```
CALL EXITNAME,(EXITPARMS)
```

Declare the parameters as follows:

```
EXITPARMS      CMQWXPA       Exit parameter block
```

Related reference

Parameters for MQ_CLUSTER_WORKLOAD_EXIT
Description of the parameters in the MQ_CLUSTER_WORKLOAD_EXIT call.

Usage notes
The function performed by the cluster workload exit is defined by the provider of the exit. The exit, however, must conform to the rules defined in the associated control block MQWXP.

MQXCLWLN - Navigate Cluster workload records

The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

The cluster cache is an area of main storage used to store information relating to the cluster.

If the cluster cache is static, it has a fixed size. If you set it to dynamic, the cluster cache can expand as required.

Set the type of cluster cache to STATIC or DYNAMIC using either a system parameter or macro.

- Multi Use the system parameter ClusterCacheType on Multiplatforms.

- z/OS Use the CLCACHE parameter in the CSQ6SYSP macro on z/OS.

Syntax

```
MQXCLWLN (ExitParms, CurrentRecord, NextOffset, NextRecord, Compcode, Reason)
```

Related reference

MQ_CLUSTER_WORKLOAD_EXIT - Call description
The cluster workload exit is called by the queue manager to route a message to an available queue manager.

MQWXP - Cluster workload exit parameter structure
The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

MQWDR - Cluster workload destination record structure
The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

MQWQR - Cluster workload queue record structure
The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

MQWCR - Cluster workload cluster record structure
The following table summarizes the fields in the MQWCR cluster workload record structure.

Parameters for MQXCLWLN - Navigate Cluster workload records

Description of the parameters in the MQXCLWLN call.

ExitParms (MQWXP) - input/output

Exit parameter block.

This structure contains information relating to the invocation of the exit. The exit sets information in this structure to indicate how to manage the workload.

CurrentRecord (MQPTR) - input

Address of current record.

This structure contains information relating to the address of the record currently being examined by the exit. The record must be one of the following types:

- Cluster workload destination record (MQWDR)
- Cluster workload queue record (MQWQR)
- Cluster workload cluster record (MQWCR)

NextOffset (MQLONG) - input

Offset of next record.

This structure contains information relating to the offset of the next record or structure. *NextOffset* is the value of the appropriate offset field in the current record, and must be one of the following fields:

- ChannelDefOffset field in MQWDR
- ClusterRecOffset field in MQWDR
- ClusterRecOffset field in MQWQR
- ClusterRecOffset field in MQWCR

NextRecord (MQPTR) - output

Address of next record or structure.

This structure contains information relating to the address of the next record or structure. If *CurrentRecord* is the address of an MQWDR, and *NextOffset* is the value of the ChannelDefOffset field, *NextRecord* is the address of the channel definition structure (MQCD).

If there is no next record or structure, the queue manager sets *NextRecord* to the null pointer, and the call returns completion code MQCC_WARNING and reason code MQRC_NO_RECORD_AVAILABLE.

CompCode (MQLONG) - output
Completion code.

The completion code has one of the following values:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion).

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying CompCode

If CompCode is MQCC_OK:

MQRC_NONE
(0, X'0000')
No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_NO_RECORD_AVAILABLE
(2359, X'0937')
No record available. An MQXCLWLN call was issued from a cluster workload exit to obtain the address of the next record in the chain. The current record is the last record in the chain. Corrective action: None.

If *CompCode* is MQCC_FAILED:

MQRC_CURRENT_RECORD_ERROR
(2357, X'0935')
CurrentRecord parameter not valid. An MQXCLWLN call was issued from a cluster workload exit to obtain the address of the next record in the chain. The address specified by the **CurrentRecord** parameter is not the address of a valid record.

CurrentRecord must be the address of a destination record, MQWDR, queue record (MQWQR), or cluster record (MQWCR) residing within the cluster cache. Corrective action: Ensure that the cluster workload exit passes the address of a valid record residing in the cluster cache.

MQRC_ENVIRONMENT_ERROR
(2012, X'07DC')
Call not valid in environment. An MQXCLWLN call was issued, but not from a cluster workload exit.

MQRC_NEXT_OFFSET_ERROR
(2358, X'0936')
NextOffset parameter not valid. An MQXCLWLN call was issued from a cluster workload exit to obtain the address of the next record in the chain. The offset specified by the **NextOffset** parameter is not valid. **NextOffset** must be the value of one of the following fields:

- ChannelDefOffset field in MQWDR
- ClusterRecOffset field in MQWDR
- ClusterRecOffset field in MQWQR
- ClusterRecOffset field in MQWCR

Corrective action: Ensure that the value specified for the **NextOffset** parameter is the value of one of the fields listed previously.

MQRC_NEXT_RECORD_ERROR
(2361, X'0939')
NextRecord parameter not valid.

MQRC_WXP_ERROR
(2356, X'0934')

Workload exit parameter structure not valid. An MQXCLWLN call was issued from a cluster workload exit to obtain the address of the next record in the chain. The workload exit parameter structure **ExitParms** is not valid, for one of the following reasons:

- The parameter pointer is not valid. It is not always possible to detect parameter pointers that are not valid; if not detected, unpredictable results occur.
- The StrucId field is not MQWXP_STRUC_ID.
- The Version field is not MQWXP_VERSION_2.
- The Context field does not contain the value passed to the exit by the queue manager.

Corrective action: Ensure that the parameter specified for **ExitParms** is the MQWXP structure that was passed to the exit when the exit was invoked.

Related reference

Usage notes for MQXCLWLN - Navigate Cluster workload records
Use MQXCLWLN to navigate through cluster records, even if the cache is static.

Language invocations of MQXCLWLN
MQXCLWLN supports two languages, C and High Level Assembler.

Usage notes for MQXCLWLN - Navigate Cluster workload records

Use MQXCLWLN to navigate through cluster records, even if the cache is static.

If the cluster cache is dynamic, the MQXCLWLN call must be used to navigate through the records. The exit ends abnormally if simple pointer-and-offset arithmetic is used to navigate through the records.

If the cluster cache is static, MQXCLWLN need not be used to navigate through the records. Typically use MQXCLWLN even when the cache is static. You can then change the cluster cache to being dynamic without needing to change the workload exit.

Related reference

Parameters for MQXCLWLN - Navigate Cluster workload records
Description of the parameters in the MQXCLWLN call.

Language invocations of MQXCLWLN
MQXCLWLN supports two languages, C and High Level Assembler.

Language invocations of MQXCLWLN

MQXCLWLN supports two languages, C and High Level Assembler.

C invocation

```
MQXCLWLN (&ExitParms, CurrentRecord, NextOffset, &NextRecord, &CompCode, &Reason) ;
```

Declare the parameters as follows:

```
Typedef struct tagMQXCLWLN {
MQWXP   ExitParms;      /* Exit parameter block */
MQPTR   CurrentRecord;  /* Address of current record*/
MQLONG  NextOffset;     /* Offset of next record */
MQPTR   NextRecord;     /* Address of next record or structure */
MQLONG  CompCode;       /* Completion code */
MQLONG  Reason;         /* Reason code qualifying CompCode */
```

High Level Assembler invocation

```
CALL MQXCLWLN,(CLWLEXITPARMS,CURRENTRECORD,NEXTOFFSET,NEXTRECORD,COMPCODE,REASON)
```

Declare the parameters as follows:

```
CLWLEXITPARMS CMQWXPA, Cluster workload exit parameter block
CURRENTRECORD CMQWDRA, Current record
NEXTOFFSET    DS F     Next offset
NEXTRECORD    DS F     Next record
COMPCODE      DS F     Completion code
REASON        DS F     Reason code qualifying COMPCODE
```

Related reference

Parameters for MQXCLWLN - Navigate Cluster workload records
Description of the parameters in the MQXCLWLN call.

Usage notes for MQXCLWLN - Navigate Cluster workload records
Use MQXCLWLN to navigate through cluster records, even if the cache is static.

MQWXP - Cluster workload exit parameter structure

The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

Table 826. Fields in MQWXP

Field	Description	Page
StrucId	Structure identifier	StrucId
Version	Structure version number	Version
ExitId	Type of exit	ExitId
ExitReason	Reason for invoking exit	ExitReason
ExitResponse	Response from exit	ExitResponse
ExitResponse2	Secondary response from exit	ExitResponse2
Feedback	Feedback code	Feedback
Flags	Flags values. These bit flags are used to indicate information about the message being put	Flags
ExitUserArea	Exit user area	ExitUserArea
ExitData	Exit data	ExitData
MsgDescPtr	Address of message descriptor (MQMD)	MsgDescPtr
MsgBufferPtr	Address of buffer containing some or all the message data	MsgBufferPtr
MsgBufferLength	Length of buffer containing message data	MsgBufferLength
MsgLength	Length of complete message	MsgLength
QName	Name of queue	QName
QMgrName	Name of local queue manager	QMgrName
DestinationCount	Number of possible destinations	DestinationCount
DestinationChosen	Destination chosen	DestinationChosen
DestinationArrayPtr	Address of an array of pointers to destination records (MQWDR)	DestinationArrayPtr
QArrayPtr	Address of an array of pointers to queue records (MQWQR)	QArrayPtr

Table 826. Fields in MQWXP (continued)		
Field	**Description**	**Page**
Note: The remaining fields are ignored if Version is less than MQWXP_VERSION_2.		
CacheContext	Context information	CacheContext
CacheType	Type of cluster cache	CacheType
Note: The remaining fields are ignored if Version is less than MQWXP_VERSION_3.		
CLWLMRUChannels	Maximum number of allowed active outbound cluster channels	CLWLMRUChannels
Note: The remaining fields are ignored if Version is less than MQWXP_VERSION_4.		
pEntryPoints	Address of the MQIEP structure to allow MQI and DCI calls to be made	pEntryPoints

The cluster workload exit parameter structure describes the information that is passed to the cluster workload exit.

The cluster workload exit parameter structure is supported on all platforms

Additionally, the MQWXP1, MQWXP2 and MQWXP3 structures are available for backwards compatibility.

Related reference

MQ_CLUSTER_WORKLOAD_EXIT - Call description
The cluster workload exit is called by the queue manager to route a message to an available queue manager.

MQXCLWLN - Navigate Cluster workload records
The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

MQWDR - Cluster workload destination record structure
The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

MQWQR - Cluster workload queue record structure
The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

MQWCR - Cluster workload cluster record structure
The following table summarizes the fields in the MQWCR cluster workload record structure.

Fields in MQWXP - Cluster workload exit parameter structure

Description of the fields in the MQWXP - Cluster workload exit parameter structure

StrucId (MQCHAR4) - input

The structure identifier for the cluster workload exit parameter structure.

- The StrucId value is MQWXP_STRUC_ID.
- For the C programming language, the constant MQWXP_STRUC_ID_ARRAY is also defined. It has the same value as MQWXP_STRUC_ID. It is an array of characters instead of a string.

Version (MQLONG) - input

Indicates the structure version number. Version takes one of the following values:

MQWXP_VERSION_1

Version-1 cluster workload exit parameter structure.

MQWXP_VERSION_1 is supported in all environments.

MQWXP_VERSION_2

Version-2 cluster workload exit parameter structure.

MQWXP_VERSION_2 is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

MQWXP_VERSION_3
Version-3 cluster workload exit parameter structure.

MQWXP_VERSION_3 is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

MQWXP_VERSION_4
Version-4 cluster workload exit parameter structure.

MQWXP_VERSION_4 is supported in the following environments:

- AIX AIX
- IBM i IBM i
- Linux Linux
- Solaris Solaris
- Windows Windows

MQWXP_CURRENT_VERSION
Current version of cluster workload exit parameter structure.

ExitId (MQLONG) - input
Indicates the type of exit being called. The cluster workload exit is the only supported exit.

- The ExitId value must be MQXT_CLUSTER_WORKLOAD_EXIT

ExitReason (MQLONG) - input
Indicates the reason for invoking the cluster workload exit. ExitReason takes one of the following values:

MQXR_INIT
Indicates that the exit is being invoked for the first time.

Acquire and initialize any resources that the exit might need, such as main storage.

MQXR_TERM
Indicates that the exit is about to be terminated.

Free any resources that the exit might have acquired since it was initialized, such as main storage.

MQXR_CLWL_OPEN
Called by MQOPEN.

MQXR_CLWL_PUT
Called by MQPUT or MQPUT1.

MQXR_CLWL_MOVE
Called by MCA when the channel state has changed.

MQXR_CLWL_REPOS
Called by MQPUT or MQPUT1 for a repository-manager PCF message.

MQXR_CLWL_REPOS_MOVE
Called by MCA for a repository-manager PCF message if the channel state has changed.

ExitResponse (MQLONG) - output
Set ExitResponse to indicate whether processing of the message continues. It must be one of the following values:

MQXCC_OK
Continue processing the message normally.

- DestinationChosen identifies the destination to which the message is to be sent.

MQXCC_SUPPRESS_FUNCTION
Discontinue processing the message.

- The actions taken by the queue manager depend on the reason the exit was invoked:

Table 827. Actions taken by the queue manager

ExitReason	Action taken
– MQXR_CLWL_OPEN – MQXR_CLWL_REPOS – MQXR_CLWL_PUT	MQOPEN, MQPUT, or MQPUT1 call fail with completion code MQCC_FAILED and reason code MQRC_STOPPED_BY_CLUSTER_EXIT.
– MQXR_CLWL_MOVE – MQXR_CLWL_REPOS_MOVE	The message is placed on the dead-letter queue.

MQXCC_SUPPRESS_EXIT
Continue processing the current message normally. Do not invoke the exit again until the queue manager shuts down.

The queue manager processes subsequent messages as if the ClusterWorkloadExit queue manager attribute is blank. DestinationChosen identifies the destination to which the current message is sent.

Any other value
Process the message as if MQXCC_SUPPRESS_FUNCTION is specified.

ExitResponse2 (MQLONG) - input/output
Set ExitResponse2 to provide the queue manager with more information.

- MQXR2_STATIC_CACHE is the default value, and is set on entry to the exit.
- When ExitReason has the value MQXR_INIT, the exit can set one of the following values in ExitResponse2:

MQXR2_STATIC_CACHE
The exit requires a static cluster cache.

- If the cluster cache is static, the exit need not use the MQXCLWLN call to navigate the chains of records in the cluster cache.
- If the cluster cache is dynamic, the exit cannot navigate correctly through the records in the cache.

Note: The queue manager processes the return from the MQXR_INIT call as though the exit had returned MQXCC_SUPPRESS_EXIT in the ExitResponse field.

MQXR2_DYNAMIC_CACHE
The exit can operate with either a static or dynamic cache.

- If the exit returns this value, the exit must use the MQXCLWLN call to navigate the chains of records in the cluster cache.

Feedback (MQLONG) - input
A reserved field. The value is zero.

Flags (MQLONG) - input
Indicates information about the message being put.

- The value of Flags is MQWXP_PUT_BY_CLUSTER_CHL. The message originates from a cluster channel, rather than locally or from a non-cluster channel. In other words, the message has come from another cluster queue manager.

Reserved (MQLONG) - input
A reserved field. The value is zero.

ExitUserArea (MQBYTE16) - input/output
Set ExitUserArea to communicate between calls to the exit.

- ExitUserArea is initialized to binary zero before the first invocation of the exit. Any changes made to this field by the exit are preserved across the invocations of the exit that occur between the MQCONN call and the matching MQDISC call. The field is reset to binary zero when the MQDISC call occurs.
- The first invocation of the exit is indicated by the ExitReason field having the value MQXR_INIT.
- The following constants are defined:

  MQXUA_NONE - string
  MQXUA_NONE_ARRAY - character array
  No user information. Both constants are binary zero for the length of the field.

  MQ_EXIT_USER_AREA_LENGTH
  The length of ExitUserArea.

ExitData (MQCHAR32) - input
The value of the ClusterWorkloadData queue manager attribute. If no value has been defined for that attribute, this field is all blanks.

- The length of ExitData is given by MQ_EXIT_DATA_LENGTH.

MsgDescPtr (PMQMD) - input
The address of a copy of the message descriptor (MQMD) for the message being processed.

- Any changes made to the message descriptor by the exit are ignored by the queue manager.
- If ExitReason has one of the following values MsgDescPtr is set to the null pointer, and no message descriptor is passed to the exit:
  - MQXR_INIT
  - MQXR_TERM
  - MQXR_CLWL_OPEN

MsgBufferPtr (PMQVOID) - input
The address of a buffer containing a copy of the first MsgBufferLength bytes of the message data.

- Any changes made to the message data by the exit are ignored by the queue manager.
- No message data is passed to the exit when:
  - MsgDescPtr is the null pointer.
  - The message has no data.
  - The ClusterWorkloadLength queue manager attribute is zero.

  In these cases, MsgBufferPtr is the null pointer.

MsgBufferLength (MQLONG) - input
The length of the buffer containing the message data passed to the exit.

- The length is controlled by the `ClusterWorkloadLength` queue manager attribute.
- The length might be less than the length of the complete message, see `MsgLength`.

`MsgLength` (MQLONG) - input
The length of the complete message passed to the exit.

- `MsgBufferLength` might be less than the length of the complete message.
- `MsgLength` is zero if `ExitReason` is `MQXR_INIT`, `MQXR_TERM`, or `MQXR_CLWL_OPEN`.

`QName` (MQCHAR48) - input
The name of the destination queue. The queue is a cluster queue.

- The length of `QName` is `MQ_Q_NAME_LENGTH`.

`QMgrName` (MQCHAR48) - input
The name of the local queue manager that has invoked the cluster workload exit.

- The length of `QMgrName` is `MQ_Q_MGR_NAME_LENGTH`.

`DestinationCount` (MQLONG) - input
The number of possible destinations. Destinations are instances of the destination queue and are described by destination records.

- A destination record is a `MQWDR` structure. There is one structure for each possible route to each instance of the queue.
- `MQWDR` structures are addressed by an array of pointers, see `DestinationArrayPtr`.

`DestinationChosen` (MQLONG) - input/output
The chosen destination.

- The number of the `MQWDR` structure that identifies the route and queue instance where the message is to be sent.
- The value is in the range `1` - `DestinationCount`.
- On input to the exit, `DestinationChosen` indicates the route and queue instance that the queue manager has selected. The exit can accept this choice, or choose a different route and queue instance.
- The value set by the exit must be in the range `1` - `DestinationCount`. If any other value is returned, the queue manager uses the value of `DestinationChosen` on input to the exit.

`DestinationArrayPtr` (PPMQWDR) - input
The address of an array of pointers to destination records (`MQWDR`).

- There are `DestinationCount` destination records.

`QArrayPtr` (PPMQWQR) - input
The address of an array of pointers to queue records (`MQWQR`).

- If queue records are available, there are `DestinationCount` of them.
- If no queue records are available, `QArrayPtr` is the null pointer.

  Note: `QArrayPtr` can be the null pointer even when `DestinationCount` is greater than zero.

`CacheContext` (MQPTR) : Version 2 - input
The `CacheContext` field is reserved for use by the queue manager. The exit must not alter the value of this field.

`CacheType` (MQLONG) : Version 2 - input
The cluster cache has one of the following types:

`MQCLCT_STATIC`
The cache is static.

- The size of the cache is fixed, and cannot grow as the queue manager operates.
- You do not need to use the `MQXCLWLN` call to navigate the records in this type of cache.

MQCLCT_DYNAMIC
The cache is dynamic.

- The size of the cache can increase in order to accommodate the varying cluster information.
- You must use the MQXCLWLN call to navigate the records in this type of cache.

CLWLMRUChannels (MQLONG) : Version 3 - input
Indicates the maximum number of active outbound cluster channels, to be considered for use by the cluster workload choice algorithm.

- CLWLMRUChannels is a value 1 - 999 999 999.

pEntryPoints (PMQIEP) : Version 4
The address of an MQIEP structure through which MQI and DCI calls can be made.

Related reference

Initial values and language declarations for MQWXP
Initial values and C and High Level Assembler Language declarations for MQWXP - Cluster workload exit parameter structure.

Initial values and language declarations for MQWXP

Initial values and C and High Level Assembler Language declarations for MQWXP - Cluster workload exit parameter structure.

Table 828. Initial values of fields in MQWXP

Field name	Name of constant	Value of constant
StrucId	MQWXP_STRUC_ID	'WXP¬'
Version	MQWXP_VERSION_2	2
ExitId	None	0
ExitReason	MQXCC_OK	0
ExitResponse	None	0
ExitResponse2	None	0
Flags	None	0
ExitUserArea	{MQXUA_NONE_ARRAY}	0
ExitData	None	""
MsgDescPtr	None	NULL
MsgBufferPtr	None	NULL
MsgBufferLength	None	0
MsgBufferPtr	None	0
QName	None	""
QMgrName	None	""
DestinationCount	None	0
DestinationChosen	None	0
DestinationArrayPtr	None	NULL
QArrayPtr	None	NULL
CacheContext	None	NULL

Table 828. Initial values of fields in MQWXP (continued)		
Field name	**Name of constant**	**Value of constant**
CacheType	MQCLCT_DYNAMIC	1
CLWLMRUChannels	None	0
pEntryPoints	None	NULL

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQWXP_DEFAULT contains the default values. Use it in the following way to provide initial values for the fields in the structure:

```
MQWDR MyWXP = {MQWXP_DEFAULT};
```

C declaration

```
typedef struct tagMQWXP {
  MQCHAR4   StrucId;              /* Structure identifier */
  MQLONG    Version;              /* Structure version number */
  MQLONG    ExitId;               /* Type of exit */
  MQLONG    ExitReason;           /* Reason for invoking exit */
  MQLONG    ExitResponse;         /* Response from exit */
  MQLONG    ExitResponse2;        /* Reserved */
  MQLONG    Feedback;             /* Reserved */
  MQLONG    Flags;                /* Flags */
  MQBYTE16  ExitUserArea;         /* Exit user area */
  MQCHAR32  ExitData;             /* Exit data */
  PMQMD     MsgDescPtr;           /* Address of message descriptor */
  PMQVOID   MsgBufferPtr;         /* Address of buffer containing some
                                     or all of the message data */
  MQLONG    MsgBufferLength;      /* Length of buffer containing message
                                     data */
  MQLONG    MsgLength;            /* Length of complete message */
  MQCHAR48  QName;                /* Queue name */
  MQCHAR48  QMgrName;             /* Name of local queue manager */
  MQLONG    DestinationCount;     /* Number of possible destinations */
  MQLONG    DestinationChosen;    /* Destination chosen */
  PPMQWDR   DestinationArrayPtr;  /* Address of an array of pointers to
                                     destination records */
  PPMQWQR   QArrayPtr;            /* Address of an array of pointers to
                                     queue records */
  /* version 1 */
  MQPTR     CacheContext;         /* Context information */
  MQLONG    CacheType;            /* Type of cluster cache */
  /* version 2 */
  MQLONG    CLWLMRUChannnels;     /* Maximum number of most recently
                                     used cluster channels */
  /* version 3 */
  PMQIEP    pEntryPoints;         /* Address of the MQIEP structure */
  /* version 4 */
};
```

High Level Assembler

```
MQWXP                          DSECT
MQWXP_STRUCID                  DS   CL4      Structure identifier
MQWXP_VERSION                  DS   F        Structure version number
MQWXP_EXITID                   DS   F        Type of exit
MQWXP_EXITREASON               DS   F        Reason for invoking exit
MQWXP_EXITRESPONSE             DS   F        Response from exit
MQWXP_EXITRESPONSE2            DS   F        Reserved
MQWXP_FEEDBACK                 DS   F        Reserved
MQWXP_RESERVED                 DS   F        Reserved
MQWXP_EXITUSERAREA             DS   XL16     Exit user area
MQWXP_EXITDATA                 DS   CL32     Exit data
```

```
MQWXP_MSGDESCPTR             DS   F         Address of message
*                                           descriptor
MQWXP_MSGBUFFERPTR           DS   F         Address of buffer containing
*                                           some or all of the message
*                                           data
MQWXP_MSGBUFFERLENGTH        DS   F         Length of buffer containing
*                                           message data
MQWXP_MSGLENGTH              DS   F         Length of complete message
MQWXP_QNAME                  DS   CL48      Queue name
MQWXP_QMGRNAME               DS   CL48      Name of local queue manager
MQWXP_DESTINATIONCOUNT       DS   F         Number of possible
*                                           destinations
MQWXP_DESTINATIONCHOSEN      DS   F         Destination chosen
MQWXP_DESTINATIONARRAYPTR    DS   F         Address of an array of
*                                           pointers to destination
*                                           records
MQWXP_QARRAYPTR              DS   F         Address of an array of
*                                           pointers to queue records
MQWXP_CACHECONTEXT           DS   F         Context information
MQWXP_CACHETYPE              DS   F         Type of cluster cache
MQWXP_CLWLMRUCHANNELS        DS   F         Number of most recently used
*                                           channels for workload balancing

MQWXP_LENGTH                 EQU  *-MQWXP   Length of structure
                             ORG  MQWXP
MQWXP_AREA                   DS   CL(MQWXP_LENGTH)
```

Related reference

Fields in MQWXP - Cluster workload exit parameter structure
Description of the fields in the MQWXP - Cluster workload exit parameter structure

MQWDR - Cluster workload destination record structure

The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

Table 829. Fields in MQWDR

Field	Description	Page
StrucId	Structure identifier	StrucId
Version	Structure version number	Version
StrucLength	Length of MQWDR structure	StrucLength
QMgrFlags	Queue manager flags	QMgrFlags
QMgrIdentifier	Queue manager identifier	QMgrIdentifier
QMgrName	Queue manager name	QMgrName
ClusterRecOffset	Logical offset of first cluster record (MQWCR)	ClusterRecOffset
ChannelState	Channel state	ChannelState
ChannelDefOffset	Logical offset of channel-definition structure (MQCD)	ChannelDefOffset
Note: The remaining fields are ignored if Version is less than MQWDR_VERSION_2.		
DestSeqNumber	Channel destination sequence number	DestSeqNumber
DestSeqFactor	Channel destination sequence factor for weighting	DestSeqFactor

The cluster workload destination record structure contains information relating to one of the possible destinations for the message. There is one cluster workload destination record structure for each instance of the destination queue.

The cluster workload destination record structure is supported in all environments.

Additionally, the MQWDR1 and MQWDR2 structures are available for backwards compatibility.

Related reference

MQ_CLUSTER_WORKLOAD_EXIT - Call description
The cluster workload exit is called by the queue manager to route a message to an available queue manager.

MQXCLWLN - Navigate Cluster workload records
The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

MQWXP - Cluster workload exit parameter structure
The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

MQWQR - Cluster workload queue record structure
The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

MQWCR - Cluster workload cluster record structure
The following table summarizes the fields in the MQWCR cluster workload record structure.

Fields in MQWDR - Cluster workload destination record structure

Description of the parameters in the MQWDR - Cluster workload destination record structure.

StrucId (MQCHAR4) - input
The structure identifier for the cluster workload destination record structure.

- The StrucId value is MQWDR_STRUC_ID.
- For the C programming language, the constant MQWDR_STRUC_ID_ARRAY is also defined. It has the same value as MQWDR_STRUC_ID. It is an array of characters instead of a string.

Version (MQLONG) - input
The structure version number. Version takes one of the following values:

MQWDR_VERSION_1
Version-1 cluster workload destination record.

MQWDR_VERSION_2
Version-2 cluster workload destination record.

MQWDR_CURRENT_VERSION
Current version of cluster workload destination record.

StrucLength (MQLONG) - input
The length of MQWDR structure. StrucLength takes one of the following values:

MQWDR_LENGTH_1
Length of version-1 cluster workload destination record.

MQWDR_LENGTH_2
Length of version-2 cluster workload destination record.

MQWDR_CURRENT_LENGTH
Length of current version of cluster workload destination record.

QMgrFlags (MQLONG) - input
Queue manager flags indicating properties of the queue manager that hosts the instance of the destination queue described by the MQWDR structure. The following flags are defined:

MQQMF_REPOSITORY_Q_MGR
Destination is a full repository queue manager.

MQQMF_CLUSSDR_USER_DEFINED
Cluster-sender channel was defined manually.

MQQMF_CLUSSDR_AUTO_DEFINED
Cluster-sender channel was defined automatically.

MQQMF_AVAILABLE
Destination queue manager is available to receive messages.

Other values
Other flags in the field might be set by the queue manager for internal purposes.

QMgrIdentifier (MQCHAR48) - input
The queue manager identifier is a unique identifier for the queue manager that hosts the instance of the destination queue described by the MQWDR structure.

- The identifier is generated by the queue manager.
- The length of QMgrIdentifier is MQ_Q_MGR_IDENTIFIER_LENGTH.

QMgrName (MQCHAR48) - input
The name of the queue manager that hosts the instance of the destination queue described by the MQWDR structure.

- QMgrName can be the name of the local queue manager, as well another queue manager in the cluster.
- The length of QMgrName is MQ_Q_MGR_NAME_LENGTH.

ClusterRecOffset (MQLONG) - input
The logical offset of the first MQWCR structure that belongs to the MQWDR structure.

- For static caches, ClusterRecOffset is the offset of the first MQWCR structure that belongs to the MQWDR structure.
- The offset is measured in bytes from the start of the MQWDR structure.
- Do not use the logical offset for pointer arithmetic with dynamic caches. To obtain the address of the next record, the MQXCLWLN call must be used.

ChannelState (MQLONG) - input
The state of the channel that links the local queue manager to the queue manager identified by the MQWDR structure. The following values are possible:

MQCHS_BINDING
Channel is negotiating with the partner.

MQCHS_INACTIVE
Channel is not active.

MQCHS_INITIALIZING
Channel is initializing.

MQCHS_PAUSED
Channel has paused.

MQCHS_REQUESTING
Requester channel is requesting connection.

MQCHS_RETRYING
Channel is reattempting to establish connection.

MQCHS_RUNNING
Channel is transferring or waiting for messages.

MQCHS_STARTING
Channel is waiting to become active.

MQCHS_STOPPING
Channel is stopping.

MQCHS_STOPPED
Channel has stopped.

ChannelDefOffset (MQLONG) - input
The logical offset of the channel definition (MQCD) for the channel that links the local queue manager to the queue manager identified by the MQWDR structure.

- ChannelDefOffset is like ClusterRecOffset

- The logical offset cannot be used in pointer arithmetic. To obtain the address of the next record, the MQXCLWLN call must be used.

DestSeqFactor (MQLONG) - input
The destination sequence factor that allows a choice of the channel based on weight.

- DestSeqFactor is used before the queue manager changes it.
- The workload manager increases DestSeqFactor in a way that ensures messages are distributed down channels according to their weight.

DestSeqNumber (MQLONG) - input
The cluster channel destination value before the queue manager changes it.

- The workload manager increases DestSeqNumber every time a message is put down that channel.
- Workload exits can use DestSeqNumber to decide which channel to put a message down.

Related reference

Initial values and language declarations for MQWDR
Initial values and C and High Level Assembler Language declarations for MQWDR - Cluster workload destination record.

Initial values and language declarations for MQWDR

Initial values and C and High Level Assembler Language declarations for MQWDR - Cluster workload destination record.

Table 830. Initial values of fields in MQWDR

Field name	Name of constant	Value of constant
StrucId	MQWDR_STRUC_ID	'WDR¬'
Version	MQWDR_VERSION_1	1
StrucLength	MQWDR_CURRENT_LENGTH [3]	136
QMgrFlags	MQWDR_NONE	0
QMgrIdentifier	None	""
QMgrName	None	""
ClusterRecOffset	None	0
ChannelState	None	0
ChannelDefOffset	None	0
DestSeqNumber	None	0
DestSeqFactor	None	0

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQWDR_DEFAULT contains the default values. Use it in the following way to provide initial values for the fields in the structure:

```
MQWDR MyWDR = {MQWDR_DEFAULT};
```

3. The initial values intentionally set the length of the structure to the length of the current version, and not version 1 of the structure.

High Level Assembler

```
MQWDR                          DSECT
MQWDR_STRUCID                  DS   CL4      Structure identifier
MQWDR_VERSION                  DS   F        Structure version number
MQWDR_STRUCLENGTH              DS   F        Length of MQWDR structure
MQWDR_QMGRFLAGS                DS   F        Queue manager flags
MQWDR_QMGRIDENTIFIER           DS   CL48     Queue manager identifier
MQWDR_QMGRNAME                 DS   CL48     Queue manager name
MQWDR_CLUSTERRECOFFSET         DS   F        Offset of first cluster
*                                            record
MQWDR_CHANNELSTATE             DS   F        Channel state
MQWDR_CHANNELDEFOFFSET         DS   F        Offset of channel definition
*                                            structure
MQWDR_LENGTH                   EQU  *-MQWDR  Length of structure
                               ORG  MQWDR
MQWDR_AREA                     DS   CL(MQWDR_LENGTH)
```

C declaration

```
typedef struct tagMQWDR {
  MQCHAR4   StrucId;           /* Structure identifier */
  MQLONG    Version;           /* Structure version number */
  MQLONG    StrucLength;       /* Length of MQWDR structure */
  MQLONG    QMgrFlags;         /* Queue managerflags */
  MQCHAR48  QMgrIdentifier;    /* Queue manageridentifier */
  MQCHAR48  QMgrName;          /* Queue manager name */
  MQLONG    ClusterRecOffset;  /* Offset of first cluster record */
  MQLONG    ChannelState;      /* Channel state */
  MQLONG    ChannelDefOffset;  /* Offset of channel definition structure */
  /* Ver:1 */
  MQLONG    DestSeqNumber;     /* Cluster channel destination sequence number */
  MQINT64   DestSeqFactor;     /* Cluster channel factor sequence number */
  /* Ver:2 */
};
```

Related reference

Fields in MQWDR - Cluster workload destination record structure
Description of the parameters in the MQWDR - Cluster workload destination record structure.

MQWQR - Cluster workload queue record structure

The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

Table 831. Fields in MQWQR

Field	Description	Page
StrucId	Structure identifier	StrucId
Version	Structure version number	Version
StrucLength	Length of MQWQR structure	StrucLength
QFlags	Queue flags	QFlags
QName	Queue name	QName
QMgrIdentifier	Queue manager identifier	QMgrIdentifier
ClusterRecOffset	Offset of first cluster record (MQWCR)	ClusterRecOffset
QType	Queue type	QType
QDesc	Queue description	QDesc
DefBind	Default binding	DefBind
DefPersistence	Default message persistence	DefPersistence

Table 831. Fields in MQWQR (continued)		
Field	**Description**	**Page**
DefPriority	Default message priority	DefPriority
InhibitPut	Whether put operations on the queue are allowed	InhibitPut
Note: The remaining fields are ignored if Version is less than MQWQR_VERSION_2.		
CWLQueuePriority	A value 0 - 9 representing the priority of the queue	CLWLQueuePriority
CLWLQueueRank	A value 0 - 9 representing the rank of the queue	CLWLQueueRank
Note: The remaining fields are ignored if Version is less than MQWQR_VERSION_3.		
DefPutResponse	Default put response	DefPutResponse

The cluster workload queue record structure contains information relating to one of the possible destinations for the message. There is one cluster workload queue record structure for each instance of the destination queue.

The cluster workload queue record structure is supported in all environments.

Additionally, the MQWQR1 and MQWQR2 structures are available for backwards compatibility.

Related reference

MQ_CLUSTER_WORKLOAD_EXIT - Call description
The cluster workload exit is called by the queue manager to route a message to an available queue manager.

MQXCLWLN - Navigate Cluster workload records
The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

MQWXP - Cluster workload exit parameter structure
The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

MQWDR - Cluster workload destination record structure
The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

MQWCR - Cluster workload cluster record structure
The following table summarizes the fields in the MQWCR cluster workload record structure.

Fields in MQWQR - Cluster workload queue record structure

Description of the fields in the MQWQR - Cluster workload queue record structure.

StrucId (MQCHAR4) - input

The structure identifier for the cluster workload queue record structure.

- The StrucId value is MQWQR_STRUC_ID.
- For the C programming language, the constant MQWQR_STRUC_ID_ARRAY is also defined. It has the same value as MQWQR_STRUC_ID. It is an array of characters instead of a string.

Version (MQLONG) - input

The structure version number. Version takes one of the following values:

MQWQR_VERSION_1
Version-1 cluster workload queue record.

MQWQR_VERSION_2
Version-2 cluster workload queue record.

MQWQR_VERSION_3
Version-3 cluster workload queue record.

MQWQR_CURRENT_VERSION
Current version of cluster workload queue record.

StrucLength (MQLONG) - input
The length of MQWQR structure. StrucLength takes one of the following values:

MQWQR_LENGTH_1
Length of version-1 cluster workload queue record.

MQWQR_LENGTH_2
Length of version-2 cluster workload queue record.

MQWQR_LENGTH_3
Length of version-3 cluster workload queue record.

MQWQR_CURRENT_LENGTH
Length of current version of cluster workload queue record.

QFlags (MQLONG) - input
The queue flags indicate properties of the queue. The following flags are defined:

MQQF_LOCAL_Q
Destination is a local queue.

MQQF_CLWL_USEQ_ANY
Allow use of local and remote queues in puts.

MQQF_CLWL_USEQ_LOCAL
Allow only local queue puts.

Other values
Other flags in the field might be set by the queue manager for internal purposes.

QName (MQCHAR48) - input
The name of the queue that is one of the possible destinations of the message.

- The length of QName is MQ_Q_NAME_LENGTH.

QMgrIdentifier (MQCHAR48) - input
The queue manager identifier is a unique identifier for the queue manager that hosts the instance of the queue described by the MQWQR structure.

- The identifier is generated by the queue manager.
- The length of QMgrIdentifier is MQ_Q_MGR_IDENTIFIER_LENGTH.

ClusterRecOffset (MQLONG) - input
The logical offset of the first MQWCR structure that belongs to the MQWQR structure.

- For static caches, ClusterRecOffset is the offset of the first MQWCR structure that belongs to the MQWQR structure.
- The offset is measured in bytes from the start of the MQWQR structure.
- Do not use the logical offset for pointer arithmetic with dynamic caches. To obtain the address of the next record, the MQXCLWLN call must be used.

QType (MQLONG) - input
The queue type of the destination queue. The following values are possible:

MQCQT_LOCAL_Q
Local queue.

MQCQT_ALIAS_Q
Alias queue.

MQCQT_REMOTE_ Q
Remote queue.

MQCQT_Q_MGR_ALIAS
Queue manager alias.

QDesc (MQCHAR64) - input
The queue description queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure.

- The length of QDesc is MQ_Q_DESC_LENGTH.

DefBind (MQLONG) - input
The default binding queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure. Either MQBND_BIND_ON_OPEN or MQBND_BIND_ON_GROUP must be specified when using groups with clusters. The following values are possible:

MQBND_BIND_ON_OPEN
Binding fixed by MQOPEN call.

MQBND_BIND_NOT_FIXED
Binding not fixed.

MQBND_BIND_ON_GROUP
Allows an application to request that a group of messages are all allocated to the same destination instance.

DefPersistence (MQLONG) - input
The default message persistence queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure. The following values are possible:

MQPER_PERSISTENT
Message is persistent.

MQPER_NOT_PERSISTENT
Message is not persistent.

DefPriority (MQLONG) - input

The default message priority queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure. The priority range is 0 - MaxPriority.

- 0 is the lowest priority.
- MaxPriority is the queue manager attribute of the queue manager that hosts this instance of the destination queue.

InhibitPut (MQLONG) - input
The put inhibited queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure. The following values are possible:

MQQA_PUT_INHIBITED
Put operations are inhibited.

MQQA_PUT_ALLOWED
Put operations are allowed.

CLWLQueuePriority (MQLONG) - input
The cluster workload queue priority attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure.

CLWLQueueRank (MQLONG) - input
The cluster workload queue rank defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure.

DefPutResponse (MQLONG) - input
The default put response queue attribute defined on the queue manager that hosts the instance of the destination queue described by the MQWQR structure. The following values are possible:

MQPRT_SYNC_RESPONSE
Synchronous response to MQPUT or MQPUT1 calls.

MQPRT_ASYNC_RESPONSE
Asynchronous response to MQPUT or MQPUT1 calls.

Related reference

Initial values and language declarations for MQWQR
Initial values and C and High Level Assembler Language declarations for MQWQR - Cluster workload queue record.

Initial values and language declarations for MQWQR

Initial values and C and High Level Assembler Language declarations for MQWQR - Cluster workload queue record.

Table 832. Initial values of fields in MQWQR

Field name	Name of constant	Value of constant
StrucId	MQWQR_STRUC_ID_ARRAY	'WQR¬'
Version	MQWQR_VERSION_1	1
StrucLength	MQWQR_CURRENT_LENGTH [3]	212
QFlags	None	0
QName	None	""
QMgrIdentifier	None	""
ClusterRecOffset	None	0
QType	None	0
QDesc	None	""
DefBind	None	0
DefPersistence	None	0
DefPriority	None	0
InhibitPut	None	0
CLWLQueuePriority	None	0
CLWLQueueRank	None	0
DefPutResponse	None	1

Notes:

1. The symbol ¬ represents a single blank character.
2. In the C programming language, the macro variable MQWQR_DEFAULT contains the default values. Use it in the following way to provide initial values for the fields in the structure:

```
MQWQR MyWQR = {MQWQR_DEFAULT};
```

3. The initial values intentionally set the length of the structure to the length of the current version, and not version 1 of the structure.

C declaration

```
typedef struct tagMQWQR {
  MQCHAR4   StrucId;           /* Structure identifier */
  MQLONG    Version;           /* Structure version number */
  MQLONG    StrucLength;       /* Length of MQWQR structure */
```

```
   MQLONG    QFlags;            /* Queue flags */
   MQCHAR48  QName;             /* Queue name */
   MQCHAR48  QMgrIdentifier;    /* Queue manageridentifier */
   MQLONG    ClusterRecOffset;  /* Offset of first cluster record */
   MQLONG    QType;             /* Queue type */
   MQCHAR64  QDesc;             /* Queue description */
   MQLONG    DefBind;           /* Default binding */
   MQLONG    DefPersistence;    /* Default message persistence */
   MQLONG    DefPriority;       /* Default message priority */
   MQLONG    InhibitPut;        /* Whether put operations on the queue
                                   are allowed */
   /* version 2 */
   MQLONG    CLWLQueuePriority; /* Queue priority */
   MQLONG    CLWLQueueRank;     /* Queue rank */
   /* version 3 */
   MQLONG    DefPutResponse;    /* Default put response */
};
```

High Level Assembler

```
MQWQR                         DSECT
MQWQR_STRUCID                 DS   CL4      Structure identifier
MQWQR_VERSION                 DS   F        Structure version number
MQWQR_STRUCLENGTH             DS   F        Length of MQWQR structure
MQWQR_QFLAGS                  DS   F        Queue flags
MQWQR_QNAME                   DS   CL48     Queue name
MQWQR_QMGRIDENTIFIER          DS   CL48     Queue manager identifier
MQWQR_CLUSTERRECOFFSET        DS   F        Offset of first cluster
*                                           record
MQWQR_QTYPE                   DS   F        Queue type
MQWQR_QDESC                   DS   CL64     Queue description
MQWQR_DEFBIND                 DS   F        Default binding
MQWQR_DEFPERSISTENCE          DS   F        Default message persistence
MQWQR_DEFPRIORITY             DS   F        Default message priority
MQWQR_INHIBITPUT              DS   F        Whether put operations on
*                                           the queue are allowed
MQWQR_DEFPUTRESPONSE          DS   F        Default put response
MQWQR_LENGTH                  EQU  *-MQWQR  Length of structure
                              ORG  MQWQR
MQWQR_AREA                    DS   CL(MQWQR_LENGTH)
```

Related reference

Fields in MQWQR - Cluster workload queue record structure
Description of the fields in the MQWQR - Cluster workload queue record structure.

MQWCR - Cluster workload cluster record structure

The following table summarizes the fields in the MQWCR cluster workload record structure.

Table 833. Fields in MQWCR

Field	Description	Page
ClusterName	Name of cluster	ClusterName
ClusterRecOffset	Offset of next cluster record (MQWCR)	ClusterRecOffset
ClusterFlags	Cluster flags	ClusterFlags

The cluster workload cluster record structure contains information about a cluster. For each cluster the destination queue belongs to, there is one cluster workload cluster record structure.

The cluster workload cluster record structure is supported in all environments.

Related reference

MQ_CLUSTER_WORKLOAD_EXIT - Call description
The cluster workload exit is called by the queue manager to route a message to an available queue manager.

MQXCLWLN - Navigate Cluster workload records

The MQXCLWLN call is used to navigate through the chains of MQWDR, MQWQR, and MQWCR records stored in the cluster cache.

MQWXP - Cluster workload exit parameter structure
The following table summarizes the fields in the MQWXP - Cluster workload exit parameter structure.

MQWDR - Cluster workload destination record structure
The following table summarizes the fields in the MQWDR - Cluster workload destination record structure.

MQWQR - Cluster workload queue record structure
The following table summarizes the fields in the MQWQR - Cluster workload queue record structure.

Fields in the MQWCR - Cluster workload cluster record structure.

Description of the fields in the MQWCR - Cluster workload cluster record structure.

ClusterName (MQCHAR48) - input
The name of a cluster to which the instance of the destination queue that owns the MQWCR structure belongs. The destination queue instance is described by an MQWDR structure.

- The length of ClusterName is MQ_CLUSTER_NAME_LENGTH.

ClusterRecOffset (MQLONG) - input
The logical offset of the next MQWCR structure.

- If there are no more MQWCR structures, ClusterRecOffset is zero.
- The offset is measured in bytes from the start of the MQWCR structure.

ClusterFlags (MQLONG) - input
The cluster flags indicate properties of the queue manager identified by the MQWCR structure. The following flags are defined:

MQQMF_REPOSITORY_Q_MGR
Destination is a full repository queue manager.

MQQMF_CLUSSDR_USER_DEFINED
Cluster-sender channel was defined manually.

MQQMF_CLUSSDR_AUTO_DEFINED
Cluster-sender channel was defined automatically.

MQQMF_AVAILABLE
Destination queue manager is available to receive messages.

Other values
Other flags in the field might be set by the queue manager for internal purposes.

Related reference

Initial values and language declarations for MQWCR
Initial values and C and High Level Assembler Language declarations for MQWCR - Cluster workload cluster record structure.

Initial values and language declarations for MQWCR

Initial values and C and High Level Assembler Language declarations for MQWCR - Cluster workload cluster record structure.

Table 834. Initial values of fields in MQWCR

Field name	Name of constant	Value of constant
ClusterName	None	""
ClusterRecOffset	None	0
ClusterFlags	None	0

C declaration

```
typedef struct tagMQWCR {
  MQCHAR48  ClusterName;       /* Cluster name */
  MQLONG    ClusterRecOffset;  /* Offset of next cluster record */
  MQLONG    ClusterFlags;      /* Cluster flags */
};
```

High Level Assembler

```
MQWCR                          DSECT
MQWCR_CLUSTERNAME              DS   CL48     Cluster name
MQWCR_CLUSTERRECOFFSET         DS   F        Offset of next cluster
*                                            record
MQWCR_CLUSTERFLAGS             DS   F        Cluster flags
MQWCR_LENGTH                   EQU  *-MQWCR  Length of structure
                               ORG  MQWCR
MQWCR_AREA                     DS   CL(MQWCR_LENGTH)
```

Related reference

Fields in the MQWCR - Cluster workload cluster record structure.
Description of the fields in the MQWCR - Cluster workload cluster record structure.

API exit reference

This section provides reference information mainly of interest to a programmer writing API exits.

General usage notes

notes:

1. All exit functions can issue the MQXEP call; this call is designed specifically for use from API exit functions.
2. The MQ_INIT_EXIT function cannot issue any MQ calls other than MQXEP.
3. You cannot issue the MQDISC call for the current connection.
4. If an exit function issues the MQCONN call, or the MQCONNX call with the MQCNO_HANDLE_SHARE_NONE option, the call completes with reason code MQRC_ALREADY_CONNECTED, and the handle returned is the same as the one passed to the exit as a parameter.
5. In general when an API exit function issues an MQI call, API exits are not be called recursively. However, if an exit function issues the MQCONNX call with the MQCNO_HANDLE_SHARE_BLOCK or MQCNO_HANDLE_SHARE_NO_BLOCK options, the call returns a new shared handle. This provides the exit suite with a connection handle of its own, and hence a unit of work that is independent of the application's unit of work. The exit suite can use this handle to put and get messages within its own unit of work, and commit or back out that unit of work; all of this can be done without affecting the application's unit of work in any way.

   Because the exit function is using a connection handle that is different from the handle being used by the application, MQ calls issued by the exit function result in the relevant API exit functions being invoked. Exit functions can therefore be invoked recursively. Note that both the *ExitUserArea* field in MQAXP and the exit chain area have connection-handle scope. Consequently, an exit function cannot use those areas to signal to another instance of itself invoked recursively that it is already active.
6. Exit functions can also put and get messages within the application's unit of work. When the application commits or backs out the unit of work, all messages within the unit of work are committed or backed out together, regardless of who placed them in the unit of work (application or exit function). However, the exit can cause the application to exceed system limits sooner than would

otherwise be the case (for example, by exceeding the maximum number of uncommitted messages in a unit of work).

When an exit function uses the application's unit of work in this way, the exit function should usually avoid issuing the MQCMIT call, as this commits the application's unit of work and might impair the correct functioning of the application. However, the exit function might sometimes need to issue the MQBACK call, if the exit function encounters a serious error that prevents the unit of work being committed (for example, an error putting a message as part of the application's unit of work). When MQBACK is called, take care to ensure that the application unit of work boundaries are not changed. In this situation the exit function must set the appropriate values to ensure that completion code MQCC_WARNING and reason code MQRC_BACKED_OUT are returned to the application, so that the application can detect the fact that the unit of work has been backed out.

If an exit function uses the application's connection handle to issue MQ calls, those calls do not themselves result in further invocations of API exit functions.

7. If an MQXR_BEFORE exit function terminates abnormally, the queue manager might be able to recover from the failure. If it can, the queue manager continues processing as though the exit function had returned MQXCC_FAILED. If the queue manager cannot recover, the application is terminated.
8. If an MQXR_AFTER exit function terminates abnormally, the queue manager might be able to recover from the failure. If it can, the queue manager continues processing as though the exit function had returned MQXCC_FAILED. If the queue manager cannot recover, the application is terminated. Be aware that in the latter case, messages retrieved outside a unit of work are lost (this is the same situation as the application failing immediately after removing a message from the queue).
9. The MCA process performs a two phase commit.

   If an API exit intercepts an MQCMIT from a prepared MCA process and attempts to perform an action within the unit of work, then the action will fail with reason code MQRC_UOW_NOT_AVAILABLE.
10. For a multi-installation environment, the only way to have an exit that works with both IBM WebSphere MQ 7.0 and IBM WebSphere MQ 7.1 is to write the exit in a way which links at IBM WebSphere MQ 7.0 with mqm.Lib and, for non-primary or relocated exits, to ensure that the application finds the correct mqm.Lib for the installation with which the queue manager is currently associated, prior to the application launch. (For example, run the **setmqenv -m QM** command before launching the application, even if the queue manager is owned by an IBM WebSphere MQ 7.0 installation.)
11. Where multiple installations of IBM MQ are available, use the exits written for an earlier version of IBM MQ, as new functionality added in the later version might not work with earlier versions. For more information about changes between releases, see What's changed in IBM MQ 8.0.

IBM MQ API exit parameter structure (MQAXP)

The MQAXP structure, an external control block, is used as an input or output parameter to the API exit. This topic also gives information about how queue managers process exit functions.

MQAXP has the following C declaration:

```
typedef struct tagMQAXP {
  MQCHAR4   StrucId;           /* Structure identifier */
  MQLONG    Version;           /* Structure version number */
  MQLONG    ExitId;            /* Exit Identifier */
  MQLONG    ExitReason;        /* Exit invocation reason */
  MQLONG    ExitResponse;      /* Response code from exit */
  MQLONG    ExitResponse2;     /* Secondary response code from exit */
  MQLONG    Feedback;          /* Feedback code from exit */
  MQLONG    APICallerType;     /* MQSeries API caller type */
  MQBYTE16  ExitUserArea;      /* User area for use by exit */
  MQCHAR32  ExitData;          /* Exit data area */
  MQCHAR48  ExitInfoName;      /* Exit information name */
  MQBYTE48  ExitPDArea;        /* Problem determination area */
  MQCHAR48  QMgrName;          /* Name of local queue manager */
  PMQACH    ExitChainAreaPtr;  /* Inter exit communication area */
  MQHCONFIG Hconfig;           /* Configuration handle */
```

```
  MQLONG    Function;           /* Function Identifier */
  /* Ver:1 */
  MQHMSG    ExitMsgHandle       /* Exit message handle
  /* Ver:2 */
};
```

The following parameter list is passed when functions in an API exit are invoked:

StrucId (MQCHAR4) - input
The exit parameter structure identifier, with a value of:

```
MQAXP_STRUC_ID.
```

The exit handler sets this field on entry to each exit function.

Version (MQLONG) - input
The structure version number, with a value of:

MQAXP_VERSION_1
Version 1 API exit parameter structure.

MQAXP_VERSION_2
Version 2 API exit parameter structure.

MQAXP_CURRENT_VERSION
Current version number for the API exit parameter structure.

The exit handler sets this field on entry to each exit function.

ExitId (MQLONG) - input
The exit identifier, set on entry to the exit routine, indicating the type of exit:

MQXT_API_EXIT
API exit.

ExitReason (MQLONG) - input
The reason for invoking the exit, set on entry to each exit function:

MQXR_CONNECTION
The exit is being invoked to initialize itself before an MQCONN or MQCONNX call, or to end itself after an MQDISC call.

MQXR_BEFORE
The exit is being invoked before executing an API call, or before converting data on an MQGET.

MQXR_AFTER
The exit is being invoked after executing an API call.

ExitResponse (MQLONG) - output
The response from the exit, initialized on entry to each exit function to:

MQXCC_OK
Continue normally.

This field must be set by the exit function, to communicate to the queue manager the result of executing the exit function. The value must be one of the following:

MQXCC_OK
The exit function completed successfully. Continue normally.

This value can be set by all MQXR_* exit functions. ExitResponse2 is used to decide whether to invoke exit functions later in the chain.

MQXCC_FAILED
The exit function failed because of an error.

This value can be set by all MQXR_* exit functions. The queue manager sets CompCode to MQCC_FAILED, and Reason to:

- MQRC_API_EXIT_INIT_ERROR if the function is MQ_INIT_EXIT

- MQRC_API_EXIT_TERM_ERROR if the function is MQ_TERM_EXIT
- MQRC_API_EXIT_ERROR for all other exit functions

The values set can be altered by an exit function later in the chain.

ExitResponse2 is ignored; the queue manager continues processing as though MQXR2_SUPPRESS_CHAIN had been returned.

MQXCC_SUPPRESS_FUNCTION
Suppress IBM MQ API function.

This value can be set only by an MQXR_BEFORE exit function. It bypasses the API call. If it is returned by the MQ_DATA_CONV_ON_GET_EXIT, data conversion is bypassed. The queue manager sets CompCode to MQCC_FAILED, and Reason to MQRC_SUPPRESSED_BY_EXIT, but the values set can be altered by an exit function later in the chain. Other parameters for the call remain as the exit left them. ExitResponse2 is used to decide whether to invoke exit functions later in the chain.

If this value is set by an MQXR_AFTER or MQXR_CONNECTION exit function, the queue manager continues processing as though MQXCC_FAILED had been returned.

MQXCC_SKIP_FUNCTION
Skip IBM MQ API function.

This value can be set only by an MQXR_BEFORE exit function. It bypasses the API call. If it is returned by the MQ_DATA_CONV_ON_GET_EXIT, data conversion is bypassed. The exit function must set CompCode and Reason to the values to be returned to the application, but the values set can be altered by an exit function later in the chain. Other parameters for the call remain as the exit left them. ExitResponse2 is used to decide whether to invoke exit functions later in the chain.

If this value is set by an MQXR_AFTER or MQXR_CONNECTION exit function, the queue manager continues processing as though MQXCC_FAILED had been returned.

MQXCC_SUPPRESS_EXIT
Suppress all exit functions belonging to the set of exits.

This value can be set only by the MQXR_BEFORE and MQXR_AFTER exit functions. It bypasses *all* subsequent invocations of exit functions belonging to this set of exits for this logical connection. This bypassing continues until the logical disconnect request occurs, when MQ_TERM_EXIT function is invoked with an ExitReason of MQXR_CONNECTION.

The exit function must set CompCode and Reason to the values to be returned to the application, but the values set can be altered by an exit function later in the chain. Other parameters for the call remain as the exit left them. ExitResponse2 is ignored.

If this value is set by an MQXR_CONNECTION exit function, the queue manager continues processing as though MQXCC_FAILED had been returned.

For information about the interaction between ExitResponse and ExitResponse2, and its effect on exit processing, see “How queue managers process exit functions” on page 1550.

ExitResponse2 (MQLONG) - output
This is a secondary exit response code that qualifies the primary exit response code for MQXR_BEFORE exit functions. It is initialized to:

```
MQXR2_DEFAULT_CONTINUATION
```

on entry to an IBM MQ API call exit function. It can then be set to one of the values:

MQXR2_DEFAULT_CONTINUATION
Whether to continue with the next exit in the chain, depending on the value of ExitResponse.

If ExitResponse is MQXCC_SUPPRESS_FUNCTION or MQXCC_SKIP_FUNCTION, bypass exit functions later in the MQXR_BEFORE chain and the matching exit functions in the MQXR_AFTER chain. Invoke exit functions in the MQXR_AFTER chain that match exit functions earlier in the MQXR_BEFORE chain.

Otherwise, invoke the next exit in the chain.

MQXR2_SUPPRESS_CHAIN
Suppress the chain.

Bypass exit functions later in the MQXR_BEFORE chain and the matching exit functions in the MQXR_AFTER chain for this API call invocation. Invoke exit functions in the MQXR_AFTER chain that match exit functions earlier in the MQXR_BEFORE chain.

MQXR2_CONTINUE_CHAIN
Continue with the next exit in the chain.

For information about the interaction between ExitResponse and ExitResponse2, and its effect on exit processing, see "How queue managers process exit functions" on page 1550.

Feedback (MQLONG) - input/output
Communicate feedback codes between exit function invocations. This is initialized to:

```
MQFB_NONE (0)
```

before invoking the first function of the first exit in a chain.

Exits can set this field to any value, including any valid MQFB_* or MQRC_* value. Exits can also set this field to a user-defined feedback value in the range MQFB_APPL_FIRST to MQFB_APPL_LAST.

APICallerType (MQLONG) - input
The API caller type, indicating whether the IBM MQ API caller is external or internal to the queue manager: MQXACT_EXTERNAL or MQXACT_INTERNAL.

ExitUserArea (MQBYTE16) - input/output
A user area, available to all the exits associated with a particular ExitInfoObject. It is initialized to MQXUA_NONE (binary zeros for the length of the ExitUserArea) before invoking the first exit function (MQ_INIT_EXIT) for the hconn. From then on, any changes made to this field by an exit function are preserved across invocations of functions of the same exit.

This field is aligned to a multiple of 4 MQLONGs.

Exits can also anchor any storage that they allocate from this area.

For each hconn, each exit in a chain of exits has a different ExitUserArea. The ExitUserArea cannot be shared by exits in a chain, and the contents of the ExitUserArea for one exit are not available to another exit in a chain.

For C programs, the constant MQXUA_NONE_ARRAY is also defined with the same value as MQXUA_NONE, but as an array of characters instead of a string.

The length of this field is given by MQ_EXIT_USER_AREA_LENGTH.

ExitData (MQCHAR32) - input
Exit data, set on input to each exit function to the 32 characters of exit-specific data that is provided in the exit. If you define no value in the exit this field is all blanks.

The length of this field is given by MQ_EXIT_DATA_LENGTH.

ExitInfoName (MQCHAR48) - input
The exit information name, set on input to each exit function to the ApiExit_name specified in the exit definitions in the stanzas.

ExitPDArea (MQBYTE48) - input/output
A problem determination area, initialized to MQXPDA_NONE (binary zeros for the length of the field) for each invocation of an exit function.

For C programs, the constant MQXPDA_NONE_ARRAY is also defined with the same value as MQXPDA_NONE, but as an array of characters instead of a string.

The exit handler always writes this area to the IBM MQ trace at the end of an exit, even when the function is successful.

The length of this field is given by MQ_EXIT_PD_AREA_LENGTH.

QMgrName (MQCHAR48) - input
The name of the queue manager the application is connected to, that has invoked an exit as a result of processing an IBM MQ API call.

If the name of a queue manager supplied on an MQCONN or MQCONNX calls is blank, this field is still set to the name of the queue manager to which the application is connected, whether the application is server or client.

The exit handler sets this field on entry to each exit function.

The length of this field is given by MQ_Q_MGR_NAME_LENGTH.

ExitChainAreaPtr (PMQACH) - input/output
This is used to communicate data across invocations of different exits in a chain. It is set to a NULL pointer before invoking the first function (MQ_INIT_EXIT with ExitReason MQXR_CONNECTION) of the first exit in a chain of exits. The value returned by the exit on one invocation is passed on to the next invocation.

Refer to "The exit chain area and exit chain area header (MQACH)" on page 1554 for more details about how to use the exit chain area.

Hconfig (MQHCONFIG) - input
The configuration handle, representing the set of functions being initialized. This value is generated by the queue manager on the MQ_INIT_EXIT function, and is later passed to the API exit function. It is set on entry to each exit function.

You can use Hconfig as a pointer to the MQIEP structure to make MQI and DCI calls. You must check that the first 4 bytes of HConfig match the StrucId of the MQIEP structure before using the HConfig parameter as a pointer to the MQIEP structure.

Function (MQLONG) - input
The function identifier, valid values for which are the MQXF_* constants described in "External constants" on page 1555.

The exit handler sets this field to the correct value, on entry to each exit function, depending on the IBM MQ API call that resulted in the exit being invoked.

ExitMsgHandle (MQHMSG) - input/output
When Function is MQXF_GET and ExitReason is MQXR_AFTER, a valid message handle is returned in this field allowing the API exit access to the message descriptor fields and any other properties matching the ExitProperties string specified in the MQXEPO structure when registering the API exit.

Any non-message descriptor properties that are returned in the ExitMsgHandle will not be available from the MsgHandle in the MQGMO structure if one was specified, or in the message data.

When Function is MQXF_GET and ExitReason is MQXR_BEFORE, if the exit program sets this field to MQHM_NONE then it will suppress the populating of the ExitMsgHandle properties.

This field is not set if Version is less then MQAXP_VERSION_2.

How queue managers process exit functions

The processing performed by the queue manager on return from an exit function depends on both ExitResponse and ExitResponse2.

Table 835 on page 1551 summarizes the possible combinations and their effects for an MQXR_BEFORE exit function, showing:

- Who sets the CompCode and Reason parameters of the API call
- Whether the remaining exit functions in the MQXR_BEFORE chain and the matching exit functions in the MQXR_AFTER chain are invoked
- Whether the API call is invoked

For an MQXR_AFTER exit function:

- CompCode and Reason are set in the same way as MQXR_BEFORE
- ExitResponse2 is ignored (the remaining exit functions in the MQXR_AFTER chain are always invoked)
- MQXCC_SUPPRESS_FUNCTION and MQXCC_SKIP_FUNCTION are not valid

For an MQXR_CONNECTION exit function:

- CompCode and Reason are set in the same way as MQXR_BEFORE
- ExitResponse2 is ignored
- MQXCC_SUPPRESS_FUNCTION, MQXCC_SKIP_FUNCTION, MQXCC_SUPPRESS_EXIT are not valid

In all cases, where an exit or the queue manager sets CompCode and Reason, the values set can be changed by an exit invoked later, or by the API call (if the API call is invoked later).

Table 835. MQXR_BEFORE exit processing

Value of ExitResponse	CompCode and Reason set by	Value of ExitResponse2 (default continuation) Chain	Value of ExitResponse2 (default continuation) API
MQXCC_OK	exit	Y	Y
MQXCC_SUPPRESS_EXIT	exit	Y	Y
MQXCC_SUPPRESS_FUNCTION	queue manager	N	N
MQXCC_SKIP FUNCTION	exit	N	N
MQXCC_FAILED	queue manager	N	N

How clients process exit functions

In general, clients process exit functions in the same way that server applications do, and the *QMgrName* attribute in this structure applies whether the function is on a server or a client.

However, the client has no concept of the *mqs.ini* file, so the *ApiExitCommon* and *APIExitTemplate* stanzas do not apply. Only the *ApiExitLocal* stanza applies, and this stanza is configured in the *mqclient.ini* file.

IBM MQ API exit context structure (MQAXC)

The MQAXC structure, an external control block, is used as an input parameter to an API exit.

MQAXC has the following C declaration:

```
typedef struct tagMQAXC {
   MQCHAR4   StrucId;                /* Structure identifier */
   MQLONG    Version;                /* Structure version number */
   MQLONG    Environment;            /* Environment */
   MQCHAR12  UserId;                 /* UserId associated with appl */
   MQBYTE40  SecurityId              /* Extension to UserId running appl */
   MQCHAR264 ConnectionName;         /* Connection name */
   MQLONG    LongMCAUserIdLength;    /* long MCA user identifier length */
   MQLONG    LongRemoteUserIdLength; /* long remote user identifier length */
   MQPTR     LongMCAUserIdPtr;       /* long MCA user identifier address */
   MQPTR     LongRemoteUserIdPtr;    /* long remote user identifier address */
   MQCHAR28  ApplName;               /* Application name */
   MQLONG    ApplType;               /* Application type */
   MQPID     ProcessId;              /* Process identifier */
   MQTID     ThreadId;               /* Thread identifier */

   /* Ver:1 */
   MQCHAR    ChannelName[20]         /* Channel Name */
   MQBYTE4   Reserved1;              /* Reserved */
   PMQCD     pChannelDefinition;     /* Channel Definition pointer */
 };
```

The parameters to MQAXC are:

StrucId (MQCHAR4) - input

The exit context structure identifier, with a value of `MQAXC_STRUC_ID`. For C programs, the constant MQAXC_STRUC_ID_ARRAY is also defined, with the same value as MQAXC_STRUC_ID, but as an array of characters instead of a string.

The exit handler sets this field on entry to each exit function.

Version (MQLONG) - input

The structure version number, with a value of:

MQAXC_VERSION_2

Version number for the exit context structure.

MQAXC_CURRENT_VERSION

Current version number for the exit context structure.

The exit handler sets this field on entry to each exit function.

Environment (MQLONG) - input

The environment from which an IBM MQ API call was issued that resulted in an exit function being driven. Valid values for this field are:

MQXE_OTHER

This value is consistent with invocations an API exit sees if the exit is called from a server application. This means that an API exit runs unchanged on a client and does not see anything different.

If the exit really needs to determine whether it is running on the client, the exit can do so by looking at the *ChannelName* and *ChannelDefinition* fields.

MQXE_MCA

Message channel agent

MQXE_MCA_SVRCONN

A message channel agent acting on behalf of a client

MQXE_COMMAND_SERVER

The command server

MQXE_MQSC

The runmqsc command interpreter

The exit handler sets this field on entry to each exit function.

UserId (MQCHAR12) - input

The user ID associated with the application. In particular, in the case of client connections, this field contains the user ID of the adopted user as opposed to the user ID under which the channel code is running. If a blank user ID flows from the client, then no change is made to the user ID already being used. That is, no new user ID is adopted.

The exit handler sets this field on entry to each exit function. The length of this field is given by MQ_USER_ID_LENGTH.

In the case of a client, this is the user ID sent from the client to the server. Note, that this might not be the effective user ID the client is running against in the queue manager, as there could be an MCAUser or CHLAUTH configuration which changes the user ID.

SecurityId (MQBYTE40) - input

An extension to the user ID running the application. Its length is given by MQ_SECURITY_ID_LENGTH.

In the case of a client, this is the user ID sent from the client to the server. Note, that this might not be the effective user ID the client is running against in the queue manager, as there could be an MCAUser or CHLAUTH configuration which changes the user ID.

ConnectionName (MQCHAR264) - input

The connection name field, set to the address of the client. For example, for TCP/IP, it would be the client IP address.

The length of this field is given by MQ_CONN_NAME_LENGTH.

In the case of a client, this is the partner address of the queue manager.

LongMCAUserIdLength (MQLONG) - input
The length of the long MCA user identifier.

When MCA connects to the queue manager this field is set to the length of the long MCA user identifier (or zero if there is no such identifier).

In the case of a client, this is the client long user identifier.

LongRemoteUserIdLength (MQLONG) - input
The length of the long remote user identifier.

When MCA connects to the queue manager this field is set to the length of the long remote user identifier. Otherwise this field will be set to zero

In the case of a client, set this field to zero.

LongMCAUserIdPtr (MQPTR) - input
Address of long MCA user identifier.

When MCA connects to the queue manager this field is set to the address of the long MCA user identifier (or to a null pointer if there is no such identifier).

In the case of a client, this is the client long user identifier.

LongRemoteUserIdPtr (MQPTR) - input
The address of the long remote user identifier.

When MCA connects to the queue manager this field is set to the address of the long remote user identifier (or to a null pointer if there is no such identifier).

In the case of a client, set this field to zero.

ApplName (MQCHAR28) - input
The name of the application or component that issued the IBM MQ API call.

The rules for generating the ApplName are the same as for generating the default name for an MQPUT.

The value of this field is found by querying the operating system for the program name. Its length is given by MQ_APPL_NAME_LENGTH.

ApplType (MQLONG) - input
The type of application or component that issued the IBM MQ API call.

The value is MQAT_DEFAULT for the platform on which the application is compiled, or it equates to one of the defined MQAT_* values.

The exit handler sets this field on entry to each exit function.

ProcessId (MQPID) - input
The operating system process identifier.

Where applicable, the exit handler sets this field on entry to each exit function.

ThreadId (MQTID) - input
The MQ thread identifier. This is the same identifier used in MQ trace and FFST dumps, but might be different from the operating system thread identifier.

Where applicable, the exit handler sets this field on entry to each exit function.

ChannelName (MQCHAR) - input
The name of the channel, padded with blanks, if applicable and known.

If not applicable, this field is set to NULL characters.

Reserved1 (MQBYTE4) - input
This field is reserved.

ChanneDefinition (PMQCD) - input
A pointer to the channel definition being used, if applicable and known.

If not applicable, this field is set to NULL characters.

Note that the pointer is only completed if the connection is processing on behalf of an IBM MQ channel and that channel definition has been read.

In particular, the channel definition is not given on the server when the first MQCONN call is made for the channel. Furthermore, if the pointer is filled, the structure (and any sub structures) pointed to by the pointer must be treated as read only; any updating of the structure would lead to unpredictable results and is not supported.

In the case of a client, fields other than those with a value specified for a client, contain values that are appropriate for a client application.

The exit chain area and exit chain area header (MQACH)

If required, an exit function can acquire storage for an exit chain area and set the ExitChainAreaPtr in MQAXP to point to this storage.

Exits (either the same or different exit functions) can acquire multiple exit chain areas and link them together. Exit chain areas must only be added or removed from this list while called from the exit handler. This ensures that there are no serialization issues caused by different threads adding or removing areas from the list at the same time.

An exit chain area must start with an MQACH header structure, the C declaration for which is:

```
typedef struct tagMQACH {
   MQCHAR4   StrucId;             /* Structure identifier */
   MQLONG    Version;             /* Structure version number */
   MQLONG    StrucLength;         /* Length of the MQACH structure */
   MQLONG    ChainAreaLength;     /* Exit chain area length */
   MQCHAR48  ExitInfoName         /* Exit information name */
   PMQACH    NextChainAreaPtr;    /* Pointer to next exit chain area */
 };
```

The fields in the exit chain area header are:

StrucId (MQCHAR4) - input
The exit chain area structure identifier, with an initial value, defined by MQACH_DEFAULT, of MQACH_STRUC_ID.

For C programs, the constant MQACH_STRUC_ID_ARRAY is also defined; this has the same value as MQACH_STRUC_ID, but as an array of characters instead of a string.

Version (MQLONG) - input
The structure version number, as follows:

MQACH_VERSION_1
The version number for the exit parameter structure.

MQACH_CURRENT_VERSION
The current version number for the exit context structure.

The initial value of this field, defined by MQACH_DEFAULT, is `MQACH_CURRENT_VERSION`.

Note: If you introduce a new version of this structure, the layout of the existing part does not change. Exit functions must check that the version number is equal to or greater than the lowest version containing the fields that the exit function needs to use.

StrucLength (MQLONG) - input
The length of the MQACH structure. Exits can use this field to determine the start of the exit data, setting it to the length of the structure created by the exit.

The initial value of this field, defined by MQACH_DEFAULT, is MQACH_CURRENT_LENGTH.

ChainAreaLength (MQLONG) - input
The exit chain area length, set to the overall length of the current exit chain area, including the MQACH header.

The initial value of this field, defined by MQACH_DEFAULT, is zero.

ExitInfoName (MQCHAR48) - input
The exit information name.

When an exit creates an MQACH structure, it must initialize this field with its own ExitInfoName, so that later this MQACH structure can be found by either another instance of this exit, or by a cooperating exit.

The initial value of this field, defined by MQACH_DEFAULT, is a zero length string ({""}).

NextChainAreaPtr (PMQACH) - input
A pointer to the next exit chain area with an initial value, defined by MQACH_DEFAULT, of null pointer (NULL).

Exit functions must release the storage for any exit chain areas that they acquire, and manipulate the chain pointers to remove their exit chain areas from the list.

An exit chain area can be constructed as follows:

```
MQAXP.ExitChainAreaPtr ──┐
  ┌────────────────────┘
  └→ ┌─────┬───┬────┬───┬───────────────────────────────────────┐
     │ ACH │ 1 │ 80 │ ─┐ │ First exit's chain area               │
     └─────┴───┴────┴─│─┴───────────────────────────────────────┘
  ┌────────────────────┘
  └→ ┌─────┬───┬────┬───┬────────────────────────┐
     │ ACH │ 1 │ 64 │ ─┐ │ Second exit's chain area │
     └─────┴───┴────┴─│─┴────────────────────────┘
  ┌────────────────────┘
  └→ ... etc.
```

External constants

Use this topic as reference information for external constants available for API exists.

The following external constants are available for API exits:

MQXF_* (exit function identifiers)

```
MQXF_INIT                      1       X'00000001'
MQXF_TERM                      2       X'00000002'
MQXF_CONN                      3       X'00000003'
MQXF_CONNX                     4       X'00000004'
MQXF_DISC                      5       X'00000005'
MQXF_OPEN                      6       X'00000006'
MQXF_CLOSE                     7       X'00000007'
MQXF_PUT1                      8       X'00000008'
MQXF_PUT                       9       X'00000009'
MQXF_GET                       10      X'0000000A'
MQXF_DATA_CONV_ON_GET          11      X'0000000B'
MQXF_INQ                       12      X'0000000C'
MQXF_SET                       13      X'0000000D'
MQXF_BEGIN                     14      X'0000000E'
MQXF_CMIT                      15      X'0000000F'
MQXF_BACK                      16      X'00000010'
MQXF_STAT                      18      X'00000012'
MQXF_CB                        19      X'00000013'
MQXF_CTL                       20      X'00000014'
MQXF_CALLBACK                  21      X'00000015'
MQXF_SUB                       22      X'00000016'
MQXF_SUBRQ                     23      X'00000017'
```

```
        MQXF_XACLOSE                    24      X'00000018'
        MQXF_XACOMMIT                   25      X'00000019'
        MQXF_XACOMPLETE                 26      X'0000001A'
        MQXF_XAEND                      27      X'0000001B'
        MQXF_XAFORGET                   28      X'0000001C'
        MQXF_XAOPEN                     29      X'0000001D'
        MQXF_XAPREPARE                  30      X'0000001E'
        MQXF_XARECOVER                  31      X'0000001F'
        MQXF_XAROLLBACK                 32      X'00000020'
        MQXF_XASTART                    33      X'00000021'
        MQXF_AXREG                      34      X'00000022'
        MQXF_AXUNREG                    35      X'00000023'
```

MQXR_* (exit reasons)

```
        MQXR_BEFORE                     1       X'00000001'
        MQXR_AFTER                      2       X'00000002'
        MQXR_CONNECTION                 3       X'00000003'
```

MQXE_* (environments)

```
        MQXE_OTHER                      0       X'00000000'
        MQXE_MCA                        1       X'00000001'
        MQXE_MCA_SVRCONN                2       X'00000002'
        MQXE_COMMAND_SERVER             3       X'00000003'
        MQXE_MQSC                       4       X'00000004'
```

MQ*_* (additional constants)

```
        MQAXP_VERSION_1                 1
        MQAXP_VERSION_2                 2
        MQAXC_VERSION_1                 1
        MQACH_VERSION_1                 1

        MQAXP_CURRENT_VERSION           1
        MQAXC_CURRENT_VERSION           1
        MQACH_CURRENT_VERSION           1

        MQXACT_EXTERNAL                 1
        MQXACT_INTERNAL                 2

        MQXT_API_EXIT                   2

        MQACH_LENGTH_1                  68 (32-bit platforms)
                                        72 (64-bit platforms)
                                        80 (128-bit platforms)

        MQACH_CURRENT_LENGTH            68 (32-bit platforms)
                                        72 (64-bit platforms)
                                        80 (128-bit platforms)
```

MQ*_* (null constants)

```
        MQXPDA_NONE                     X'00...00' (48 nulls)
        MQXPDA_NONE_ARRAY               '\0','\0',...,'\0','\0'
```

MQXCC_* (completion codes)

```
       MQXCC_FAILED                    -8
```

MQRC_* (reason codes)

MQRC_API_EXIT_ERROR 2374 X'00000946'

An exit function invocation has returned an invalid response code, or has failed in some way, and the queue manager cannot determine the next action to take.

Examine both the ExitResponse and ExitResponse2 fields of the MQAXP to determine the bad response code, and change the exit to return a valid response code.

MQRC_API_EXIT_INIT_ERROR 2375 X'00000947'
The queue manager encountered an error while initializing the execution environment for an API exit function.

MQRC_API_EXIT_TERM_ERROR 2376 X'00000948'
The queue manager encountered an error while closing the execution environment for an API exit function.

MQRC_EXIT_REASON_ERROR 2377 X'00000949'
The value of the ExitReason field supplied on an exit entry point registration call (MQXEP) call is in error.

Examine the value of the ExitReason field to determine and correct the bad exit reason value.

MQRC_RESERVED_VALUE_ERROR 2378 X'0000094A'
The value of the Reserved field is in error.

Examine the value of the Reserved field to determine and correct the Reserved value.

C language typedefs

This topic provides information about typedefs associated with API exits available in C language.

Here are the C language typedefs associated with the API exits:

```
        typedef PMQLONG  MQPOINTER PPMQLONG;
        typedef PMQBYTE  MQPOINTER PPMQBYTE;
        typedef PMQHOBJ  MQPOINTER PPMQHOBJ;
        typedef PMQOD    MQPOINTER PPMQOD;
        typedef PMQMD    MQPOINTER PPMQMD;
        typedef PMQPMO   MQPOINTER PPMQPMO;
        typedef PMQGMO   MQPOINTER PPMQGMO;
        typedef PMQCNO   MQPOINTER PPMQCNO;
        typedef PMQBO    MQPOINTER PPMQBO;

        typedef MQAXP    MQPOINTER PMQAXP;
        typedef MQACH    MQPOINTER PMQACH;
        typedef MQAXC    MQPOINTER PMQAXC;

        typedef MQCHAR   MQCHAR16[16];
        typedef MQCHAR16 MQPOINTER PMQCHAR16;

        typedef MQLONG   MQPID;
        typedef MQLONG   MQTID;
```

The exit entry point registration call (MQXEP)

Use this information to learn about MQXEP, MQXEP C language invocation, and MQXEP C function prototype.

Use the MQXEP call to:

1. Register the before and after IBM MQ API exit invocation points at which to invoke exit functions
2. Specify the exit function entry points
3. Deregister the exit function entry points

You would typically code the MQXEP calls in the MQ_INIT_EXIT exit function, but you can specify them in any subsequent exit function.

If you use an MQXEP call to register an already registered exit function, the second MQXEP call completes successfully, replacing the registered exit function.

If you use an MQXEP call to register a NULL exit function, the MQXEP call completes successfully and the exit function is deregistered.

If MQXEP calls are used to register, deregister, and reregister a particular exit function during the life of a connection request, the previously registered exit function is reactivated. Any storage still allocated

and associated with this exit function instance is available for use by the exit's functions. (This storage is typically released during the invocation of the termination exit function.)

The interface to MQXEP is:

```
MQXEP (Hconfig, ExitReason, Function, EntryPoint, &ExitOpts, &CompCode, &Reason)
```

where:

Hconfig (MQHCONFIG) - input
The configuration handle, representing the API exit that includes the set of functions being initialized. This value is generated by the queue manager immediately before invoking the MQ_INIT_EXIT function, and is passed in the MQAXP to each API exit function.

ExitReason (MQLONG) - input
The reason for which the entry point is being registered, from the following reasons:

- Connection level initialization or termination (MQXR_CONNECTION)
- Before an IBM MQ API call (MQXR_BEFORE)
- After an IBM MQ API call (MQXR_AFTER)

Function (MQLONG) - input
The function identifier, valid values for which are the MQXF_* constants (see “External constants” on page 1555).

EntryPoint (PMQFUNC) - input
The address of the entry point for the exit function to be registered. The value NULL indicates either that the exit function has not been provided, or that a previous registration of the exit function is being deregistered.

ExitOpts(MQXEPO)
API exits can specify options that control how API exits are registered. If a null pointer is specified for this field, the default values of the MQXEPO structure are assumed.

CompCode (MQLONG) - output
The completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
The reason code that qualifies the completion code.

If the completion code is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If the completion code is MQCC_FAILED:

MQRC_HCONFIG_ERROR
(2280, X'8E8') The supplied configuration handle is not valid. Use the configuration handle from the MQAXP.

MQRC_EXIT_REASON_ERROR
(2377, X'949') The supplied exit function invocation reason is either not valid or is not valid for the supplied exit function identifier.

Either use one of the valid exit function invocation reasons (MQXR_* value), or use a valid function identifier and exit reason combination. (See Table 836 on page 1559.)

MQRC_FUNCTION_ERROR
(2281, X'8E9') The supplied function identifier is not valid for API exit reason. The following table shows valid combinations of function identifiers and ExitReasons.

Table 836. Valid combinations of function identifiers and ExitReasons	
Function	**ExitReason**
MQXF_INIT MQXF_TERM	MQXR_CONNECTION
MQXF_CONN MQXF_CONNX MQXF_DISC MQXF_OPEN MQXF_CLOSE MQXF_PUT1 MQXF_PUT MQXF_GET MQXF_INQ MQXF_SET MQXF_BEGIN MQXF_CMIT MQXF_BACK MQXF_STAT MQXF_CB MQXF_CTL MQXF_CALLBACK MQXF_SUB MQXF_SUBRQ	MQXR_BEFORE MQXR_AFTER
MQXF_DATA_CONV_ON_GET	MQXR_BEFORE

MQRC_RESOURCE_PROBLEM
(2102, X'836') An attempt to register or deregister an exit function has failed because of a resource problem.

MQRC_UNEXPECTED_ERROR
(2195, X'893') An attempt to register or deregister an exit function has failed unexpectedly.

MQRC_PROPERTY_NAME_ERROR
(2442, X'098A') Invalid ExitProperties name.

MQRC_XEPO_ERROR
(2507, X'09CB') Exit options structure not valid.

MQXEP C language invocation

```
MQXEP (Hconfig, ExitReason, Function, EntryPoint, &ExitOpts, &CompCode, &Reason);
```

Declaration for parameter list:

```
    MQHCONFIG       Hconfig;        /* Configuration handle */
    MQLONG          ExitReason;     /* Exit reason */
    MQLONG          Function;       /* Function identifier */
    PMQFUNC         EntryPoint;     /* Function entry point */
    MQXEPO          ExitOpts;       /* Options that control the action of MQXEP */
    MQLONG          CompCode;       /* Completion code */
    MQLONG          Reason;         /* Reason code qualifying completion
                                       code */
```

MQXEP C function prototype

```
void MQXEP (
MQHCONFIG    Hconfig,        /* Configuration handle */
MQLONG       ExitReason,     /* Exit reason */
MQLONG       Function,       /* Function identifier */
PMQFUNC      EntryPoint,     /* Function entry point */
PMQXEPO      pExitOpts;      /* Options that control the action of MQXEP */
PMQLONG      pCompCode,      /* Address of completion code */
PMQLONG      pReason);       /* Address of reason code qualifying completion
                                code */
```

Exit functions

This section provides some general information to help you when using the function calls and describes how to invoke the individual exit functions.

Use this information to understand the general rules for API exit routines, and setting up and cleaning up the exit execution environment.

General rules for API exit routines

The following general rules apply when invoking API exit routines:

- In all cases, API exit functions are driven before validating API call parameters, and before any security checks (in the case of MQCONN, MQCONNX, or MQOPEN).
- The values of fields entered into and output from an exit routine are:
  - On input to a *before* IBM MQ API exit function, the value of a field can be set by the application program, or by a previous exit function invocation.
  - On output from a *before* IBM MQ API exit function, the value of a field can be left unchanged, or set to some other value by the exit function.
  - On input to an *after* IBM MQ API exit function, the value of a field can be the value set by the queue manager after processing the IBM MQ API call, or can be set to a value by a previous exit function invocation in the chain of exit functions.
  - On output from an *after* IBM MQ API call exit function, the value of a field can be left unchanged, or set to some other value by the exit function.
- Exit functions must communicate with the queue manager by using the ExitResponse and ExitResponse2 fields.
- The CompCode and Reason code fields communicate back to the application. The queue manager and exit functions can set the CompCode and Reason code fields.
- The MQXEP call returns new reason codes to the exit functions that call MQXEP. However, exit functions can translate these new reason codes to any existing reasons codes that existing and new applications can understand.
- Each exit function prototype has similar parameters to the API function with an extra level of indirection except for the CompCode and Reason.
- API exits can issue MQI calls (except MQDISC), but these MQI calls do not themselves invoke API exits.

Note, that whether the application is on a server or a client, you cannot predict the sequencing of the API exit calls. An API exit BEFORE call might not be followed immediately by an AFTER call.

The BEFORE call can be followed by another BEFORE call. For example:

BEFORE MQCTL
BEFORE Callback
BEFORE MQPUT
AFTER MQPUT
AFTER Callback

AFTER MQCTL

or

BEFORE XAOPEN
BEFORE MQCONNX
AFTER MQCONNX
AFTER XAOPEN

On the client, there is an exit that can modify the behavior of the MQCONN or MQCONNX call, called the `PreConnect` exit. The `PreConnect` exit can modify any of the parameters on the MQCONN or MQCONNX call including the queue manager name. The client calls this exit first and then invokes the MQCONN or MQCONNX call. Note that only the initial MQCONN or MQCONNX call invokes the API exit; any subsequent reconnect calls have no effect.

The execution environment

In general, all errors from exit functions are communicated back to the exit handler using the ExitResponse and ExitResponse2 fields in MQAXP.

These errors in turn are converted into MQCC_* and MQRC_* values and communicated back to the application in the CompCode and Reason fields. However, any errors encountered in the exit handler logic are communicated back to the application as MQCC_* and MQRC_* values in the CompCode and Reason fields.

If an MQ_TERM_EXIT function returns an error:

- The MQDISC call has already taken place
- There is no other opportunity to drive the *after* MQ_TERM_EXIT exit function (and thus perform exit execution environment cleanup)
- Exit execution environment cleanup is not performed

The exit cannot be unloaded as it might still be in use. Also, other registered exits further down in the exit chain for which the *before* exit was successful, will be driven in the reverse order.

Setting up the exit execution environment

While processing an explicit MQCONN or MQCONNX call, exit handling logic sets up the exit execution environment before invoking the exit initialization function (MQ_INIT_EXIT). Exit execution environment setup involves loading the exit, acquiring storage for, and initializing exit parameter structures. The exit configuration handle is also allocated.

If errors occur during this phase, the MQCONN or MQCONNX call fails with CompCode MQCC_FAILED and one of the following reason codes:

MQRC_API_EXIT_LOAD_ERROR
An attempt to load an API exit module has failed.

MQRC_API_EXIT_NOT_FOUND
An API exit function could not be found in the API exit module.

MQRC_STORAGE_NOT_AVAILABLE
An attempt to initialize the execution environment for an API exit function failed because insufficient storage was available.

MQRC_API_EXIT_INIT_ERROR
An error was encountered while initializing the execution environment for an API exit function.

Cleaning up the exit execution environment

While processing an explicit MQDISC call, or an implicit disconnect request as a result of an application ending, exit handling logic might need to clean up the exit execution environment after invoking the exit termination function (MQ_TERM_EXIT), if registered.

Cleaning up the exit execution environment involves releasing storage for exit parameter structures, possibly deleting any modules previously loaded into memory.

If errors occur during this phase, an explicit MQDISC call fails with CompCode MQCC_FAILED and the following reason code (errors are not highlighted on implicit disconnect requests):

MQRC_API_EXIT_TERM_ERROR
An error was encountered while closing the execution environment for an API exit function. The exit should not return any failure from the MQDISC before or after the MQ_TERM* API exit function calls.

API exits on clients

A client uses the PreConnect exit to modify the behavior of the MQCONN and MQCONNX calls and does not support API exit properties.

PreConnect exit

On a client, the PreConnect exit can be used to look up the channel definition from a central repository, such as an LDAP server.

The PreConnect exit can also modify any parameter, or all the parameters, on an MQCONN or MQCONNX call itself, for example, the queue manager name.

In the case of client applications, the PreConnect exit must be called before the API exit because the MQCONN or MQCONNX API exit is called only once the name of the queue manager is known and this name can be changed by the PreConnect exit.

Note that only the initial MQCONN or MQCONNX call invokes the exit.

API exit properties

On a server, API exits can register an MQXEPO structure at initialization time. The MQXEPO structure contains the ExitProperties field which details the group of properties the exit is interested in. This has the effect of generating a separate message property handle which the exit can manipulate separately from any application message property handle.

On a client, API exit properties are not supported. If an attempt is made to register a property group name on a client, the function fails with a reason code of MQRC_EXIT_PROPS_NOT_SUPPORTED.

Backout - MQ_BACK_EXIT

MQ_BACK_EXIT provides a backout exit function to perform *before* and *after* backout processing. Use function identifier MQXF_BACK with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* backout call exit functions.

The interface to this function is:

```
MQ_BACK_EXIT (&ExitParms, &ExitContext, &Hconn, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_BACK_EXIT (&ExitParms, &ExitContext, &Hconn, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_BACK_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Begin - MQ_BEGIN_EXIT

MQ_BEGIN_EXIT provides a begin exit function to perform *before* and *after* MQBEGIN call processing. Use function identifier MQXF_BEGIN with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQBEGIN call exit functions.

The interface to this function is:

```
MQ_BEGIN_EXIT (&ExitParms, &ExitContext, &Hconn, &pBeginOptions, &CompCode,
               &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pBeginOptions (PMQBO)- input/output
Pointer to begin options.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        PMQBO    pBeginOptions;  /* Ptr to begin options */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_BEGIN_EXIT (&ExitParms, &ExitContext, &Hconn, &pBeginOptions, &CompCode,
               &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_BEGIN_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PPMQBO    ppBeginOptions,   /* Address of ptr to begin options */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Callback - MQ_CALLBACK_EXIT

MQ_CALLBACK_EXIT provides an exit function to perform *before* and *after* callback processing. Use function identifier MQXF_CALLBACK with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* callback call exit functions.

The interface to this function is:

```
MQ_CALLBACK_EXIT (&ExitParms, &ExitContext, &Hconn, &pMsgDesc, &pGetMsgOpts,
                  &pBuffer, &pMQCBContext)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure

ExitContext (MQAXC) - input/output
Exit context structure

Hconn (MQHCONN) - input/output
Connection handle

pMsgDesc
Message descriptor

pGetMsgOpts
Options that control the action of MQGET

pBuffer
Area to contain the message data

pMQCBContext
Context data for the callback

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        PMQMD    pMsgDesc;       /* Message descriptor */
        PMQGMO   pGetMsgOpts;    /* Options that define the operation of the consumer */
        PMQVOID  pBuffer;        /* Area to contain the message data */
        PMQCBC   pContext;       /* Context data for the callback */
```

The queue manager then logically calls the exit as follows:

```
MQ_SUBRQ_EXIT (&ExitParms, &ExitContext, &Hconn, &pMsgDesc, &pGetMsgOpts, &pBuffer,
               &pContext);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CALLBACK_EXIT (
PMQAXP    pExitParms;    /* Exit parameter structure */
PMQAXC    pExitContext;  /* Exit context structure */
PMQHCONN  pHconn;        /* Connection handle */
PPMQMD    ppMsgDesc;     /* Message descriptor */
PPMQGMO   ppGetMsgOpts;  /* Options that define the operation of the consumer */
PPMQVOID  ppBuffer;      /* Area to contain the message data */
PPMQCBC   ppContext;)    /* Context data for the callback */
```

Usage notes

1. The Callback exit is invoked before the consumer is invoked and after the consumer's consumer function has completed. Although the MQMD and MQGMO structures are alterable, changing the values in the before exit does not redrive the retrieval of a message from the queue as the message has already been removed from the queue to be delivered to the consumer function

Manage callback functions - MQ_CB_EXIT

MQ_CB_EXIT provides an exit function to perform *before* and *after* the MQCB call. Use function identifier MQXF_CB with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQCB call exit functions.

The interface to this function is:

```
MQ_CB_EXIT (&ExitParms, &ExitContext, &Hconn, &Operation, &pCallbackDesc,
            &Hobj, &pMsgDesc, &pGetMsgOpts, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure

ExitContext (MQAXC) - input/output
Exit context structure

Hconn (MQHCONN) - input/output
Connection handle

Operation (MQLONG) - input/output
Operation value

pCallbackDesc (PMQCBD) - input/output
Callback descriptor

Hobj (MQHOBJ) - input/output
Object handle

pMsgDesc (PMQMD) - input/output
Message descriptor

pGetMsgOpts (PMQGMO) - input/output
Options that control the action of MQCB

CompCode (MQLONG) - input/output
Completion code

Reason (MQLONG) - input/output
Reason code qualifying CompCode

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        MQLONG   Operation;      /* Operation value. */
        MQCBD    pMsgDesc;       /* Callback descriptor. */
        MQHOBJ   Hobj;           /* Object handle. */
        PMQMD    pMsgDesc;       /* Message descriptor */
        PMQGMO   pGetMsgOpts;    /* Options that define the operation of the consumer */
        PMQLONG  CompCode;       /* Completion code. */
        PMQLONG  Reason;         /* Reason code qualifying CompCode. */
```

The queue manager then logically calls the exit as follows:

```
       MQ_CB_EXIT (&ExitParms, &ExitContext, &Hconn, &Operation, &Hobj, &pMsgDesc,
                   &pGetMsgOpts, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CB_EXIT (
PMQAXP     pExitParms;     /* Exit parameter structure */
PMQAXC     pExitContext;   /* Exit context structure */
PMQHCONN   pHconn;         /* Connection handle */
PMQLONG    pOperation;     /* Callback operation */
PMQHOBJ    pHobj;          /* Object handle */
PPMQMD     ppMsgDesc;      /* Message descriptor */
PPMQGMO    ppGetMsgOpts;   /* Options that control the action of MQCB */
PMQLONG    pCompCode;      /* Completion code */
PMQLONG    pReason;        /* Reason code qualifying CompCode */
```

Close - MQ_CLOSE_EXIT

MQ_CLOSE_EXIT provides a close exit function to perform *before* and *after* MQCLOSE call processing. Use function identifier MQXF_CLOSE with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQCLOSE call exit functions.

The interface to this function is:

```
MQ_CLOSE_EXIT (&ExitParms, &ExitContext, &Hconn, &pHobj,
               &Options, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pHobj (PMQHOBJ) - input
Pointer to object handle.

Options (MQLONG)- input/output
Close options.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQHCONN         Hconn;          /* Connection handle */
        PMQHOBJ         pHobj;          /* Ptr to object handle */
        MQLONG          Options;        /* Close options */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_CLOSE_EXIT (&ExitParms, &ExitContext,&Hconn, &pHobj, &Options,
               &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CLOSE_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PMQHCONN        pHconn,         /* Address of connection handle */
PPMQHOBJ        ppHobj,         /* Address of ptr to object handle */
PMQLONG         pOptions,       /* Address of close options */
PMQLONG         pCompCode,      /* Address of completion code */
```

```
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Commit - MQ_CMIT_EXIT

MQ_CMIT_EXIT provides a commit exit function to perform *before* and *after* commit processing. Use function identifier MQXF_CMIT with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* commit call exit functions.

If a commit operation fails, and the transaction is backed out, the MQCMIT call fails with MQCC_WARNING and MQRC_BACKED_OUT. These return and reason codes are passed into any *after* MQCMIT exit functions to give the exit functions an indication that the unit of work has been backed out.

The interface to this function is:

```
MQ_CMIT_EXIT (&ExitParms, &ExitContext, &Hconn, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

CompCode (MQLONG) - input/output
: Completion code, valid values for which are:

  MQCC_OK
  : Successful completion.

  MQCC_WARNING
  : Partial completion.

  MQCC_FAILED
  : Call failed

Reason (MQLONG) - input/output
: Reason code qualifying the completion code.

  If the completion code is MQCC_OK, the only valid value is:

  MQRC_NONE
  : (0, x'000') No reason to report.

  If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_CMIT_EXIT (&ExitParms, &ExitContext,&Hconn, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CMIT_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Usage notes

1. The MQ_GET_EXIT function interface described here is used for both the MQXF_GET exit function and the “MQXF_DATA_CONV_ON_GET” on page 1575 exit function.

   Separate entry points are defined for these two exit functions, so to intercept *both* the MQXEP call must be used twice; for this call use function identifier MQXF_GET.

   Because the MQ_GET_EXIT interface is the same for MQXF_GET and MQXF_DATA_CONV_ON_GET, a single exit function can be used for both; the `Function` field in the MQAXP structure indicates which exit function has been invoked. Alternatively, the MQXEP call can be used to register different exit functions for the two cases.

Connect and connect extension - MQ_CONNX_EXIT

MQ_CONNX_EXIT provides connection exit function to perform *before* and *after* MQCONN processing, and connection extension exit function to perform *before* and *after* MQCONNX processing.

The same interface, as described here, is invoked for both MQCONN and MQCONNX call exit functions.

When the message channel agent (MCA) responds to an inbound client connection, the MCA can connect and make a number of IBM MQ API calls before the client state is fully known. These API calls call the API exit functions with the MQAXC based on the MCA program itself (for example in the UserId and ConnectionName fields of the MQAXC).

When the MCA responds to subsequent inbound client API calls, the MQAXC structure is based on the inbound client, setting the UserId and ConnectionName fields appropriately.

The queue manager name set by the application on an MQCONN or MQCONNX call is passed to the underlying connect call. Any attempt by a *before* MQ_CONNX_EXIT to change the name of the queue manager has no effect.

Use function identifiers MQXF_CONN and MQXF_CONNX with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQCONN and MQCONNX call exit functions.

An MQ_CONNX_EXIT exit called for reason MQXR_BEFORE *must not* issue any IBM MQ API calls, as the correct environment has not been set up at this time.

An MQ_CONNX_EXIT cannot call MQDISC from an API exit call for the connection for which it is being called. This restriction is applicable to both client and server API exits.

The interface to MQCONN and MQCONNX is identical:

```
MQ_CONNX_EXIT (&ExitParms, &ExitContext, &pQMgrName, &pConnectOpts,
&pHconn, &CompCode, &Reason);
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

pQMgrName (PMQCHAR) - input
: Pointer to the queue manager name supplied on the MQCONNX call. The exit must not change this name on the MQCONN or MQCONNX call.

pConnectOpts (PMQCNO) - input/output
Pointer to the options that control the action of the MQCONNX call.

See "MQCNO - Connect options" on page 311 for details.

For exit function MQXF_CONN, pConnectOpts points to the default connect options structure (MQCNO_DEFAULT).

pHconn (PMQHCONN) - input
Pointer to the connection handle.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Warning (partial completion)

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        PMQCHAR         pQMgrName;      /* Ptr to Queue manager name */
        PMQCNO          pConnectOpts;   /* Ptr to Connection options */
        PMQHCONN        pHconn;         /* Ptr to Connection handle */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_CONNX_EXIT (&ExitParms, &ExitContext, &pQMgrName, &pConnectOps,
               &pHconn, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CONNX_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PPMQCHAR        ppQMgrName,     /* Address of ptr to queue manager name */
PPMQCNO         ppConnectOpts,  /* Address of ptr to connection options */
PPMQHCONN       ppHconn,        /* Address of ptr to connection handle */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Usage notes

1. The MQ_CONNX_EXIT function interface described here is used for both the MQCONN call and the MQCONNX call. However, separate entry points are defined for these two calls. To intercept *both* calls,

the MQXEP call must be used at least twice - once with function identifier MQXF_CONN, and again with MQXF_CONNX.

Because the MQ_CONNX_EXIT interface is the same for MQCONN and MQCONNX, a single exit function can be used for both calls; the `Function` field in the MQAXP structure indicates which call is in progress. Alternatively, the MQXEP call can be used to register different exit functions for the two calls.

2. When a message channel agent (MCA) responds to an inbound client connection, the MCA can issue a number of MQ calls before the client state is fully known. These MQ calls result in the API exit functions being invoked with the MQAXC structure containing data relating to the MCA, and not to the client (for example, user identifier and connection name). However, once the client state is fully known, subsequent MQ calls result in the API exit functions being invoked with the appropriate client data in the MQAXC structure.
3. All MQXR_BEFORE exit functions are invoked before any parameter validation is performed by the queue manager. The parameters might therefore be invalid (including invalid pointers for the addresses of parameters).

   The MQ_CONNX_EXIT function is invoked before any authorization checks are performed by the queue manager.
4. The exit function must not change the name of the queue manager specified on the MQCONN or MQCONNX call. If the name is changed by the exit function, the results are undefined.
5. An MQXR_BEFORE exit function for the MQ_CONNX_EXIT cannot issue MQ calls other than MQXEP.

Control callback - MQ_CTL_EXIT

MQ_CTL_EXIT provides a subscription request exit function to perform *before* and *after* control callback processing. Use function identifier MQXF_CTL with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* control callback call exit functions.

The interface to this function is:

```
MQ_CTL_EXIT (&Hconn, &Operation, &ControlOpts, &CompCode, &Reason)
```

where the parameters are:

Hconn (MQHCONN) - input/output
Connection handle.

Operation (MQLONG) input/output
The operation being processed on the callback defined for the specified object handle

ControlOpts (MQCTLO) input/output
Options that control the action of MQCTL

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQHCONN  Hconn;          /* Connection handle */
        MQLONG   Operation;      /* Operation being processed */
        MQCTLO   ControlOpts;    /* Options that control the action of MQCTL  */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_CTL_EXIT (&Hconn, &Operation, &ControlOpts, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_CTL_EXIT (
PMQHCONN  pHconn;          /* Address of connection handle */
PMQLONG   pOperation;      /* Address of operation being processed */
PMQCTLO   pControlOpts;    /* Address of options that control the action of MQCTL  */
PMQLONG   pCompCode;       /* Address of completion code */
PMQLONG   pReason;)        /* Address of reason code qualifying completion code */
```

Disconnect - MQ_DISC_EXIT

MQ_DISC_EXIT provides a disconnect exit function to perform *before* and *after* MQDISC exit processing. Use function identifier MQXF_DISC with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQDISC call exit functions.

The interface to this function is

```
MQ_DISC_EXIT (&ExitParms, &ExitContext, &pHconn,
&CompCode, &Reason);
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

pHconn (PMQHCONN) - input
Pointer to the connection handle.

For the before MQDISC call, the value of this field is one of:

- The connection handle returned on the MQCONN or MQCONNX call
- Zero, for environments where an environment-specific adapter has connected to the queue manager
- A value set by a previous exit function invocation

For the after MQDISC call, the value of this field is zero or a value set by a previous exit function invocation.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        PMQHCONN        pHconn;         /* Ptr to Connection handle */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_DISC_EXIT (&ExitParms, &ExitContext, &pHconn,
              &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_DISC_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PPMQHCONN       ppHconn,        /* Address of ptr to connection handle */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Get - MQ_GET_EXIT

MQ_GET_EXIT provides a get exit function to perform *before* and *after* MQGET call processing.

There are two function identifiers:

1. Use MQXF_GET with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQGET call exit functions.
2. See "MQXF_DATA_CONV_ON_GET" on page 1575 for information on using the MQXF_DATA_CONV_ON_GET function identifier.

The interface to this function is:

```
MQ_GET_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &pMsgDesc,
             &pGetMsgOpts, &BufferLength, &pBuffer, &pDataLength,
             &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

Hobj (MQHOBJ) - input/output
Object handle.

pMsgDesc (PMQMD) - input/output
Pointer to message descriptor.

pGetMsgOpts (PMQGMO) - input/output
Pointer to get message options.

BufferLength (MQLONG) - input/output
Message buffer length.

pBuffer (PMQBYTE) - input/output
Pointer to message buffer.

pDataLength (PMQLONG) - input/output
Pointer to data length field.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQHCONN         Hconn;          /* Connection handle */
        MQHOBJ          Hobj;           /* Object handle */
        PMQMD           pMsgDesc;       /* Ptr to message descriptor */
        PMQPMO          pGetMsgOpts;    /* Ptr to get message options */
        MQLONG          BufferLength;   /* Message buffer length */
        PMQBYTE         pBuffer;        /* Ptr to message buffer */
        PMQLONG         pDataLength;    /* Ptr to data length field */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_GET_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &pMsgDesc,
             &pGetMsgOpts, &BufferLength, &pBuffer, &pDataLength,
             &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_GET_EXIT (
```

```
PMQAXP           pExitParms,      /* Address of exit parameter structure */
PMQAXC           pExitContext,    /* Address of exit context structure */
PMQHCONN         pHconn,          /* Address of connection handle */
PMQHOBJ          pHobj,           /* Address of object handle */
PPMQMD           ppMsgDesc,       /* Address of ptr to message descriptor */
PPMQGMO          ppGetMsgOpts,    /* Address of ptr to get message options */
PMQLONG          pBufferLength,   /* Address of message buffer length */
PPMQBYTE         ppBuffer,        /* Address of ptr to message buffer */
PPMQLONG         ppDataLength,    /* Address of ptr to data length field */
PMQLONG          pCompCode,       /* Address of completion code */
PMQLONG          pReason);        /* Address of reason code qualifying
                                     completion code */
```

Usage notes

1. The MQ_GET_EXIT function interface described here is used for both the MQXF_GET exit function and the “MQXF_DATA_CONV_ON_GET” on page 1575 exit function.

   Separate entry points are defined for these two exit functions, so to intercept *both* the MQXEP call must be used twice; for this call use function identifier MQXF_GET.

   Because the MQ_GET_EXIT interface is the same for MQXF_GET and MQXF_DATA_CONV_ON_GET, a single exit function can be used for both; the *Function* field in the MQAXP structure indicates which exit function has been invoked. Alternatively, the MQXEP call can be used to register different exit functions for the two cases.

MQXF_DATA_CONV_ON_GET

The MQXF_DATA_CONV_ON_GET function identifier is used with MQ_GET_EXIT.

See MQ_GET_EXIT for information about the interface to this call, and a sample C language declaration.

Usage notes

If registered, this entry point is called when messages arrive at the application but before any data conversion has occurred. This can be useful if the API exit needs to perform processing, such as decryption or decompression, before the message is passed to data conversion. The exit can, if necessary, cause data conversion to be bypassed by returning MQXCC_SUPPRESS_FUNCTION; for more information, see MQAXP structure.

Registering for this entry point on a client has the effect of causing the data conversion to be performed locally on the client machine. For correct operation it might, therefore, be necessary to install the application conversion exits on the client. Note that MQXF_DATA_CONV_ON_GET is also used for asynchronous consume.

When using the MQ_GET_EXIT call, use MQXF_DATA_CONV_ON_GET, with exit reason MQXR_BEFORE, to register a *before* MQGET data conversion exit function.

There is no MQXR_AFTER exit function for MQXF_DATA_CONV_ON_GET; the MQXR_AFTER exit function for MQXF_GET provides the required capability for exit processing after data conversion.

Separate entry points are defined for the MQ_GET_EXIT call, so to intercept *both* exit functions, the MQXEP call must be used twice; for this call use function identifier MQXF_DATA_CONV_ON_GET.

Because the MQ_GET_EXIT interface is the same for MQXF_GET and MQXF_DATA_CONV_ON_GET, a single exit function can be used for both; the *Function* field in the MQAXP structure indicates which exit function has been invoked. Alternatively, the MQXEP call can be used to register different exit functions for the two cases.

Initialization - MQ_INIT_EXIT

MQ_INIT_EXIT provides connection level initialization, indicated by setting ExitReason in MQAXP to MQXR_CONNECTION.

During the initialization, note the following:

- The MQ_INIT_EXIT function calls MQXEP to register the IBM MQ API verbs and the ENTRY and EXIT points in which it is interested.

- Exits do not need to intercept all the IBM MQ API verbs. Exit functions are invoked only if an interest has been registered.
- Storage that is to be used by the exit can be acquired while initializing it.
- If a call to this function fails, the MQCONN or MQCONNX call that invoked it also fails with a CompCode and Reason that depend on the value of the ExitResponse field in MQAXP.
- An MQ_INIT_EXIT exit must not issue IBM MQ API calls, because the correct environment has not been set up at this time.
- If an MQ_INIT_EXIT fails with MQXCC_FAILED, the queue manager returns from the MQCONN or MQCONNX call that called it with MQCC_FAILED and MQRC_API_EXIT_ERROR.
- If the queue manager encounters an error while initializing the API exit function execution environment before invoking the first MQ_INIT_EXIT, the queue manager returns from the MQCONN or MQCONNX call that invoked MQ_INIT_EXIT with MQCC_FAILED and MQRC_API_EXIT_INIT_ERROR.

The interface to MQ_INIT_EXIT is:

```
MQ_INIT_EXIT (&ExitParms, &ExitContext, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

CompCode (MQLONG) - input/output
Pointer to completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Pointer to reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

The CompCode and Reason returned to the application depend on the value of the ExitResponse field in MQAXP.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_INIT_EXIT (&ExitParms, &ExitContext, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_INIT_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Usage notes

1. The MQ_INIT_EXIT function can issue the MQXEP call to register the addresses of the exit functions for the particular MQ calls to be intercepted. It is not necessary to intercept all MQ calls, or to intercept both MQXR_BEFORE and MQXR_AFTER calls. For example, an exit suite could choose to intercept only the MQXR_BEFORE call of MQPUT.
2. Storage that is to be used by exit functions in the exit suite can be acquired by the MQ_INIT_EXIT function. Alternatively, exit functions can acquire storage when they are invoked, as and when needed. However, all storage should be freed before the exit suite is terminated; the MQ_TERM_EXIT function can free the storage, or an exit function invoked earlier.
3. If MQ_INIT_EXIT returns MQXCC_FAILED in the `ExitResponse` field of MQAXP, or fails in some other way, the MQCONN or MQCONNX call that caused MQ_INIT_EXIT to be invoked also fails, with the **CompCode** and **Reason** parameters set to appropriate values.
4. An MQ_INIT_EXIT function cannot issue MQ calls other than MQXEP.

Inquire - MQ_INQ_EXIT

MQ_INQ_EXIT provides an inquire exit function to perform *before* and *after* MQINQ call processing. Use function identifier MQXF_INQ with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQINQ call exit functions.

The interface to this function is:

```
MQ_INQ_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &SelectorCount,
             &pSelectors, &IntAttrCount, &pIntAttrs, &CharAttrLength,
             &pCharAttrs, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

Hobj (MQHOBJ) - input
Object handle.

SelectorCount (MQLONG) - input
Count of selectors

pSelectors (PMQLONG) - input/output
Pointer to array of selector values.

IntAttrCount (MQLONG) - input
Count of integer attributes.

pIntAttrs (PMQLONG) - input/output
Pointer to array of integer attribute values.

CharAttrLength (MQLONG) - input/output
Character attributes array length.

pCharAttrs (PMQCHAR) - input/output
Pointer to character attributes array.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
         MQAXP    ExitParms;       /* Exit parameter structure */
         MQAXC    ExitContext;     /* Exit context structure */
         MQHCONN  Hconn;           /* Connection handle */
         MQHOBJ   Hobj;            /* Object handle */
         MQLONG   SelectorCount;   /* Count of selectors */
         PMQLONG  pSelectors;      /* Ptr to array of attribute selectors */
         MQLONG   IntAttrCount;    /* Count of integer attributes */
         PMQLONG  pIntAttrs;       /* Ptr to array of integer attributes */
         MQLONG   CharAttrLength;  /* Length of char attributes array */
         PMQCHAR  pCharAttrs;      /* Ptr to character attributes */
         MQLONG   CompCode;        /* Completion code */
         MQLONG   Reason;          /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_INQ_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &SelectorCount,
             &pSelectors, &IntAttrCount, &pIntAttrs, &CharAttrLength,
             &pCharAttrs, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_INQ_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PMQHOBJ   pHobj,            /* Address of object handle */
PMQLONG   pSelectorCount,   /* Address of selector count */
PPMQLONG  ppSelectors,      /* Address of ptr to array of selectors */
PMQLONG   pIntAttrCount;    /* Address of count of integer attributes */
PPMQLONG  ppIntAttrs,       /* Address of ptr to array of integer attributes */
PMQLONG   pCharAttrLength,  /* Address of character attribute length */
PPMQCHAR  ppCharAttrs,      /* Address of ptr to character attributes array */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Open - MQ_OPEN_EXIT

MQ_OPEN_EXIT provides an open exit function to perform *before* and *after* MQOPEN call processing. Use function identifier MQXF_OPEN with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQOPEN call exit functions.

The interface to this function is

```
MQ_OPEN_EXIT (&ExitParms, &ExitContext, &Hconn, &pObjDesc, &Options,
&pHobj, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

pObjDesc (PMQOD) - input/output
: Pointer to object descriptor.

Options (MQLONG) - input/output
: Open options.

pHobj (PMQHOBJ) - input
: Pointer to object handle.

CompCode (MQLONG) - input/output
: Completion code, valid values for which are:

  MQCC_OK
  : Successful completion.

  MQCC_WARNING
  : Partial completion

  MQCC_FAILED
  : Call failed

Reason (MQLONG) - input/output
: Reason code qualifying the completion code.

  If the completion code is MQCC_OK, the only valid value is:

  MQRC_NONE
  : (0, x'000') No reason to report.

  If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQHCONN         Hconn;          /* Connection handle */
        PMQOD           pObjDesc;       /* Ptr to object descriptor */
        MQLONG          Options;        /* Open options */
        PMQHOBJ         pHobj;          /* Ptr to object handle */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_OPEN_EXIT (&ExitParms, &ExitContext, &Hconn, &pObjDesc, &Options,
              &pHobj, &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_OPEN_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PMQHCONN        pHconn,         /* Address of connection handle */
PPMQOD          ppObjDesc,      /* Address of ptr to object descriptor */
PMQLONG         pOptions,       /* Address of open options */
PPMQHOBJ        ppHobj,         /* Address of ptr to object handle */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Put - MQ_PUT_EXIT

MQ_PUT_EXIT provides a put exit function to perform *before* and *after* MQPUT call processing. Use function identifier MQXF_PUT with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQPUT call exit functions.

The interface to this function is:

```
MQ_PUT_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &pMsgDesc,
             &pPutMsgOpts, &BufferLength, &pBuffer, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

Hobj (MQHOBJ) - input/output
Object handle.

pMsgDesc (PMQMD) - input/output
Pointer to message descriptor.

pPutMsgOpts (PMQPMO) - input/output
Pointer to put message options.

BufferLength (MQLONG) - input/output
Message buffer length.

pBuffer (PMQBYTE) - input/output
Pointer to message buffer.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQHCONN         Hconn;          /* Connection handle */
        MQHOBJ          Hobj;           /* Object handle */
        PMQMD           pMsgDesc;       /* Ptr to message descriptor */
        PMQPMO          pPutMsgOpts;    /* Ptr to put message options */
        MQLONG          BufferLength;   /* Message buffer length */
        PMQBYTE         pBuffer;        /* Ptr to message data */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_PUT_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &pMsgDesc,
             &pPutMsgOpts, &BufferLength, &pBuffer, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_PUT_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PMQHCONN        pHconn,         /* Address of connection handle */
PMQHOBJ         pHobj,          /* Address of object handle */
PPMQMD          ppMsgDesc,      /* Address of ptr to message descriptor */
PPMQPMO         ppPutMsgOpts,   /* Address of ptr to put message options */
PMQLONG         pBufferLength,  /* Address of message buffer length */
PPMQBYTE        ppBuffer,       /* Address of ptr to message buffer */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Usage notes

- Report messages generated by the queue manager skip the normal call processing. As a result, such messages cannot be intercepted by the MQ_PUT_EXIT function or the MQPUT1 function. However, report messages generated by the message channel agent are processed normally, and hence can be intercepted by the MQ_PUT_EXIT function or the MQ_PUT1_EXIT function. To be sure to intercepting all of the report messages generated by the MCA, both MQ_PUT_EXIT and MQ_PUT1_EXIT should be used.

Put1 - MQ_PUT1_EXIT

MQ_PUT1_EXIT provides a *put one message only* exit function to perform *before* and *after* MQPUT1 call processing. Use function identifier MQXF_PUT1 with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQPUT1 call exit functions.

The interface to this function is:

```
MQ_PUT1_EXIT (&ExitParms, &ExitContext, &Hconn, &pObjDesc, &pMsgDesc,
&pPutMsgOpts, &BufferLength, &pBuffer, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pObjDesc (PMQOD) - input/output
Pointer to object descriptor.

pMsgDesc (PMQMD) - input/output
Pointer to message descriptor.

pPutMsgOpts (PMQPMO) - input/output
Pointer to put message options.

BufferLength (MQLONG) - input/output
Message buffer length.

pBuffer (PMQBYTE) - input/output
Pointer to message buffer.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQHCONN         Hconn;          /* Connection handle */
        PMQOD           pObjDesc;       /* Ptr to object descriptor */
        PMQMD           pMsgDesc;       /* Ptr to message descriptor */
        PMQPMO          pPutMsgOpts;    /* Ptr to put message options */
        MQLONG          BufferLength;   /* Message buffer length */
        PMQBYTE         pBuffer;        /* Ptr to message data */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_PUT1_EXIT (&ExitParms, &ExitContext, &Hconn, &pObjDesc, &pMsgDesc,
              &pPutMsgOpts, &BufferLength, &pBuffer, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_PUT1_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
```

```
PMQHCONN         pHconn,         /* Address of connection handle */
PPMQOD           ppObjDesc,      /* Address of ptr to object descriptor */
PPMQMD           ppMsgDesc,      /* Address of ptr to message descriptor */
PPMQPMO          ppPutMsgOpts,   /* Address of ptr to put message options */
PMQLONG          pBufferLength,  /* Address of message buffer length */
PPMQBYTE         ppBuffer,       /* Address of ptr to message buffer */
PMQLONG          pCompCode,      /* Address of completion code */
PMQLONG          pReason);       /* Address of reason code qualifying
                                    completion code */
```

Set - MQ_SET_EXIT

MQ_SET_EXIT provides a set exit function to perform *before* and *after* MQSET call processing. Use function identifier MQXF_SET with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQSET call exit functions.

The interface to this function is:

```
MQ_SET_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &SelectorCount,
             &pSelectors, &IntAttrCount, &pIntAttrs, &CharAttrLength,
             &pCharAttr, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

Hobj (MQHOBJ) - input
: Object handle.

SelectorCount (MQLONG) - input
: Count of selectors

pSelectors (PMQLONG) - input/output
: Pointer to array of selector values.

IntAttrCount (MQLONG) - input
: Count of integer attributes.

pIntAttrs (PMQLONG) - input/output
: Pointer to array of integer attribute values.

CharAttrLength (MQLONG) - input/output
: Character attributes array length.

pCharAttrs (PMQCHAR) - input/output
: Pointer to character attribute values.

CompCode (MQLONG) - input/output
: Completion code, valid values for which are:

  MQCC_OK
  : Successful completion.

  MQCC_WARNING
  : Partial completion.

  MQCC_FAILED
  : Call failed

Reason (MQLONG) - input/output
: Reason code qualifying the completion code.

  If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;       /* Exit parameter structure */
        MQAXC    ExitContext;     /* Exit context structure */
        MQHCONN  Hconn;           /* Connection handle */
        MQHOBJ   Hobj;            /* Object handle */
        MQLONG   SelectorCount;   /* Count of selectors */
        PMQLONG  pSelectors;      /* Ptr to array of attribute selectors */
        MQLONG   IntAttrCount;    /* Count of integer attributes */
        PMQLONG  pIntAttrs;       /* Ptr to array of integer attributes */
        MQLONG   CharAttrLength;  /* Length of char attributes array */
        PMQCHAR  pCharAttrs;      /* Ptr to character attributes */
        MQLONG   CompCode;        /* Completion code */
        MQLONG   Reason;          /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_SET_EXIT (&ExitParms, &ExitContext, &Hconn, &Hobj, &SelectorCount,
             &pSelectors, &IntAttrCount, &pIntAttrs, &CharAttrLength,
             &pCharAttrs, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_SET_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PMQHOBJ   pHobj,            /* Address of object handle */
PMQLONG   pSelectorCount,   /* Address of selector count */
PPMQLONG  ppSelectors,      /* Address of ptr to array of selectors */
PMQLONG   pIntAttrCount;    /* Address of count of integer attributes */
PPMQLONG  ppIntAttrs,       /* Address of ptr to array of integer attributes */
PMQLONG   pCharAttrLength,  /* Address of character attribute length */
PPMQCHAR  ppCharAttrs,      /* Address of ptr to character attributes array */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Status - MQ_STAT_EXIT

MQ_STAT_EXIT provides a status exit function to perform *before* and *after* MQSTAT call processing. Use function identifier MQXF_STAT with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* MQSTAT call exit functions.

The interface to this function is:

```
MQ_STAT_EXIT (&ExitParms, &ExitContext, &Hconn, &Type, &pStatus
              &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

Type (MQLONG) - input
Type of status information to retrieve.

pStatus (PMQSTS) - output
Pointer to status buffer.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

Your exit must match the following C function prototype:

```
void MQENTRY MQ_STAT_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PMQLONG   pType             /* Address of status type */
PPMQSTS   ppStatus          /* Address of status buffer */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

Termination - MQ_TERM_EXIT

MQ_TERM_EXIT provides connection level termination, registered with a function identifier of MQXF_TERM and ExitReason MQXR_CONNECTION. If registered, MQ_TERM_EXIT is called once for every disconnect request.

As part of the termination, storage no longer required by the exit can be released, and any clean up required can be performed.

If an MQ_TERM_EXIT fails with MQXCC_FAILED, the queue manager returns from the MQDISC that called it with MQCC_FAILED and MQRC_API_EXIT_ERROR.

If the queue manager encounters an error while terminating the API exit function execution environment after invoking the last MQ_TERM_EXIT, the queue manager returns from the MQDISC call that invoked MQ_TERM_EXIT with MQCC_FAILED and MQRC_API_EXIT_TERM_ERROR

The interface to this function is:

```
MQ_TERM_EXIT (&ExitParms, &ExitContext, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED, the exit function can set the reason code field to any valid MQRC_* value.

The CompCode and Reason returned to the application depend on the value of the ExitResponse field in MQAXP.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP           ExitParms;      /* Exit parameter structure */
        MQAXC           ExitContext;    /* Exit context structure */
        MQLONG          CompCode;       /* Completion code */
        MQLONG          Reason;         /* Reason code */
```

The queue manager then logically calls the exit as follows:

```
MQ_TERM_EXIT (&ExitParms, &ExitContext, &CompCode, &Reason)
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_TERM_EXIT (
PMQAXP          pExitParms,     /* Address of exit parameter structure */
PMQAXC          pExitContext,   /* Address of exit context structure */
PMQLONG         pCompCode,      /* Address of completion code */
PMQLONG         pReason);       /* Address of reason code qualifying
                                   completion code */
```

Usage notes

1. The MQ_TERM_EXIT function is optional. It is not necessary for an exit suite to register a termination exit if there is no termination processing to be done.

   If functions belonging to the exit suite acquire resources during the connection, an MQ_TERM_EXIT function is a convenient point at which to free those resources, for example, freeing storage obtained dynamically.

2. If an MQ_TERM_EXIT function is registered when the MQDISC call is issued, the exit function is invoked after all of the MQDISC exit functions have been invoked.

3. If MQ_TERM_EXIT returns MQXCC_FAILED in the `ExitResponse` field of MQAXP, or fails in some other way, the MQDISC call that caused MQ_TERM_EXIT to be invoked also fails, with the **CompCode** and **Reason** parameters set to appropriate values.

Register subscription - MQ_SUB_EXIT

MQ_SUB_EXIT provides an exit function to perform *before* and *after* subscription reregistration processing. Use function identifier MQXF_SUB with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* subscription registrationcall exit functions.

The interface to this function is:

```
MQ_SUB_EXIT (&ExitParms, &ExitContext, &Hconn, &pSubDesc, &pHobj, &pHsub, &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input/output
: Connection handle.

pSubDesc - input/output
: Array of attribute selectors.

pHobj - input/output
: Object handle

pHsub (MQHOBJ) input/output
: Subscription handle

CompCode (MQLONG) - input/output
: Completion code, valid values for which are:

  MQCC_OK
  : Successful completion.

  MQCC_WARNING
  : Partial completion.

  MQCC_FAILED
  : Call failed

Reason (MQLONG) - input/output
: Reason code qualifying the completion code.

  If the completion code is MQCC_OK, the only valid value is:

  MQRC_NONE
  : (0, x'000') No reason to report.

  If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        PMQSD    pSubDesc;       /* Subscription descriptor */
        PMQHOBJ  pHobj;          /* Object Handle */
        PMQHOBJ  pHsub;          /* Subscription handle */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_SUB_EXIT (&ExitParms, &ExitContext, &Hconn, &pSubDesc, &pHobj, &pHsub,
             &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
        PMQAXP    pExitParms;      /* Exit parameter structure */
        PMQAXC    pExitContext;    /* Exit context structure */
        PMQHCONN  pHconn;          /* Connection handle */
        PPMQSD    ppSubDesc;       /* Subscription descriptor */
        PPMQHOBJ  ppHobj;          /* Object Handle */
        PPMQHOBJ  ppHsub;          /* Subscription handle */
        PMQLONG   pCompCode;       /* Completion code */
        PMQLONG   pReason;         /* Reason code qualifying completion code */
```

Subscription request - MQ_SUBRQ_EXIT

MQ_SUBRQ_EXIT provides a subscription request exit function to perform *before* and *after* subscription request processing. Use function identifier MQXF_SUBRQ with exit reasons MQXR_BEFORE and MQXR_AFTER to register *before* and *after* subscription request call exit functions.

The interface to this function is:

```
MQ_SUBRQ_EXIT (&ExitParms, &ExitContext, &Hconn, &pHsub, &Action, &pSubRqOpts,
               &CompCode, &Reason)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input/output
Connection handle.

pHsub (MQHOBJ) input/output
Subscription handle

Action (MQLONG) input/output
Action

pSubRqOpts (MQSRO) input/output

CompCode (MQLONG) - input/output
Completion code, valid values for which are:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed

Reason (MQLONG) - input/output
Reason code qualifying the completion code.

If the completion code is MQCC_OK, the only valid value is:

MQRC_NONE
(0, x'000') No reason to report.

If the completion code is MQCC_FAILED or MQCC_WARNING, the exit function can set the reason code field to any valid MQRC_* value.

C language invocation

The queue manager logically defines the following variables:

```
        MQAXP    ExitParms;      /* Exit parameter structure */
        MQAXC    ExitContext;    /* Exit context structure */
        MQHCONN  Hconn;          /* Connection handle */
        PMQLONG  pHsub;          /* Subscription handle */
        MQLONG   Action;         /* Action */
        PMQSRO   pSubRqOpts;     /* Subscription Request Options */
        MQLONG   CompCode;       /* Completion code */
        MQLONG   Reason;         /* Reason code qualifying completion code */
```

The queue manager then logically calls the exit as follows:

```
MQ_SUBRQ_EXIT (&ExitParms, &ExitContext, &Hconn, &pHsub, &Action, &pSubRqOpts,
               &CompCode, &Reason);
```

Your exit must match the following C function prototype:

```
void MQENTRY MQ_SUBRQ_EXIT (
PMQAXP    pExitParms,       /* Address of exit parameter structure */
PMQAXC    pExitContext,     /* Address of exit context structure */
PMQHCONN  pHconn,           /* Address of connection handle */
PPMQHOBJ  ppHsub;           /* Address of Subscription handle */
PMQLONG   pAction;          /* Address of Action */
PPMQSRO   ppSubRqOpts;      /* Address of Subscription Request Options */
PMQLONG   pCompCode,        /* Address of completion code */
PMQLONG   pReason);         /* Address of reason code qualifying completion
                               code */
```

xa_close - XA_CLOSE_EXIT

XA_CLOSE_EXIT provides an xa_close exit function to perform before and after xa_close processing. Use function identifier MQXF_XACLOSE with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_close call exit functions.

The interface to this function is:

```
XA_CLOSE_EXIT (&ExitParms, &ExitContext, &Hconn, &pXa_info, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXa_info (PMQCHAR) - input/output
Instance-specific resource manager information.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
    MQAXP    ExitParms;    /* Exit parameter structure */
    MQAXC    ExitContext;  /* Exit context structure */
    MQHCONN  Hconn;        /* Connection handle */
    PMQCHAR  pXa_info;     /* Instance-specific RM info */
    MQLONG   Rmid;         /* Resource manager identifier */
    MQLONG   Flags;        /* Resource manager options*/
    MQLONG   XARetCode;    /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_CLOSE_EXIT (&ExitParms, &ExitContext, &Hconn, &pXa_info, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_CLOSE_EXIT (
     PMQAXP    pExitParms,    /* Address of exit parameter structure */
     PMQAXC    pExitContext,  /* Address of exit context structure */
     PMQHCONN  pHconn,        /* Address of connection handle */
     PPMQCHAR  ppXa_info,     /* Address of instance-specific RM info */
     PMQLONG   pRmid,         /* Address of resource manager identifier */
     PMQLONG   pFlags,        /* Address of resource manager options*/
     PMQLONG   pXARetCode);   /* Address of response from XA call */
```

xa_commit - XA_COMMIT_EXIT

XA_COMMIT_EXIT provides an xa_commit exit function to perform before and after xa_commit processing. Use function identifier MQXF_XACOMMIT with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_commit call exit functions.

The interface to this function is:

```
XA_COMMIT_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
    MQAXP    ExitParms;   /* Exit parameter structure */
    MQAXC    ExitContext; /* Exit context structure */
    MQHCONN  Hconn;       /* Connection handle */
    MQPTR    pXID;        /* Transaction branch ID */
    MQLONG   Rmid;        /* Resource manager identifier */
```

```
    MQLONG   Flags;       /* Resource manager options*/
    MQLONG   XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_COMMIT_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_COMMIT_EXIT (
     PMQAXP    pExitParms,   /* Address of exit parameter structure */
     PMQAXC    pExitContext, /* Address of exit context structure */
     PMQHCONN  pHconn,       /* Address of connection handle */
     PMQPTR    ppXID,        /* Address of transaction branch ID */
     PMQLONG   pRmid,        /* Address of resource manager identifier */
     PMQLONG   pFlags,       /* Address of resource manager options*/
     PMQLONG   pXARetCode);  /* Address of response from XA call */
```

xa_complete - XA_COMPLETE_EXIT

XA_COMPLETE_EXIT provides an xa_complete exit function to perform before and after xa_complete processing. Use function identifier MQXF_XACOMPLETE with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_complete call exit functions.

The interface to this function is:

```
XA_COMPLETE_EXIT (&ExitParms, &ExitContext, &Hconn, &pHandle, &pRetval, &Rmid, &Flags,
&XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

pHandle (PMQLONG) - input/output
: Pointer to asynchronous operation.

pRetVal (PMQLONG) - input/output
: Return value of asynchronous operation.

Rmid (MQLONG) - input/output
: Resource manager identifier.

Flags (MQLONG) - input/output
: Resource manager options.

XARetCode (MQLONG) - input/output
: Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
    MQAXP   ExitParms;   /* Exit parameter structure */
    MQAXC   ExitContext; /* Exit context structure */
    MQHCONN Hconn;       /* Connection handle */
    PMQLONG pHandle;     /* Ptr to asynchronous op */
    PMQLONG pRetval;     /* Return value of async op */
    MQLONG  Rmid;        /* Resource manager identifier */
    MQLONG  Flags;       /* Resource manager options*/
    MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_COMPLETE_EXIT (&ExitParms, &ExitContext, &Hconn, &pHandle, &pRetval, &Rmid, &Flags,
&XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_COMPLETE_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PPMQLONG ppHandle,     /* Address of ptr to asynchronous op */
     PPMQLONG ppRetval,     /* Address of return value of async op */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_end - XA_END_EXIT

XA_END_EXIT provides an xa_end exit function to perform before and after xa_end processing. Use function identifier MQXF_XAEND with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_end call exit functions.

The interface to this function is:

```
XA_END_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

pXID (MQPTR) - input/output
: Transaction branch ID.

Rmid (MQLONG) - input/output
: Resource manager identifier.

Flags (MQLONG) - input/output
: Resource manager options.

XARetCode (MQLONG) - input/output
: Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_END_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_END_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_forget - XA_FORGET_EXIT

XA_FORGET_EXIT provides an xa_forget exit function to perform before and after xa_forget processing. Use function identifier MQXF_XAFORGET with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_forget call exit functions.

The interface to this function is:

```
XA_FORGET_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_FORGET_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_FORGET_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
```

```
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_open - XA_OPEN_EXIT

XA_OPEN_EXIT provides an xa_open exit function to perform before and after xa_open processing. Use function identifier MQXF_XAOPEN with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_open call exit functions.

The interface to this function is:

```
XA_OPEN_EXIT (&ExitParms, &ExitContext, &Hconn, &pXa_info, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXa_info (PMQCHAR) - input/output
Instance-specific resource manager information.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     PMQCHAR pXa_info;    /* Instance-specific RM info */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_OPEN_EXIT (&ExitParms, &ExitContext, &Hconn, &pXa_info, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_OPEN_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PPMQCHAR ppXa_info,    /* Address of instance-specific RM info */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_prepare - XA_PREPARE_EXIT

XA_PREPARE_EXIT provides an xa_prepare exit function to perform before and after xa_prepare processing. Use function identifier MQXF_XAPREPARE with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_prepare call exit functions.

The interface to this function is:

```
XA_PREPARE_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Hconn (MQHCONN) - input
: Connection handle.

pXID (MQPTR) - input/output
: Transaction branch ID.

Rmid (MQLONG) - input/output
: Resource manager identifier.

Flags (MQLONG) - input/output
: Resource manager options.

XARetCode (MQLONG) - input/output
: Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
MQAXP  ExitParms;  /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_PREPARE_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_PREPARE_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_recover - XA_RECOVER_EXIT

XA_RECOVER_EXIT provides an xa_recover exit function to perform before and after xa_recover processing. Use function identifier MQXF_XARECOVER with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_recover call exit functions.

The interface to this function is:

```
XA_RECOVER_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Count, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Count (MQLONG) - input/output
Maximum XIDs in XID array

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Count;       /* Max XIDs in XID array */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_RECOVER_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Count, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_RECOVER_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
     PMQLONG  pCount,       /* Address of max XIDs in XID array */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_rollback - XA_ROLLBACK_EXIT

XA_ROLLBACK_EXIT provides an xa_rollback exit function to perform before and after xa_rollback processing. Use function identifier MQXF_XAROLLBACK with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_rollback call exit functions.

The interface to this function is:

```
XA_ROLLBACK_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_ROLLBACK_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_ROLLBACK_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

xa_start - XA_START_EXIT

XA_START_EXIT provides an xa_start exit function to perform before and after xa_start processing. Use function identifier MQXF_XASTART with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after xa_start call exit functions.

The interface to this function is:

```
XA_START_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Rmid (MQLONG) - input/output
Resource manager identifier.

Flags (MQLONG) - input/output
Resource manager options.

XARetCode (MQLONG) - input/output
Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP   ExitParms;   /* Exit parameter structure */
     MQAXC   ExitContext; /* Exit context structure */
     MQHCONN Hconn;       /* Connection handle */
     MQPTR   pXID;        /* Transaction branch ID */
     MQLONG  Rmid;        /* Resource manager identifier */
     MQLONG  Flags;       /* Resource manager options*/
     MQLONG  XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
XA_START_EXIT (&ExitParms, &ExitContext, &Hconn, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY XA_START_EXIT (
     PMQAXP   pExitParms,   /* Address of exit parameter structure */
     PMQAXC   pExitContext, /* Address of exit context structure */
     PMQHCONN pHconn,       /* Address of connection handle */
     PMQPTR   ppXID,        /* Address of transaction branch ID */
     PMQLONG  pRmid,        /* Address of resource manager identifier */
     PMQLONG  pFlags,       /* Address of resource manager options*/
     PMQLONG  pXARetCode);  /* Address of response from XA call */
```

ax_reg - AX_REG_EXIT

AX_REG_EXIT provides an ax_reg exit function to perform before and after ax_reg processing. Use function identifier MQXF_AXREG with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after ax_reg call exit functions.

The interface to this function is:

```
AX_REG_EXIT (&ExitParms, &ExitContext, &pXID, &Rmid, &Flags, &XARetCode)
```

where the parameters are:

ExitParms (MQAXP) - input/output
Exit parameter structure.

ExitContext (MQAXC) - input/output
Exit context structure.

Hconn (MQHCONN) - input
Connection handle.

pXID (MQPTR) - input/output
Transaction branch ID.

Rmid (MQLONG) - input/output
: Resource manager identifier.

Flags (MQLONG) - input/output
: Resource manager options.

XARetCode (MQLONG) - input/output
: Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP  ExitParms;   /* Exit parameter structure */
     MQAXC  ExitContext; /* Exit context structure */
     MQPTR  pXID;        /* Transaction branch ID */
     MQLONG Rmid;        /* Resource manager identifier */
     MQLONG Flags;       /* Resource manager options*/
     MQLONG XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
AX_REG_EXIT (&ExitParms, &ExitContext, &pXID, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY AX_REG_EXIT (
     PMQAXP  pExitParms,   /* Address of exit parameter structure */
     PMQAXC  pExitContext, /* Address of exit context structure */
     PMQPTR  ppXID,        /* Address of transaction branch ID */
     PMQLONG pRmid,        /* Address of resource manager identifier */
     PMQLONG pFlags,       /* Address of resource manager options*/
     PMQLONG pXARetCode);  /* Address of response from XA call */
```

ax_unreg - AX_UNREG_EXIT

AX_UNREG_EXIT provides an ax_unreg exit function to perform before and after ax_unreg processing. Use function identifier MQXF_AXUNREG with exit reasons MQXR_BEFORE and MQXR_AFTER to register the before and after ax_unreg call exit functions.

The interface to this function is:

```
AX_UNREG_EXIT (&ExitParms, &ExitContext, &Rmid, &Flags, &XARetCode);
```

where the parameters are:

ExitParms (MQAXP) - input/output
: Exit parameter structure.

ExitContext (MQAXC) - input/output
: Exit context structure.

Rmid (MQLONG) - input/output
: Resource manager identifier.

Flags (MQLONG) - input/output
: Resource manager options.

XARetCode (MQLONG) - input/output
: Response from XA call.

C language invocation

The queue manager logically defines the following variables:

```
     MQAXP  ExitParms;   /* Exit parameter structure */
     MQAXC  ExitContext; /* Exit context structure */
     MQLONG Rmid;        /* Resource manager identifier */
     MQLONG Flags;       /* Resource manager options*/
     MQLONG XARetCode;   /* Response from XA call */
```

The queue manager then logically calls the exit as follows:

```
AX_UNREG_EXIT (&ExitParms, &ExitContext, &Rmid, &Flags, &XARetCode);
```

Your exit must match the following C function prototype:

```
typedef void MQENTRY AX_UNREG_EXIT (
     PMQAXP  pExitParms,   /* Address of exit parameter structure */
     PMQAXC  pExitContext, /* Address of exit context structure */
     PMQLONG pRmid,        /* Address of resource manager identifier */
     PMQLONG pFlags,       /* Address of resource manager options*/
     PMQLONG pXARetCode);  /* Address of response from XA call */
```

General information on invoking exit functions

This topic provides some general guidance to help you to plan your exits, particularly related to handling errors and unexpected events.

Exit failure

If an exit function abnormally terminates after a destructive, out of syncpoint, MQGET call but before the message has been passed to the application, the exit handler can recover from the failure, and pass control to the application.

In this case, the message might be lost. This is like what happens when an application fails immediately after receiving a message from a queue.

The MQGET call might complete with MQCC_FAILED and MQRC_API_EXIT_ERROR.

If a *before* API call exit function terminates abnormally, the exit handler can recover from the failure and pass control to the application without processing the API call. In this event, the exit function must recover any resources that it owns.

If chained exits are in use, the *after* API call exits for any *before* API call exits that had successfully been driven can themselves be driven. The API call might fail with MQCC_FAILED and MQRC_API_EXIT_ERROR.

Example error handling for exit functions

The following diagram shows the points (e *N*) at which errors can occur. It is only an example to show how exits behave and should be read together with the following table. In this example, two exit functions are invoked both before and after each API call to show the behavior with chained exits.

```
Application ErrPt     Exit function            API call
----------- -----     -------------            --------

Start

MQCONN  -->
            e1
                         MQ_INIT_EXIT
            e2
                  before MQ_CONNX_EXIT  1
            e3
                  before MQ_CONNX_EXIT  2
            e4
                                             -->  MQCONN
            e5
                  after  MQ_CONNX_EXIT  2
            e6
                  after  MQ_CONNX_EXIT  1
```

```
            e7
        <--
MQOPEN  -->
                  before MQ_OPEN_EXIT  1
            e8
                  before MQ_OPEN_EXIT  2
            e9
                                            -->  MQOPEN
            e10
                  after  MQ_OPEN_EXIT  2
            e11
                  after  MQ_OPEN_EXIT  1
            e12
        <--
MQPUT   -->
                  before MQ_PUT_EXIT   1
            e13
                  before MQ_PUT_EXIT   2
            e14
                                            -->  MQPUT
            e15
                  after  MQ_PUT_EXIT   2
            e16
                  after  MQ_PUT_EXIT   1
            e17
        <--
MQCLOSE -->
                  before MQ_CLOSE_EXIT 1
            e18
                  before MQ_CLOSE_EXIT 2
            e19
                                            -->  MQCLOSE
            e20
                  after  MQ_CLOSE_EXIT 2
            e21
                  after  MQ_CLOSE_EXIT 1
            e22
        <--
MQDISC  -->
                  before MQ_DISC_EXIT  1
            e23
                  before MQ_DISC_EXIT  2
            e24
                                            -->  MQDISC
            e25
                  after  MQ_DISC_EXIT  2
            e26
                  after  MQ_DISC_EXIT  1
            e27

        <--

end
```

The following table lists the actions to be taken at each error point. Only a subset of the error points have been covered, as the rules shown here can apply to all others. It is the actions that specify the intended behavior in each case.

Table 837. API exit errors and appropriate actions to take

Err Pt	Description	Actions
e1	Error while setting up environment setup.	1. Undo environment setup as required 2. Drive no exit functions 3. Fail MQCONN with MQCC_FAILED, MQRC_API_EXIT_LOAD_ERROR

Table 837. API exit errors and appropriate actions to take (continued)		
Err Pt	**Description**	**Actions**
e2	MQ_INIT_EXIT function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Clean up environment 2. Fail MQCONN with MQCC_FAILED, MQRC_API_EXIT_INIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Clean up environment
e3	*Before* MQ_CONNX_EXIT 1 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive MQ_TERM_EXIT function 2. Clean up environment 3. Fail MQCONN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Drive MQ_TERM_EXIT function if required 3. Clean up environment if required
e4	*Before* MQ_CONNX_EXIT 2 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive *after* MQ_CONNX_EXIT 1 function 2. Drive MQ_TERM_EXIT function 3. Clean up environment 4. Fail MQCONN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Drive *after* MQ_CONNX_EXIT 1 function if exit not suppressed 3. Drive MQ_TERM_EXIT function if required 4. Clean up environment if required
e5	MQCONN call fails.	1. Pass MQCONN CompCode and Reason 2. Drive *after* MQ_CONNX_EXIT 2 function if the *before* MQ_CONNX_EXIT 2 succeeded and the exit is not suppressed 3. Drive *after* MQ_CONNX_EXIT 1 function if the *before* MQ_CONNX_EXIT 1 succeeded and the exit is not suppressed 4. Drive MQ_TERM_EXIT function 5. Clean up environment

Table 837. API exit errors and appropriate actions to take (continued)		
Err Pt	**Description**	**Actions**
e6	*After* MQ_CONNX_EXIT 2 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive *after* MQ_CONNX_EXIT 1 function 2. Complete MQCONN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Drive *after* MQ_CONNX_EXIT 1 function if required
e7	*After* MQ_CONNX_EXIT 1 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED, complete MQCONN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_*, act as for the values of MQXCC_* and MQXR2_* [1]
e8	*Before* MQ_OPEN_EXIT 1 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED, complete MQOPEN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_*, act as for the values of MQXCC_* and MQXR2_* [1]
e9	*Before* MQ_OPEN_EXIT 2 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive *after* MQ_OPEN_EXIT 1 function 2. Complete MQOPEN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_*, act as for the values of MQXCC_* and MQXR2_* [1]
e10	MQOPEN call fails	1. Pass MQOPEN CompCode and Reason 2. Drive *after* MQ_OPEN_EXIT 2 function if exit not suppressed 3. Drive *after* MQ_OPEN_EXIT 1 function if exit not suppressed and if chained exits not suppressed
e11	*After* MQ_OPEN_EXIT 2 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive *after* MQ_OPEN_EXIT 1 function 2. Complete MQOPEN call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Drive *after* MQ_OPEN_EXIT 1 function if exit not suppressed

Table 837. API exit errors and appropriate actions to take (continued)		
Err Pt	**Description**	**Actions**
e25	*After* MQ_DISC_EXIT 2 function completes with: • MQXCC_FAILED • MQXCC_*	• For MQXCC_FAILED: 1. Drive *after* MQ_DISC_EXIT 1 function 2. Drive MQ_TERM_EXIT function 3. Clean up exit execution environment 4. Complete MQDISC call with MQCC_FAILED, MQRC_API_EXIT_ERROR • For MQXCC_* 1. Act as for the values of MQXCC_* and MQXR2_* [1] 2. Drive MQ_TERM_EXIT function 3. Clean up exit execution environment

Note:

1. The values of MQXCC_* and MQXR2_* and their corresponding actions are defined in How queue managers process exit functions.

ExitResponse fields set incorrectly

This topic gives information about what would happen when the ExitResponse field is set to anything but the supported values.

If the ExitResponse field is set to a value other than one of the supported values, the following actions apply:

- For a *before* MQCONN or MQDISC API exit function:
  - The ExitResponse2 value is ignored.
  - No further *before* exit functions in the exit chain (if any) are invoked; the API call itself is not issued.
  - For any *before* exits that were successfully called, the *after* exits are called in reverse order.
  - If registered, the termination exit functions for those *before* MQCONN or MQDISC exit functions in the chain that were successfully invoked are driven to clean up after these exit functions.
  - The MQCONN or MQDISC call fails with MQRC_API_EXIT_ERROR.
- For a *before* IBM MQ API exit function other than MQCONN or MQDISC:
  - The ExitResponse2 value is ignored.
  - No further *before* or *after* data conversion functions in the exit chain (if any) are invoked.
  - For any *before* exits that were successfully called, the *after* exits are called in reverse order.
  - The IBM MQ API call itself is not issued.
  - The IBM MQ API call fails with MQRC_API_EXIT_ERROR.
- For an *after* MQCONN or MQDISC API exit function:
  - The ExitResponse2 value is ignored.
  - The remaining exit functions that were successfully called before the API call are called in reverse order.
  - If registered, the termination exit functions for those *before* or *after* MQCONN or MQDISC exit functions in the chain that were successfully invoked are driven to clean up after the exit.
  - A CompCode of the more severe of MQCC_WARNING and the CompCode returned by the exit is returned to the application.
  - A Reason of MQRC_API_EXIT_ERROR is returned to the application.

- The IBM MQ API call is successfully issued.

- For an *after* IBM MQ API call exit function other than MQCONN or MQDISC:
  - The ExitResponse2 value is ignored.
  - The remaining exit functions that were successfully called before the API call are called in reverse order.
  - A CompCode of the more severe of MQCC_WARNING and the CompCode returned by the exit is returned to the application.
  - A Reason of MQRC_API_EXIT_ERROR is returned to the application.
  - The IBM MQ API call is successfully issued.
- For the *before* data conversion on get exit function:
  - The ExitResponse2 value is ignored.
  - The remaining exit functions that were successfully called before the API call are called in reverse order.
  - The message is not converted, and the unconverted message is returned to the application.
  - A CompCode of the more severe of MQCC_WARNING and the CompCode returned by the exit is returned to the application.
  - A Reason of MQRC_API_EXIT_ERROR is returned to the application.
  - The IBM MQ API call is successfully issued.

  Note: As the error is with the exit, it is better to return MQRC_API_EXIT_ERROR than to return MQRC_NOT_CONVERTED.

If an exit function sets the ExitResponse2 field to a value other than one of the supported values, a value of MQXR2_DEFAULT_CONTINUATION is assumed instead.

Installable services interface reference information

This collection of topics provides reference information for the installable services.

The functions and data types are listed in alphabetical order within the group for each service type.

Related concepts

ULW Installable services and components for UNIX, Linux and Windows

IBM i Installable services and components for IBM i

Related tasks

Extending queue manager facilities

ULW Configuring installable services

Related reference

IBM i Installable services interface reference information for IBMi

How the functions are shown

How the installable services functions are documented.

For each function there is a description, including the function identifier (for MQZEP).

The *parameters* are shown listed in the order they must occur. They must all be present.

Each parameter name is followed by its data type. These are the elementary data types described in the "Elementary data types" on page 234.

The C language invocation is also given, after the description of the parameters.

MQZ_AUTHENTICATE_USER - Authenticate user

This function is provided by an MQZAS_VERSION_5 authorization service component, and is invoked by the queue manager to authenticate a user, or to set identity context fields. It is invoked when the IBM MQ user application context is established.

The application context is established during connect calls at the point where the application's user context is initialized, and at each point where the application's user context is changed. Each time a connect call is made, the application's user context information is reacquired in the *IdentityContext* field.

The function identifier for this function (for MQZEP) is MQZID_AUTHENTICATE_USER.

Syntax

MQZ_AUTHENTICATE_USER (*QMgrName* , *SecurityParms* , *ApplicationContext* , *IdentityContext* , *CorrelationPtr* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

SecurityParms

Type: MQCSP - input

Security parameters. Data relating to the user ID, password, and authentication type. If the AuthenticationType attribute of the MQCSP structure is specified as MQCSP_AUTH_USER_ID_AND_PWD, both the user ID and password are compared against the equivalent fields in the IdentityContext (MQZIC) parameter to determine whether they match . For more information, see “MQCSP - Security parameters” on page 330.

During an MQCONN MQI call this parameter contains null, or default values.

ApplicationContext

Type: MQZAC - input

Application context. Data relating to the calling application. See MQZAC - Application context for details.

During every MQCONN or MQCONNX MQI call, the user context information in the MQZAC structure is reacquired.

IdentityContext

Type: MQZIC - input/output

Identity context. On input to the authenticate user function, this identifies the current identity context. The authenticate user function can change this, at which point the queue manager adopts the new identity context. See MQZIC - Identity context for more details on the MQZIC structure.

CorrelationPtr

Type: MQPTR - output

Correlation pointer. Specifies the address of any correlation data. This pointer is subsequently passed on to other OAM calls.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation flag. You can specify the following values:

MQZCI_DEFAULT
Continuation dependent on other components.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information about these reason codes, see Messages and reason codes.

C invocation

```
MQZ_AUTHENTICATE_USER (QMgrName, SecurityParms, ApplicationContext,
                   IdentityContext, &CorrelationPtr, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

Declare the parameters passed to the service as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQCSP     SecurityParms;      /* Security parameters */
MQZAC     ApplicationContext; /* Application context */
MQZIC     IdentityContext;    /* Identity context */
MQPTR     CorrelationPtr;     /* Correlation pointer */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

MQZ_CHECK_AUTHORITY - Check authority

This function is provided by a MQZAS_VERSION_1 authorization service component, and is started by the queue manager to check whether an entity has authority to perform a particular action, or actions, on a specified object.

The function identifier for this function (for MQZEP) is MQZID_CHECK_AUTHORITY.

Syntax

MQZ_CHECK_AUTHORITY(*QMgrName* , *EntityName* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityName
Type: MQCHAR12 - input

Entity name. The name of the entity whose authorization to the object is to be checked. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

It is not essential for this entity to be known to the underlying security service. If it is not known, the authorizations of the special **nobody** group (to which all entities are assumed to belong) are used for the check. An all-blank name is valid and can be used in this way.

EntityType
Type: MQLONG - input

Entity type. The type of entity specified by EntityName. It must be one of the following values:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

ObjectName
Type: MQCHAR48 - input

Object name. The name of the object to which access is required. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority

Type: MQLONG - input

Authority to be checked. If one authorization is being checked, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authorization is being checked, it is the bitwise OR of the corresponding MQZAO_* constants.

The following authorizations apply to use of the MQI calls:

MQZAO_CONNECT
Ability to use the MQCONN call.

MQZAO_BROWSE
Ability to use the MQGET call with a browse option.

This allows the MQGMO_BROWSE_FIRST, MQGMO_BROWSE_MSG_UNDER_CURSOR, or MQGMO_BROWSE_NEXT option to be specified on the MQGET call.

MQZAO_INPUT
Principal. Ability to use the MQGET call with an input option.

This allows the MQOO_INPUT_SHARED, MQOO_INPUT_EXCLUSIVE, or MQOO_INPUT_AS_Q_DEF option to be specified on the MQOPEN call.

MQZAO_OUTPUT
Ability to use the MQPUT call.

This allows the MQOO_OUTPUT option to be specified on the MQOPEN call.

MQZAO_INQUIRE
Ability to use the MQINQ call.

This allows the MQOO_INQUIRE option to be specified on the MQOPEN call.

MQZAO_SET
Ability to use the MQSET call.

This allows the MQOO_SET option to be specified on the MQOPEN call.

MQZAO_PASS_IDENTITY_CONTEXT
Ability to pass identity context.

This allows the MQOO_PASS_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_PASS_ALL_CONTEXT
Ability to pass all context.

This allows the MQOO_PASS_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_IDENTITY_CONTEXT
Ability to set identity context.

This allows the MQOO_SET_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_ALL_CONTEXT
Ability to set all context.

This allows the MQOO_SET_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_ALTERNATE_USER_AUTHORITY
Ability to use alternate user authority.

This allows the MQOO_ALTERNATE_USER_AUTHORITY option to be specified on the MQOPEN call, and the MQPMO_ALTERNATE_USER_AUTHORITY option to be specified on the MQPUT1 call.

MQZAO_ALL_MQI
All of the MQI authorizations.

This enables all of the authorizations.

The following authorizations apply to administration of a queue manager:

MQZAO_CREATE
Ability to create objects of a specified type.

MQZAO_DELETE
Ability to delete a specified object.

MQZAO_DISPLAY
Ability to display the attributes of a specified object.

MQZAO_CHANGE
Ability to change the attributes of a specified object.

MQZAO_CLEAR
Ability to delete all messages from a specified queue.

MQZAO_AUTHORIZE
Ability to authorize other users for a specified object.

MQZAO_CONTROL
Ability to start or stop a listener, service, or non-client channel object, and the ability to ping a non-client channel object.

MQZAO_CONTROL_EXTENDED
Ability to reset a sequence number, or resolve an indoubt message on a non-client channel object.

MQZAO_ALL_ADMIN
Ability to set identity context.

All of the administration authorizations, other than MQZAO_CREATE.

The following authorizations apply to both use of the MQI and to administration of a queue manager:

MQZAO_ALL
All authorizations, other than MQZAO_CREATE.

MQZAO_NONE
No authorizations.

ComponentData
Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

If the call to a component fails (that is, *CompCode* returns MQCC_FAILED), and the *Continuation* parameter is MQZCI_DEFAULT or MQZCI_CONTINUE, the queue manager continues to call other components if there are any.

If the call succeeds (that is, *CompCode* returns MQCC_OK) no other components are called no matter what the setting of *Continuation* is.

If the call fails and the *Continuation* parameter is MQZCI_STOP then no other components are called and the error is returned to the queue manager. Components have no knowledge of previous calls, so the *Continuation* parameter is always set to MQZCI_DEFAULT before the call.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_CHECK_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                     ObjectType, Authority, ComponentData,
                     &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority to be checked */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_CHECK_AUTHORITY_2 - Check authority (extended)

This function is provided by a MQZAS_VERSION_2 authorization service component, and is started by the queue manager to check whether an entity has authority to perform a particular action, or actions, on a specified object.

The function identifier for this function (for MQZEP) is MQZID_CHECK_AUTHORITY.

MQZ_CHECK_AUTHORITY_2 is like MQZ_CHECK_AUTHORITY, but with the **EntityName** parameter replaced by the **EntityData** parameter.

Syntax

MQZ_CHECK_AUTHORITY_2(*QMgrName* , *EntityData* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity with authorization to the object that is to be checked. See “MQZED - Entity descriptor” on page 1663 for details.

It is not essential for this entity to be known to the underlying security service. If it is not known, the authorizations of the special **nobody** group (to which all entities are assumed to belong) are used for the check. An all-blank name is valid and can be used in this way.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by *EntityData*. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName

Type: MQCHAR48 - input

Object name. The name of the object to which access is required. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority to be checked. If one authorization is being checked, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authorization is being checked, it is the bitwise OR of the corresponding MQZAO_* constants.

The following authorizations apply to use of the MQI calls:

MQZAO_CONNECT
Ability to use the MQCONN call.

MQZAO_BROWSE
Ability to use the MQGET call with a browse option.

This allows the MQGMO_BROWSE_FIRST, MQGMO_BROWSE_MSG_UNDER_CURSOR, or MQGMO_BROWSE_NEXT option to be specified on the MQGET call.

MQZAO_INPUT
Principal. Ability to use the MQGET call with an input option.

This allows the MQOO_INPUT_SHARED, MQOO_INPUT_EXCLUSIVE, or MQOO_INPUT_AS_Q_DEF option to be specified on the MQOPEN call.

MQZAO_OUTPUT
Ability to use the MQPUT call.

This allows the MQOO_OUTPUT option to be specified on the MQOPEN call.

MQZAO_INQUIRE
Ability to use the MQINQ call.

This allows the MQOO_INQUIRE option to be specified on the MQOPEN call.

MQZAO_SET
Ability to use the MQSET call.

This allows the MQOO_SET option to be specified on the MQOPEN call.

MQZAO_PASS_IDENTITY_CONTEXT
Ability to pass identity context.

This allows the MQOO_PASS_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_PASS_ALL_CONTEXT
Ability to pass all context.

This allows the MQOO_PASS_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_IDENTITY_CONTEXT
Ability to set identity context.

This allows the MQOO_SET_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_ALL_CONTEXT
Ability to set all context.

This allows the MQOO_SET_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_ALTERNATE_USER_AUTHORITY
Ability to use alternate user authority.

This allows the MQOO_ALTERNATE_USER_AUTHORITY option to be specified on the MQOPEN call, and the MQPMO_ALTERNATE_USER_AUTHORITY option to be specified on the MQPUT1 call.

MQZAO_ALL_MQI
All of the MQI authorizations.

This enables all of the authorizations.

The following authorizations apply to administration of a queue manager:

MQZAO_CREATE
Ability to create objects of a specified type.

MQZAO_DELETE
Ability to delete a specified object.

MQZAO_DISPLAY
Ability to display the attributes of a specified object.

MQZAO_CHANGE
Ability to change the attributes of a specified object.

MQZAO_CLEAR
Ability to delete all messages from a specified queue.

MQZAO_AUTHORIZE
Ability to authorize other users for a specified object.

MQZAO_CONTROL
Ability to start or stop a listener, service, or non-client channel object, and the ability to ping a non-client channel object.

MQZAO_CONTROL_EXTENDED
Ability to reset a sequence number, or resolve an indoubt message on a non-client channel object.

MQZAO_ALL_ADMIN
Ability to set identity context.

All of the administration authorizations, other than MQZAO_CREATE.

The following authorizations apply to both use of the MQI and to administration of a queue manager:

MQZAO_ALL
All authorizations, other than MQZAO_CREATE.

MQZAO_NONE
No authorizations.

ComponentData
Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_CHECK_AUTHORITY_2 (QMgrName, &EntityData, EntityType,
                      ObjectName, ObjectType, Authority, ComponentData,
                      &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity data */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority to be checked */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_CHECK_PRIVILEGED - Check if user is privileged

This function is provided by an MQZAS_VERSION_6 authorization service component, and is invoked by the queue manager to determine whether a specified user is a privileged user.

The function identifier for this function (for MQZEP) is MQZID_CHECK_PRIVILEGED.

Syntax

MQZ_CHECK_PRIVILEGED(*QMgrName* , *EntityData* , *EntityType* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity that is to be checked. For more information, see "MQZED - Entity descriptor" on page 1663.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by EntityData. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ComponentData

Type: MQBYTExComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

If the call to a component fails (that is, *CompCode* returns MQCC_FAILED), and the *Continuation* parameter is MQZCI_DEFAULT or MQZCI_CONTINUE, the queue manager continues to call other components if there are any.

If the call succeeds (that is, *CompCode* returns MQCC_OK) no other components are called no matter what the setting of *Continuation* is.

If the call fails and the *Continuation* parameter is MQZCI_STOP then no other components are called and the error is returned to the queue manager. Components have no knowledge of previous calls, so the *Continuation* parameter is always set to MQZCI_DEFAULT before the call.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_PRIVILEGED
(2584, X'A18') This user is not a privileged user ID.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_CHECK_PRIVILEGED (QMgrName, &EntityData, EntityType,
                      ComponentData, &Continuation,
                      &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_COPY_ALL_AUTHORITY - Copy all authority

This function is provided by an authorization service component. It is started by the queue manager to copy all of the authorizations that are currently in force for a reference object to another object.

The function identifier for this function (for MQZEP) is MQZID_COPY_ALL_AUTHORITY.

Syntax

MQZ_COPY_ALL_AUTHORITY(*QMgrName* , *RefObjectName* , *ObjectName* , *ObjectType* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

RefObjectName
Type: MQCHAR48 - input

Reference object name. The name of the reference object, the authorizations for which are to be copied. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

ObjectName
Type: MQCHAR48 - input

Object name. The name of the object for which accesses are to be set. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *RefObjectName* and *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

ComponentData
Type: MQBYTExComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_REF_OBJECT
(2294, X'8F6') Reference object unknown.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_COPY_ALL_AUTHORITY (QMgrName, RefObjectName, ObjectName, ObjectType,
                        ComponentData, &Continuation, &CompCode,
                        &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR48  RefObjectName;     /* Reference object name */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_DELETE_AUTHORITY - Delete authority

This function is provided by an authorization service component, and is started by the queue manager to delete all of the authorizations associated with the specified object.

The function identifier for this function (for MQZEP) is MQZID_DELETE_AUTHORITY.

Syntax

MQZ_DELETE_AUTHORITY(*QMgrName* , *ObjectName* , *ObjectType* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

ObjectName
Type: MQCHAR48 - input

Object name. The name of the object for which accesses are to be deleted. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

ComponentData
Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_DELETE_AUTHORITY (QMgrName, ObjectName, ObjectType, ComponentData,
                      &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQCHAR48  ObjectName;         /* Object name */
MQLONG    ObjectType;         /* Object type */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

MQZ_ENUMERATE_AUTHORITY_DATA - Enumerate authority data

This function is provided by an MQZAS_VERSION_4 authorization service component, and is started repeatedly by the queue manager to retrieve all of the authority data that matches the selection criteria specified on the first invocation.

The function identifier for this function (for MQZEP) is MQZID_ENUMERATE_AUTHORITY_DATA.

Syntax

MQZ_ENUMERATE_AUTHORITY_DATA(*QMgrName* , *StartEnumeration* , *Filter* , *AuthorityBufferLength* , *AuthorityBuffer* , *AuthorityDataLength* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

StartEnumeration
Type: MQLONG - input

Flag indicating whether call can start enumeration. This indicates whether the call can start the enumeration of authority data, or continue the enumeration of authority data started by a previous call to MQZ_ENUMERATE_AUTHORITY_DATA. The value is one of the following values:

MQZSE_START

Start enumeration. The call is started with this value to start the enumeration of authority data. The **Filter** parameter specifies the selection criteria to be used to select the authority data returned by this and successive calls.

MQZSE_CONTINUE

Continue enumeration. The call is started with this value to continue the enumeration of authority data. The **Filter** parameter is ignored in this case, and can be specified as the null pointer (the selection criteria are determined by the **Filter** parameter specified by the call that had *StartEnumeration* set to MQZSE_START).

Filter

Type: MQZAD - input

Filter. If *StartEnumeration* is MQZSE_START, *Filter* specifies the selection criteria to be used to select the authority data to return. If *Filter* is the null pointer, no selection criteria are used, that is, all authority data is returned. See "MQZAD - Authority data" on page 1660 for details of the selection criteria that can be used.

If *StartEnumeration* is MQZSE_CONTINUE, *Filter* is ignored, and can be specified as the null pointer.

AuthorityBufferLength

Type: MQLONG - input

Length of *AuthorityBuffer*. This is the length in bytes of the **AuthorityBuffer** parameter. The authority buffer must be large enough to accommodate the data to be returned.

AuthorityBuffer

Type: MQZAD - output

Authority data. This is the buffer in which the authority data is returned. The buffer must be large enough to accommodate an MQZAD structure, an MQZED structure, plus the longest entity name and longest domain name defined.

Note: Note: This parameter is defined as an MQZAD, as the MQZAD always occurs at the start of the buffer. However, if the buffer is declared as an MQZAD, the buffer will be too small - it must be bigger than an MQZAD so that it can accommodate the MQZAD, MQZED, plus entity and domain names.

AuthorityDataLength

Type: MQLONG - output

Length of data returned in *AuthorityBuffer*. If the authority buffer is too small, *AuthorityDataLength* is set to the length of the buffer required, and the call returns completion code MQCC_FAILED and reason code MQRC_BUFFER_LENGTH_ERROR.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_ENUMERATE_AUTHORITY_DATA, this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_NO_DATA_AVAILABLE
(2379, X'94B') No data available.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_ENUMERATE_AUTHORITY_DATA (QMgrName, StartEnumeration, &Filter,
                             AuthorityBufferLength,
                             &AuthorityBuffer,
                             &AuthorityDataLength, ComponentData,
                             &Continuation, &CompCode,
                             &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;              /* Queue manager name */
MQLONG    StartEnumeration;      /* Flag indicating whether call should
                                    start enumeration */
MQZAD     Filter;                /* Filter */
MQLONG    AuthorityBufferLength; /* Length of AuthorityBuffer */
MQZAD     AuthorityBuffer;       /* Authority data */
MQLONG    AuthorityDataLength;   /* Length of data returned in
                                    AuthorityBuffer */
MQBYTE    ComponentData[n];      /* Component data */
MQLONG    Continuation;          /* Continuation indicator set by
                                    component */
MQLONG    CompCode;              /* Completion code */
MQLONG    Reason;                /* Reason code qualifying CompCode */
```

MQZ_FREE_USER - Free user

This function is provided by a MQZAS_VERSION_5 authorization service component, and is started by the queue manager to free associated allocated resource.

It is started when an application has finished running under all user contexts, for example during an MQDISC MQI call.

The function identifier for this function (for MQZEP) is MQZID_FREE_USER.

Syntax

MQZ_FREE_USER(*QMgrName* , *FreeParms* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

FreeParms

Type: MQZFP - input

Free parameters. A structure containing data relating to the resource to be freed. See "MQZFP - Free parameters" on page 1665 for details.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation flag. The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on other components.

MQZCI_STOP

Do not continue with next component.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_AUTHENTICATE_USER (QMgrName, SecurityParms, ApplicationContext,
                    IdentityContext, CorrelationPtr, ComponentData,
                    &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQZFP     FreeParms;          /* Resource to be freed */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

MQZ_GET_AUTHORITY - Get authority

This function is provided by a MQZAS_VERSION_1 authorization service component, and is started by the queue manager to retrieve the authority that an entity has to access the specified object, including (if the entity is a principal) authorities possessed by the groups in which the principal is a member. Authorities from generic profiles are included in the returned authority set.

The function identifier for this function (for MQZEP) is MQZID_GET_AUTHORITY.

Syntax

MQZ_GET_AUTHORITY(*QMgrName* , *EntityName* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityName
Type: MQCHAR12 - input

Entity name. The name of the entity whose access to the object is to be retrieved. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType
Type: MQLONG - input

Entity type. The type of entity specified by *EntityName*. It must be one of the following values:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

ObjectName
Type: MQCHAR48 - input

Object name. The name of the object to which access is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority of entity. If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData
Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_GET_AUTHORITY, this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_GET_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                   ObjectType, &Authority, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_GET_AUTHORITY_2 - Get authority (extended)

This function is provided by a MQZAS_VERSION_2 authorization service component, and is started by the queue manager to retrieve the authority that an entity has to access the specified object.

The function identifier for this function (for MQZEP) is MQZID_GET_AUTHORITY.

MQZ_GET_AUTHORITY_2 is like MQZ_GET_AUTHORITY, but with the **EntityName** parameter replaced by the **EntityData** parameter.

Syntax

MQZ_GET_AUTHORITY_2(*QMgrName* , *EntityData* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity for which authorization to the object is to be retrieved. See "MQZED - Entity descriptor" on page 1663 for details.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by *EntityData*. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName

Type: MQCHAR48 - input

Object name. The name of the object for which the entity authority is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType

Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO

Authentication information.

MQOT_CHANNEL

Channel.

MQOT_CLNTCONN_CHANNEL

Client connection channel.

MQOT_LISTENER

Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority of entity. If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData
Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **`ComponentDataLength`** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

Syntax

MQZ_GET_AUTHORITY_2 *(QMgrName, EntityData, EntityType, ObjectName, ObjectType, Authority, ComponentData, Continuation, CompCode, Reason)*

C invocation

```
MQZ_GET_AUTHORITY_2 (QMgrName, &EntityData, EntityType, ObjectName,
                    ObjectType, &Authority, ComponentData,
                    &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity data */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_GET_EXPLICIT_AUTHORITY - Get explicit authority

This function is provided by a MQZAS_VERSION_1 authorization service component, and is started by the queue manager to retrieve the authority that an entity has to access the specified object, including (if the entity is a principal) authorities possessed by the groups in which the principal is a member. Authorities from generic profiles are included in the returned authority set.

On UNIX, for the built-in IBM MQ object authority manager (OAM), the returned authority is that possessed only by the principal's primary group.

The function identifier for this function (for MQZEP) is MQZID_GET_EXPLICIT_AUTHORITY.

Syntax

MQZ_GET_EXPLICIT_AUTHORITY(*QMgrName* , *EntityName* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityName
Type: MQCHAR12 - input

Entity name. The name of the entity for which access to the object is to be retrieved. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType
Type: MQLONG - input

Entity type. The type of entity specified by *EntityName*. It must be one of the following values:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

ObjectName
Type: MQCHAR48 - input

Object name. The name of the object for which the entity authority is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority of entity. If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_GET_AUTHORITY, this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP

Do not continue with next component.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED

(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR

(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE

(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY

(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_GET_EXPLICIT_AUTHORITY (QMgrName, EntityName, EntityType,
                            ObjectName, ObjectType, &Authority,
                            ComponentData, &Continuation,
                            &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_GET_EXPLICIT_AUTHORITY_2 - Get explicit authority (extended)

This function is provided by a MQZAS_VERSION_2 authorization service component, and is started by the queue manager to retrieve the authority that a named group has to access a specified object (but without the additional authority of the **nobody** group), or the authority that the primary group of the named principal has to access a specified object.

The function identifier for this function (for MQZEP) is MQZID_GET_EXPLICIT_AUTHORITY.

MQZ_GET_EXPLICIT_AUTHORITY_2 is like MQZ_GET_EXPLICIT_AUTHORITY, but with the **EntityName** parameter replaced by the **EntityData** parameter.

Syntax

MQZ_GET_EXPLICIT_AUTHORITY_2(*QMgrName* , *EntityData* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity whose authorization to the object is to be retrieved. See "MQZED - Entity descriptor" on page 1663 for details.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by *EntityData*. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName

Type: MQCHAR48 - input

Object name. The name of the object for which the entity authority is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType

Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority

Type: MQLONG - input

Authority of entity. If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData

Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_GET_EXPLICIT_AUTHORITY_2 (QMgrName, &EntityData, EntityType,
                              ObjectName, ObjectType, &Authority,
                              ComponentData, &Continuation,
                              &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity data */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_INIT_AUTHORITY - Initialize authorization service

This function is provided by an authorization service component, and is started by the queue manager during configuration of the component. It is expected to call MQZEP in order to provide information to the queue manager.

The function identifier for this function (for MQZEP) is MQZID_INIT_AUTHORITY.

Syntax

MQZ_INIT_AUTHORITY(*Hconfig* , *Options* , *QMgrName* , *ComponentDataLength* , *ComponentData* , *Version* , *CompCode* , *Reason*)

Parameters

Hconfig

Type: MQHCONFIG - input

Configuration handle. This handle represents the particular component being initialized. It is to be used by the component when calling the queue manager with the MQZEP function.

Options

Type: MQLONG - input

Initialization options. It must be one of the following values:

MQZIO_PRIMARY

Primary initialization.

MQZIO_SECONDARY

Secondary initialization.

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

ComponentDataLength

Type: MQLONG - input

Length of component data. Length in bytes of the *ComponentData* area. This length is defined in the component configuration data.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This is initialized to all zeros before calling the component primary initialization function. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Version

Type: MQLONG - input/output

Version number. On input to the initialization function, this identifies the highest version number that the queue manager supports. The initialization function must change this, if necessary, to the version of the interface which it supports. If on return the queue manager does not support the version returned by the component, it calls the component MQZ_TERM_AUTHORITY function and makes no further use of this component.

The following values are supported:

MQZAS_VERSION_1

Version 1.

MQZAS_VERSION_2

Version 2.

MQZAS_VERSION_3

Version 3.

MQZAS_VERSION_4

Version 4.

MQZAS_VERSION_5
Version 5.

MQZAS_VERSION_6
Version 6.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_INITIALIZATION_FAILED
(2286, X'8EE') Initialization failed for an undefined reason.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_INIT_AUTHORITY (Hconfig, Options, QMgrName, ComponentDataLength,
                   ComponentData, &Version, &CompCode,
                   &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;              /* Configuration handle */
MQLONG     Options;              /* Initialization options */
MQCHAR48   QMgrName;             /* Queue manager name */
MQLONG     ComponentDataLength;  /* Length of component data */
MQBYTE     ComponentData[n];     /* Component data */
MQLONG     Version;              /* Version number */
MQLONG     CompCode;             /* Completion code */
MQLONG     Reason;               /* Reason code qualifying CompCode */
```

MQZ_INQUIRE - Inquire authorization service

This function is provided by a MQZAS_VERSION_5 authorization service component, and is started by the queue manager to query the supported functionality.

Where multiple service components are used, service components are called in reverse order to the order they were installed in.

The function identifier for this function (for MQZEP) is MQZID_INQUIRE.

Syntax

MQZ_INQUIRE(*QMgrName* , *SelectorCount* , *Selectors* , *IntAttrCount* , *IntAttrs* , *CharAttrLength* , *CharAttrs* , *SelectorReturned* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

SelectorCount

Type: MQLONG - input

Number of selectors. The number of selectors supplied in the **Selectors** parameter.

The value must be in the range 0 through 256.

Selectors

Type: MQLONGxSelectorCount - input

Array of selectors. Each selector identifies a required attribute and must be one of the following:

- MQIACF_INTERFACE_VERSION (integer)
- MQIACF_USER_ID_SUPPORT (integer)
- MQCACF_SERVICE_COMPONENT (character)

Selectors can be specified in any order. The number of selectors in the array is indicated by the **SelectorCount** parameter.

Integer attributes identified by selectors are returned in the **IntAttrs** parameter in the same order as they appear in *Selectors*.

Character attributes identified by selectors are returned in the **CharAttrs** parameter in the same order as they in appear *Selectors*.

IntAttrCount

Type: MQLONG - input

Number of integer attributes supplied in the IntAttrs parameter.

The value must be in the range 0 through 256.

IntAttrs

Type: MQLONG x IntAttrCount - output

Integer attributes. Array of integer attributes. The integer attributes are returned in the same order as the corresponding integer selectors in the *Selectors* array.

CharAttrCount

Type: MQLONG - input

Length of the character attributes buffer. The length in bytes of the **CharAttrs** parameter.

The value must be at least the sum of the lengths of the requested character attributes. If no character attributes are requested, zero is a valid value.

CharAttrs

Type: MQLONG x CharAttrCount - output

Character attributes buffer. Buffer containing character attributes, concatenated together. The character attributes are returned in the same order as the corresponding character selectors in the *Selectors* array.

The length of the buffer is given by the CharAttrCount parameter.

SelectorReturned
Type: MQLONG x SelectorCount - input

Selector returned. Array of values identifying which attributes have been returned from the set requested for by the selectors in the Selectors parameter. The number of values in this array is indicated by the **SelectorCount** parameter. Each value in the array relates to the selector from the corresponding position in the Selectors array. Each value is one of the following:

MQZSL_RETURNED
The attribute requested by the corresponding selector in the **Selectors** parameter has been returned.

MQZSL_NOT_RETURNED
The attribute requested by the corresponding selector in the **Selectors** parameter has not been returned.

The array is initialized with all values as *MQZSL_NOT_RETURNED*. When an authorization service component returns an attribute, it sets the appropriate value in the array to *MQZSL_NOT_RETURNED*. This allows any other authorization service components, to which the inquire call is made, to identify which attributes have already been returned.

ComponentData
Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_CHAR_ATTRS_TOO_SHORT
Not enough space for character attributes.

MQRC_INT_COUNT_TOO_SMALL
Not enough space for integer attributes.

If *CompCode* is MQCC_FAILED:

MQRC_SELECTOR_COUNT_ERROR
Number of selectors is not valid.

MQRC_SELECTOR_ERROR
Attribute selector not valid.

MQRC_SELECTOR_LIMIT_EXCEEDED
Too many selectors specified.

MQRC_INT_ATTR_COUNT_ERROR
Number of integer attributes is not valid.

MQRC_INT_ATTRS_ARRAY_ERROR
Integer attributes array not valid.

MQRC_CHAR_ATTR_LENGTH_ERROR
Number of character attributes is not valid.

MQRC_CHAR_ATTRS_ERROR
Character attributes string is not valid.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_INQUIRE (QMgrName, SelectorCount, Selectors, IntAttrCount,
                   &IntAttrs, CharAttrLength, &CharAttrs,
                   SelectorReturned, ComponentData, &Continuation,
                   &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48   QMgrName;              /* Queue manager name */
MQLONG     SelectorCount;         /* Selector count */
MQLONG     Selectors[n];          /* Selectors */
MQLONG     IntAttrCount;          /* IntAttrs count */
MQLONG     IntAttrs[n];           /* Integer attributes */
MQLONG     CharAttrCount;         /* CharAttrs count */
MQLONG     CharAttrs[n];          /* Chatacter attributes */
MQLONG     SelectorReturned[n];   /* Selector returned */
MQBYTE     ComponentData[n];      /* Component data */
MQLONG     Continuation;          /* Continuation indicator set by
                                     component */
MQLONG     CompCode;              /* Completion code */
MQLONG     Reason;                /* Reason code qualifying CompCode */
```

MQZ_REFRESH_CACHE - Refresh all authorizations

This function is provided by an MQZAS_VERSION_3 authorization service component, and is invoked by the queue manager to refresh the list of authorizations held internally by the component.

The function identifier for this function (for MQZEP) is MQZID_REFRESH_CACHE (8L).

Syntax

MQZ_REFRESH_CACHE(*QMgrName* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

ComponentData

Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP

Do not continue with next component.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_SERVICE_ERROR

(2289, X'8F1') Unexpected error occurred accessing service.

C invocation

```
MQZ_REFRESH_CACHE (QMgrName, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_SET_AUTHORITY - Set authority

This function is provided by a MQZAS_VERSION_1 authorization service component, and is started by the queue manager to set the authority that an entity has to access the specified object.

The function identifier for this function (for MQZEP) is MQZID_SET_AUTHORITY.

Note: This function overrides any existing authorities. To preserve any existing authorities you must set them again with this function.

Syntax

MQZ_SET_AUTHORITY(*QMgrName* , *EntityName* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityName

Type: MQCHAR12 - input

Entity name. The name of the entity for which access to the object is to be retrieved. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by *EntityName*. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName

Type: MQCHAR48 - input

Object name. The name of the object to which access is required. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType
Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority of entity. If one authority is being set, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authority is being set, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentDatarname>
Type: MQBYTExComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_GET_AUTHORITY, this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_SET_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                   ObjectType, Authority, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority to be checked */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_SET_AUTHORITY_2 - Set authority (extended)

This function is provided by a MQZAS_VERSION_2 authorization service component, and is started by the queue manager to set the authority that an entity has to access the specified object.

The function identifier for this function (for MQZEP) is MQZID_SET_AUTHORITY.

Note: This function overrides any existing authorities. To preserve any existing authorities you must set them again with this function.

MQZ_SET_AUTHORITY_2 is like MQZ_SET_AUTHORITY, but with the **EntityName** parameter replaced by the **EntityData** parameter.

Syntax

MQZ_SET_AUTHORITY_2(*QMgrName* , *EntityData* , *EntityType* , *ObjectName* , *ObjectType* , *Authority* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity whose authorization to the object is to be set. See "MQZED - Entity descriptor" on page 1663 for details.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by *EntityData*. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName

Type: MQCHAR48 - input

Object name. The name of the object to which the entity authority is to be set. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType

Type: MQLONG - input

Object type. The type of entity specified by *ObjectName*. It must be one of the following values:

MQOT_AUTH_INFO

Authentication information.

MQOT_CHANNEL

Channel.

MQOT_CLNTCONN_CHANNEL

Client connection channel.

MQOT_LISTENER

Listener.

MQOT_NAMELIST

Namelist.

MQOT_PROCESS

Process definition.

MQOT_Q

Queue.

MQOT_Q_MGR

Queue manager.

MQOT_SERVICE
Service.

MQOT_TOPIC
Topic.

Authority
Type: MQLONG - input

Authority of entity. If one authority is being set, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authority is being set, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData
Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation
Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_SET_AUTHORITY_2 (QMgrName, &EntityData, EntityType, ObjectName,
                     ObjectType, Authority, ComponentData,
                     &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity data */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority to be checked */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_TERM_AUTHORITY - Terminate authorization service

This function is provided by an authorization service component, and is started by the queue manager when it no longer requires the services of this component. The function must perform any cleanup required by the component.

The function identifier for this function (for MQZEP) is MQZID_TERM_AUTHORITY.

Syntax

MQZ_TERM_AUTHORITY(*Hconfig* , *Options* , *QMgrName* , *ComponentData* , *CompCode* , *Reason*)

Parameters

Hconfig
Type: MQHCONFIG - input

Configuration handle. This handle represents the particular component being terminated. It is to be used by the component when calling the queue manager with the MQZEP function.

Options
Type: MQLONG - input

Termination options. It must be one of the following values:

MQZTO_PRIMARY
Primary termination.

MQZTO_SECONDARY
Secondary termination.

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter on the MQZ_INIT_AUTHORITY call.

When the MQZ_TERM_AUTHORITY call has completed, the queue manager discards this data.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_NOT_AVAILABLE

(2285, X'8ED') Underlying service not available.

MQRC_TERMINATION_FAILED

(2287, X'8FF') Termination failed for an undefined reason.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_TERM_AUTHORITY (Hconfig, Options, QMgrName, ComponentData,
                    &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;           /* Configuration handle */
MQLONG     Options;           /* Termination options */
MQCHAR48   QMgrName;          /* Queue manager name */
MQBYTE     ComponentData[n];  /* Component data */
MQLONG     CompCode;          /* Completion code */
MQLONG     Reason;            /* Reason code qualifying CompCode */
```

MQZ_DELETE_NAME - Delete name

This function is provided by a name service component, and is started by the queue manager to delete an entry for the specified queue.

The function identifier for this function (for MQZEP) is MQZID_DELETE_NAME.

Syntax

MQZ_DELETE_NAME(*QMgrName* , *QName* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

QName

Type: MQCHAR48 - input

Queue name. The name of the queue for which an entry is to be deleted. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the ComponentDataLength parameter on the MQZ_INIT_NAME call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. It must be one of the following values:

MQZCI_DEFAULT

Continuation dependent on queue manager.

MQZCI_STOP

Do not continue with next component.

For the **MQZ_DELETE_NAME** command, the queue manager does not attempt to start another component, no matter what is returned in the **Continuation** parameter.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_WARNING

Warning (partial completion).

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_WARNING:

MQRC_UNKNOWN_NAME
(2288, X'8F0') Queue name not found.

Note: It might not be possible to return this code if the underlying service responds with success for this case.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_DELETE_NAME (QMgrName, QName, ComponentData, &Continuation,
                 &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR48  QName;             /* Queue name */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_INIT_NAME - Initialize name service

This function is provided by a name service component, and is started by the queue manager during configuration of the component. It is expected to call MQZEP in order to provide information to the queue manager.

The function identifier for this function (for MQZEP) is MQZID_INIT_NAME.

Syntax

MQZ_INIT_NAME(*Hconfig* , *Options* , *QMgrName* , *ComponentDataLength* , *ComponentData* , *Version* , *CompCode* , *Reason*)

Parameters

Hconfig
Type: MQHCONFIG - input

Configuration handle. This handle represents the particular component being initialized. It is to be used by the component when calling the queue manager with the MQZEP function.

Options
Type: MQLONG - input

Initialization options. It must be one of the following values:

MQZIO_PRIMARY
Primary initialization.

MQZIO_SECONDARY
Secondary initialization.

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

ComponentDataLength

Type: MQLONG - input

Length of component data. Length in bytes of the *ComponentData* area. This length is defined in the component configuration data.

ComponentData

Type: MQBYTE x ComponentDataLength - input/output

Component data. This is initialized to all zeros before calling the component primary initialization function. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Version

Type: MQLONG - input/output

Version number. On input to the initialization function, this identifies the highest version number that the queue manager supports. The initialization function must change this, if necessary, to the version of the interface which it supports. If on return the queue manager does not support the version returned by the component, it calls the component MQZ_TERM_NAME function and makes no further use of this component.

The following values are supported:

MQZAS_VERSION_1

Version 1.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_INITIALIZATION_FAILED

(2286, X'8EE') Initialization failed for an undefined reason.

MQRC_SERVICE_NOT_AVAILABLE

(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_INIT_NAME (Hconfig, Options, QMgrName, ComponentDataLength,
               ComponentData, &Version, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;              /* Configuration handle */
MQLONG     Options;              /* Initialization options */
MQCHAR48   QMgrName;             /* Queue manager name */
MQLONG     ComponentDataLength;  /* Length of component data */
MQBYTE     ComponentData[n];     /* Component data */
MQLONG     Version;              /* Version number */
MQLONG     CompCode;             /* Completion code */
MQLONG     Reason;               /* Reason code qualifying CompCode */
```

MQZ_INSERT_NAME - Insert name

This function is provided by a name service component, and is started by the queue manager to insert an entry for the specified queue, containing the name of the queue manager that owns the queue. If the queue is already defined in the service, the call fails.

The function identifier for this function (for MQZEP) is MQZID_INSERT_NAME.

Syntax

MQZ_INSERT_NAME(*QMgrName* , *QName* , *ResolvedQMgrName* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

QName
Type: MQCHAR48 - input

Queue name. The name of the queue for which an entry is to be inserted. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

ResolvedQMgrName
Type: MQCHAR48 - input

Resolved queue manager name. The name of the queue manager to which the queue resolves. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

ComponentData
Type: MQBYTE×ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_NAME call.

Continuation
Type: MQLONG - input/output

Continuation indicator set by component. For MQZ_INSERT_NAME, the queue manager does not attempt to start another component, whatever is returned in the **Continuation** parameter.

The following values are supported:

MQZCI_DEFAULT
Continuation dependent on queue manager.

MQZCI_STOP
Do not continue with next component.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_Q_ALREADY_EXISTS
(2290, X'8F2') Queue object already exists.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_INSERT_NAME (QMgrName, QName, ResolvedQMgrName, ComponentData,
                 &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR48  QName;             /* Queue name */
MQCHAR48  ResolvedQMgrName;  /* Resolved queue manager name */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_LOOKUP_NAME - Lookup name

This function is provided by a name service component, and is started by the queue manager to retrieve the name of the owning queue manager, for a specified queue.

The function identifier for this function (for MQZEP) is MQZID_LOOKUP_NAME.

Syntax

MQZ_LOOKUP_NAME(*QMgrName* , *QName* , *ResolvedQMgrName* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

QName

Type: MQCHAR48 - input

Queue name. The name of the queue for which an entry is to be resolved. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

ResolvedQMgrName

Type: MQCHAR48 - output

Resolved queue manager name. If the function completes successfully, this is the name of the queue manager that owns the queue.

The name returned by the service component must be padded on the right with blanks to the full length of the parameter; the name must not be terminated by a null character, or contain leading or embedded blanks.

ComponentData

Type: MQBYTExComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_NAME call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. For MQZ_LOOKUP_NAME, the queue manager specifies whether to start another name service component, as follows:

- If *CompCode* is MQCC_OK, no further components are started, whatever value is returned in *Continuation*.
- If *CompCode* is not MQCC_OK, a further component is started, unless *Continuation* is MQZCI_STOP.

The following values are supported:

MQZCI_DEFAULT

Continuation dependent on queue manager.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP

Do not continue with next component.

CompCode

Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason

Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_Q_NAME
(2288, X'8F0') Queue name not found.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_LOOKUP_NAME (QMgrName, QName, ResolvedQMgrName, ComponentData,
                &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQCHAR48  QName;              /* Queue name */
MQCHAR48  ResolvedQMgrName;   /* Resolved queue manager name */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

MQZ_TERM_NAME - Terminate name service

This function is provided by a name service component, and is started by the queue manager when it no longer requires the services of this component. The function must perform any cleanup required by the component.

The function identifier for this function (for MQZEP) is MQZID_TERM_NAME.

Syntax

MQZ_TERM_NAME(*Hconfig* , *Options* , *QMgrName* , *ComponentData* , *CompCode* , *Reason*)

Parameters

Hconfig

Type: MQHCONFIG - input

Configuration handle. This handle represents the particular component being terminated. It is used by the component when calling the queue manager with the MQZEP function.

Options
Type: MQLONG - input

Termination options. It must be one of the following values:

MQZTO_PRIMARY
Primary termination.

MQZTO_SECONDARY
Secondary termination.

QMgrName
Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

ComponentData
Type: MQBYTE x ComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of these component functions is called.

Component data is in shared memory accessible to all processes.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_NAME call.

When the MQZ_TERM_NAME call has completed, the queue manager discards this data.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_TERMINATION_FAILED
(2287, X'8FF') Termination failed for an undefined reason.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_TERM_NAME (Hconfig, Options, QMgrName, ComponentData, &CompCode,
               &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;            /* Configuration handle */
MQLONG     Options;            /* Termination options */
MQCHAR48   QMgrName;           /* Queue manager name */
MQBYTE     ComponentData[n];   /* Component data */
MQLONG     CompCode;           /* Completion code */
MQLONG     Reason;             /* Reason code qualifying CompCode */
```

MQZAC - Application context

The MQZAC structure is used on the MQZ_AUTHENTICATE_USER call for the *ApplicationContext* parameter. This parameter specifies data related to the calling application.

Table 1 summarizes the fields in the structure.

Table 838. Fields in MQZAC

Field	Description
StrucId	Structure identifier
Version	Structure version number
ProcessId	Process identifier
ThreadId	Thread identifier
ApplName	Application name
UserID	User identifier
EffectiveUserID	Effective user identifier
Environment	Environment
CallerType	Caller type
AuthenticationType	Authentication type
BindType	Bind type

Fields

StrucId

Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQZAC_STRUC_ID

Identifier for application context structure.

For the C programming language, the constant MQZAC_STRUC_ID_ARRAY is also defined; this has the same value as MQZAC_STRUC_ID, but is an array of characters instead of a string.

Version

Type: MQLONG - input

Structure version number. The value is as follows:

MQZAC_VERSION_1

Version-1 application context structure. The constant MQZAC_CURRENT_VERSION specifies the version number of the current version.

ProcessId

Type: MQPID - input

Process identifier of the application.

ThreadId
Type: MQTID - input

Thread identifier of the application.

ApplName
Type: MQCHAR28 - input

Application name.

UserID
Type: MQCHAR12 - input

User identifier. On UNIX this field specifies the application's real user ID. On Windows this field specifies the application's user ID.

EffectiveUserID
Type: MQCHAR12 - input

Effective user identifier. On UNIX this field specifies the application's effective user ID. On Windows this field is blank.

Environment
Type: MQLONG - input

Environment. This field specifies the environment from which the call was made. The field is one of the following values:

MQXE_COMMAND_SERVER
Command server

MQXE_MQSC
runmqsc command interpreter

MQXE_MCA
Message channel agent MQXE_OTHER

MQXE_OTHER
Undefined environment

CallerType
Type: MQLONG - input

Caller Type. This field specifies the type of program that made the call. The field is one of the following values:

MQXACT_EXTERNAL
The call is external to the queue manager.

MQXACT_INTERNAL
The call is internal to the queue manager.

AuthenticationType
Type: MQLONG - input

Authentication Type. This field specifies the type of authentication being performed. The field is one of the following values:

MQZAT_INITIAL_CONTEXT
The authentication call is due to user context being initialized. This value is used during an MQCONN or MQCONNX call.

MQZAT_CHANGE_CONTEXT
The authentication call is due to the user context being changed. This value is used when the MCA changes the user context. Parent topic: MQZAC -

BindType
Type: MQLONG - input

Bind Type. This field specifies the type of binding in use. The field is one of the following values:

MQCNO_FASTPATH_BINDING
Fastpath binding.

MQCNO_SHARED_BINDING
Shared binding.

MQCNO_ISOLATED_BINDING
Isolated binding.

C declaration

Declare the fields of the structure as follows:

```
typedef struct tagMQZAC MQZAC;
struct tagMQZAC {
  MQCHAR4   StrucId;            /* Structure identifier */
  MQLONG    Version;            /* Structure version number */
  MQPID     ProcessId;          /* Process identifier */
  MQTID     ThreadId;           /* Thread identifier */
  MQCHAR28  ApplName;           /* Application name */
  MQCHAR12  UserID;             /* User identifier */
  MQCHAR12  EffectiveUserID;    /* Effective user identifier */
  MQLONG    Environment;        /* Environment */
  MQLONG    CallerType;         /* Caller type */
  MQLONG    AuthenticationType; /* Authentication type */
  MQLONG    BindType;           /* Bind type */
};
```

MQZAD - Authority data

The MQZAD structure is used on the MQZ_ENUMERATE_AUTHORITY_DATA call for two parameters, one input and one output.

See "MQZ_ENUMERATE_AUTHORITY_DATA - Enumerate authority data" on page 1622 for further information on the **Filter** and **AuthorityBuffer** parameters:

- MQZAD is used for the **Filter** parameter which is input to the call. This parameter specifies the selection criteria that are to be used to select the authority data returned by the call.
- MQZAD is also used for the **AuthorityBuffer** parameter which is output from the call. This parameter specifies the authorizations for one combination of profile name, object type, and entity.

Table 1. summarizes the fields in the structure.

Table 839. Fields in MQZAD

Field	Description
StrucId	Structure identifier
Version	Structure version number
ProfileName	Profile name
ObjectType	Object type
Authority	Authority
EntityDataPtr	Pointer to entity data
EntityType	Entity type
Options	Options

Fields

StrucId
Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQZAD_STRUC_ID
Identifier for authority data structure.

For the C programming language, the constant MQZAD_STRUC_ID_ARRAY is also defined; this has the same value as MQZAD_STRUC_ID, but is an array of characters instead of a string.

Version
Type: MQLONG - input

Structure version number. The value is as follows:

MQZAD_VERSION_1
Version-1 application context structure. The constant MQZAD_CURRENT_VERSION specifies the version number of the current version.

The following constant specifies the version number of the current version:

MQZAD_CURRENT_VERSION
Current version of authority data structure.

ProfileName
Type: MQCHAR48 - input

Profile name.

For the **Filter** parameter, this field is the profile name for which authority data is required. If the name is entirely blank up to the end of the field or the first null character, authority data for all profile names is returned.

For the **AuthorityBuffer** parameter, this field is the name of a profile that matches the specified selection criteria.

ObjectType
Type: MQLONG - input

Object type.

For the **Filter** parameter, this field is the object type for which authority data is required. If the value is MQOT_ALL, authority data for all object types is returned.

For the **AuthorityBuffer** parameter, this field is the object type to which the profile identified by the **ProfileName** parameter applies.

The value is one of the following; for the **Filter** parameter, the value MQOT_ALL is also valid:

MQOT_AUTH_INFO
Authentication information

MQOT_CHANNEL
Channel

MQOT_CLNTCONN_CHANNEL
Client connection channel

MQOT_LISTENER
Listener

MQOT_NAMELIST
Namelist

MQOT_PROCESS
Process definition

MQOT_Q
Queue

MQOT_Q_MGR
Queue manager

MQOT_SERVICE
Service

Authority
Type: MQLONG - input

Authority.

For the **Filter** parameter, this field is ignored.

For the **AuthorityBuffer** parameter, this field represents the authorizations that the entity has to the objects identified by **ProfileName** and **ObjectType**. If the entity has only one authority, the field is equal to the appropriate authorization value (MQZAO_* constant). If the entity has more than one authority, the field is the bitwise OR of the corresponding MQZAO_* constants.

EntityDataPtr
Type: PMQZED - input

Address of MQZED structure identifying an entity.

For the **Filter** parameter, this field points to an MQZED structure that identifies the entity for which authority data is required. If **EntityDataPtr** is the null pointer, authority data for all entities is returned.

For the **AuthorityBuffer** parameter, this field points to an MQZED structure that identifies the entity for which authority data has been returned.

EntityType
Type: MQLONG - input

Entity type.

For the **Filter** parameter, this field specifies the entity type for which authority data is required. If the value is MQZAET_NONE, authority data for all entity types is returned.

For the **AuthorityBuffer** parameter, this field specifies the type of the entity identified by the MQZED structure pointed to by the **EntityDataPtr** parameter.

The value is one of the following; for the **Filter** parameter, the value MQZAET_NONE is also valid:

MQZAET_PRINCIPAL
Principal

MQZAET_GROUP
Group

Options
Type: MQAUTHOPT - input

Options. This field specifies options that give control over the profiles that are displayed. One of the following values must be specified:

MQAUTHOPT_NAME_ALL_MATCHING
Displays all profiles

MQAUTHOPT_NAME_EXPLICIT
Displays profiles that have exactly the same name as specified in the **ProfileName** field.

In addition, one of the following must also be specified:

MQAUTHOPT_ENTITY_SET
Display all profiles that are used to calculate the cumulative authority that the entity has to the object specified by the **ProfileName** parameter. The **ProfileName** parameter must not contain any wildcard characters.

- If the specified entity is a principal, for each member of the set {entity, groups} the most applicable profile that applies to the object is displayed.
- If the specified entity is a group, the most applicable profile from the group that applies to the object is displayed.

- If this value is specified, then the values of **ProfileName**, **ObjectType**, **EntityType**, and the entity name specified in the **EntityDataPtr** MQZED structure, must all be non-blank.

If you have specified MQAUTHOPT_NAME_ALL_MATCHING, you can also specify the following value:

MQAUTHOPT_ENTITY_EXPLICIT
Displays profiles that have exactly the same entity name as the entity name specified in the **EntityDataPtr** MQZED structure.

C declaration

```
typedef struct tagMQZAD MQZAD;
struct tagMQZAD {
  MQCHAR4   StrucId;        /* Structure identifier */
  MQLONG    Version;        /* Structure version number */
  MQCHAR48  ProfileName;    /* Profile name */
  MQLONG    ObjectType;     /* Object type */
  MQLONG    Authority;      /* Authority */
  PMQZED    EntityDataPtr;  /* Address of MQZED structure identifying an
                               entity */
  MQLONG    EntityType;     /* Entity type */
  MQAUTHOPT Options;        /* Options */
};
```

MQZED - Entity descriptor

The MQZED structure is used in a number of authorization service calls to specify the entity for which authorization is to be checked.

Table 1. summarizes the fields in the structure.

Table 840. Fields in MQZED

Field	Description
StrucId	Structure identifier
Version	Version
EntityName Ptr	Entity name
EntityDomainPtr	Entity domain pointer
SecurityId	Security identifier
CorrelationPtr	Correlation pointer

Fields

StrucId
Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQZED_STRUC_ID
Identifier for entity descriptor structure.

For the C programming language, the constant MQZED_STRUC_ID_ARRAY is also defined; this has the same value as MQZED_STRUC_ID, but is an array of characters instead of a string.

Version
Type: MQLONG - input

Structure version number. The value is as follows:

MQZED_VERSION_1
Version-1 entity descriptor structure.

The following constant specifies the version number of the current version:

MQZED_CURRENT_VERSION
Current version of entity descriptor structure.

EntityNamePtr
Type: PMQCHAR - input

Profile name.

Address of entity name. This is a pointer to the name of the entity whose authorization is to be checked.

EntityDomainPtr
Type: PMQCHAR - input

Address of entity domain name. This is a pointer to the name of the domain containing the definition of the entity whose authorization is to be checked.

SecurityId
Type: MQBYTE40 - input

Authority.

Security identifier. This is the security identifier whose authorization is to be checked.

CorrelationPtr
Type: MQPTR - input

Correlation pointer. This facilitates the passing of correlational data between the authenticate user function and other appropriate OAM functions.

C declaration

```
typedef struct tagMQZED MQZED;
struct tagMQZED {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  PMQCHAR   EntityNamePtr;    /* Address of entity name */
  PMQCHAR   EntityDomainPtr;  /* Address of entity domain name */
  MQBYTE40  SecurityId;       /* Security identifier */
  MQPTR     CorrelationPtr;   /* Address of correlation data */
```

MQZEP - Add component entry point

A service component starts this function, during initialization, to add an entry point to the entry point vector for that service component.

Syntax

MQZEP (*Hconfig* , *Function* , *EntryPoint* , *CompCode* , *Reason*)

Parameters

Hconfig
Type: MQHCONFIG - input

Configuration handle. This handle represents the component that is being configured for this particular installable service. It must be the same as the component passed to the component configuration function by the queue manager on the component initialization call.

Function
Type: MQLONG - input

Function identifier. Valid values for this are defined for each installable service.

If MQZEP is called more than once for the same function, the last call made provides the entry point that is used.

EntryPoint
Type: PMQFUNC - input

Function entry point. This is the address of the entry point provided by the component to perform the function.

The value NULL is valid, and indicates that the function is not provided by this component. NULL is assumed for entry points that are not defined using MQZEP.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_FUNCTION_ERROR
(2281, X'8E9') Function identifier not valid.

MQRC_HCONFIG_ERROR
(2280, X'8E8') Configuration handle not valid.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZEP (Hconfig, Function, EntryPoint, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONFIG  Hconfig;     /* Configuration handle */
MQLONG     Function;    /* Function identifier */
PMQFUNC    EntryPoint;  /* Function entry point */
MQLONG     CompCode;    /* Completion code */
MQLONG     Reason;      /* Reason code qualifying CompCode */
```

MQZFP - Free parameters

The MQZFP structure is used on the MQZ_FREE_USER call for the *FreeParms* parameter. This parameter specifies data related to resource to be freed.

Table 1. summarizes the fields in the structure.

Table 841. Fields in MQZFP

Field	Description
StrucId	Structure identifier

Table 841. Fields in MQZFP (continued)	
Field	**Description**
Version	Version
Reserved	Reserved field
CorrelationPtr	Correlation pointer

Fields

StrucId

Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQZIC_STRUC_ID

Identifier for identity context structure. For the C programming language, the constant MQZIC_STRUC_ID_ARRAY is also defined; this has the same value as MQZIC_STRUC_ID, but is an array of characters instead of a string.

Version

Type: MQLONG - input

Structure version number. The value is as follows:

MQZFP_VERSION_1

Version-1 free parameters structure.

The following constant specifies the version number of the current version:

MQZFP_CURRENT_VERSION

Current version of free parameters structure.

Reserved

Type: MQBYTE8 - input

Reserved field. The initial value is null.

CorrelationPtr

Type: MQPTR - input

Correlation pointer. Address of correlation data relating to the resource to be freed.

C declaration

```
typedef struct tagMQZFP MQZFP;
struct tagMQZFP {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQBYTE8   Reserved;         /* Reserved field */
  MQPTR     CorrelationPtr;   /* Address of correlation data */
};
```

MQZIC - Identity context

The MQZIC structure is used on the MQZ_AUTHENTICATE_USER call for the *IdentityContext* parameter.

The MQZIC structure contains identity context information, which identifies the user of the application that first put the message on a queue:

- The queue manager fills the *UserIdentifier* field with a name that identifies the user, the way that the queue manager can do this depends on the environment in which the application is running.
- The queue manager fills the *AccountingToken* field with a token or number that it determined from the application that put the message.

- Applications can use the *ApplIdentityData* field for any extra information that they want to include about the user (for example, an encrypted password).

Suitably authorized applications can set the identity context using the MQZ_AUTHENTICATE_USER function.

A Windows systems security identifier (SID) is stored in the *AccountingToken* field when a message is created under IBM MQ for Windows. The SID can be used to supplement the *UserIdentifier* field and to establish the credentials of a user.

Table 1. summarizes the fields in the structure.

Table 842. Fields in MQZIC

Field	Description
StrucId	Structure identifier
Version	Version
UserIdentifier	User identifier
AccountingToken	Accounting token
ApplIdentityData	Application identity data

Fields

StrucId

Type: MQCHAR4 - input

Structure identifier. The value is as follows:

MQZIC_STRUC_ID

Identifier for identity context structure. For the C programming language, the constant MQZIC_STRUC_ID_ARRAY is also defined; this has the same value as MQZIC_STRUC_ID, but is an array of characters instead of a string.

Version

Type: MQLONG - input

Structure version number. The value is as follows:

MQZIC_VERSION_1

Version-1 identity context structure.

The following constant specifies the version number of the current version:

MQZIC_CURRENT_VERSION

Current version of identity context structure.

UserIdentifier

Type: MQCHAR12 - input

User identifier. This is part of the identity context of the message. *UserIdentifier* specifies the user identifier of the application that originated the message. The queue manager treats this information as character data, but does not define the format of it. For more information on the *UserIdentifier* field, see “UserIdentifier (MQCHAR12)” on page 449.

AccountingToken

Type: MQBYTE32 - input

Accounting token. This is part of the identity context of the message. *AccountingToken* allows an application to cause work done as a result of the message to be appropriately charged. The queue manager treats this information as a string of bits and does not check its content. For more information on the *AccountingToken* field, see “AccountingToken (MQBYTE32)” on page 450.

ApplIdentityData

Type: MQCHAR32 - input

Application data relating to identity. This is part of the identity context of the message. ApplIdentityData is information that is defined by the application suite that can be used to provide additional information about the origin of the message. For example, it could be set by applications running with suitable user authority to indicate whether the identity data is trusted. For more information on the ApplIdentityData field, see "ApplIdentityData (MQCHAR32)" on page 452.

C declaration

```
typedef struct tagMQZED MQZED;
struct tagMQZED {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQCHAR12  UserIdentifier;   /* User identifier */
  MQBYTE32  AccountingToken;  /* Accounting token */
  MQCHAR32  ApplIdentityData; /* Application data relating to identity */
};
```

IBM i Installable services interface reference information on IBM i

Use this information to understand the reference information for the installable services for IBM i.

For each function there is a description, including the function identifier (for MQZEP).

The *parameters* are shown listed in the order they must occur. They must all be present.

Each parameter name is followed by its data type in parentheses. These are the elementary data types described in "Elementary data types" on page 986.

The C language invocation is also given, after the description of the parameters.

Related concepts

IBM i Installable services and components for IBM i

ULW Installable services and components for UNIX, Linux and Windows

Related reference

"Installable services interface reference information" on page 1605
This collection of topics provides reference information for the installable services.

IBM i MQZEP (Add component entry point) on IBM i

This function is invoked by a service component, during initialization, to add an entry point to the entry point vector for that service component.

Syntax

```
MQZEP (Hconfig, Function, EntryPoint, CompCode, Reason)
```

Parameters

The MQZEP call has the following parameters.

Hconfig (MQHCONFIG) - input

Configuration handle.

This handle represents the component which is being configured for this particular installable service. It must be the same as the one passed to the component configuration function by the queue manager on the component initialization call.

Function (MQLONG) - input
Function identifier.

Valid values for this are defined for each installable service. If MQZEP is called more than once for the same function, the last call made provides the entry point which is used.

EntryPoint (PMQFUNC) - input
Function entry point.

This is the address of the entry point provided by the component to perform the function. The value NULL is valid, and indicates that the function is not provided by this component. NULL is assumed for entry points which are not defined using MQZEP.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_FUNCTION_ERROR
(2281, X'8E9') Function identifier not valid.

MQRC_HCONFIG_ERROR
(2280, X'8E8') Configuration handle not valid.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZEP (Hconfig, Function, EntryPoint, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQHCONFIG  Hconfig;     /* Configuration handle */
MQLONG     Function;    /* Function identifier */
PMQFUNC    EntryPoint;  /* Function entry point */
MQLONG     CompCode;    /* Completion code */
MQLONG     Reason;      /* Reason code qualifying CompCode */
```

IBM i MQHCONFIG (Configuration handle) on IBM i

The MQHCONFIG data type represents a configuration handle, that is, the component that is being configured for a particular installable service. A configuration handle must be aligned on its natural boundary.

Applications must test variables of this type for equality only.

C declaration

```
typedef void MQPOINTER MQHCONFIG;
```

IBM i PMQFUNC (Pointer to function) on IBM i

Pointer to a function.

C declaration

```
typedef void MQPOINTER PMQFUNC;
```

IBM i MQZ_AUTHENTICATE_USER (Authenticate user) on IBM i

This function is provided by a MQZAS_VERSION_5 authorization service component. It is invoked by the queue manager to authenticate a user, or to set identity context fields.

It is invoked when an IBM MQ user application context is established. This happens during connect calls at the point where the application's user context is initialized, and at each point where the application's user context is changed. Each time a connect call is made, the application's user context information is reacquired in the *IdentityContext* field.

The function identifier for this function (for MQZEP) is MQZID_AUTHENTICATE_USER.

Syntax

MQZ_AUTHENTICATE_USER *(QMgrName, SecurityParms, ApplicationContext,*
IdentityContext, CorrelationPtr, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_AUTHENTICATE_USER call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character. The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

SecurityParms (MQCSP) - input
Security parameters.

Data relating to the user ID, password, and authentication type.

During an MQCONN MQI call this parameter contains null, or default values.

ApplicationContext (MQZAC) - input
Application context.

Data relating to the calling application. See “MQZAC (Application context) on IBM i” on page 1700 for details. During every MQCONN or MQCONNX MQI call, the user context information in the MQZAC structure is reacquired.

IdentityContext (MQZIC) - input/output
Identity context.

On input to the authenticate user function, this identifies the current identity context. The authenticate user function can change this, at which point the queue manager adopts the new identity

context. See “MQZIC (Identity context) on IBM i” on page 1706 for more details on the MQZIC structure.

CorrelationPtr (MQPTR) - output
Correlation pointer.

Specifies the address of any correlation data. This pointer is then passed on to other OAM calls.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this components functions is called. The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation flag.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on other components.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information about these reason codes, see Messages and reason codes.

C invocation

```
MQZ_AUTHENTICATE_USER (QMgrName, SecurityParms, ApplicationContext,
                       IdentityContext, &CorrelationPtr, ComponentData,
                       &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQCSP     SecurityParms;      /* Security parameters */
MQZAC     ApplicationContext; /* Application context */
MQZIC     IdentityContext;    /* Identity context */
MQPTR     CorrelationPtr;     /* Correlation pointer */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
```

```
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

IBM i MQZ_CHECK_AUTHORITY (Check authority) on IBM i

This function is provided by a MQZAS_VERSION_1 authorization service component, and is invoked by the queue manager to check whether an entity has authority to perform a particular action, or actions, on a specified object.

The function identifier for this function (for MQZEP) is MQZID_CHECK_AUTHORITY.

Syntax

MQZ_CHECK_AUTHORITY *(QMgrName, EntityName, EntityType,*
ObjectName, ObjectType, Authority, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_CHECK_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character. The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

EntityName (MQCHAR12) - input
Entity name.

The name of the entity whose authorization to the object is to be checked. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

It is not essential for this entity to be known to the underlying security service. If it is not known, then the authorizations of the special **nobody** group (to which all entities are assumed to belong) are used for the check. An all-blank name is valid and can be used in this way.

EntityType (MQLONG) - input
Entity type.

The type of entity specified by *EntityName*. It is one of the following:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

ObjectName (MQCHAR48) - input
Object name.

The name of the object to which access is required. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType (MQLONG) - input
Object type.

The type of entity specified by *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority (MQLONG) - input
Authority to be checked.

If one authorization is being checked, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authorization is being checked, it is the bitwise OR of the corresponding MQZAO_* constants.

The following authorizations apply to use of the MQI calls:

MQZAO_CONNECT
Ability to use the MQCONN call.

MQZAO_BROWSE
Ability to use the MQGET call with a browse option.

This allows the MQGMO_BROWSE_FIRST, MQGMO_BROWSE_MSG_UNDER_CURSOR, or MQGMO_BROWSE_NEXT option to be specified on the MQGET call.

MQZAO_INPUT
Ability to use the MQGET call with an input option.

This allows the MQOO_INPUT_SHARED, MQOO_INPUT_EXCLUSIVE, or MQOO_INPUT_AS_Q_DEF option to be specified on the MQOPEN call.

MQZAO_OUTPUT
Ability to use the MQPUT call.

This allows the MQOO_OUTPUT option to be specified on the MQOPEN call.

MQZAO_INQUIRE
Ability to use the MQINQ call.

This allows the MQOO_INQUIRE option to be specified on the MQOPEN call.

MQZAO_SET
Ability to use the MQSET call.

This allows the MQOO_SET option to be specified on the MQOPEN call.

MQZAO_PASS_IDENTITY_CONTEXT
Ability to pass identity context.

This allows the MQOO_PASS_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_PASS_ALL_CONTEXT
Ability to pass all context.

This allows the MQOO_PASS_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_PASS_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_IDENTITY_CONTEXT
Ability to set identity context.

This allows the MQOO_SET_IDENTITY_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_IDENTITY_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_SET_ALL_CONTEXT
Ability to set all context.

This allows the MQOO_SET_ALL_CONTEXT option to be specified on the MQOPEN call, and the MQPMO_SET_ALL_CONTEXT option to be specified on the MQPUT and MQPUT1 calls.

MQZAO_ALTERNATE_USER_AUTHORITY
Ability to use alternate user authority.

This allows the MQOO_ALTERNATE_USER_AUTHORITY option to be specified on the MQOPEN call, and the MQPMO_ALTERNATE_USER_AUTHORITY option to be specified on the MQPUT1 call.

MQZAO_ALL_MQI
All of the MQI authorizations.

This enables all of the authorizations described previously.

The following authorizations apply to administration of a queue manager:

MQZAO_CREATE
Ability to create objects of a specified type.

MQZAO_DELETE
Ability to delete a specified object.

MQZAO_DISPLAY
Ability to display the attributes of a specified object.

MQZAO_CHANGE
Ability to change the attributes of a specified object.

MQZAO_CLEAR
Ability to delete all messages from a specified queue.

MQZAO_AUTHORIZE
Ability to authorize other users for a specified object.

MQZAO_CONTROL
Ability to start, stop, or ping a non-client channel object.

MQZAO_CONTROL_EXTENDED
Ability to reset a sequence number, or resolve an indoubt message on a non-client channel object.

MQZAO_ALL_ADMIN
All of the administration authorizations, other than MQZAO_CREATE.

The following authorizations apply to both use of the MQI and to administration of a queue manager:

MQZAO_ALL
All authorizations, other than MQZAO_CREATE.

MQZAO_NONE
No authorizations.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output

Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP

Do not continue with next component.

CompCode (MQLONG) - output

Completion code.

It is one of the following:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

Reason (MQLONG) - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED

(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR

(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE

(2285, X'8ED') Underlying service not available.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_CHECK_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                     ObjectType, Authority, ComponentData,
                     &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority to be checked */
```

```
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

MQZ_CHECK_PRIVILEGED - Check if user is privileged

This function is provided by an MQZAS_VERSION_6 authorization service component, and is invoked by the queue manager to determine whether a specified user is a privileged user.

The function identifier for this function (for MQZEP) is MQZID_CHECK_PRIVILEGED.

Syntax

MQZ_CHECK_PRIVILEGED(*QMgrName* , *EntityData* , *EntityType* , *ComponentData* , *Continuation* , *CompCode* , *Reason*)

Parameters

QMgrName

Type: MQCHAR48 - input

Queue manager name. The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

EntityData

Type: MQZED - input

Entity data. Data relating to the entity that is to be checked. For more information, see "MQZED - Entity descriptor" on page 1663.

EntityType

Type: MQLONG - input

Entity type. The type of entity specified by EntityData. It must be one of the following values:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ComponentData

Type: MQBYTExComponentDataLength - input/output

Component data. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of these component functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation

Type: MQLONG - output

Continuation indicator set by component. The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_CHECK_AUTHORITY, this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP
Do not continue with next component.

If the call to a component fails (that is, *CompCode* returns MQCC_FAILED), and the *Continuation* parameter is MQZCI_DEFAULT or MQZCI_CONTINUE, the queue manager continues to call other components if there are any.

If the call succeeds (that is, *CompCode* returns MQCC_OK) no other components are called no matter what the setting of *Continuation* is.

If the call fails and the *Continuation* parameter is MQZCI_STOP then no other components are called and the error is returned to the queue manager. Components have no knowledge of previous calls, so the *Continuation* parameter is always set to MQZCI_DEFAULT before the call.

CompCode
Type: MQLONG - output

Completion code. It must be one of the following values:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason
Type: MQLONG - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_PRIVILEGED
(2584, X'A18') This user is not a privileged user ID.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information about these reason codes, see API completion and reason codes.

C invocation

```
MQZ_CHECK_PRIVILEGED (QMgrName, &EntityData, EntityType,
                      ComponentData, &Continuation,
                      &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQZED     EntityData;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_COPY_ALL_AUTHORITY (Copy all authority) on IBM i

This function is provided by an authorization service component. It is invoked by the queue manager to copy all of the authorizations that are currently in force for a reference object to another object.

The function identifier for this function (for MQZEP) is MQZID_COPY_ALL_AUTHORITY.

Syntax

MQZ_COPY_ALL_AUTHORITY *(QMgrName, RefObjectName, ObjectName,*
ObjectType, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_COPY_ALL_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

RefObjectName (MQCHAR48) - input
Reference object name.

The name of the reference object, the authorizations for which are to be copied. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

ObjectName (MQCHAR48) - input
Object name.

The name of the object for which accesses are to be set. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

ObjectType (MQLONG) - input
Object type.

The type of object specified by *RefObjectName* and *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_COPY_ALL_AUTHORITY this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_REF_OBJECT
(2294, X'8F6') Reference object unknown.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_COPY_ALL_AUTHORITY (QMgrName, RefObjectName, ObjectName, ObjectType,
                        ComponentData, &Continuation, &CompCode,
                        &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR48  RefObjectName;     /* Reference object name */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_DELETE_AUTHORITY (Delete authority) on IBM i

This function is provided by an authorization service component, and is invoked by the queue manager to delete all of the authorizations associated with the specified object.

The function identifier for this function (for MQZEP) is MQZID_DELETE_AUTHORITY.

Syntax

MQZ_DELETE_AUTHORITY *(QMgrName, ObjectName, ObjectType,*
ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_DELETE_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

ObjectName (MQCHAR48) - input
Object name.

The name of the object for which accesses are to be deleted. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType (MQLONG) - input
Object type.

The type of entity specified by *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_DELETE_AUTHORITY this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_DELETE_AUTHORITY (QMgrName, ObjectName, ObjectType, ComponentData,
                      &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_ENUMERATE_AUTHORITY_DATA (Enumerate authority data) on IBM i

This function is provided by an MQZAS_VERSION_4 authorization service component, and is invoked repeatedly by the queue manager to retrieve all of the authority data that matches the selection criteria specified on the first invocation.

The function identifier for this function (for MQZEP) is MQZID_ENUMERATE_AUTHORITY_DATA.

Syntax

MQZ_ENUMERATE_AUTHORITY_DATA *(QMgrName, StartEnumeration,* *Filter, AuthorityBufferLength, AuthorityBuffer, AuthorityDataLength, ComponentData, Continuation, CompCode, Reason)*

Parameters

The MQZ_ENUMERATE_AUTHORITY_DATA call has the following parameters.

QMgrName (MQCHAR48) - input

Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

StartEnumeration (MQLONG) - input

Flag indicating whether call should start enumeration.

This indicates whether the call should start the enumeration of authority data, or continue the enumeration of authority data started by a previous call to MQZ_ENUMERATE_AUTHORITY_DATA. The value is one of the following:

MQZSE_START

Start enumeration.

The call is invoked with this value to start the enumeration of authority data. The **Filter** parameter specifies the selection criteria to be used to select the authority data returned by this and successive calls.

MQZSE_CONTINUE

Continue enumeration.

The call is invoked with this value to continue the enumeration of authority data. The **Filter** parameter is ignored in this case, and can be specified as the null pointer (the selection criteria are determined by the **Filter** parameter specified by the call that had *StartEnumeration* set to MQZSE_START).

Filter (MQZAD) - input

Filter.

If *StartEnumeration* is MQZSE_START, *Filter* specifies the selection criteria to be used to select the authority data to return. If *Filter* is the null pointer, no selection criteria are used, that is, all authority data is returned. See "MQZAD (Authority data) on IBM i" on page 1702 for details of the selection criteria that can be used.

If *StartEnumeration* is MQZSE_CONTINUE, *Filter* is ignored, and can be specified as the null pointer.

AuthorityBufferLength (MQLONG) - input
Length of *AuthorityBuffer*.

This is the length in bytes of the **AuthorityBuffer** parameter. The authority buffer must be big enough to accommodate the data to be returned.

AuthorityBuffer (MQZAD) - output
Authority data.

This is the buffer in which the authority data is returned. The buffer must be big enough to accommodate an MQZAD structure, an MQZED structure, plus the longest entity name and longest domain name defined.

Note: This parameter is defined as an MQZAD, as the MQZAD always occurs at the start of the buffer. However, if the buffer is actually declared as an MQZAD, the buffer will be too small - it needs to be bigger than an MQZAD so that it can accommodate the MQZAD, MQZED, plus entity and domain names.

AuthorityDataLength (MQLONG) - output
Length of data returned in *AuthorityBuffer*.

This is the length of the data returned in *AuthorityBuffer*. If the authority buffer is too small, *AuthorityDataLength* is set to the length of the buffer required, and the call returns completion code MQCC_FAILED and reason code MQRC_BUFFER_LENGTH_ERROR.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_ENUMERATE_AUTHORITY_DATA this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_BUFFER_LENGTH_ERROR
(2005, X'7D5') Buffer length parameter not valid.

MQRC_NO_DATA_AVAILABLE
(2379, X'94B') No data available.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_ENUMERATE_AUTHORITY_DATA (QMgrName, StartEnumeration, &Filter,
                              AuthorityBufferLength,
                              &AuthorityBuffer,
                              &AuthorityDataLength, ComponentData,
                              &Continuation, &CompCode,
                              &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;              /* Queue manager name */
MQLONG    StartEnumeration;      /* Flag indicating whether call should
                                    start enumeration */
MQZAD     Filter;                /* Filter */
MQLONG    AuthorityBufferLength; /* Length of AuthorityBuffer */
MQZAD     AuthorityBuffer;       /* Authority data */
MQLONG    AuthorityDataLength;   /* Length of data returned in
                                    AuthorityBuffer */
MQBYTE    ComponentData[n];      /* Component data */
MQLONG    Continuation;          /* Continuation indicator set by
                                    component */
MQLONG    CompCode;              /* Completion code */
MQLONG    Reason;                /* Reason code qualifying CompCode */
```

MQZ_FREE_USER - Free user

This function is provided by a MQZAS_VERSION_5 authorization service component, and is invoked by the queue manager to free associated allocated resource. It is invoked when an application has finished running under all user contexts, for example during an MQDISC MQI call.

The function identifier for this function (for MQZEP) is MQZID_FREE_USER.

IBM i MQZ_GET_AUTHORITY (Get authority) on IBM i

This function is provided by a MQZAS_VERSION_1 authorization service component, and is invoked by the queue manager to retrieve the authority that an entity has to access the specified object.

The function identifier for this function (for MQZEP) is MQZID_GET_AUTHORITY.

Syntax

MQZ_GET_AUTHORITY *(QMgrName, EntityName, EntityType, ObjectName,*
ObjectType, Authority, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_GET_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

EntityName (MQCHAR12) - input
Entity name.

The name of the entity whose access to the object is to be retrieved. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType (MQLONG) - input
Entity type.

The type of entity specified by *EntityName*. The following value can be specified:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

ObjectName (MQCHAR48) - input
Object name.

The name of the object for which the entity's authority is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType (MQLONG) - input
Object type.

The type of entity specified by *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority (MQLONG) - output
Authority of entity.

If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_GET_AUTHORITY this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_GET_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                   ObjectType, &Authority, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_GET_EXPLICIT_AUTHORITY (Get explicit authority) on IBM i

This function is provided by a MQZAS_VERSION_1 authorization service component, and is invoked by the queue manager to retrieve the authority that a named group has to access a specified object (but without the additional authority of the **nobody** group), or the authority that the primary group of the named principal has to access a specified object.

The function identifier for this function (for MQZEP) is MQZID_GET_EXPLICIT_AUTHORITY.

Syntax

MQZ_GET_EXPLICIT_AUTHORITY *(QMgrName, EntityName, EntityType,*
ObjectName, ObjectType, Authority, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_GET_EXPLICIT_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input

Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

EntityName (MQCHAR12) - input

Entity name.

The name of the entity from which access to the object is to be retrieved. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType (MQLONG) - input

Entity type.

The type of entity specified by *EntityName*. The following value can be specified:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName (MQCHAR48) - input
Object name.

The name of the object for which the entity's authority is to be retrieved. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType (MQLONG) - input
Object type.

The type of entity specified by *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority (MQLONG) - output
Authority of entity.

If the entity has one authority, this field is equal to the appropriate authorization operation (MQZAO_* constant). If it has more than one authority, this field is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_GET_EXPLICIT_AUTHORITY this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_GET_EXPLICIT_AUTHORITY (QMgrName, EntityName, EntityType,
                            ObjectName, ObjectType, &Authority,
                            ComponentData, &Continuation,
                            &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQCHAR12  EntityName;        /* Entity name */
MQLONG    EntityType;        /* Entity type */
MQCHAR48  ObjectName;        /* Object name */
MQLONG    ObjectType;        /* Object type */
MQLONG    Authority;         /* Authority of entity */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_INIT_AUTHORITY (Initialize authorization service) on IBM i

This function is provided by an authorization service component, and is invoked by the queue manager during configuration of the component. It is expected to call MQZEP in order to provide information to the queue manager.

The function identifier for this function (for MQZEP) is MQZID_INIT_AUTHORITY.

Syntax

MQZ_INIT_AUTHORITY ***(Hconfig, Options, QMgrName, ComponentDataLength,***
ComponentData, Version, CompCode, Reason)

Parameters

The MQZ_INIT_AUTHORITY call has the following parameters.

Hconfig (MQHCONFIG) - input
Configuration handle.

This handle represents the particular component being initialized. It is to be used by the component when calling the queue manager with the MQZEP function.

Options (MQLONG) - input
Initialization options.

It is one of the following:

MQZIO_PRIMARY
Primary initialization.

MQZIO_SECONDARY
Secondary initialization.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

ComponentDataLength (MQLONG) - input
Length of component data.

Length in bytes of the *ComponentData* area. This length is defined in the component configuration data.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This is initialized to all zeros before calling the component's primary initialization function. This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions (including the initialization function) provided by this component are preserved, and presented the next time one of this component's functions is called.

Version (MQLONG) - input/output
Version number.

On input to the initialization function, this identifies the *highest* version number that the queue manager supports. The initialization function must change this, if necessary, to the version of the interface which *it* supports. If on return the queue manager does not support the version returned by the component, it calls the component's MQZ_TERM_AUTHORITY function and makes no further use of this component.

The following values are supported:

MQZAS_VERSION_1
Version 1.

MQZAS_VERSION_2
Version 2.

MQZAS_VERSION_3
Version 3.

MQZAS_VERSION_4
Version 4.

MQZAS_VERSION_5
Version 5.

MQZAS_VERSION_6
Version 6.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_INITIALIZATION_FAILED
(2286, X'8EE') Initialization failed for an undefined reason.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_INIT_AUTHORITY (Hconfig, Options, QMgrName, ComponentDataLength,
                    ComponentData, &Version, &CompCode,
                    &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;              /* Configuration handle */
MQLONG     Options;              /* Initialization options */
MQCHAR48   QMgrName;             /* Queue manager name */
MQLONG     ComponentDataLength;  /* Length of component data */
MQBYTE     ComponentData[n];     /* Component data */
MQLONG     Version;              /* Version number */
MQLONG     CompCode;             /* Completion code */
MQLONG     Reason;               /* Reason code qualifying CompCode */
```

IBM i MQZ_INQUIRE (Inquire authorization service) on IBM i

This function is provided by a MQZAS_VERSION_5 authorization service component, and is invoked by the queue manager to query the supported functionality. Where multiple service components are used, service components are called in reverse order to the order they were installed in.

The function identifier for this function (for MQZEP) is MQZID_INQUIRE.

Syntax

MQZ_INQUIRE
(QMgrName, SelectorCount, Selectors, IntAttrCount, IntAttrs, CharAttrLength, CharAttrs, SelectorReturned, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_INQUIRE call has the following parameters.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

SelectorCount (MQLONG) - input
Number of selectors.

The number of selectors supplied in the Selectors parameter.

The value must be between zero and 256.

Selectors (MQLONG x SelectorCount) - input
Selectors.

Array of selectors. Each selector identifies a required attribute and must be of one of the following types:

- MQIACF_* (integer)
- MQCACF_* (character)

Selectors can be specified in any order. The number of selectors in the array is indicated by the SelectorCount parameter.

Integer attributes identified by selectors are returned in the IntAttrs parameter in the same order as they appear in Selectors.

Character attributes identified by selectors are returned in the CharAttrs parameter in the same order as they in appear Selectors.

IntAttrCount (MQLONG) - input
Number of integer attributes.

The number of integer attributes supplied in the IntAttrs parameter.

The value must be in the range 0 through 256.

IntAttrs (MQLONG x IntAttrCount) - output
Integer attributes.

Array of integer attributes. The integer attributes are returned in the same order as the corresponding integer selectors in the Selectors array.

CharAttrCount (MQLONG) - input
Length of the character attributes buffer.

The length in bytes of the CharAttrs parameter.

The value must at least sum of the lengths of the requested character attributes. If no character attributes are requested, zero is a valid value.

CharAttrs (MQLONG x CharAttrCount) - output
Character attributes buffer.

Buffer containing character attributes, concatenated together. The character attributes are returned in the same order as the corresponding character selectors in the Selectors array.

The length of the buffer is given by the CharAttrCount parameter.

SelectorReturned (MQLONGxSelectorCount) - input
Selector returned.

Array of values identifying which attributes have been returned from the set requested for by the selectors in the Selectors parameter. The number of values in this array is indicated by the SelectorCount parameter. Each value in the array relates to the selector from the corresponding position in the Selectors array. Each value is one of the following:

MQZSL_RETURNED
The attribute requested by the corresponding selector in the Selectors parameter has been returned.

MQZSL_NOT_RETURNED
The attribute requested by the corresponding selector in the Selectors parameter has not been returned.

The array is initialized with all values as *MQZSL_NOT_RETURNED*. When an authorization service component returns an attribute, it sets the appropriate value in the array to *MQZSL_RETURNED*. This allows any other authorization service components, to which the inquire call is made, to identify which attributes have already been returned.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **`ComponentDataLength`** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation flag.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on other components.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_WARNING
Partial completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *`CompCode`*.

If *`CompCode`* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *`CompCode`* is MQCC_WARNING:

MQRC_CHAR_ATTRS_TOO_SHORT
Not enough space for character attributes.

MQRC_INT_COUNT_TOO_SMALL
Not enough space for integer attributes.

If *CompCode* is MQCC_FAILED:

MQRC_SELECTOR_COUNT_ERROR
Number of selectors is not valid.

MQRC_SELECTOR_ERROR
Attribute selector not valid.

MQRC_SELECTOR_LIMIT_EXCEEDED
Too many selectors specified.

MQRC_INT_ATTR_COUNT_ERROR
Number of integer attributes is not valid.

MQRC_INT_ATTRS_ARRAY_ERROR
Integer attributes array not valid.

MQRC_CHAR_ATTR_LENGTH_ERROR
Number of character attributes is not valid.

MQRC_CHAR_ATTRS_ERROR
Character attributes string is not valid.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

C invocation

```
MQZ_INQUIRE (QMgrName, SelectorCount, Selectors, IntAttrCount,
                   &IntAttrs, CharAttrLength, &CharAttrs,
                   SelectorReturned, ComponentData, &Continuation,
                   &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48   QMgrName;              /* Queue manager name */
MQLONG     SelectorCount;         /* Selector count */
MQLONG     Selectors[n];          /* Selectors */
MQLONG     IntAttrCount;          /* IntAttrs count */
MQLONG     IntAttrs[n];           /* Integer attributes */
MQLONG     CharAttrCount;         /* CharAttrs count */
MQLONG     CharAttrs[n];          /* Chatacter attributes */
MQLONG     SelectorReturned[n];   /* Selector returned */
MQBYTE     ComponentData[n];      /* Component data */
MQLONG     Continuation;          /* Continuation indicator set by
                                     component */
MQLONG     CompCode;              /* Completion code */
MQLONG     Reason;                /* Reason code qualifying CompCode */
```

IBM i MQZ_REFRESH_CACHE (Refresh all authorizations) on IBM i

This function is provided by an MQZAS_VERSION_3 authorization service component. It is invoked by the queue manager to refresh the list of authorizations held internally by the component.

The function identifier for this function (for MQZEP) is MQZID_REFRESH_CACHE (8L).

Syntax

MQZ_REFRESH_CACHE
(QMgrName, ComponentData, Continuation, CompCode, Reason)

Parameters

***QMgrName* (MQCHAR48) - input**

Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to use it in any defined manner.

***ComponentData* (MQBYTE x *ComponentDataLength*) - input/output**

Component data.

This data is kept by the queue manager on behalf of this particular component. Any changes made to it by any of the functions provided by this component are preserved, and presented the next time a function of the component is called.

The length of this data area is passed by the queue manager in the *ComponentDataLength* parameter of the MQZ_INIT_AUTHORITY call.

***Continuation* (MQLONG) - output**

Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT

Continuation dependent on queue manager.

For MQZ_REFRESH_CACHE, this has the same effect as MQZCI_CONTINUE.

MQZCI_CONTINUE

Continue with next component.

MQZCI_STOP

Do not continue with next component.

***CompCode* (MQLONG) - output**

Completion code.

It is one of the following:

MQCC_OK

Successful completion.

MQCC_FAILED

Call failed.

***Reason* (MQLONG) - output**

Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE

(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_ERROR

(2289, X'8F1') Unexpected error occurred accessing service.

C invocation

```
MQZ_REFRESH_CACHE (QMgrName, ComponentData,
                   &Continuation, &CompCode, &Reason);
```

Declare the parameters as follows:

```
MQCHAR48  QMgrName;          /* Queue manager name */
MQBYTE    ComponentData[n];  /* Component data */
MQLONG    Continuation;      /* Continuation indicator set by
                                component */
MQLONG    CompCode;          /* Completion code */
MQLONG    Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZ_SET_AUTHORITY (Set authority) on IBM i

This function is provided by a MQZAS_VERSION_1 authorization service component, and is invoked by the queue manager to set the authority that an entity has to access the specified object.

The function identifier for this function (for MQZEP) is MQZID_SET_AUTHORITY.

Note: This function overrides any existing authorities. To preserve any existing authorities you must set them again with this function.

Syntax

MQZ_SET_AUTHORITY ***(QMgrName, EntityName, EntityType, ObjectName,***
ObjectType, Authority, ComponentData, Continuation, CompCode, Reason)

Parameters

The MQZ_SET_AUTHORITY call has the following parameters.

QMgrName (MQCHAR48) - input

Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

EntityName (MQCHAR12) - input

Entity name.

The name of the entity for which access to the object is to be set. The maximum length of the string is 12 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

EntityType (MQLONG) - input

Entity type.

The type of entity specified by *EntityName*. The following value can be specified:

MQZAET_PRINCIPAL

Principal.

MQZAET_GROUP

Group.

ObjectName (MQCHAR48) - input

Object name.

The name of the object to which access is required. The maximum length of the string is 48 characters; if it is shorter than that it is padded to the right with blanks. The name is not terminated by a null character.

If *ObjectType* is MQOT_Q_MGR, this name is the same as *QMgrName*.

ObjectType (MQLONG) - input

Object type.

The type of entity specified by *ObjectName*. It is one of the following:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority (MQLONG) - input
Authority to be checked.

If one authorization is being set, this field is equal to the appropriate authorization operation (MQZAO_* constant). If more than one authorization is being set, it is the bitwise OR of the corresponding MQZAO_* constants.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter of the MQZ_INIT_AUTHORITY call.

Continuation (MQLONG) - output
Continuation indicator set by component.

The following values can be specified:

MQZCI_DEFAULT
Continuation dependent on queue manager.

For MQZ_SET_AUTHORITY this has the same effect as MQZCI_STOP.

MQZCI_CONTINUE
Continue with next component.

MQZCI_STOP
Do not continue with next component.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_NOT_AUTHORIZED
(2035, X'7F3') Not authorized for access.

MQRC_SERVICE_ERROR
(2289, X'8F1') Unexpected error occurred accessing service.

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_UNKNOWN_ENTITY
(2292, X'8F4') Entity unknown to service.

C invocation

```
MQZ_SET_AUTHORITY (QMgrName, EntityName, EntityType, ObjectName,
                  ObjectType, Authority, ComponentData,
                  &Continuation, &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQCHAR48  QMgrName;           /* Queue manager name */
MQCHAR12  EntityName;         /* Entity name */
MQLONG    EntityType;         /* Entity type */
MQCHAR48  ObjectName;         /* Object name */
MQLONG    ObjectType;         /* Object type */
MQLONG    Authority;          /* Authority to be checked */
MQBYTE    ComponentData[n];   /* Component data */
MQLONG    Continuation;       /* Continuation indicator set by
                                 component */
MQLONG    CompCode;           /* Completion code */
MQLONG    Reason;             /* Reason code qualifying CompCode */
```

MQZ_TERM_AUTHORITY - Terminate authorization service

This function is provided by an authorization service component, and is invoked by the queue manager when it no longer requires the services of this component. The function must perform any cleanup required by the component.

The function identifier for this function (for MQZEP) is MQZID_TERM_AUTHORITY.

Syntax

MQZ_TERM_AUTHORITY *(Hconfig, Options, QMgrName, ComponentData,*
CompCode, Reason)

Parameters

The MQZ_TERM_AUTHORITY call has the following parameters.

Hconfig (MQHCONFIG) - input
Configuration handle.

This handle represents the particular component being terminated.

Options (MQLONG) - input
Termination options.

It is one of the following:

MQZTO_PRIMARY
Primary termination.

MQZTO_SECONDARY
Secondary termination.

QMgrName (MQCHAR48) - input
Queue manager name.

The name of the queue manager calling the component. This name is padded with blanks to the full length of the parameter; the name is not terminated by a null character.

The queue manager name is passed to the component for information; the authorization service interface does not require the component to make use of it in any defined manner.

ComponentData (MQBYTE x ComponentDataLength) - input/output
Component data.

This data is kept by the queue manager on behalf of this particular component; any changes made to it by any of the functions provided by this component are preserved, and presented the next time one of this component's functions is called.

The length of this data area is passed by the queue manager in the **ComponentDataLength** parameter on the MQZ_INIT_AUTHORITY call.

When the MQZ_TERM_AUTHORITY call has completed, the queue manager discards this data.

CompCode (MQLONG) - output
Completion code.

It is one of the following:

MQCC_OK
Successful completion.

MQCC_FAILED
Call failed.

Reason (MQLONG) - output
Reason code qualifying *CompCode*.

If *CompCode* is MQCC_OK:

MQRC_NONE
(0, X'000') No reason to report.

If *CompCode* is MQCC_FAILED:

MQRC_SERVICE_NOT_AVAILABLE
(2285, X'8ED') Underlying service not available.

MQRC_TERMINATION_FAILED
(2287, X'8FF') Termination failed for an undefined reason.

For more information on these reason codes, see Messages and reason codes.

C invocation

```
MQZ_TERM_AUTHORITY (Hconfig, Options, QMgrName, ComponentData,
                    &CompCode, &Reason);
```

The parameters passed to the service are declared as follows:

```
MQHCONFIG  Hconfig;           /* Configuration handle */
MQLONG     Options;           /* Termination options */
MQCHAR48   QMgrName;          /* Queue manager name */
```

```
MQBYTE     ComponentData[n];  /* Component data */
MQLONG     CompCode;          /* Completion code */
MQLONG     Reason;            /* Reason code qualifying CompCode */
```

IBM i MQZAC (Application context) on IBM i

This parameter specifies data related to the calling application.

The MQZAC structure is used on the MQZ_AUTHENTICATE_USER call for the **ApplicationContext** parameter.

Fields

StrucId (MQCHAR4)
Structure identifier.

The value is:

MQZAC_STRUC_ID
Identifier for application context structure.

For the C programming language, the constant MQZAC_STRUC_ID_ARRAY is also defined; this has the same value as MQZAC_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the service.

Version (MQLONG
Structure version number.

The value is:

MQZAC_VERSION_1
Version-1 application context structure.

The following constant specifies the version number of the current version:

MQZAC_CURRENT_VERSION
Current version of application context structure.

This is an input field to the service.

ProcessId (MQPID)
Process identifier.

The process identifier of the application.

ThreadId (MQTID)
Thread identifier.

The thread identifier of the application.

ApplName (MQCHAR28)
Application name.

The application name.

UserID (MQCHAR12)
User identifier.

For IBM i systems the user profile that the application job was created under. (On IBM i, when a profile swap is done with the QWTSETP API in the application job, the current user profile is returned).

EffectiveUserID (MQCHAR12)
Effective user identifier.

For IBM i systems the application job's current user profile.

Environment (MQLONG)
Environment.

This field specifies the environment from which the call was made.

This can have one of the following values:

MQXE_COMMAND_SERVER
Command server.

MQXE_MQSC
`runmqsc` command interpreter.

MQXE_MCA
Message channel agent

MQXE_OTHER
Undefined environment

CallerType (MQLONG)
Caller Type.

This field specifies the type of program that made the call.

This can have one of the following values:

MQXACT_EXTERNAL
The call is external to the queue manager.

MQXACT_INTERNAL
The call is internal to the queue manager.

AuthenticationType (MQLONG)
Authentication Type.

This field specifies the type of authentication being performed.

This can have one of the following values:

MQZAT_INITIAL_CONTEXT
The authentication call is due to user context being initialized. This value is used during an `MQCONN` or `MQCONNX` call.

MQZAT_CHANGE_CONTEXT
The authentication call is due to the user context being changed. This value is used when the MCA changes the user context.

v

BindType (MQLONG
Bind Type.

This field specifies the type of binding in use.

This can have one of the following values:

MQCNO_FASTPATH_BINDING
Fastpath binding.

MQCNO_SHARED_BINDING
Shared binding.

MQCNO_ISOLATED_BINDING
Isolated binding.

C declaration

```
typedef struct tagMQZAC MQZAC;
struct tagMQZAC {
  MQCHAR4   StrucId;            /* Structure identifier */
  MQLONG    Version;            /* Structure version number */
  MQPID     ProcessId;          /* Process identifier */
  MQTID     ThreadId;           /* Thread identifier */
  MQCHAR28  ApplName;           /* Application name */
```

```
  MQCHAR12  UserID;             /* User identifier */
  MQCHAR12  EffectiveUserID;    /* Effective user identifier */
  MQLONG    Environment;        /* Environment */
  MQLONG    CallerType;         /* Caller type */
  MQLONG    AuthenticationType; /* Authentication type */
  MQLONG    BindType;           /* Bind type */
};
```

IBM i MQZAD (Authority data) on IBM i

The MQZAD structure is used on the MQZ_ENUMERATE_AUTHORITY_DATA call for two parameters.

See "MQZ_ENUMERATE_AUTHORITY_DATA (Enumerate authority data) on IBM i" on page 1682 for further information on the **Filter** and **AuthorityBuffer** parameters:

- MQZAD is used for the **Filter** parameter which is input to the call. This parameter specifies the selection criteria that are to be used to select the authority data returned by the call.
- MQZAD is also used for the **AuthorityBuffer** parameter which is output from the call. This parameter specifies the authorizations for one combination of profile name, object type, and entity.

Fields

StrucId (MQCHAR4)

Structure identifier.

The value is:

MQZAD_STRUC_ID

Identifier for authority data structure.

For the C programming language, the constant MQZAD_STRUC_ID_ARRAY is also defined; this has the same value as MQZAD_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the service.

Version (MQLONG)

Structure version number.

The value is:

MQZAD_VERSION_1

Version-1 authority data structure.

The following constant specifies the version number of the current version:

MQZAD_CURRENT_VERSION

Current version of authority data structure.

This is an input field to the service.

ProfileName (MQCHAR48)

Profile name.

For the **Filter** parameter, this field is the profile name from which authority data is required. If the name is entirely blank up to the end of the field or the first null character, authority data for all profile names is returned.

For the **AuthorityBuffer** parameter, this field is the name of a profile that matches the specified selection criteria.

ObjectType (MQLONG)

Object type.

For the **Filter** parameter, this field is the object type for which authority data is required. If the value is MQOT_ALL, authority data for all object types is returned.

For the **AuthorityBuffer** parameter, this field is the object type to which the profile identified by **ProfileName** applies.

The value is one of the following; for the **Filter** parameter, the value MQOT_ALL is also valid:

MQOT_AUTH_INFO
Authentication information.

MQOT_CHANNEL
Channel.

MQOT_CLNTCONN_CHANNEL
Client connection channel.

MQOT_LISTENER
Listener.

MQOT_NAMELIST
Namelist.

MQOT_PROCESS
Process definition.

MQOT_Q
Queue.

MQOT_Q_MGR
Queue manager.

MQOT_SERVICE
Service.

Authority (MQLONG)
Authority.

For the **Filter** parameter, this field is ignored.

For the **AuthorityBuffer** parameter, this field represents the authorizations that the entity has to the objects identified by **ProfileName** and **ObjectType**. If the entity has only one authority, the field is equal to the appropriate authorization value (MQZAO_* constant). If the entity has more than one authority, the field is the bitwise OR of the corresponding MQZAO_* constants.

EntityDataPtr (PMQZED)
Address of MQZED structure identifying an entity.

For the **Filter** parameter, this field points to an MQZED structure that identifies the entity from which authority data is required. If **EntityDataPtr** is the null pointer, authority data for all entities is returned.

For the **AuthorityBuffer** parameter, this field points to an MQZED structure that identifies the entity that the returned authority data came from.

EntityType (MQLONG)
Entity type.

For the **Filter** parameter, this field specifies the entity type for which authority data is required. If the value is MQZAET_NONE, authority data for all entity types is returned.

For the **AuthorityBuffer** parameter, this field specifies the type of the entity identified by the MQZED structure pointed to by **EntityDataPtr**.

The value is one of the following; for the **Filter** parameter, the value MQZAET_NONE is also valid:

MQZAET_PRINCIPAL
Principal.

MQZAET_GROUP
Group.

Options (MQAUTHOPT)
Options.

This field specifies options that give control over the profiles that are displayed.

One of the following must be specified:

MQAUTHOPT_NAME_ALL_MATCHING
Displays all profiles

MQAUTHOPT_NAME_EXPLICIT
Displays profiles that have exactly the same name as specified in the **ProfileName** field.

In addition, one of the following must also be specified:

MQAUTHOPT_ENTITY_SET
Display all profiles used to calculate the cumulative authority that the entity has to the object specified by **ProfileName**. The **ProfileName** field must not contain any wildcard characters.

- If the specified entity is a principal, for each member of the set {entity, groups} the most applicable profile that applies to the object is displayed.
- If the specified entity is a group, the most applicable profile from the group that applies to the object is displayed.
- If this value is specified, then the values of **ProfileName**, **ObjectType**, **EntityType**, and the entity name specified in the **EntityDataPtr** MQZED structure, must all be non-blank.

If you have specified *MQAUTHOPT_NAME_ALL_MATCHING*, you can also specify the following:

MQAUTHOPT_ENTITY_EXPLICIT
Displays profiles that have exactly the same entity name as the entity name specified in the **EntityDataPtr** MQZED structure.

C declaration

```
typedef struct tagMQZAD MQZAD;
struct tagMQZAD {
  MQCHAR4   StrucId;        /* Structure identifier */
  MQLONG    Version;        /* Structure version number */
  MQCHAR48  ProfileName;    /* Profile name */
  MQLONG    ObjectType;     /* Object type */
  MQLONG    Authority;      /* Authority */
  PMQZED    EntityDataPtr;  /* Address of MQZED structure identifying an
                               entity */
  MQLONG    EntityType;     /* Entity type */
  MQAUTHOPT Options;        /* Options */
};
```

IBM i MQZED (Entity descriptor) on IBM i

The MQZED structure is used in a number of authorization service calls to specify the entity for which authorization is to be checked.

Fields

StrucId (MQCHAR4)
Structure identifier.

The value is:

MQZED_STRUC_ID
Identifier for entity descriptor structure.

For the C programming language, the constant MQZED_STRUC_ID_ARRAY is also defined; this has the same value as MQZED_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the service.

Version (MQLONG)
Structure version number.

The value is:

MQZED_VERSION_1
Version-1 entity descriptor structure.

The following constant specifies the version number of the current version:

MQZED_CURRENT_VERSION
Current version of entity descriptor structure.

This is an input field to the service.

EntityNamePtr (PMQCHAR)
Address of entity name.

This is a pointer to the name of the entity whose authorization is to be checked.

EntityDomainPtr (PMQCHAR)
Address of entity domain name.

This is a pointer to the name of the domain containing the definition of the entity whose authorization is to be checked.

SecurityId (MQBYTE40)
Security identifier.

This is the security identifier whose authorization is to be checked.

CorrelationPtr (MQPTR)
Correlation pointer.

This facilitates the passing of correlational data between the authenticate user function and other appropriate OAM functions.

C declaration

```
typedef struct tagMQZED MQZED;
struct tagMQZED {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  PMQCHAR   EntityNamePtr;    /* Address of entity name */
  PMQCHAR   EntityDomainPtr;  /* Address of entity domain name */
  MQBYTE40  SecurityId;       /* Security identifier */
  MQPTR     CorrelationPtr;   /* Address of correlation data */
```

IBM i MQZFP (Free parameters) on IBM i

This parameter specifies data related to resource to be freed.

The MQZFP structure is used on the MQZ_FREE_USER call for the **FreeParms** parameter.

Fields

StrucId (MQCHAR4)
Structure identifier.

The value is:

MQZFP_STRUC_ID
Identifier for free parameters structure.

For the C programming language, the constant MQZFP_STRUC_ID_ARRAY is also defined; this has the same value as MQZFP_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the service.

Version (MQLONG)
Structure version number.

The value is:

MQZFP_VERSION_1
Version-1 free parameters structure.

The following constant specifies the version number of the current version:

MQZFP_CURRENT_VERSION
Current version of free parameters structure.

This is an input field to the service.

Reserved (MQBYTE8)
Reserved field.

The initial value is null.

CorrelationPtr (MQPTR)
Correlation pointer.

Address of correlation data relating to the resource to be freed.

C declaration

```
typedef struct tagMQZFP MQZFP;
struct tagMQZFP {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQBYTE8   Reserved;         /* Reserved field */
  MQPTR     CorrelationPtr;   /* Address of correlation data */
};
```

IBM i MQZIC (Identity context) on IBM i

The MQZIC structure is used on the MQZ_AUTHENTICATE_USER call for the **IdentityContext** parameter.

The MQZIC structure contains identity context information, that identifies the user of the application that first put the message on a queue:

- The queue manager fills the UserIdentifier field with a name that identifies the user, the way that the queue manager can do this depends on the environment in which the application is running.
- The queue manager fills the AccountingToken field with a token or number that it determined from the application that put the message.
- Applications can use the ApplIdentityData field for any extra information that they want to include about the user (for example, an encrypted password).

Suitably authorized applications may set the identity context using the MQZ_AUTHENTICATE_USER function.

A Windows systems security identifier (SID) is stored in the AccountingToken field when a message is created under IBM MQ for Windows. The SID can be used to supplement the UserIdentifier field and to establish the credentials of a user.

Fields

StrucId (MQCHAR4)
Structure identifier.

The value is:

MQZIC_STRUC_ID
Identifier for identity context structure.

For the C programming language, the constant MQZIC_STRUC_ID_ARRAY is also defined; this has the same value as MQZIC_STRUC_ID, but is an array of characters instead of a string.

This is an input field to the service.

Version (MQLONG)
Structure version number.

The value is:

MQZIC_VERSION_1
Version-1 identity context structure.

The following constant specifies the version number of the current version:

MQZIC_CURRENT_VERSION
Current version of identity context structure.

This is an input field to the service.

UserIdentifier (MQCHAR12)
User identifier.

This is part of the **identity context** of the message.

UserIdentifier specifies the user identifier of the application that originated the message. The queue manager treats this information as character data, but does not define the format of it. For more information on the *UserIdentifier* field, see "UserIdentifier (MQCHAR12)" on page 449.

AccountingToken (MQBYTE32)
Accounting token.

This is part of the **identity context** of the message.

AccountingToken allows an application to cause work done as a result of the message to be appropriately charged. The queue manager treats this information as a string of bits and does not check its content. For more information on the *AccountingToken* field, see "AccountingToken (MQBYTE32)" on page 450.

ApplIdentityData (MQCHAR32)
Application data relating to identity.

This is part of the **identity context** of the message.

ApplIdentityData is information that is defined by the application suite that can be used to provide additional information about the origin of the message. For example, it could be set by applications running with suitable user authority to indicate whether the identity data is trusted. For more information on the *ApplIdentityData* field, see "ApplIdentityData (MQCHAR32)" on page 452.

C declaration

```
typedef struct tagMQZED MQZED;
struct tagMQZED {
  MQCHAR4   StrucId;          /* Structure identifier */
  MQLONG    Version;          /* Structure version number */
  MQCHAR12  UserIdentifier;   /* User identifier */
  MQBYTE32  AccountingToken;  /* Accounting token */
  MQCHAR32  ApplIdentityData; /* Application data relating to identity */
};
```

The IBM MQ .NET classes and interfaces

IBM MQ .NET classes and interfaces are listed alphabetically. The properties, methods and constructors are described.

MQAsyncStatus.NET class

Use MQAsyncStatus to inquire on the status of previous MQI activity; for example inquiring on the success of previous asynchronous put operations. MQAsyncStatus encapsulates features of the MQSTS data structure.

Class

```
System.Object
    │
    └─ IBM.WMQ.MQBase
           │
           └─ IBM.WMQ.MQBaseObject
                  │
                  └─ IBM.WMQ.MQAsyncStatus
```

```
public class IBM.WMQ.MQAsyncStatus extends IBM.WMQ.MQBaseObject;
```


- “Properties” on page 1708
- “Constructors” on page 1709

Properties

Test for MQException being thrown when getting properties.

public static int CompCode {get;}

The completion code from the first error or warning.

public static int Reason {get;}

The reason code from the first error or warning.

public static int PutSuccessCount {get;}

The number of successful asynchronous MQI put calls.

public static int PutWarningCount {get;}

The number of asynchronous MQI put calls that succeeded with a warning.

public static int PutFailureCount {get;}

The number of failed asynchronous MQI put calls.

public static int ObjectType {get;}

The object type for the first error. The following values are possible:

- MQC.MQOT_ALIAS_Q
- MQC.MQOT_LOCAL_Q
- MQC.MQOT_MODEL_Q
- MQC.MQOT_Q
- MQC.MQOT_REMOTE_Q
- MQC.MQOT_TOPIC
- 0, meaning that no object is returned

public static string ObjectName {get;}

The object name.

public static string ObjectQMgrName {get;}

The object queue manager name.

public static string ResolvedObjectName {get;}

The resolved object name.

public static string ResolvedObjectQMgrName {get;}

The resolved object queue manager name.

Constructors

public MQAsyncStatus() throws MQException;

Constructor method, constructs an object with fields initialized to zero or blank as appropriate.

MQAuthenticationInformationRecord.NET class

Use `MQAuthenticationInformationRecord` to specify information about an authenticator that is to be used in an IBM MQ TLS client connection. `MQAuthenticationInformationRecord` encapsulates an authentication information record, `MQAIR`.

Class

```
System.Object
    │
    └─ IBM.WMQ.MQAuthenticationInformationRecord
```

`public class IBM.WMQ.MQAuthenticationInformationRecord extends System.Object;`

- “Properties” on page 1709
- “Constructors” on page 1710

Properties

Test for `MQException` being thrown when getting properties.

public long Version {get; set;}

Structure version number.

public long AuthInfoType {get; set;}

The type of authentication information. This attribute must be set to one of the following values:

- `OCSP` - Certificate revocation status checking is done using OCSP.
- `CRLLDAP` - Certificate revocation status checking is done using Certificate Revocation Lists on LDAP servers.

public string AuthInfoConnName {get; set;}

The DNS name or IP address of the host on which the LDAP server is running, with an optional port number. This keyword is required.

public string LDAPPassword {get; set;}

The password associated with the distinguished name of the user who is accessing the LDAP server. This property applies only when **AuthInfoType** is set to `CRLLDAP`.

public string LDAPUserName {get; set;}

The distinguished name of the user who is accessing the LDAP server. When you set this property, `LDAPUserNameLength` and `LDAPUserNamePtr` are automatically set correctly. This property applies only when `AuthInfoType` is set to `CRLLDAP`.

public string OCSPResponderURL {get; set;}

The URL at which the OCSP responder can be contacted. This property applies only when `AuthInfoType` is set to `OCSP`

This field is case sensitive. It must start with the string http:// in lowercase. The rest of the URL might be case sensitive, depending on the OCSP server implementation.

Constructors

MQAuthenticationInformationRecord();

MQDestination.NET class

Use `MQDestination` to access methods that are common to `MQQueue` and `MQTopic`. `MQDestination` is an abstract base class and cannot be instantiated.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQManagedObject
                                │
                                └─ IBM.WMQ.MQDestination
                                        │
                                        └─ IBM.WMQ.MQQueue
                                        │
                                        └─ IBM.WMQ.MQTopic
```

```
public class IBM.WMQ.MQDestination extends IBM.WMQ.MQManagedObject;
```


- "Properties" on page 1710
- "Methods" on page 1711
- "Constructors" on page 1712

Properties

Test for `MQException` being thrown when getting properties.

public DateTime CreationDateTime {get;}

The date and time that the queue or topic was created. Originally contained within `MQQueue`, this property has been moved into the base `MQDestination` class.

There is no default value.

public int DestinationType {get;}

Integer value describing the type of destination being used. Initialized from the sub classes constructor, `MQQueue` or `MQTopic`, this value can take one of these values:

- `MQOT_Q`
- `MQOT_TOPIC`

There is no default value.

Methods

public void Get(MQMessage *message*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*, int *MaxMsgSize*);

Throws MQException.

Gets a message from a queue if the destination is an MQQueue object or from a topic if the destination is an MQTopic object, using a default instance of MQGetMessageOptions to do the get.

If the get fails, the MQMessage object is unchanged. If it succeeds, the message descriptor and message data portions of the MQMessage are replaced with the message descriptor and message data from the incoming message.

All calls to IBM MQ from a particular MQQueueManager are synchronous. Therefore, if you perform a get with wait, all other threads using the same MQQueueManager are blocked from making further IBM MQ calls until the Get call is accomplished. If you need multiple threads to access IBM MQ simultaneously, each thread must create its own MQQueueManager object.

message
Contains the message descriptor and the returned message data. Some of the fields in the message descriptor are input parameters. It is important to ensure that the MessageId and CorrelationId input parameters are set as required.

A reconnectable client returns the reason code MQRC_BACKED_OUT after successful reconnection, for messages received under MQGM_SYNCPOINT.

getMessageOptions
Options controlling the action of the get.

Using option MQC.MQGMO_CONVERT might result in an exception with reason code MQC.MQRC_CONVERTED_STRING_TOO_BIG when converting from single-byte character codes to double byte codes. In this case, the message is copied into the buffer without conversion.

If *getMessageOptions* is not specified, the message option used is MQGMO_NOWAIT.

If you use the MQGMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

MaxMsgSize
The largest message this message object is to receive. If the message on the queue is larger than this size, one of two things occurs:

- If the MQGMO_ACCEPT_TRUNCATED_MSG flag is set in the MQGetMessageOptions object, the message is filled with as much of the message data as possible. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_ACCEPTED reason code.
- If the MQGMO_ACCEPT_TRUNCATED_MSG flag is not set, the message remains on the queue. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_FAILED reason code.

If *MaxMsgSize* is not specified, the whole message is retrieved.

public void Put(MQMessage *message*);
public void Put(MQMessage *message*, MQPutMessageOptions *putMessageOptions*);

Throws MQException.

Puts a message to a queue if the destination is an MQQueue object or publishes a message to a topic if the destination is an MQTopic object.

Modifications to the MQMessage object after the Put call has been accomplished do not affect the actual message on the IBM MQ queue or publication topic.

Put updates the MessageId and CorrelationId properties of the MQMessage object and does not clear message data. Further Put or Get calls refer to the updated information in the MQMessage object. For example, in the following code snippet, the first message contains a and the second ab.

```
msg.WriteString("a");
q.Put(msg,pmo);
msg.WriteString("b");
q.Put(msg,pmo);
```

message

An MQMessage object containing the message descriptor data, and message to be sent. The message descriptor can be altered as a consequence of this method. The values in the message descriptor immediately after the completion of this method are the values that were put to the queue or published to the topic.

The following reason codes are returned to a reconnectable client:

- MQRC_CALL_INTERRUPTED if the connection is broken while running a Put call on a persistent message and the reconnection is successful.
- MQRC_NONE if the connection is successful while running a Put call on a non-persistent message (see Application Recovery).

putMessageOptions

Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of MQPutMessageOptons is used.

If you use the MQPMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

Note: For simplicity and performance, if you want to put a single message to a queue, use MQQueueManager.Put object. You should have an MQQueue object for this.

Constructors

MQDestination is an abstract base class and cannot be instantiated. Access destinations using MQQueue and MQTopic constructors, or using MQQueueManager.AccessQueue and MQQueueManager.AccessTopic methods.

MQEnvironment.NET class

Use MQEnvironment to control how the MQQueueManager constructor is called and to select an IBM MQ MQI client connection. The MQEnvironment class contains properties that control the behavior of the IBM MQ.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQEnvironment
```

public class IBM.WMQ.MQEnvironment extends System.Object;

- “Properties - client only” on page 1712
- “Properties” on page 1713
- “Constructors” on page 1714

Properties - client only

Test for MQException being thrown when getting properties.

public static int CertificateValPolicy {get; set;}

Set which TLS certificate validation policy is used to validate digital certificates received from remote partner systems. Valid values are:

- MQC.CERTIFICATE_VALIDATION_POLICY_ANY
- MQC.CERTIFICATE_VALIDATION_POLICY_RFC5280

public static ArrayList EncryptionPolicySuiteB {get; set;}

Set the level of Suite B compliant cryptography. Valid values are:

- MQC.MQ_SUITE_B_NONE - This is the default value.
- MQC.MQ_SUITE_B_128_BIT
- MQC.MQ_SUITE_B_192_BIT

public static string Channel {get; set;}

The name of the channel to connect to the target queue manager. You must set the channel property before instantiating an `MQQueueManager` instance in client mode.

public static int FipsRequired {get; set;}

Specify `MQC.MQSSL_FIPS_YES` to use only FIPS-certified algorithms if cryptography is carried out in IBM MQ. The default is `MQC.MQSSL_FIPS_NO`.

If cryptographic hardware is configured, the cryptographic modules used are those provided by the hardware product. Depending on the hardware in use, these might not be FIPS-certified to a particular level.

public static string Hostname {get; set;}

The TCP/IP host name of the computer on which the IBM MQ server resides. If the host name is not set, and no overriding properties are set, server bindings mode is used to connect to the local queue manager.

public static int Port {get; set;}

The port to connect to. This is the port on which the IBM MQ server is listening for incoming connection requests. The default value is 1414.

public static string SSLCipherSpec {get; set;}

Set `SSLCipherSpec` to the value of the CipherSpec set on the SVRCONN channel to enable TLS for the connection. The default is Null, and TLS is not enabled for the connection.

public static string sslPeerName {get; set;}

A distinguished name pattern. If `sslCipherSpec` is set, this variable can be used to ensure that the correct queue manager is used. If set to null (default), the DN of the queue manager is not performed. `sslPeerName` is ignored if `sslCipherSpec` is null.

Properties

Test for `MQException` being thrown when getting properties.

public static ArrayList HdrCompList {get; set;}

Header Data Compression List

public static int KeyResetCount {get; set;}

Indicates the number of unencrypted bytes sent and received within an TLS conversation before the secret key is renegotiated.

public static ArrayList MQAIRArray {get; set;}

An array of `MQAuthenticationInformationRecord` objects.

public static ArrayList MsgCompList {get; set;}

Message Data Compression List

public static string Password {get; set;}
The password to be authenticated. The password referenced from the MQCSP structure gets populated by setting this Password property.

public static string ReceiveExit {get; set;}
A receive exit allows you to examine and alter data received from a queue manager. It is normally used with a corresponding send exit at the queue manager. If ReceiveExit is set to null, no receive exit is called.

public static string ReceiveUserData {get; set;}
The user data associated with a receive exit. Limited to 32 characters.

public static string SecurityExit {get; set;}
A security exit allows you to customize the security flows that occur when an attempt is made to connect to a queue manager. If `SecurityExit` is set to null, no security exit is called.

public static string SecurityUserData {get; set;}
The user data associated with a security exit. Limited to 32 characters.

public static string SendExit {get; set;}
A send exit allows you to examine or alter the data sent to a queue manager. It is normally used with a corresponding receive exit at the queue manager. If `SendExit` is set to null, no send exit is called.

public static string SendUserData {get; set;}
The user data associated with a send exit. Limited to 32 characters.

public static string SharingConversations {get; set;}

The `SharingConversations` field is used on connections from .NET applications, when these applications are not using a client channel definition table (CCDT).

`SharingConversations` determines the maximum number of conversations that can be shared on a socket associated with this connection.

A value of 0 means that the channel operates as it did before IBM WebSphere MQ 7.0, with regard to conversation sharing, read ahead, and heartbeat.

The field is passed in the hash table of properties as a `SHARING_CONVERSATIONS_PROPERTY`, when instantiating an IBM MQ queue manager.

If you do not specify `SharingConversations`, a default value of 10 is used.

public static string SSLCryptoHardware {get; set;}

Sets the name of the parameter string required to configure the cryptographic hardware present on the system. `SSLCryptoHardware` is ignored if `sslCipherSpec` is null.

public static string SSLKeyRepository {get; set;}

Set the fully qualified file name of the key repository.

If `SSLKeyRepository` is set to null (default), the certificate MQSSLKEYR environment variable is used to locate the key repository. `SSLCryptoHardware` is ignored if `sslCipherSpec` is null.

Note: The `.kdb` extension is a mandatory part of the file name, but is not included as part of the value of the parameter. The directory you specify must exist. IBM MQ creates the file the first time it accesses the new key repository, unless the file already exists.

public static string UserId {get; set;}

The user ID to be authenticated. The user ID referenced from the MQCSP structure gets populated by setting `UserId`. Authenticate `UserId` using an API or Security exit.

Constructors

public MQEnvironment()

MQException.NET class

Use `MQException` to find out the completion and reason code of a failed IBM MQ function. An `MQException` is thrown whenever an IBM MQ error occurs.

Class

```
System.Object
        │
        └─ System.Exception
                │
                └─ System.ApplicationException
                        │
                        └─ IBM.WMQ.MQException
```

```
public class IBM.WMQ.MQException extends System.ApplicationException;
```


- "Properties" on page 1715
- "Constructors" on page 1715

Properties

public int CompletionCode {get; set;}
The IBM MQ completion code associated with the error. The possible values are:

- `MQException.MQCC_OK`
- `MQException.MQCC_WARNING`
- `MQException.MQCC_FAILED`

public int ReasonCode {get; set;}
IBM MQ reason code describing the error.

Constructors

public MQException(int *completionCode*, int *reasonCode*)

completionCode
The IBM MQ completion code.

reasonCode
The IBM MQ completion code.

MQGetMessageOptions.NET class

Use `MQGetMessageOptions` to specify how messages are retrieved. It modifies the behavior of `MQDestination.Get`.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQGetMessageOptions
```

```
public class IBM.WMQ.MQGetMessageOptions extends IBM.WMQ.MQBaseObject;
```


- "Properties" on page 1716
- "Constructors" on page 1718

Properties

Note: The behavior of some of the options available in this class depends on the environment in which they are used. These elements are marked with an asterisk *.

Test for `MQException` being thrown when getting properties.

`public int GroupStatus {get;}*`

`GroupStatus` indicates whether the retrieved message is in a group and if it is the last in the group. Possible values are:

`MQC.MQGS_LAST_MSG_IN_GROUP`
Message is the last or only message in the group.

`MQC.MQGS_MSG_IN_GROUP`
Message is in a group, but is not the last in the group.

`MQC.MQGS_NOT_IN_GROUP`
Message is not in a group.

`public int MatchOptions {get; set;}*`

`MatchOptions` determines how a message is selected. The following match options can be set:

`MQC.MQMO_MATCH_CORREL_ID`
Correlation ID to be matched.

`MQC.MQMO_MATCH_GROUP_ID`
Group ID to be matched.

`MQC.MQMO_MATCH_MSG_ID`
Message ID to be matched.

`MQC.MQMO_MATCH_MSG_SEQ_NUMBER`
Match message sequence number.

`MQC.MQMO_NONE`
No matching required.

`public int Options {get; set;}`

`Options` control the action of `MQQueue.get`. Any of the following values can be specified. If more than one option is required, the values can be added, or combined using the bitwise OR operator.

`MQC.MQGMO_ACCEPT_TRUNCATED_MSG`
Allow truncation of message data.

`MQC.MQGMO_ALL_MSGS_AVAILABLE*`
Retrieve messages from a group only when all the messages in the group are available.

`MQC.MQGMO_ALL_SEGMENTS_AVAILABLE*`
Retrieve the segments of a logical message only when all the segments in the group are available.

`MQC.MQGMO_BROWSE_FIRST`
Browse from start of queue.

`MQC.MQGMO_BROWSE_MSG_UNDER_CURSOR*`
Browse message under browse cursor.

`MQC.MQGMO_BROWSE_NEXT`
Browse from the current position in the queue.

`MQC.MQGMO_COMPLETE_MSG*`
Retrieve only complete logical messages.

`MQC.MQGMO_CONVERT`
Request the application data to be converted, to conform to the `CharacterSet` and `Encoding` attributes of the `MQMessage`, before the data is copied into the message buffer. Because data conversion is also applied when the data is retrieved from the message buffer, applications do not set this option.

Using this option can cause problems when converting from single-byte character sets to double-byte character sets. Instead, do the conversion using the `readString`, `readLine`, and `writeString` methods after the message has been delivered.

MQC.MQGMO_FAIL_IF_QUIESCING
Fail if the queue manager is quiescing.

MQC.MQGMO_LOCK*
Lock the message that is browsed.

MQC.MQGMO_LOGICAL_ORDER*
Return messages in groups, and segments of logical messages, in logical order.

If you use the `MQGMO_LOGICAL_ORDER` option in a reconnectable client, the `MQRC_RECONNECT_INCOMPATIBLE` reason code is returned to the application.

MQC.MQGMO_MARK_SKIP_BACKOUT*
Allow a unit of work to be backed out without reinstating the message on the queue.

MQC.MQGMO_MSG_UNDER_CURSOR
Get message under browse cursor.

MQC.MQGMO_NONE
No other options have been specified; all options assume their default values.

MQC.MQGMO_NO_PROPERTIES
No properties of the message, except properties contained in the message descriptor (or extension) are retrieved.

MQC.MQGMO_NO_SYNCPOINT
Get message without sync point control.

MQC.MQGMO_NO_WAIT
Return immediately if there is no suitable message.

MQC.MQGMO_PROPERTIES_AS_Q_DEF
Retrieve message properties as defined by the `PropertyControl` attribute of `MQQueue`. Access to the message properties in the message descriptor, or extension, are not affected by the `PropertyControl` attribute.

MQC.MQGMO_PROPERTIES_COMPATIBILITY
Retrieve message properties with a prefix of `mcd`, `jms`, `usr`, or `mqext`, in `MQRFH2` headers. Other properties of the message, except properties contained in the message descriptor, or extension, are discarded.

MQC.MQGMO_PROPERTIES_FORCE_MQRFH2
Retrieve message properties, except properties contained in the message descriptor, or extension, in `MQRFH2` headers. Use `MQC.MQGMO_PROPERTIES_FORCE_MQRFH2` in applications that are expecting to retrieve properties but cannot be changed to use message handles.

MQC.MQGMO_PROPERTIES_IN_HANDLE
Retrieve message properties using a `MsgHandle`.

MQC.MQGMO_SYNCPOINT
Get the message under sync point control. The message is marked as being unavailable to other applications, but it is deleted from the queue only when the unit of work is committed. The message is made available again if the unit of work is backed out.

MQC.MQGMO_SYNCPOINT_IF_PERSISTENT*
Get message with sync point control if message is persistent.

MQC.MQGMO_UNLOCK*
Unlock a previously locked message.

MQC.MQGMO_WAIT
Wait for a message to arrive.

public string ResolvedQueueName {get;}
The queue manager sets ResolvedQueueName to the local name of the queue from which the message was retrieved. ResolvedQueueName is different from the name used to open the queue if an alias queue or model queue was opened.

public char Segmentation {get;}*
Segmentation indicates whether you can allow segmentation for the retrieved message. Possible values are:

MQC.MQSEG_INHIBITED
Do not allow segmentation.

MQC.MQSEG_ALLOWED
Allow segmentation

public byte SegmentStatus {get;}*
SegmentStatus is an output field that indicates whether the retrieved message is a segment of a logical message. If the message is a segment, the flag indicates whether it is the last segment. Possible values are:

MQC.MQSS_LAST_SEGMENT
Message is the last or only segment of the logical message.

MQC.MQSS_NOT_A_SEGMENT
Message is not a segment.

MQC.MQSS_SEGMENT
Message is a segment, but is not the last segment of the logical message.

public int WaitInterval {get; set;}
WaitInterval is the maximum time in milliseconds that an MQQueue.get call waits for a suitable message to arrive. Use WaitInterval with MQC.MQGMO_WAIT. Set a value of MQC.MQWI_UNLIMITED to wait an unlimited time for a message.

Constructors

public MQGetMessageOptions()
Construct a new MQGetMessageOptions object with Options set to MQC.MQGMO_NO_WAIT, WaitInterval set to zero, and ResolvedQueueName set to blank.

MQManagedObject.NET class

Use MQManagedObject to inquire and set attributes of MQDestination, MQProcess, MQQueueManager, and MQSubscription. MQManagedObject is a superclass of these classes.

Classes

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQManagedObject
                                │
                                └─ IBM.WMQ.MQProcess
                                │
                                └─ IBM.WMQ.MQQueueManager
                                │
                                └─ IBM.WMQ.MQSubscription
                                │
                                └─ IBM.WMQ.MQDestination
```

```
public class IBM.WMQ.MQManagedObject extends IBM.WMQ.MQBaseObject;
```

• "Properties" on page 1719

- “Methods” on page 1719
- “Constructors” on page 1721

Properties

Test for MQException being thrown when getting properties.

public string AlternateUserId {get; set;}
The alternate user ID, if any, set when the resource was opened. AlternateUserID.set is ignored when issued for an object that is opened. AlternateUserId is not valid for subscriptions.

public int CloseOptions {get; set;}

Set this attribute to control the way the resource is closed. The default value is MQC.MQCO_NONE. MQC.MQCO_NONE s the only permissible value for all resources other than permanent dynamic queues, temporary dynamic queues, subscriptions, and topics that are being accessed by the objects that created them.

For queues and topics, the following additional values are permissible:

MQC.MQCO_DELETE
Delete the queue if there are no messages.

MQC.MQCO_DELETE_PURGE
Delete the queue, purging any messages on it.

MQC.MQCO_QUIESCE
Request the queue be closed, receiving a warning if any messages remain (allowing them to be retrieved before final closing).

For subscriptions, the following additional values are permissible:

MQC.MQCO_KEEP_SUB
The subscription is not deleted. This option is valid only if the original subscription is durable. MQC.MQCO_KEEP_SUB is the default value for a durable topic.

MQC.MQCO_REMOVE_SUB
The subscription is deleted. MQC.MQCO_REMOVE_SUB is the default value for a non-durable, unmanaged topic.

MQC.MQCO_PURGE_SUB
The subscription is deleted. MQC.MQCO_PURGE_SUB is the default value for a non-durable, managed topic.

public MQQueueManager ConnectionReference {get;}
The queue manager to which this resource belongs.

public string MQDescription {get;}
The description of the resource as held by the queue manager. MQDescription returns an empty string for subscriptions and topics.

public boolean IsOpen {get;}
Indicates whether the resource is currently open.

public string Name {get;}
The name of the resource. The name is either the supplied on the access method, or the allocated by the queue manager for a dynamic queue.

public int OpenOptions {get; set;}
OpenOptions are set when an IBM MQ object is opened. The OpenOptions.set method is ignored and does not cause an error. Subscriptions have no OpenOptions.

Methods

public virtual void Close();
Throws MQException.

Closes the object. No further operations against this resource are permitted after calling `Close`. To change the behavior of the `Close` method, set the `closeOptions` attribute.

`public string GetAttributeString(int` *`selector`*`, int` *`length`*`);`

Throws `MQException`.

Gets an attribute string.

selector
Integer indicating which attribute is being queried.

length
Integer indicating the length of the string required.

`public void Inquire(int[]` *`selectors`*`, int[]` *`intAttrs`*`, byte[]` *`charAttrs`*`);`

Throws `MQException`.

Returns an array of integers and a set of character strings containing the attributes of a queue, process, or queue manager. The attributes to be queried are specified in the selectors array.

Note: Many of the more common attributes can be queried using the `Get` methods defined in `MQManagedObject`, `MQQueue` and `MQQueueManager`.

selectors
Integer array identifying the attributes with values to be inquired on.

intAttrs
The array in which the integer attribute values are returned. Integer attribute values are returned in the same order as the integer attribute selectors in the selectors array.

charAttrs
The buffer in which the character attributes are returned, concatenated. Character attributes are returned in the same order as the character attribute selectors in the selectors array. The length of each attribute string is fixed for each attribute.

`public void Set(int[]` *`selectors`*`, int[]` *`intAttrs`*`, byte[]` *`charAttrs`*`);`

Throws `MQException`.

Sets the attributes defined in the vector of selectors. The attributes to be set are specified in the selectors array.

selectors
Integer array identifying the attributes with values to be set.

intAttrs
The array of integer attribute values to be set. These values must be in the same order as the integer attribute selectors in the selectors array.

charAttrs
The buffer in which the character attributes to be set are concatenated. These values must be in the same order as the character attribute selectors in the selectors array. The length of each character attribute is fixed.

`public void SetAttributeString(int` *`selector`*`, string` *`value`*`, int` *`length`*`);`

Throws `MQException`.

Sets an attribute string.

selector
Integer indicating which attribute is being set.

value
The string to set as the attribute value.

length
Integer indicating the length of the string required.

Constructors

protected MQManagedObject()
Constructor method. This object is an abstract base class which cannot be instantiated by itself.

MQMessage.NET class

Use MQMessage to access the message descriptor and data for an IBM MQ message. MQMessage encapsulates an IBM MQ message.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQMessage
```

```
public class IBM.WMQ.MQMessage extends IBM.WMQ.MQBaseObject;
```

Create an MQMessage object and then use the Read and Write methods to transfer data between the message and other objects in your application. Send and receive MQMessage objects using the Put and Get methods of the MQDestination, MQQueue and MQTopic classes.

Get and set the properties of the message descriptor using the properties of MQMessage. Set and Get extended message properties using the SetProperty and GetProperty methods.

- "Properties" on page 1721
- "Read and Write message methods" on page 1727
- "Buffer methods" on page 1730
- "Property methods" on page 1730
- "Constructors" on page 1733

Properties

Test for MQException being thrown when getting properties.

public string AccountingToken {get; set;}
Part of the identity context of the message; it helps an application to charge for work done as a result of the message. The default value is MQC.MQACT_NONE.

public string ApplicationIdData {get; set;}
Part of the identity context of the message. ApplicationIdData is information that is defined by the application suite, and can be used to provide additional information about the message or its originator. The default value is "".

public string ApplicationOriginData {get; set;}
Information defined by the application that can be used to provide additional information about the origin of the message. The default value is "".

public int BackoutCount {get;}
A count of the number of times the message has previously been returned and backed out by an MQQueue.Get call as part of a unit of work. The default value is zero.

public int CharacterSet {get; set;}

The coded character set identifier of character data in the message.

Set CharacterSet to identify the character set of character data in the message. Get CharacterSet to find out in what character set has been used to encode character data in the message.

.NET applications always run in Unicode, whereas in other environments applications run in the same character set as the queue manager is running under.

The `ReadString` and `ReadLine` methods convert the character data in the message to Unicode for you.

The `WriteString` method converts from Unicode to the character set encoded in `CharacterSet`. If `CharacterSet` is set to its default value, `MQC.MQCCSI_Q_MGR`, which is 0, no conversion takes place and `CharacterSet` is set to 1200. If you set `CharacterSet` to some other value, `WriteString` converts from Unicode to the alternate value.

Note: Other read and write methods do not use `CharacterSet`.

- `ReadChar` and `WriteChar` read and write a Unicode character to and from the message buffer without conversion.
- `ReadUTF` and `WriteUTF` convert between a Unicode string in the application, and a UTF-8 string, prefixed by a 2-byte length field, in the message buffer.
- Byte methods transfer bytes between the application and the message buffer without alteration.

`public byte[] CorrelationId {get; set;}`

- For an `MQQueue.Get` call, the correlation identifier of the message to be retrieved. The queue manager returns the first message with a message identifier and a correlation identifier that match the message descriptor fields. The default value, `MQC.MQCI_NONE`, helps any correlation identifier to match.
- For an `MQQueue.Put` call, the correlation identifier to set.

`public int DataLength {get;}`
The number of bytes of message data remaining to be read.

`public int DataOffset {get; set;}`
The current cursor position within the message data. Reads and writes take effect at the current position.

`public int Encoding {get; set;}`
The representation used for numeric values in the application message data. `Encoding` applies to binary, packed decimal, and floating point data. The behavior of the read and write methods for these numeric formats is altered accordingly. Construct a value for the encoding field by adding one value from each of these three sections. Alternatively, construct the value combining the values from each of the three sections using the bitwise OR operator.

1. Binary integer

   `MQC.MQENC_INTEGER_NORMAL`
   Big-endian integers.

   `MQC.MQENC_INTEGER_REVERSED`
   Little-endian integers, as used in Intel architecture.

2. Packed-decimal

   `MQC.MQENC_DECIMAL_NORMAL`
   Big-endian packed-decimal, as used by z/OS.

   `MQC.MQENC_DECIMAL_REVERSED`
   Little-endian packed-decimal.

3. Floating-point

   `MQC.MQENC_FLOAT_IEEE_NORMAL`
   Big-endian IEEE floats.

   `MQC.MQENC_FLOAT_IEEE_REVERSED`
   Little-endian IEEE floats, as used Intel architecture.

   `MQC.MQENC_FLOAT_S390`
   z/OS format floating points.

The default value is:

```
MQC.MQENC_INTEGER_REVERSED |
MQC.MQENC_DECIMAL_REVERSED |
MQC.MQENC_FLOAT_IEEE_REVERSED
```

The default setting causes `WriteInt` to write a little-endian integer, and `ReadInt` to read a little-endian integer. If you set the flag `MQC.MQENC_INTEGER_NORMAL` flag instead, `WriteInt` writes a big-endian integer, and `ReadInt` reads a big-endian integer.

Note: A loss in precision can occur when converting from IEEE format floating points to zSeries format floating points.

public int Expiry {get; set;}
An expiry time expressed in tenths of a second, set by the application that puts the message. After the expiry time of a message has elapsed, it is eligible to be discarded by the queue manager. If the message specified one of the `MQC.MQRO_EXPIRATION` flags, a report is generated when the message is discarded. The default value is `MQC.MQEI_UNLIMITED`, meaning that the message never expires.

public int Feedback {get; set;}
Use `Feedback` with a message of type `MQC.MQMT_REPORT` to indicate the nature of the report. The following feedback codes are defined by the system:

- `MQC.MQFB_EXPIRATION`
- `MQC.MQFB_COA`
- `MQC.MQFB_COD`
- `MQC.MQFB_QUIT`
- `MQC.MQFB_PAN`
- `MQC.MQFB_NAN`
- `MQC.MQFB_DATA_LENGTH_ZERO`
- `MQC.MQFB_DATA_LENGTH_NEGATIVE`
- `MQC.MQFB_DATA_LENGTH_TOO_BIG`
- `MQC.MQFB_BUFFER_OVERFLOW`
- `MQC.MQFB_LENGTH_OFF_BY_ONE`
- `MQC.MQFB_IIH_ERROR`

Application-defined feedback values in the range `MQC.MQFB_APPL_FIRST` to `MQC.MQFB_APPL_LAST` can also be used. The default value of this field is `MQC.MQFB_NONE`, indicating that no feedback is provided.

public string Format {get; set;}
A format name used by the sender of the message to indicate the nature of the data in the message to the receiver. You can use your own format names, but names beginning with the letters `MQ` have meanings that are defined by the queue manager. The queue manager built-in formats are:

MQC.MQFMT_ADMIN
Command server request/reply message.

MQC.MQFMT_COMMAND_1
Type 1 command reply message.

MQC.MQFMT_COMMAND_2
Type 2 command reply message.

MQC.MQFMT_DEAD_LETTER_HEADER
Dead-letter header.

MQC.MQFMT_EVENT
Event message.

MQC.MQFMT_NONE
No format name.

MQC.MQFMT_PCF
User-defined message in programmable command format.

MQC.MQFMT_STRING
Message consisting entirely of characters.

MQC.MQFMT_TRIGGER
Trigger message

MQC.MQFMT_XMIT_Q_HEADER
Transmission queue header.

The default value is MQC.MQFMT_NONE.

public byte[] GroupId {get; set;}
A byte string that identifies the message group to which the physical message belongs. The default value is MQC.MQGI_NONE.

public int MessageFlags {get; set;}
Flags controlling the segmentation and status of a message.

public byte[] MessageId {get; set;}

For an MQQueue.Get call, this field specifies the message identifier of the message to be retrieved. Normally, the queue manager returns the first message with a message identifier and correlation identifier that match the message descriptor fields. Allow any message identifier to match using the special value MQC.MQMI_NONE.

For an MQQueue.Put call, this field specifies the message identifier to use. If MQC.MQMI_NONE s specified, the queue manager generates a unique message identifier when the message is put. The value of this member variable is updated after the put, to indicate the message identifier that was used. The default value is MQC.MQMI_NONE.

public int MessageLength {get;}
The number of bytes of message data in the MQMessage object.

public int MessageSequenceNumber {get; set;}
The sequence number of a logical message within a group.

public int MessageType {get; set;}
Indicates the type of the message. The following values are currently defined by the system:

- MQC.MQMT_DATAGRAM
- MQC.MQMT_REPLY
- MQC.MQMT_REPORT
- MQC.MQMT_REQUEST

Application-defined values can also be used, in the range MQC.MQMT_APPL_FIRST to MQC.MQMT_APPL_LAST. The default value of this field is MQC.MQMT_DATAGRAM.

public int Offset {get; set;}
In a segmented message, the offset of data in a physical message from the start of a logical message.

public int OriginalLength {get; set;}
The original length of a segmented message.

public int Persistence {get; set;}

Message persistence. The following values are defined:

- MQC.MQPER_NOT_PERSISTENT

  If you set this option in a reconnectable client, the MQRC_NONE reason code is returned to the application when the connection is successful.

- MQC.MQPER_PERSISTENT

If you set this option in a reconnectable client, the MQRC_CALL_INTERRUPTED reason code is returned to the application after the connection is successful.

- MQC.MQPER_PERSISTENCE_AS_Q_DEF

The default value is MQC.MQPER_PERSISTENCE_AS_Q_DEF, which takes the persistence for the message from the default persistence attribute of the destination queue.

public int Priority {get; set;}
The message priority. The special value MQC.MQPRI_PRIORITY_AS_Q_DEF can also be set in outbound message. The priority for the message is then taken from the default priority attribute of the destination queue. The default value is MQC.MQPRI_PRIORITY_AS_Q_DEF.

public int PropertyValidation {get; set;}
Specifies whether validation of properties takes place when a property of the message is set. Possible values are:

- MQCMHO_DEFAULT_VALIDATION
- MQCMHO_VALIDATE
- MQCMHO_NO_VALIDATION

The default value is MQCMHO_DEFAULT_VALIDATION.

public string PutApplicationName {get; set;}
The name of the application that put the message. The default value is "".

public int PutApplicationType {get; set;}
The type of application that put the message. PutApplicationType can be a system-defined or user-defined value. The following values are defined by the system:

- MQC.MQAT_AIX
- MQC.MQAT_CICS
- MQC.MQAT_DOS
- MQC.MQAT_IMS
- MQC.MQAT_MVS
- MQC.MQAT_OS2
- MQC.MQAT_OS400
- MQC.MQAT_QMGR
- MQC.MQAT_UNIX
- MQC.MQAT_WINDOWS
- MQC.MQAT_JAVA

The default value is MQC.MQAT_NO_CONTEXT, which indicates that no context information is present in the message.

public DateTime PutDateTime {get; set;}
The time and date that the message was put.

public string ReplyToQueueManagerName {get; set;}
The name of the queue manager to send reply or report messages. The default value is "", and the queue manager provides the ReplyToQueueManagerName.

public string ReplyToQueueName {get; set;}
The name of the message queue to which the application that issued the get request for the message sends MQC.MQMT_REPLY and MQC.MQMT_REPORT messages. The default ReplyToQueueName is "".

public int Report {get; set;}
Use Report to specify options about report and reply messages:

- Whether reports are required.
- Whether the application message data is to be included in the reports.
- How to set the message and correlation identifiers in the report or reply.

Any combination of the four report types can be requested:

- Specify any combination of the four report types. Selecting any of the three options for each report type, depending on whether the application message data is to be included in the report message.
  1. Confirm on arrival
     - MQC.MQRO_COA
     - MQC.MQRO_COA_WITH_DATA
     - MQC.MQRO_COA_WITH_FULL_DATA **
  2. Confirm on delivery
     - MQC.MQRO_COD
     - MQC.MQRO_COD_WITH_DATA
     - MQC.MQRO_COD_WITH_FULL_DATA **
  3. Exception
     - MQC.MQRO_EXCEPTION
     - MQC.MQRO_EXCEPTION_WITH_DATA
     - MQC.MQRO_EXCEPTION_WITH_FULL_DATA **
  4. Expiration
     - MQC.MQRO_EXPIRATION
     - MQC.MQRO_EXPIRATION_WITH_DATA
     - MQC.MQRO_EXPIRATION_WITH_FULL_DATA **

  Note: Values marked with ** in the list are not supported by z/OS queue managers. Do not use them if your application is likely to access a z/OS queue manager, regardless of the platform on which the application is running.
- Specify one of the following to control how the message ID is generated for the report or reply message:
  - MQC.MQRO_NEW_MSG_ID
  - MQC.MQRO_PASS_MSG_ID
- Specify one of the following to control how the correlation ID of the report or reply message is to be set:
  - MQC.MQRO_COPY_MSG_ID_TO_CORREL_ID
  - MQC.MQRO_PASS_CORREL_ID
- Specify one of the following to control the disposition of the original message when it cannot be delivered to the destination queue:
  - MQC.MQRO_DEAD_LETTER_Q
  - MQC.MQRO_DISCARD_MSG **
- If no report options are specified, the default is:

```
MQC.MQRO_NEW_MSG_ID |
MQC.MQRO_COPY_MSG_ID_TO_CORREL_ID |
MQC.MQRO_DEAD_LETTER_Q
```

- You can specify one or both of the following to request that the receiving application sends a positive action or negative action report message.
  - MQC.MQRO_PAN
  - MQC.MQRO_NAN

public int TotalMessageLength {get;}
: The total number of bytes in the message as stored on the message queue from which this message was received.

public string UserId {get; set;}
: UserId is part of the identity context of the message. The queue manager generally provides the value. You can override the value if you have authority to set the identity context.

public int Version {get; set;}
: The version of the MQMD structure in use.

Read and Write message methods

The Read and Write methods perform the same functions as the members of the BinaryReader and BinaryWriter classes in the .NET System.IO namespace. See MSDN for the full language syntax and usage examples. The methods read or write from the current position in the message buffer. They move the current position forward by the number of bytes read or written.

Note: If the message data contains an MQRFH or MQRFH2 header, you must use the ReadBytes method to read the data.

- All the methods throw IOException.
- The ReadFully methods automatically resize the target byte or sbyte array to fit the message exactly. A null array is also resized.
- Read methods throw EndOfStreamException.
- WriteDecimal methods throw MQException.
- ReadString, ReadLine and WriteString methods convert between Unicode and the character set of the message; see CharacterSet.
- The Decimal methods read and write packed decimal numbers encoded either in big-endian, MQC.MQENC_DECIMAL_NORMAL, or little-endian MQC.MQENC_DECIMAL_REVERSE format, according to the value of Encoding. Decimal ranges and corresponding .NET types are as follows:

  Decimal2/short
  : -999 to 999

  Decimal4/int
  : -9999999 to 9999999

  Decimal8/long
  : -999999999999999 to 999999999999999
- The Double and Float methods read and write floating values encoded in IEE big-endian and little-endian formats, MQC.MQENC_FLOAT_IEEE_NORMAL and MQC.MQENC_FLOAT_IEEE_REVERSED, or in S/390 format, MQC.MQENC_FLOAT_S390, according to the value of Encoding.
- The Int methods read and write integer values encoded in big-endian, MQC.MQENC_INTEGER_NORMAL, or little-endian, MQC.MQENC_INTEGER_REVERSED, format, according to the value of Encoding. The integers are all signed, except for the addition of an unsigned 2-byte integer type. The integer sizes, and .NET and IBM MQ types are as follows:

  2 byte
  : short, Int2, ushort, UInt2

  4 byte
  : int, Int4

  8 byte
  : long, Int8
- WriteObject transfers the class of an object, the values of its non-transient and non-static fields, and the fields of its supertypes, to the message buffer.
- ReadObject creates an object from the class of the object, the signature of the class, and the values of its non-transient and non-static fields, and the fields of its supertypes.

Table 843. Read and Write message methods	
Target type	**Method signatures**

Boolean	`public bool ReadBoolean();`
	
	`public void WriteBoolean(bool value);`

Byte	`public byte ReadByte()`
	`public byte ReadUnsignedByte()`
	
	`public void Write(int value)`
	`public void WriteByte(int value)`
	`public void WriteByte(byte value)`
	`public void WriteByte(sbyte value)`

Bytes	`public byte[] ReadBytes(int count)`
	`public void ReadFully(ref byte[] value)`
	`public void ReadFully(ref sbyte[] value)`
	`public void ReadFully(ref byte[] value, int offset,int length)`
	`public void ReadFully(ref sbyte[] value, int offset,int length)`
	
	`public void Write(byte[] value)`
	`public void Write(sbyte[] value)`
	`public void Write(byte[] value, int offset,int length)`
	`public void Write(sbyte[] value, int offset,int length)`
	`public void WriteBytes(string value)`

Decimal2	`public void WriteDecimal2(short value)`
Decimal4	`public void WriteDecimal4(short value)`
Decimal8	`public void WriteDecimal8(short value)`

Double	`public double ReadDouble()`
	
	`public void WriteDouble(double value)`

Float	`public float ReadFloat()`
	
	`public void WriteFloat(float value)`

Int2	`public void WriteInt2(int value)`

Table 843. Read and Write message methods (continued)	
Target type	**Method signatures**

Int4	`public int readDecimal4()`
	`public int ReadInt()`
	`public int ReadInt4()`
	
	`public void WriteInt(int value)`
	`public void WriteInt4(int value)`

Int8	`public void WriteInt8(long value)`

Long	`public long ReadDecimal8()`
	`public long ReadLong()`
	`public long ReadInt8()`
	
	`public void WriteLong(long value)`

Object	`public Object ReadObject()`
	
	`public void WriteObject(Object object)`

Short	`public short ReadShort()`
	`public short ReadDecimal2()`
	`public short ReadInt2()`
	
	`public void WriteShort(int value)`

string	`public string ReadString(int length)`
	
	`public void WriteString(string string)`

Unsigned Short	`public ushort ReadUnsignedShort()` `public ushort ReadUInt2()`

Unicode	`public string ReadLine()`
	`public char ReadChar()`
	
	`public void WriteChar(int value)`
	`public void WriteChars(string string)`

Table 843. Read and Write message methods (continued)

Target type	Method signatures
UTF	`public string ReadUTF()` `public void WriteUTF(string string)`

Buffer methods

public void ClearMessage();

Throws IOException.

Discards any data in the message buffer and sets the data offset back to zero.

public void ResizeBuffer(int *size*)

Throws IOException.

A hint to the MQMessage object about the size of buffer that might be required for subsequent get operations. If the message currently contains message data, and the new size is less than the current size, the message data is truncated.

public void Seek(int *pos*)

Throws IOException, ArgumentOutOfRangeException, ArgumentException.

Moves the cursor to the absolute position in the message buffer given by *pos*. Subsequent reads and writes act at this position in the buffer.

public int SkipBytes(int *i*)

Throws IOException, EndOfStreamException.

Moves forward n bytes in the message buffer and returns n, the number of bytes skipped.

SkipBytes method blocks until one of the following events occurs:

- All the bytes are skipped
- The end of message buffer is detected
- An exception is thrown

Property methods

public void DeleteProperty(string *name*);

Throws MQException.

Deletes a property with the specified name from the message.

name
The name of the property to delete.

public System.Collections.IEnumerator GetPropertyNames(string *name*)

Throws MQException.

Returns an IEnumerator of all the property names matching the specified name. The percent sign '%' can be used at the end of the name as a wildcard character to filter the properties of the message, matching on zero, or more characters, including the period.

name
The name of the property to match on.

SetProperty and GetProperty methods

All the SetProperty and GetProperty methods throw MQException.

The SetProperty method of MQMessage .NET class adds a new property if a property does not exist already. However, if the property already exists, then the supplied property value is added to the end of the list. When multiple values are set to a property name using SetProperty, calling GetProperty for that name returns those values sequentially in the order that those values were set.

The behavior is same for all the Set*Property and Get*Property typed methods such as GetLongProperty, SetLongProperty, GetBooleanProperty, SetBooleanProperty, GetStringProperty, and SetStringProperty.

Table 844. SetProperty and GetProperty methods

Type	Method signatures

Boolean	`public boolean GetBooleanProperty(string name);`
	`public boolean GetBooleanProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetBooleanProperty(string name, boolean value);`
	`public void SetBooleanProperty(string name, MQPropertyDescriptor pd, boolean value);`

Byte	`public sbyte GetByteProperty(string name);`
	`public sbyte GetByteProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetByteProperty(string name, sbyte value);`
	`public void SetByteProperty(string name, MQPropertyDescriptor pd, sbyte value);`

Bytes	`public sbyte[] GetBytesProperty(string name);`
	`public sbyte[] GetBytesProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetBytesProperty(string name, sbyte[] value);`
	`public void SetBytesProperty(string name, MQPropertyDescriptor pd, sbyte[] value);`

Double	`public double GetDoubleProperty(string name);`
	`public double GetDoubleProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetDoubleProperty(string name, double value);`
	`public void SetDoubleProperty(string name, MQPropertyDescriptor pd, double value);`

Float	`public float GetFloatProperty(string name);`
	`public float GetFloatProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetFloatProperty(string name, float value);`
	`public void SetFloatProperty(string name, MQPropertyDescriptor pd, float value);`

Table 844. *SetProperty* and *GetProperty* methods (continued)

Type	Method signatures

Int2	`public short GetInt2Property(string name);`
	`public short GetInt2Property(string name, MQPropertyDescriptor pd);`
	
	`public void SetInt2Property(string name, short value);`
	`public void SetInt2Property(string name, MQPropertyDescriptor pd, short value);`

Int4	`public int GetInt4Property(string name);`
	`public int GetInt4Property(string name, MQPropertyDescriptor pd);`
	
	`public void SetInt4Property(string name, int value);`
	`public void SetInt4Property(string name, MQPropertyDescriptor pd, int value);`

Int8	`public long GetInt8Property(string name);`
	`public long GetInt8Property(string name, MQPropertyDescriptor pd);`
	
	`public void SetInt8Property(string name, long value);`
	`public void SetInt8Property(string name, MQPropertyDescriptor pd, long value);`

Long	`public long GetLongProperty(string name);`
	`public long GetLongProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetLongProperty(string name, long value);`
	`public void SetLongProperty(string name, MQPropertyDescriptor pd, long value);`

Object	`public Object GetObjectProperty(string name);`
	`public Object GetObjectProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetObjectProperty(string name, Object value);`
	`public void SetObjectProperty(string name, MQPropertyDescriptor pd, Object value);`

Short	`public short GetShortProperty(string name);`
	`public short GetShortProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetShortProperty(string name, short value);`
	`public void SetShortProperty(string name, MQPropertyDescriptor pd, short value);`

string	`public string GetStringProperty(string name);`
	`public string GetStringProperty(string name, MQPropertyDescriptor pd);`
	
	`public void SetStringProperty(string name, string value);`
	`public void SetStringProperty(string name, MQPropertyDescriptor pd, string value);`

Constructors

public MQMessage();

Creates an MQMessage object with default message descriptor information and an empty message buffer.

MQProcess.NET class

Use MQProcess to query the attributes of an IBM MQ process. Create an MQProcess object using a constructor, or an MQQueueManager AccessProcess method.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQManagedObject
                                │
                                └─ IBM.WMQ.MQProcess
```

```
public class IBM.WMQ.MQProcess extends IBM.WMQ.MQManagedObject;
```


- “Properties” on page 1733
- “Constructors” on page 1734

Properties

Test for MQException being thrown when getting properties.

public string ApplicationId {get;}

Gets the character string that identifies the application to be started. ApplicationId is used by a trigger monitor application. ApplicationId is sent to the initiation queue as part of the trigger message.

The default value is null.

public int ApplicationType {get;}

Identifies the type of the process to be started by a trigger monitor application. Standard types are defined, but others can be used:

- MQAT_AIX
- MQAT_CICS
- MQAT_IMS
- MQAT_MVS
- MQAT_NATIVE
- MQAT_OS400
- MQAT_UNIX
- MQAT_WINDOWS
- MQAT_JAVA
- MQAT_USER_FIRST
- MQAT_USER_LAST

The default value is MQAT_NATIVE.

public string EnvironmentData {get;}

Gets information about the environment of the application that is to be started.

The default value is null.

public string UserData {get;}

Gets information the user has provided about the application to be started.

The default value is null.

Constructors

public MQProcess(MQQueueManager *queueManager*, string *processName*, int *openOptions*);
public MQProcess(MQQueueManager *qMgr*, string *processName*, int *openOptions*, string *queueManagerName*, string *alternateUserId*);

Throws `MQException`.

Access an IBM MQ process on queue manager *qMgr* to inquire on process attributes.

qMgr
Queue manager to access.

processName
The name of the process to open.

openOptions
Options that control the opening of the process. The valid options that can be added, or combined using a bitwise OR, are:

- `MQC.MQOO_FAIL_IF_QUIESCING`
- `MQC.MQOO_INQUIRE`
- `MQC.MQOO_SET`
- `MQC.MQOO_ALTERNATE_USER_AUTHORITY`

queueManagerName
The name of the queue manager on which the process is defined. You can leave a blank or null queue manager name if the queue manager is the same as the one the process is accessing.

alternateUserId

If `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is specified in the **openOptions** parameter, *alternateUserId* specifies the alternative user ID used to check the authorization for the action. If `MQOO_ALTERNATE_USER_AUTHORITY` is not specified, *alternateUserId* can be blank or null.

Default user authority is used for connection to the queue manager if `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is not specified.

public MQProcess MQQueueManager.AccessProcess(string *processName*, int *openOptions*);
public MQProcess MQQueueManager.AccessProcess(string *processName*, int *openOptions*, string *queueManagerName*, string *alternateUserId*);

Throws `MQException`.

Access an IBM MQ process on this queue manager to inquire on process attributes.

processName
The name of the process to open.

openOptions
Options that control the opening of the process. The valid options that can be added, or combined using a bitwise OR, are:

- MQC.MQOO_FAIL_IF_QUIESCING
- MQC.MQOO_INQUIRE
- MQC.MQOO_SET
- MQC.MQOO_ALTERNATE_USER_AUTHORITY

queueManagerName
The name of the queue manager on which the process is defined. You can leave a blank or null queue manager name if the queue manager is the same as the one the process is accessing.

alternateUserId

If MQC.MQOO_ALTERNATE_USER_AUTHORITY is specified in the **openOptions** parameter, *alternateUserId* specifies the alternative user ID used to check the authorization for the action. If MQOO_ALTERNATE_USER_AUTHORITY is not specified, *alternateUserId* can be blank or null.

Default user authority is used for connection to the queue manager if MQC.MQOO_ALTERNATE_USER_AUTHORITY is not specified.

MQPropertyDescriptor.NET class

Use MQPropertyDescriptor as a parameter to MQMessage GetProperty and SetProperty methods. MQPropertyDescriptor describes an MQMessage property.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQPropertyDescriptor
```

```
public class IBM.WMQ.MQPropertyDescriptor extends System.Object;
```


- "Properties" on page 1735
- "Constructors" on page 1736

Properties

Test for MQException being thrown when getting properties.

public int Context {get; set;}

The message context the property belongs to. Possible values are:

MQC.MQPD_NO_CONTEXT
The property is not associated with a message context.

MQC.MQPD_USER_CONTEXT
The property is associated with the user context.

If the user is authorized, a property associated with the user context is saved when a message is retrieved. A subsequent Put method referencing the saved context, can pass the property into the new message.

public int CopyOptions {get; set;}

CopyOptions describes which type of message the property can be copied into.

When a queue manager receives a message containing an IBM MQ defined property that the queue manager recognizes as being incorrect, the queue manager corrects the value of the CopyOptions field.

Any combination of the following options can be specified. Combine the options by adding the values, or using bitwise OR.

MQC.MQCOPY_ALL
The property is copied into all types of subsequent messages.

MQC.MQCOPY_FORWARD
The property is copied into a message being forwarded.

MQC.MQCOPY_PUBLISH
The property is copied into the message received by a subscriber when a message is being published.

MQC.MQCOPY_REPLY
The property is copied into a reply message.

MQC.MQCOPY_REPORT
The property is copied into a report message.

MQC.MQCOPY_DEFAULT
The value indicated no other copy options have been specified. No relationship exists between the property and subsequent messages. `MQC.MQCOPY_DEFAULT` is always returned for message descriptor properties.

MQC.MQCOPY_NONE
The same as `MQC.MQCOPY_DEFAULT`

public int Options { set; }
`Options` defaults to `CMQC.MQPD_NONE`. You cannot set any other value.

public int Support { get; set; }

Set `Support` to specify the level of support required for IBM MQ-defined message properties. Support for all other properties is optional. Any or none of the following values can be specified

MQC.MQPD_SUPPORT_OPTIONAL
The property is accepted by a queue manager even if it is not supported. The property can be discarded in order for the message to flow to a queue manager that does not support message properties. This value is also assigned to properties that are not IBM MQ defined.

MQC.MQPD_SUPPORT_REQUIRED
Support for the property is required. If you put the message to a queue manager that does not support the IBM MQ-defined property, the method fails. It returns completion code `MQC.MQCC_FAILED` and reason code `MQC.MQRC_UNSUPPORTED_PROPERTY`.

MQC.MQPD_SUPPORT_REQUIRED_IF_LOCAL

Support for the property is required, if the message is destined for a local queue. If you put the message to a local queue on a queue manager that does not support the IBM MQ-defined property, the method fails. It returns completion code `MQC.MQCC_FAILED` and reason code `MQC.MQRC_UNSUPPORTED_PROPERTY`.

No check is made if the message is put to a remote queue manager.

Constructors

PropertyDescriptor();
Create a property descriptor.

MQPutMessageOptions.NET class

Use `MQPutMessageOptions` to specify how messages are sent. It modifies the behavior of `MQDestination.Put`.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQPutMessageOptions
```

```
public class IBM.WMQ.MQPutMessageOptions extends IBM.WMQ.MQBaseObject;
```

• "Properties" on page 1737 "Constructors" on page 1739

Properties

Test for `MQException` being thrown when getting properties.

Note: The behavior of some of the options available in this class depends on the environment in which they are used. These elements are marked with an asterisk, *.

public MQQueue ContextReference {get; set;}

If the `options` field includes `MQC.MQPMO_PASS_IDENTITY_CONTEXT` or `MQC.MQPMO_PASS_ALL_CONTEXT`, set this field to refer to the `MQQueue` from which to take the context information.

The initial value of this field is null.

public int InvalidDestCount {get;} *

Generally, used for distribution lists, `InvalidDestCount` indicates the number of messages that could not be sent to queues in a distribution list. The count includes queues that failed to open and also the queues that were opened successfully, but for which the put operation had failed.

.NET does not support distribution lists, but `InvalidDestCount` is set when opening a single queue.

public int KnownDestCount {get;} *

Generally used for distribution lists, `KnownDestCount` indicates the number of messages that the current call has sent successfully to queues that resolve to local queues.

.NET does not support distribution lists, but `InvalidDestCount` is set when opening a single queue.

public int Options {get; set;}

Options that control the action of `MQDestination.put` and `MQQueueManager.put`. Any or none of the following values can be specified. If more than one option is required, the values can be added or combined using the bitwise OR operator.

MQC.MQPMO_ASYNC_RESPONSE
This option causes the `MQDestination.put` call to be made asynchronously, with some response data.

MQC.MQPMO_DEFAULT_CONTEXT
Associate default context with the message.

MQC.MQPMO_FAIL_IF_QUIESCING
Fail if the queue manager is quiescing.

MQC.MQPMO_LOGICAL_ORDER *
Put logical messages and segments in message groups into their logical order.

If you use the `MQPMO_LOGICAL_ORDER` option in a reconnectable client, the `MQRC_RECONNECT_INCOMPATIBLE` reason code is returned to the application.

MQC.MQPMO_NEW_CORREL_ID *
Generate a new correlation ID for each sent message.

MQC.MQPMO_NEW_MSG_ID *
Generate a new message ID for each sent message.

MQC.MQPMO_NONE
No options specified. Do not use with other options.

MQC.MQPMO_NO_CONTEXT
No context is to be associated with the message.

MQC.MQPMO_NO_SYNCPOINT
Put a message without sync point control. If the sync point control option is not specified, a default of no sync point is assumed.

MQC.MQPMO_PASS_ALL_CONTEXT
Pass all context from an input queue handle.

MQC.MQPMO_PASS_IDENTITY_CONTEXT
Pass identity context from an input queue handle.

MQC.MQPMO_RESPONSE_AS_Q_DEF

For an `MQDestination.put` call, this option takes the put response type from DEFPRESP attribute of the queue.

For an `MQQueueManager.put` call, this option causes the call to be made synchronously.

MQC.MQPMO_RESPONSE_AS_TOPIC_DEF
`MQC.MQPMO_RESPONSE_AS_TOPIC_DEF` is a synonym for `MQC.MQPMO_RESPONSE_AS_Q_DEF` for use with topic objects.

MQC.MQPMO_RETAIN

The publication being sent is to be retained by the queue manager. If this option is used and the publication cannot be retained, the message is not published and the call fails with `MQC.MQRC_PUT_NOT_RETAINED`.

Request a copy of this publication after the time it was published, by calling the `MQSubscription.RequestPublicationUpdate` method. The saved publication is sent to applications that create a subscription without setting the `MQC.MQSO_NEW_PUBLICATIONS_ONLY` option. Check the `MQIsRetained` message property of a publication, when it is received, to find out if it was the retained publication.

When retained publications are requested by a subscriber, the subscription used might contain a wildcard in the topic string. If there are multiple retained publications in the topic tree that match the subscription, they are all sent.

MQC.MQPMO_SET_ALL_CONTEXT
Set all context from the application.

MQC.MQPMO_SET_IDENTITY_CONTEXT
Set identity context from the application.

MQC.MQPMO_SYNC_RESPONSE
This option causes the `MQDestination.put` or `MQQueueManager.put` call to be made synchronously, with full response data.

MQC.MQPMO_SUPPRESS_REPLYTO
Any information filled into the `ReplyToQueueName` and `ReplyToQueueManagerName` fields of the publication is not passed on to subscribers. If this option is used in combination with a report option that requires a `ReplyToQueueName`, the call fails with `MQC.MQRC_MISSING_REPLY_TO_Q`.

MQC.MQPMO_SYNCPOINT
Put a message with sync point control. The message is not visible outside the unit of work until the unit of work is committed. If the unit of work is backed out, the message is deleted.

public int RecordFields {get; set;} *

Information about distribution lists. Distribution lists are not supporting in .NET.

public string ResolvedQueueManagerName {get;}

An output field set by the queue manager to the name of the queue manager that owns the queue specified by the remote queue name. ResolvedQueueManagerName might be different from the name of the queue manager from which the queue was accessed if the queue is a remote queue.

A nonblank value is returned only if the object is a single queue. If the object is a distribution list or a topic, the value returned is undefined.

public string ResolvedQueueName {get;}

An output field that is set by the queue manager to the name of the queue on which the message is placed. ResolvedQueueName might be different from the name used to open the queue if the opened queue was an alias or model queue.

A non-blank value is returned only if the object is a single queue. If the object is a distribution list or a topic, the value returned is undefined.

public int UnknownDestCount {get;} *

Generally used for distribution lists, UnknownDestCount is an output field set by the queue manager. It reports the number of messages that the current call has sent successfully to queues that resolve to remote queues.

.NET does not support distribution lists, but InvalidDestCount is set when opening a single queue.

Constructors

public MQPutMessageOptions();

Construct a new MQPutMessageOptions object with no options set, and a blank ResolvedQueueName and ResolvedQueueManagerName.

MQQueue.NET class

Use MQQueue to send and receive messages, and query attributes of an IBM MQ queue. Create an MQQueue object using a constructor, or an MQQueueManager.AccessProcess method.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQManagedObject
                                │
                                └─ IBM.WMQ.MQDestination
                                        │
                                        └─ IBM.WMQ.MQQueue
```

```
public class IBM.WMQ.MQQueue extends IBM.WMQ.MQDestination;
```


- “Properties” on page 1739
- “Methods” on page 1741
- “Constructors” on page 1744

Properties

Test for MQException being thrown when getting properties.

public int ClusterWorkLoadPriority {get;}

Specifies the priority of the queue. This parameter is valid only for local, remote, and alias queues.

public int ClusterWorkLoadRank {get;}
Specifies the rank of the queue. This parameter is valid only for local, remote, and alias queues.

public int ClusterWorkLoadUseQ {get;}
Specifies the behavior of an MQPUT operation when the target queue has a local instance and at least one remote cluster instance. This parameter does not apply if the MQPUT originates from a cluster channel. This parameter is valid only for local queues.

public DateTime CreationDateTime {get;}
The date and time that this queue was created.

public int CurrentDepth {get;}
Gets the number of messages currently on the queue. This value is incremented during a put call, and during backout of a get call. It is decremented during a non-browse get and during backout of a put call.

public int DefinitionType {get;}
How the queue was defined. The possible values are:

- `MQC.MQQDT_PREDEFINED`
- `MQC.MQQDT_PERMANENT_DYNAMIC`
- `MQC.MQQDT_TEMPORARY_DYNAMIC`

public int InhibitGet {get; set;}
Controls whether you can get messages on this queue or for this topic. The possible values are:

- `MQC.MQQA_GET_INHIBITED`
- `MQC.MQQA_GET_ALLOWED`

public int InhibitPut {get; set;}
Controls whether you can put messages on this queue or for this topic. The possible values are:

- `MQQA_PUT_INHIBITED`
- `MQQA_PUT_ALLOWED`

public int MaximumDepth {get;}
The maximum number of messages that can exist on the queue at any one time. An attempt to put a message to a queue that already contains this many messages fails with reason code `MQC.MQRC_Q_FULL`.

public int MaximumMessageLength {get;}
The maximum length of the application data that can exist in each message on this queue. An attempt to put a message larger than this value fails with reason code `MQC.MQRC_MSG_TOO_BIG_FOR_Q`.

public int NonPersistentMessageClass {get;}
The level of reliability for non-persistent messages put to this queue.

public int OpenInputCount {get;}
The number of handles that are currently valid for removing messages from the queue. `OpenInputCount` is the total number of valid input handles known to the local queue manager, not just handles created by the application.

public int OpenOutputCount {get;}
The number of handles that are currently valid for adding messages to the queue. `OpenOutputCount` is the total number of valid output handles known to the local queue manager, not just handles created by the application.

public int QueueAccounting {get;}
Specifies whether you can enable the collection of accounting information for the queue.

public int QueueMonitoring {get;}
Specifies whether you can enable the monitoring for the queue.

public int QueueStatistics {get;}
Specifies whether you can enable the collection of statistics for the queue.

public int QueueType {get;}
The type of this queue with one of the following values:

- MQC.MQQT_ALIAS
- MQC.MQQT_LOCAL
- MQC.MQQT_REMOTE
- MQC.MQQT_CLUSTER

public int Shareability {get;}
Whether the queue can be opened for input multiple times. The possible values are:

- MQC.MQQA_SHAREABLE
- MQC.MQQA_NOT_SHAREABLE

public string TPIPE {get;}
The TPIPE name used for communication with OTMA using the IBM MQ IMS bridge.

public int TriggerControl {get; set;}
Whether trigger messages are written to an initiation queue, to start an application to service the queue. The possible values are:

- MQC.MQTC_OFF
- MQC.MQTC_ON

public string TriggerData {get; set;}
The free-format data that the queue manager inserts into the trigger message. It inserts `TriggerData` when a message arriving on this queue causes a trigger message to be written to the initiation queue. The maximum permissible length of the string is given by MQC.MQ_TRIGGER_DATA_LENGTH.

public int TriggerDepth {get; set;}
The number of messages that must be on the queue before a trigger message is written when trigger type is set to MQC.MQTT_DEPTH.

public int TriggerMessagePriority {get; set;}
The message priority under which messages do not contribute to the generation of trigger messages. That is, the queue manager ignores these messages when deciding whether to generate a trigger. A value of zero causes all messages to contribute to the generation of trigger messages.

public int TriggerType {get; set;}
The conditions under which trigger messages are written as a result of messages arriving on this queue. The possible values are:

- MQC.MQTT_NONE
- MQC.MQTT_FIRST
- MQC.MQTT_EVERY
- MQC.MQTT_DEPTH

Methods

public void Get(MQMessage *message*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*, int *MaxMsgSize*);

Throws `MQException`.

Gets a message from a queue.

If the get fails, the `MQMessage` object is unchanged. If it succeeds, the message descriptor and message data portions of the `MQMessage` are replaced with the message descriptor and message data from the incoming message.

All calls to IBM MQ from a particular MQQueueManager are synchronous. Therefore, if you perform a get with wait, all other threads using the same MQQueueManager are blocked from making further IBM MQ calls until the Get call is accomplished. If you need multiple threads to access IBM MQ simultaneously, each thread must create its own MQQueueManager object.

message
: Contains the message descriptor and the returned message data. Some of the fields in the message descriptor are input parameters. It is important to ensure that the MessageId and CorrelationId input parameters are set as required.

  A reconnectable client returns the reason code MQRC_BACKED_OUT after successful reconnection, for messages received under MQGM_SYNCPOINT.

getMessageOptions
: Options controlling the action of the get.

  Using option MQC.MQGMO_CONVERT might result in an exception with reason code MQC.MQRC_CONVERTED_STRING_TOO_BIG when converting from single-byte character codes to double byte codes. In this case, the message is copied into the buffer without conversion.

  If *getMessageOptions* is not specified, the message option used is MQGMO_NOWAIT.

  If you use the MQGMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

MaxMsgSize
: The largest message this message object is to receive. If the message on the queue is larger than this size, one of two things occurs:

  - If the MQGMO_ACCEPT_TRUNCATED_MSG flag is set in the MQGetMessageOptions object, the message is filled with as much of the message data as possible. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_ACCEPTED reason code.
  - If the MQGMO_ACCEPT_TRUNCATED_MSG flag is not set, the message remains on the queue. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_FAILED reason code.

  If *MaxMsgSize* is not specified, the whole message is retrieved.

public void Put(MQMessage *message*);
public void Put(MQMessage *message*, MQPutMessageOptions *putMessageOptions*);

Throws MQException.

Puts a message to a queue.

Modifications to the MQMessage object after the Put call has been accomplished do not affect the actual message on the IBM MQ queue or publication topic.

Put updates the MessageId and CorrelationId properties of the MQMessage object and does not clear message data. Further Put or Get calls refer to the updated information in the MQMessage object. For example, in the following code snippet, the first message contains a and the second ab.

```
msg.WriteString("a");
q.Put(msg,pmo);
msg.WriteString("b");
q.Put(msg,pmo);
```

message
: An MQMessage object containing the message descriptor data, and message to be sent. The message descriptor can be altered as a consequence of this method. The values in the message descriptor immediately after the completion of this method are the values that were put to the queue or published to the topic.

  The following reason codes are returned to a reconnectable client:

- `MQRC_CALL_INTERRUPTED` if the connection is broken while running a Put call on a persistent message and the reconnection is successful.
- `MQRC_NONE` if the connection is successful while running a Put call on a non-persistent message (see Application Recovery).

putMessageOptions

Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of `MQPutMessageOptons` is used.

If you use the `MQPMO_LOGICAL_ORDER` option in a reconnectable client, the `MQRC_RECONNECT_INCOMPATIBLE` reason code is returned.

Note: For simplicity and performance, if you want to put a single message to a queue, use `MQQueueManager.Put` object. You should have an `MQQueue` object for this.

public void PutForwardMessage(MQMessage *message*); public void PutForwardMessage(MQMessage *message*, MQPutMessageOptions *putMessageOptions*);

Throws `MQException`

Put a message being forwarded onto the queue, where *message* is the original message.

message

An `MQMessage` object containing the message descriptor data, and message to be sent. The message descriptor can be altered as a consequence of this method. The values in the message descriptor immediately after the completion of this method are the values that were put to the queue or published to the topic.

The following reason codes are returned to a reconnectable client:

- `MQRC_CALL_INTERRUPTED` if the connection is broken while running a Put call on a persistent message and the reconnection is successful.
- `MQRC_NONE` if the connection is successful while running a Put call on a non-persistent message (see Application Recovery).

putMessageOptions

Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of `MQPutMessageOptons` is used.

If you use the `MQPMO_LOGICAL_ORDER` option in a reconnectable client, the `MQRC_RECONNECT_INCOMPATIBLE` reason code is returned.

public void PutReplyMessage(MQMessage *message*) public void PutReplyMessage(MQMessage *message*, MQPutMessageOptions *putMessageOptions*)

Throws `MQException`.

Put a reply message onto the queue, where *message* is the original message.

message

Contains the message descriptor and the returned message data. Some of the fields in the message descriptor are input parameters. It is important to ensure that the `MessageId` and `CorrelationId` input parameters are set as required.

A reconnectable client returns the reason code `MQRC_BACKED_OUT` after successful reconnection, for messages received under `MQGM_SYNCPOINT`.

putMessageOptions

Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of `MQPutMessageOptons` is used.

If you use the `MQPMO_LOGICAL_ORDER` option in a reconnectable client, the `MQRC_RECONNECT_INCOMPATIBLE` reason code is returned.

public void PutReportMessage(MQMessage *message*)
public void PutReportMessage(MQMessage *message*, MQPutMessageOptions *putMessageOptions*)

Throws MQException.

Put a report message onto the queue, where *message* is the original message.

message
Contains the message descriptor and the returned message data. Some of the fields in the message descriptor are input parameters. It is important to ensure that the MessageId and CorrelationId input parameters are set as required.

A reconnectable client returns the reason code MQRC_BACKED_OUT after successful reconnection, for messages received under MQGM_SYNCPOINT.

putMessageOptions
Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of MQPutMessageOptons is used.

If you use the MQPMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

Constructors

public MQQueue MQQueueManager.AccessQueue(string *queueName*, int *openOptions*);
public MQQueue MQQueueManager.AccessQueue(string *queueName*, int *openOptions*, string *queueManagerName*, string *dynamicQueueName*, string *alternateUserId*);

Throws MQException.

Accesses a queue on this queue manager.

You can get or browse messages, put messages, inquire about the attributes of the queue or set the attributes of the queue. If the queue named is a model queue, a dynamic local queue is created. Query the name attribute of the resultant MQQueue object to find out the name of the dynamic queue.

queueName
Name of queue to open.

openOptions
Options that control the opening of the queue.

MQC.MQOO_ALTERNATE_USER_AUTHORITY
Validate with the specified user identifier.

MQC.MQOO_BIND_AS_QDEF
Use default binding for queue.

MQC.MQOO_BIND_NOT_FIXED
Do not bind to a specific destination.

MQC.MQOO_BIND_ON_OPEN
Bind handle to destination when queue is opened.

MQC.MQOO_BROWSE
Open to browse message.

MQC.MQOO_FAIL_IF_QUIESCING
Fail if the queue manager is quiescing.

MQC.MQOO_INPUT_AS_Q_DEF
Open to get messages using queue-defined default.

MQC.MQOO_INPUT_SHARED
Open to get messages with shared access.

MQC.MQOO_INPUT_EXCLUSIVE
Open to get messages with exclusive access.

MQC.MQOO_INQUIRE
Open for inquiry - required if you want to query properties.

MQC.MQOO_OUTPUT
Open to put messages.

MQC.MQOO_PASS_ALL_CONTEXT
Allow all context to be passed.

MQC.MQOO_PASS_IDENTITY_CONTEXT
Allow identity context to be passed.

MQC.MQOO_SAVE_ALL_CONTEXT
Save context when message retrieved.

MQC.MQOO_SET
Open to set attributes - required if you want to set properties.

MQC.MQOO_SET_ALL_CONTEXT
Allows all context to be set.

MQC.MQOO_SET_IDENTITY_CONTEXT
Allows identity context to be set.

queueManagerName
Name of the queue manager on which the queue is defined. A name that is entirely blank or null denotes the queue manager to which the `MQQueueManager` object is connected.

dynamicQueueName
dynamicQueueName is ignored unless `queueName` specifies the name of a model queue. If it does, *dynamicQueueName* specifies the name of the dynamic queue to be created. A blank or null name is not valid if `queueName` specifies the name of a model queue. If the last nonblank character in the name is an asterisk, `*`, the queue manager replaces the asterisk with a string of characters. The characters guarantee that the name generated for the queue is unique on this queue manager.

alternateUserId
If `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is specified in the `openOptions` parameter, *alternateUserId* specifies the alternate user identifier that is used to check the authorization for the open. If `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is not specified, *alternateUserId* can be left blank, or null.

public MQQueue(MQQueueManager *queueManager*, string *queueName*, int *openOptions*, string *queueManagerName*, string *dynamicQueueName*, string *alternateUserId*);

Throws `MQException`.

Accesses a queue on `queueManager`.

You can get or browse messages, put messages, inquire about the attributes of the queue or set the attributes of the queue. If the queue named is a model queue, a dynamic local queue is created. Query the `name` attribute of the resultant `MQQueue` object to find out the name of the dynamic queue.

queueManager
Queue manager to access queue on.

queueName
Name of queue to open.

openOptions
Options that control the opening of the queue.

MQC.MQOO_ALTERNATE_USER_AUTHORITY
Validate with the specified user identifier.

MQC.MQOO_BIND_AS_QDEF
Use default binding for queue.

MQC.MQOO_BIND_NOT_FIXED
Do not bind to a specific destination.

MQC.MQOO_BIND_ON_OPEN
Bind handle to destination when queue is opened.

MQC.MQOO_BROWSE
Open to browse message.

MQC.MQOO_FAIL_IF_QUIESCING
Fail if the queue manager is quiescing.

MQC.MQOO_INPUT_AS_Q_DEF
Open to get messages using queue-defined default.

MQC.MQOO_INPUT_SHARED
Open to get messages with shared access.

MQC.MQOO_INPUT_EXCLUSIVE
Open to get messages with exclusive access.

MQC.MQOO_INQUIRE
Open for inquiry - required if you want to query properties.

MQC.MQOO_OUTPUT
Open to put messages.

MQC.MQOO_PASS_ALL_CONTEXT
Allow all context to be passed.

MQC.MQOO_PASS_IDENTITY_CONTEXT
Allow identity context to be passed.

MQC.MQOO_SAVE_ALL_CONTEXT
Save context when message retrieved.

MQC.MQOO_SET
Open to set attributes - required if you want to set properties.

MQC.MQOO_SET_ALL_CONTEXT
Allows all context to be set.

MQC.MQOO_SET_IDENTITY_CONTEXT
Allows identity context to be set.

queueManagerName
Name of the queue manager on which the queue is defined. A name that is entirely blank or null denotes the queue manager to which the MQQueueManager object is connected.

dynamicQueueName
dynamicQueueName is ignored unless queueName specifies the name of a model queue. If it does, *dynamicQueueName* specifies the name of the dynamic queue to be created. A blank or null name is not valid if queueName specifies the name of a model queue. If the last nonblank character in the name is an asterisk, *, the queue manager replaces the asterisk with a string of characters. The characters guarantee that the name generated for the queue is unique on this queue manager.

alternateUserId
If MQC.MQOO_ALTERNATE_USER_AUTHORITY is specified in the openOptions parameter, *alternateUserId* specifies the alternate user identifier that is used to check the authorization for the open. If MQC.MQOO_ALTERNATE_USER_AUTHORITY is not specified, *alternateUserId* can be left blank, or null.

MQQueueManager.NET class

Use MQQueueManager to connect to a queue manager and access queue manager objects. It also controls transactions. The MQQueueManager constructor creates either a client or server connection.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.ManagedObject
                                │
                                └─ IBM.WMQ.MQQueueManager
```

```
public class IBM.WMQ.MQQueueManager extends IBM.WMQ.MQManagedObject;
```


- “Properties” on page 1747
- “Methods” on page 1750
- “Constructors” on page 1755

Properties

Test for `MQException` being thrown when getting properties.

public int AccountingConnOverride {get;}
Whether applications can override the setting of the MQI accounting and queue accounting values.

public int AccountingInterval {get;}
How long before intermediate accounting records are written (in seconds).

public int ActivityRecording {get;}
Controls the generation of activity reports.

public int AdoptNewMCACheck {get;}
Specifies which elements are checked to determine whether the MCA is adopted when a new inbound channel is detected. To be adopted, the MCA name must match the name of an active MCA.

public int AdoptNewMCAInterval {get;}
The amount of time, in seconds, that the new channel waits for the orphaned channel to end.

public int AdoptNewMCAType {get;}
Whether an orphaned MCA instance is to be adopted (restarted) when a new inbound channel request is detected matching the AdoptNewMCACheck value.

public int BridgeEvent {get;}
Whether IMS bridge events are generated.

public int ChannelEvent {get;}
Whether channel events are generated.

public int ChannelInitiatorControl {get;}
Whether the channel initiator starts automatically when the queue manager starts.

public int ChannelInitiatorAdapters {get;}
The number of adapter subtasks to process IBM MQ calls.

public int ChannelInitiatorDispatchers {get;}
The number of dispatchers to use for the channel initiator.

public int ChannelInitiatorTraceAutoStart {get;}
Specifies whether the channel initiator trace starts automatically.

public int ChannelInitiatorTraceTableSize {get;}
The size, in megabytes, of the trace data space of a channel initiator.

public int ChannelMonitoring {get;}
Whether channel monitoring is used.

public int ChannelStatistics {get;}
Controls the collection of statistics data for channels.

public int CharacterSet {get;}
Returns the coded character set identifier (CCSID) of the queue manager. `CharacterSet` is used by the queue manager for all character string fields in the application programming interface.

public int ClusterSenderMonitoring {get;}
Controls the collection of online monitoring data for automatically defined cluster sender channels.

public int ClusterSenderStatistics {get;}
Controls the collection of statistics data for automatically defined cluster sender channels.

public int ClusterWorkLoadMRU {get;}
The maximum number of outbound cluster channels.

public int ClusterWorkLoadUseQ {get;}
The default value of the `MQQueue` property, `ClusterWorkLoadUseQ`, if it specifies a value of `QMGR`.

public int CommandEvent {get;}
Specifies whether command events are generated.

public string CommandInputQueueName {get;}
Returns the name of the command input queue defined on the queue manager. Applications can send commands to this queue, if authorized to do so.

public int CommandLevel {get;}
Indicates the function level of the queue manager. The set of functions that correspond to a particular function level depends on the platform. On a particular platform, you can rely on every queue manager supporting the functions at the lowest functional level common to all the queue managers.

public int CommandLevel {get;}
Whether the command server starts automatically when the queue manager starts.

public string DNSGroup {get;}
No longer used.

public int DNSWLM {get;}
No longer used.

public int IPAddressVersion {get;}
Which IP protocol (IPv4 or IPv6) to use for a channel connection.

public boolean IsConnected {get;}
Returns the value of the `isConnected`.

If true, a connection to the queue manager has been made, and is not known to be broken. Any calls to IsConnected do not actively attempt to reach the queue manager, so it is possible that physical connectivity can break, but IsConnected can still return true. The IsConnected state is only updated when activity, for example, putting a message, getting a message, is performed on the queue manager.

If false, a connection to the queue manager has not been made, or has been broken, or has been disconnected.

public int KeepAlive {get;}
Specifies whether the TCP KEEPALIVE facility is to be used to check that the other end of the connection is still available. If it is unavailable, the channel is closed.

public int ListenerTimer {get;}
The time interval, in seconds, between attempts by IBM MQ to restart the listener after an APPC or TCP/IP failure.

public int LoggerEvent {get;}
Whether logger events are generated.

public string LU62ARMSuffix {get;}
The suffix of the APPCPM member of SYS1.PARMLIB. This suffix nominates the LUADD for this channel initiator. When automatic restart manager (ARM) restarts the channel initiator, the z/OS command SET APPC=xx is issued.

public string LUGroupName {get; z/os}
The generic LU name to be used by the LU 6.2 listener that handles inbound transmissions for the queue sharing group.

public string LUName {get;}
The name of the LU to use for outbound LU 6.2 transmissions.

public int MaximumActiveChannels {get;}
The maximum number of channels that can be active at any time.

public int MaximumCurrentChannels {get;}
The maximum number of channels that can be current at any time (including server-connection channels with connected clients).

public int MaximumLU62Channels {get;}
The maximum number of channels that can be current, or clients that can be connected, that use the LU 6.2 transmission protocol.

public int MaximumMessageLength {get;}
Returns the maximum length of a message (in bytes) that can be handled by the queue manager. No queue can be defined with a maximum message length greater than `MaximumMessageLength`.

public int MaximumPriority {get;}
Returns the maximum message priority supported by the queue manager. Priorities range from zero (lowest) to this value. Throws `MQException` if you call this method after disconnecting from the queue manager.

public int MaximumTCPChannels {get;}
The maximum number of channels that can be current, or clients that can be connected, that use the TCP/IP transmission protocol.

public int MQIAccounting {get;}
Controls the collection of accounting information for MQI data.

public int MQIStatistics {get;}
Controls the collection of statistics monitoring information for the queue manager.

public int OutboundPortMax {get;}
The maximum value in the range of port numbers to be used when binding outgoing channels.

public int OutboundPortMin {get;}
The minimum value in the range of port numbers to be used when binding outgoing channels.

public int QueueAccounting {get;}
Whether class 3 accounting (thread-level and queue-level accounting) data is to be used for all queues.

public int QueueMonitoring {get;}
Controls the collection of online monitoring data for queues.

public int QueueStatistics {get;}
Controls the collection of statistics data for queues.

public int ReceiveTimeout {get;}
The length of time that a TCP/IP channel waits to receive data, including heartbeats, from its partner before returning to the inactive state.

public int ReceiveTimeoutMin {get;}
The minimum length of time that a TCP/IP channel waits to receive data, including heartbeats, from its partner before returning to an inactive state.

public int ReceiveTimeoutType {get;}
The qualifier to apply to the value in `ReceiveTimeout`.

public int SharedQueueQueueManagerName {get;}
Specifies how to deliver messages to a shared queue. If the put specifies a different queue manager from the same queue sharing group as the target queue manager, the message is delivered in two ways:

MQC.MQSQQM_USE
Messages are delivered to the object queue manager before being put on the shared queue.

MQCMQSQQM_IGNORE
Messages are put directly on the shared queue.

public int SSLEvent {get;}
Whether TLS events are generated.

public int SSLFips {get;}
Whether only FIPS-certified algorithms are to be used if cryptography is performed in IBM MQ, rather than cryptographic hardware.

public int SSLKeyResetCount {get;}
Indicates the number of unencrypted bytes sent and received within a TLS conversation before the secret key is renegotiated.

public int ClusterSenderStatistics {get;}
Specifies the interval, in minutes, between consecutive gatherings of statistics.

public int SyncpointAvailability {get;}
Indicates whether the queue manager supports units of work and sync points with the `MQQueue.get` and `MQQueue.put` methods.

public string TCPName {get;}
The name of either the only, or default, TCP/IP system to be used, depending on the value of TCPStackType.

public int TCPStackType {get;}
Specifies whether the channel initiator uses only the TCP/IP address space specified in TCPName. Alternatively, the channel initiator can bind to any TCP/IP address.

public int TraceRouteRecording {get;}
Controls the recording of route tracing information.

Methods

public MQProcess AccessProcess(string *processName*, int *openOptions*);
public MQProcess AccessProcess(string *processName*, int *openOptions*, string *queueManagerName*, string *alternateUserId*);

Throws `MQException`.

Access an IBM MQ process on this queue manager to inquire on process attributes.

processName
The name of the process to open.

openOptions
Options that control the opening of the process. The valid options that can be added, or combined using a bitwise OR, are:

- `MQC.MQOO_FAIL_IF_QUIESCING`
- `MQC.MQOO_INQUIRE`
- `MQC.MQOO_SET`
- `MQC.MQOO_ALTERNATE_USER_AUTHORITY`

queueManagerName
The name of the queue manager on which the process is defined. You can leave a blank or null queue manager name if the queue manager is the same as the one the process is accessing.

alternateUserId

If `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is specified in the **openOptions** parameter, *alternateUserId* specifies the alternative user ID used to check the authorization for the action. If `MQOO_ALTERNATE_USER_AUTHORITY` is not specified, *alternateUserId* can be blank or null.

Default user authority is used for connection to the queue manager if `MQC.MQOO_ALTERNATE_USER_AUTHORITY` is not specified.

public MQQueue AccessQueue(string *queueName*, int *openOptions*);
public MQQueue AccessQueue(string *queueName*, int *openOptions*, string *queueManagerName*, string *dynamicQueueName*, string *alternateUserId*);

Throws MQException.

Accesses a queue on this queue manager.

You can get or browse messages, put messages, inquire about the attributes of the queue or set the attributes of the queue. If the queue named is a model queue, a dynamic local queue is created. Query the name attribute of the resultant MQQueue object to find out the name of the dynamic queue.

queueName
Name of queue to open.

openOptions
Options that control the opening of the queue.

MQC.MQOO_ALTERNATE_USER_AUTHORITY
Validate with the specified user identifier.

MQC.MQOO_BIND_AS_QDEF
Use default binding for queue.

MQC.MQOO_BIND_NOT_FIXED
Do not bind to a specific destination.

MQC.MQOO_BIND_ON_OPEN
Bind handle to destination when queue is opened.

MQC.MQOO_BROWSE
Open to browse message.

MQC.MQOO_FAIL_IF_QUIESCING
Fail if the queue manager is quiescing.

MQC.MQOO_INPUT_AS_Q_DEF
Open to get messages using queue-defined default.

MQC.MQOO_INPUT_SHARED
Open to get messages with shared access.

MQC.MQOO_INPUT_EXCLUSIVE
Open to get messages with exclusive access.

MQC.MQOO_INQUIRE
Open for inquiry - required if you want to query properties.

MQC.MQOO_OUTPUT
Open to put messages.

MQC.MQOO_PASS_ALL_CONTEXT
Allow all context to be passed.

MQC.MQOO_PASS_IDENTITY_CONTEXT
Allow identity context to be passed.

MQC.MQOO_SAVE_ALL_CONTEXT
Save context when message retrieved.

MQC.MQOO_SET
Open to set attributes - required if you want to set properties.

MQC.MQOO_SET_ALL_CONTEXT
Allows all context to be set.

MQC.MQOO_SET_IDENTITY_CONTEXT
Allows identity context to be set.

queueManagerName
Name of the queue manager on which the queue is defined. A name that is entirely blank or null denotes the queue manager to which the MQQueueManager object is connected.

dynamicQueueName

dynamicQueueName is ignored unless queueName specifies the name of a model queue. If it does, *dynamicQueueName* specifies the name of the dynamic queue to be created. A blank or null name is not valid if queueName specifies the name of a model queue. If the last nonblank character in the name is an asterisk, *, the queue manager replaces the asterisk with a string of characters. The characters guarantee that the name generated for the queue is unique on this queue manager.

alternateUserId

If MQC.MQOO_ALTERNATE_USER_AUTHORITY is specified in the openOptions parameter, *alternateUserId* specifies the alternate user identifier that is used to check the authorization for the open. If MQC.MQOO_ALTERNATE_USER_AUTHORITY is not specified, *alternateUserId* can be left blank, or null.

public MQTopic AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*);
public MQTopic AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*);
public MQTopic AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);
public MQTopic AccessTopic(string *topicName*, string *topicObject*, int *openAs*, int *options*);
public MQTopic AccessTopic(string *topicName*, string *topicObject*, int *openAs*, int *options*, string *alternateUserId*);
public MQTopic AccessTopic(string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic AccessTopic(string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);

Access a topic on this queue manager.

MQTopic objects are closely related to administrative topic objects, which are sometimes called topic objects. On input, topicObject points to an administrative topic object. The MQTopic constructor obtains a topic string from the topic object and combines it with topicName to create a topic name. Either or both topicObject or topicName can be null. The topic name is matched to the topic tree, and the name of the closest matching administrative topic object is returned in topicObject.

The topics that are associated with the MQTopic object are the result of combining two topic strings. The first topic string is defined by the administrative topic object identified by *topicObject*. The second topic string is *topicString*. The resulting topic string associated with the MQTopic object can identify multiple topics by including wildcards.

Depending on whether the topic is opened for publishing or subscribing, you can use the MQTopic.Put methods to publish on topics, or MQTopic.Get methods to receive publications on topics. If you want to publish and subscribe to the same topic, you must access the topic twice, once for publish and once for subscribe.

If you create an MQTopic object for subscription, without providing an MQDestination object, a managed subscription is assumed. If you pass a queue as an MQDestination object, an unmanaged subscription is assumed. You must ensure the subscription options you set are consistent with the subscription being managed or unmanaged.

destination

destination is an MQQueue instance. By providing *destination*, MQTopic is opened as an unmanaged subscription. Publications on the topic are delivered to the queue accessed as *destination*.

topicName

A topic string that is the second part of the topic name. *topicName* is concatenated with the topic string defined in the *topicObject* administrative topic object. You can set *topicName* to null, in which case the topic name is defined by the topic string in *topicObject*.

topicObject

On input, *topicObject* is the name of the topic object that contains the topic string that forms the first part of the topic name. The topic string in *topicObject* is concatenated with *topicName*. The rules for constructing topic strings are defined in Combining topic strings.

On output, *topicObject* contains the name of the administrative topic object that is the closest match in the topic tree to the topic identified by the topic string.

openAs

Access the topic to publish or subscribe. The parameter can contain only one of these options:

- MQC.MQTOPIC_OPEN_AS_SUBSCRIPTION
- MQC.MQTOPIC_OPEN_AS_PUBLICATION

options

Combine the options that control the opening of the topic for either publication or subscription. Use MQC.MQSO_* constants to access a topic for subscription and MQC.MQOO_* constants to access a topic for publication.

If more than one option is required, add the values together, or combine the option values using the bitwise OR operator.

alternateUserId

Specify the alternate user ID that is used to check for the required authorization to finish the operation. You must specify *alternateUserId*, if either MQC.MQOO_ALTERNATE_USER_AUTHORITY or MQC.MQSO_ALTERNATE_USER_AUTHORITY is set in the options parameter.

subscriptionName

subscriptionName is required if the options MQC.MQSO_DURABLE or MQC.MQSO_ALTER are provided. In both cases, MQTopic is implicitly opened for subscription. An exception is thrown if the MQC.MQSO_DURABLE is set, and the subscription exists, or if MQC.MQSO_ALTER is set, and the subscription does not exist.

properties

Set any of the special subscription properties listed using a hash table. Specified entries in the hash table are updated with output values. Entries are not added to the hash table to report output values.

- MQC.MQSUB_PROP_ALTERNATE_SECURITY_ID
- MQC.MQSUB_PROP_SUBSCRIPTION_EXPIRY
- MQC.MQSUB_PROP_SUBSCRIPTION_USER_DATA
- MQC.MQSUB_PROP_SUBSCRIPTION_CORRELATION_ID
- MQC.MQSUB_PROP_PUBLICATION_PRIORITY
- MQC.MQSUB_PROP_PUBLICATION_ACCOUNTING_TOKEN
- MQC.MQSUB_PROP_PUBLICATION_APPLICATIONID_DATA

public MQAsyncStatus GetAsyncStatus();

Throws MQException

Returns an MQAsyncStatus object, which represents the asynchronous activity for the queue manager connection.

public void Backout();

Throws MQException.

Backout any messages that were read or written within sync point since the last sync point.

Messages that were written with the MQC.MQPMO_SYNCPOINT flag set are removed from queues. Messages read with the MQC.MQGMO_SYNCPOINT flag are reinstated on the queues they came from. If the messages are persistent, the changes are logged.

For reconnectable clients, the MQRC_NONE reason code is returned to a client after reconnection is successful.

public void Begin();

Throws MQException.

Begin is supported only in server bindings mode. It starts a global unit of work.

public void Commit();

Throws MQException.

Commit any messages that were read or written within sync point since the last sync point.

Messages written with the MQC.MQPMO_SYNCPOINT flag set are made available to other applications. Messages retrieved with the MQC.MQGMO_SYNCPOINT flag set are deleted. If the messages are persistent, the changes are logged.

The following reason codes are returned to a reconnectable client:

- MQRC_CALL_INTERRUPTED if connection is lost while carrying out the commit call.
- MQRC_BACKED_OUT if the commit call is issued after reconnection.

Disconnect();

Throws MQException.

Close the connection to the queue manager. All objects accessed on this queue manager are not longer accessible to this application. To reaccess the objects, create a MQQueueManager object.

Generally, any work performed as part of a unit of work is committed. However, if the unit of work is managed by .NET, the unit of work might be rolled back.

public void Put(int *type*, string *destinationName*, MQMessage *message*);
public void Put(int *type*, string *destinationName*, MQMessage *message* MQPutMessageOptions *putMessageOptions*);
public void Put(int *type*, string *destinationName*, string *queueManagerName*, string *topicString*, MQMessage *message*);
public void Put(string *queueName*, MQMessage *message*);
public void Put(string *queueName*, MQMessage *message*, MQPutMessageOptions *putMessageOptions*);
public void Put(string *queueName*, string *queueManagerName*, MQMessage *message*);
public void Put(string *queueName*, string *queueManagerName*, MQMessage *message*, MQPutMessageOptions *putMessageOptions*);
public void Put(string *queueName*, string *queueManagerName*, MQMessage *message*, MQPutMessageOptions *putMessageOptions*, string *alternateUserId*);

Throws MQException.

Places a single message onto a queue or topic without creating an MQQueue or MQTopic object first.

queueName
The name of the queue onto which to place the message.

destinationName
The name of a destination object. It is either a queue or a topic depending on the value of *type*.

type
The type of destination object. You must not combine the options.

MQC.MQOT_Q
Queue

MQC.MQOT_TOPIC
Topic

queueManagerName

The name of the queue manager or queue manager alias, on which the queue is defined. If type MQC.MQOT_TOPIC is specified this parameter is ignored.

If the queue is a model queue, and the resolved queue manager name is not this queue manager, an MQException is thrown.

topicString

topicString is combined with the topic name in the *destinationName* topic object.

topicString is ignored if *destinationName* is a queue.

message

The message to send. Message is an input/output object.

The following reason codes are returned to a reconnectable client:

- MQRC_CALL_INTERRUPTED if the connection is broken while performing a Put call on a persistent message.
- MQRC_NONE if the connection is successful while performing a Put call on a non-persistent message (see Application Recovery).

putMessageOptions

Options controlling the actions of the put.

If you omit *putMessageOptions*, a default instance of *putMessageOptions* is created. *putMessageOptions* is an input/output object.

If you use the MQPMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

alternateUserId

Specifies an alternate user identifier used to check authorization when placing the message on a queue.

You can omit *alternateUserId* if you do not set MQC.MQOO_ALTERNATE_USER_AUTHORITY in *putMessageOptions*. If you set MQC.MQOO_ALTERNATE_USER_AUTHORITY, you must also set *alternateUserId*. *alternateUserId* has not effect unless you also set MQC.MQOO_ALTERNATE_USER_AUTHORITY.

Constructors

public MQQueueManager();
public MQQueueManager(string *queueManagerName*);
public MQQueueManager(string *queueManagerName*, Int *options*);
public MQQueueManager(string *queueManagerName*, Int *options*, string *channel*, string *connName*);
public MQQueueManager(string *queueManagerName*, string *channel*, string *connName*);
public MQQueueManager(string *queueManagerName*, System.Collections.Hashtable *properties*);

Throws MQException.

Creates a connection to a queue manager. Select between creating a client connection or a server connection.

You must have inquire (inq) authority on the queue manager when attempting to connect to the queue manager. Without inquire authority, the connection attempt fails.

A client connection is created if one of the following conditions is true:

1. *channel* or *connName* are specified in the constructor.
2. *HostName*, *Port*, or *Channel* are specified in *properties*.
3. *MQEnvironment.HostName*, *MQEnvironment.Port*, or *MQEnvironment.Channel* are specified.

The values of the connection properties are defaulted in the order shown. The *channel* and *connName* in the constructor take precedence over the property values in the constructor. The constructor property values take precedence of the `MQEnvironment` properties.

The host name, channel name, and port are defined in the `MQEnvironment` class.

queueManagerName
Name of the queue manager, or queue manager group to connect to.

Omit the parameter, or leave it null, or blank to make a default queue manager selection. The default queue manager connection on a server is to the default queue manager on the server. The default queue manager connection on a client connection is to the queue manager the listener is connected to.

options
Specify `MQCNO` connection options. The values must be applicable to the type of connection being made. For example, if you specify the following server connection properties for a client connection an `MQException` is thrown.

- `MQC.MQCNO_FASTPATH_BINDING`
- `MQC.MQCNO_STANDARD_BINDING`

properties

The properties parameter takes a series of key/value pairs that override the properties set by `MQEnvironment` ; see the example, "Override MQEnvironment properties" on page 1758. The following properties can be overridden:

- `MQC.CONNECT_OPTIONS_PROPERTY`
- `MQC.CONNECTION_NAME_PROPERTY`
- `MQC.ENCRYPTION_POLICY_SUITE_B`
- `MQC.HOST_NAME_PROPERTY`
- `MQC.PORT_PROPERTY`
- `MQC.CHANNEL_PROPERTY`
- `MQC.SSL_CIPHER_SPEC_PROPERTY`
- `MQC.SSL_PEER_NAME_PROPERTY`
- `MQC.SSL_CERT_STORE_PROPERTY`
- `MQC.SSL_CRYPTO_HARDWARE_PROPERTY`
- `MQC.SECURITY_EXIT_PROPERTY`
- `MQC.SECURITY_USERDATA_PROPERTY`
- `MQC.SEND_EXIT_PROPERTY`
- `MQC.SEND_USERDATA_PROPERTY`
- `MQC.RECEIVE_EXIT_PROPERTY`
- `MQC.RECEIVE_USERDATA_PROPERTY`
- `MQC.USER_ID_PROPERTY`
- `MQC.PASSWORD_PROPERTY`
- `MQC.MQAIR_ARRAY`
- `MQC.KEY_RESET_COUNT`
- `MQC.FIPS_REQUIRED`

- `MQC.HDR_CMP_LIST`
- `MQC.MSG_CMP_LIST`
- `MQC.TRANSPORT_PROPERTY`

channel
Name of a server connection channel

connName
Connection name in the format *HostName* (*Port*).

You can supply a list of *hostnames* and *ports* as an argument to the constructor `MQQueueManager (String queueManagerName, Hashtable properties)` using CONNECTION_NAME_PROPERTY.

For example:

```
ConnectionName = "fred.mq.com(2344),nick.mq.com(3746),tom.mq.com(4288)";
```

```
Hashtable Properties-new Hashtable();
```

```
properties.Add(MQC.CONNECTION_NAME_PROPERTY,ConnectionName);
```

```
MQQueueManager qmgr=new MQQueue Manager("qmgrname",properties);
```

When a connection attempt is made, the connection name list is processed in order. If the connection attempt to the first host name and port fails, then connection to the second pair of attributes is attempted. The client repeats this process until either a successful connection is made or the list is exhausted. If the list is exhausted, an appropriate reason code and completion code is returned to the client application.

When a port number is not provided for the connection name, the default port (configured in `mqclient.ini`) is used.

Set the Connection List

You can set the connection list by using the following methods when the automatic client reconnection options are set:

Set the connection list through MQSERVER
You can set the connection list through the command prompt.

At the command prompt, set the following command:

```
MQSERVER=SYSTEM.DEF.SVRCONN/TCP/Hostname1(Port1),Hostname2(Por2),Hostname3(Port3)
```

For example:

```
MQSERVER=SYSTEM.DEF.SVRCONN/TCP/fred.mq.com(5266),nick.mq.com(6566),jack.mq.com(8413)
```

If you set the connection in the MQSERVER, do not set it in the application.

If you set the connection list in the application, the application overwrites whatever is set in the MQSERVER environment variable.

Set the connection list through the application
You can set the connection list in the application by specifying the host name and port properties.

```
String connName = "fred.mq.com(2344), nick.mq.com(3746), chris.mq.com(4288)";
MQQueueManager qm = new MQQueueManager("QM1", "TestChannel", connName);
```

Set the connection list through `app.config`
`App.config` is an XML file where you specify the key-value pairs.

In the connection list specify

```
<app.Settings>
<add key="Connection1" value="Hostname1(Port1)"/>
<add key="Connection2" value="Hostname2(Port2)"/>
<app.Settings>
```

For example:

```
<app.Settings>
<add key>="Connection1" value="fred.mq.com(2966)"/>
<add key>="Connection2" value="alex.mq.com(6533)"/>
<app.Settings>
```

You can directly change the connection list in the `app.config` file.

Set the connection list through `MQEnvironment`

To set the Connection list through the `MQEnvironment`, use the *ConnectionName* property.

```
MQEnvironment.ConnectionName = "fred.mq.com(4288),"alex.mq.com(5211);
```

The *ConnectionName* property overwrites the host name and port properties set in the `MQEnvironment`.

Create a client connection

The following example shows you how to create a client connection to a queue manager. You can create a client connection by setting the `MQEnvironment` variables before creating a new `MQQueueManager` Object.

```
MQEnvironment.Hostname = "fred.mq.com";  // host to connect to
MQEnvironment.Port     = 1414;           // port to connect to
                                         //If not explicitly set,
                                         // defaults to 1414
                                         // (the default IBM MQ port)
MQEnvironment.Channel  = "channel.name"; // the case sensitive
                                         //  name of the
                                         // SVR CONN channel on
                                         // the queue manager
MQQueueManager qMgr    = new MQQueueManager("MYQM");
```

Figure 11. Client connection

Override `MQEnvironment` properties

The following example shows you how to create a queue manager with its user ID and password defined in a hash table.

```
Hashtable properties = new Hashtable();

properties.Add( MQC.USER_ID_PROPERTY, "ExampleUserId" );
properties.Add( MQC.PASSWORD_PROPERTY, "ExamplePassword" );

try
{
    MQQueueManager qMgr = new MQQueueManager("qmgrname", properties);
}
catch (MQException mqe)
{
    System.Console.WriteLine("Connect failed with " + mqe.Message);
    return((int)mqe.Reason);
}
```

Figure 12. Overriding `MQEnvironment` properties

Create a reconnectable connection

The following example shows you how to automatically reconnect a client to a Queue Manager.

```
Hashtable properties = new Hashtable(); // The queue manager name and the
                                 // properties how it has to be connected

properties.Add(MQC.CONNECT_OPTIONS_PROPERTY, MQC.MQCNO_RECONNECT); // Options
                                 // through which reconnection happens

properties.Add(MQC.CONNECTION_NAME_PROPERTY,"fred.mq.com(4789),nick.mq.com(4790)"); // The list
                                 // of queue managers through which reconnection happens

MQ QueueManager qmgr = new MQQueueManager("qmgrname", properties);
```

Figure 13. Automatically reconnecting a client to a queue manager

MQSubscription.NET class

Use MQSubscription to request that retained publications are sent to the subscriber. MQSubscription is a property of an MQTopic object opened for subscription.

Class

```
System.Object
        │
        └─ IBM.WMQ.MQBase
                │
                └─ IBM.WMQ.MQBaseObject
                        │
                        └─ IBM.WMQ.MQManagedObject
                                │
                                └─ IBM.WMQ.MQSubscription
```

public class IBM.WMQ.MQSubscription extends IBM.WMQ.MQManagedObject;

- “Properties” on page 1759
- “Methods” on page 1759
- “Constructors” on page 1760

Properties

Access subscription properties using the MQManagedObject class; see “Properties” on page 1719.

Methods

Access subscription Inquire, Set and Get methods using the MQManagedObject class; see “Methods” on page 1719.

public int RequestPublicationUpdate(int *options*);

Throws MQException.

Request an updated publication for the current topic. If the queue manager has a retained publications for the topic, they are sent to the subscriber.

Before calling RequestPublicationUpdate, open a topic for subscription to obtain an MQSubscription object.

Typically, open the subscription with the MQC.MQSO_PUBLICATIONS_ON_REQUEST option. If no wildcards are present in the topic string, then only one publication is sent as a result of this call. If the topic string contains wildcards, many publications might be sent. The method returns the number of retained publications that are sent to the subscription queue. There is no guarantee that this many publications are received, especially if they are non-persistent messages.

options

MQC.MQSRO_FAIL_IF_QUIESCING
The method fails if the queue manager is in a quiescent state. On z/OS, for a CICS or IMS application, MQC.MQSRO_FAIL_IF_QUIESCING also forces the method to fail if the connection is in a quiescent state.

MQC.MQSRO_NONE
No options are specified.

Constructors

No Public constructor.

An MQSubscription object is returned in the SubscriptionReference property of an MQTopic object that is opened for subscription,

Call the RequestPublicationUpdate method. MQSubscription is a subclass of MQManagedObject. Use the reference to access the properties and methods of MQManagedObject.

MQTopic.NET class

Use MQTopic to publish or subscribe messages on a topic, or to query or set attributes of a topic. Create an MQTopic object for publishing or subscribing by using a constructor or the MQQueueManager.AccessTopic method.

Class

```
System.Object
          |
          └─ IBM.WMQ.MQBase
                    |
                    └─ IBM.WMQ.MQBaseObject
                              |
                              └─ IBM.WMQ.MQManagedObject
                                        |
                                        └─ IBM.WMQ.MQDestination
                                                  |
                                                  └─ IBM.WMQ.MQTopic
```

```
public class IBM.WMQ.MQTopic extends IBM.WMQ.MQDestination;
```


- “Properties” on page 1760
- “Methods” on page 1761
- “Constructors” on page 1763

Properties

Test for MQException being thrown when getting properties.

public Boolean IsDurable {get;}
Read only property that returns True if the subscription is durable or False otherwise. If the topic was opened for publication, the property is ignored and would always return False.

public Boolean IsManaged {get;};
Read only property that returns True if the subscription is managed by the queue manager, or False otherwise. If the topic was opened for publication, the property is ignored and would always return False.

public Boolean IsSubscribed {get;};
Read only property that returns True if the topic was opened for subscription and False if the topic was opened for publication.

public MQSubscription SubscriptionReference {get;};

Read only property that returns the MQSubscription object associated with a topic object opened for subscription. The reference is available if you want to modify the close options or start any of the objects methods.

public MQDestination UnmanagedDestinationReference {get;};

Read only property that returns the MQQueue associated with an unmanaged subscription. It is the destination specified when the topic object was created. The property returns null for any topic objects opened for publication or with a managed subscription.

Methods

public void Put(MQMessage *message*);
public void Put(MQMessage *message*, MQPutMessageOptions *putMessageOptions*);

Throws MQException.

Publishes a message to the topic.

Modifications to the MQMessage object after the Put call has been accomplished do not affect the actual message on the IBM MQ queue or publication topic.

Put updates the MessageId and CorrelationId properties of the MQMessage object and does not clear message data. Further Put or Get calls refer to the updated information in the MQMessage object. For example, in the following code snippet, the first message contains a and the second ab.

```
msg.WriteString("a");
q.Put(msg,pmo);
msg.WriteString("b");
q.Put(msg,pmo);
```

message

An MQMessage object containing the message descriptor data, and message to be sent. The message descriptor can be altered as a consequence of this method. The values in the message descriptor immediately after the completion of this method are the values that were put to the queue or published to the topic.

The following reason codes are returned to a reconnectable client:

- MQRC_CALL_INTERRUPTED if the connection is broken while running a Put call on a persistent message and the reconnection is successful.
- MQRC_NONE if the connection is successful while running a Put call on a non-persistent message (see Application Recovery).

putMessageOptions

Options controlling the action of the put.

If *putMessageOptions* is not specified the default instance of MQPutMessageOptons is used.

If you use the MQPMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

Note: For simplicity and performance, if you want to put a single message to a queue, use MQQueueManager.Put object. You should have an MQQueue object for this.

public void Get(MQMessage *message*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*);
public void Get(MQMessage *message*, MQGetMessageOptions *getMessageOptions*, int *MaxMsgSize*);

Throws MQException.

Retrieves a message from the topic.

This method uses a default instance of MQGetMessageOptions to do the get. The message option used is MQGMO_NOWAIT.

If the get fails, the MQMessage object is unchanged. If it succeeds, the message descriptor and message data portions of the MQMessage are replaced with the message descriptor and message data from the incoming message.

All calls to IBM MQ from a particular MQQueueManager are synchronous. Therefore, if you perform a get with wait, all other threads using the same MQQueueManager are blocked from making further IBM MQ calls until the Get call is accomplished. If you need multiple threads to access IBM MQ simultaneously, each thread must create its own MQQueueManager object.

message
: Contains the message descriptor and the returned message data. Some of the fields in the message descriptor are input parameters. It is important to ensure that the MessageId and CorrelationId input parameters are set as required.

  A reconnectable client returns the reason code MQRC_BACKED_OUT after successful reconnection, for messages received under MQGM_SYNCPOINT.

getMessageOptions
: Options controlling the action of the get.

  Using option MQC.MQGMO_CONVERT might result in an exception with reason code MQC.MQRC_CONVERTED_STRING_TOO_BIG when converting from single-byte character codes to double byte codes. In this case, the message is copied into the buffer without conversion.

  If *getMessageOptions* is not specified, the message option used is MQGMO_NOWAIT.

  If you use the MQGMO_LOGICAL_ORDER option in a reconnectable client, the MQRC_RECONNECT_INCOMPATIBLE reason code is returned.

MaxMsgSize
: The largest message this message object is to receive. If the message on the queue is larger than this size, one of two things occurs:

  - If the MQGMO_ACCEPT_TRUNCATED_MSG flag is set in the MQGetMessageOptions object, the message is filled with as much of the message data as possible. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_ACCEPTED reason code.
  - If the MQGMO_ACCEPT_TRUNCATED_MSG flag is not set, the message remains on the queue. An exception is thrown with the MQCC_WARNING completion code and MQRC_TRUNCATED_MSG_FAILED reason code.

  If *MaxMsgSize* is not specified, the whole message is retrieved.

Constructors

public MQTopic(MQQueueManager *queueManager*, MQDestination *destination*, string *topicName*, string *topicObject*, int *options*);
public MQTopic(MQQueueManager *queueManager*, MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*);
public MQTopic(MQQueueManager *queueManager*, MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic(MQQueueManager *queueManager*, MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);
public MQTopic(MQQueueManager *queueManager*, string *topicName*, string *topicObject*, int *openAs*, int *options*);
public MQTopic(MQQueueManager *queueManager*, string *topicName*, string *topicObject*, int *openAs*, int *options*, string *alternateUserId*);
public MQTopic(MQQueueManager *queueManager*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic(MQQueueManager *queueManager*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);

Access a topic on *queueManager*.

MQTopic objects are closely related to administrative topic objects, which are sometimes called topic objects. On input, topicObject points to an administrative topic object. The MQTopic constructor obtains a topic string from the topic object and combines it with topicName to create a topic name. Either or both topicObject or topicName can be null. The topic name is matched to the topic tree, and the name of the closest matching administrative topic object is returned in topicObject.

The topics that are associated with the MQTopic object are the result of combining two topic strings. The first topic string is defined by the administrative topic object identified by *topicObject*. The second topic string is *topicString*. The resulting topic string associated with the MQTopic object can identify multiple topics by including wildcards.

Depending on whether the topic is opened for publishing or subscribing, you can use the MQTopic.Put methods to publish on topics, or MQTopic.Get methods to receive publications on topics. If you want to publish and subscribe to the same topic, you must access the topic twice, once for publish and once for subscribe.

If you create an MQTopic object for subscription, without providing an MQDestination object, a managed subscription is assumed. If you pass a queue as an MQDestination object, an unmanaged subscription is assumed. You must ensure the subscription options you set are consistent with the subscription being managed or unmanaged.

queueManager
Queue manager to access a topic on.

destination
destination is an MQQueue instance. By providing *destination*, MQTopic is opened as an unmanaged subscription. Publications on the topic are delivered to the queue accessed as *destination*.

topicName
A topic string that is the second part of the topic name. *topicName* is concatenated with the topic string defined in the *topicObject* administrative topic object. You can set *topicName* to null, in which case the topic name is defined by the topic string in *topicObject*.

topicObject
On input, *topicObject* is the name of the topic object that contains the topic string that forms the first part of the topic name. The topic string in *topicObject* is concatenated with *topicName*. The rules for constructing topic strings are defined in Combining topic strings.

On output, *topicObject* contains the name of the administrative topic object that is the closest match in the topic tree to the topic identified by the topic string.

openAs
Access the topic to publish or subscribe. The parameter can contain only one of these options:

- MQC.MQTOPIC_OPEN_AS_SUBSCRIPTION
- MQC.MQTOPIC_OPEN_AS_PUBLICATION

options

Combine the options that control the opening of the topic for either publication or subscription. Use MQC.MQSO_* constants to access a topic for subscription and MQC.MQOO_* constants to access a topic for publication.

If more than one option is required, add the values together, or combine the option values using the bitwise OR operator.

alternateUserId
Specify the alternate user ID that is used to check for the required authorization to finish the operation. You must specify *alternateUserId*, if either MQC.MQOO_ALTERNATE_USER_AUTHORITY or MQC.MQSO_ALTERNATE_USER_AUTHORITY is set in the options parameter.

subscriptionName
subscriptionName is required if the options MQC.MQSO_DURABLE or MQC.MQSO_ALTER are provided. In both cases, MQTopic is implicitly opened for subscription. An exception is thrown if the MQC.MQSO_DURABLE is set, and the subscription exists, or if MQC.MQSO_ALTER is set, and the subscription does not exist.

properties
Set any of the special subscription properties listed using a hash table. Specified entries in the hash table are updated with output values. Entries are not added to the hash table to report output values.

- MQC.MQSUB_PROP_ALTERNATE_SECURITY_ID
- MQC.MQSUB_PROP_SUBSCRIPTION_EXPIRY
- MQC.MQSUB_PROP_SUBSCRIPTION_USER_DATA
- MQC.MQSUB_PROP_SUBSCRIPTION_CORRELATION_ID
- MQC.MQSUB_PROP_PUBLICATION_PRIORITY
- MQC.MQSUB_PROP_PUBLICATION_ACCOUNTING_TOKEN
- MQC.MQSUB_PROP_PUBLICATION_APPLICATIONID_DATA

public MQTopic MQQueueManager.AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*);
public MQTopic MQQueueManager.AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*);
public MQTopic MQQueueManager.AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic MQQueueManager.AccessTopic(MQDestination *destination*, string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);
public MQTopic MQQueueManager.AccessTopic(string *topicName*, string *topicObject*, int *openAs*, int *options*);
public MQTopic MQQueueManager.AccessTopic(string *topicName*, string *topicObject*, int *openAs*, int *options*, string *alternateUserId*);
public MQTopic MQQueueManager.AccessTopic(string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*);
public MQTopic MQQueueManager.AccessTopic(string *topicName*, string *topicObject*, int *options*, string *alternateUserId*, string *subscriptionName*, System.Collections.Hashtable *properties*);

Access a topic on this queue manager.

`MQTopic` objects are closely related to administrative topic objects, which are sometimes called topic objects. On input, `topicObject` points to an administrative topic object. The `MQTopic` constructor obtains a topic string from the topic object and combines it with `topicName` to create a topic name. Either or both `topicObject` or `topicName` can be null. The topic name is matched to the topic tree, and the name of the closest matching administrative topic object is returned in `topicObject`.

The topics that are associated with the `MQTopic` object are the result of combining two topic strings. The first topic string is defined by the administrative topic object identified by *topicObject*. The second topic string is *topicString*. The resulting topic string associated with the `MQTopic` object can identify multiple topics by including wildcards.

Depending on whether the topic is opened for publishing or subscribing, you can use the `MQTopic.Put` methods to publish on topics, or `MQTopic.Get` methods to receive publications on topics. If you want to publish and subscribe to the same topic, you must access the topic twice, once for publish and once for subscribe.

If you create an `MQTopic` object for subscription, without providing an `MQDestination` object, a managed subscription is assumed. If you pass a queue as an `MQDestination` object, an unmanaged subscription is assumed. You must ensure the subscription options you set are consistent with the subscription being managed or unmanaged.

destination
destination is an `MQQueue` instance. By providing *destination*, `MQTopic` is opened as an unmanaged subscription. Publications on the topic are delivered to the queue accessed as *destination*.

topicName
A topic string that is the second part of the topic name. *topicName* is concatenated with the topic string defined in the *topicObject* administrative topic object. You can set *topicName* to null, in which case the topic name is defined by the topic string in *topicObject*.

topicObject
On input, *topicObject* is the name of the topic object that contains the topic string that forms the first part of the topic name. The topic string in *topicObject* is concatenated with *topicName*. The rules for constructing topic strings are defined in Combining topic strings.

On output, *topicObject* contains the name of the administrative topic object that is the closest match in the topic tree to the topic identified by the topic string.

openAs
Access the topic to publish or subscribe. The parameter can contain only one of these options:

- MQC.MQTOPIC_OPEN_AS_SUBSCRIPTION
- MQC.MQTOPIC_OPEN_AS_PUBLICATION

options

Combine the options that control the opening of the topic for either publication or subscription. Use MQC.MQSO_* constants to access a topic for subscription and MQC.MQOO_* constants to access a topic for publication.

If more than one option is required, add the values together, or combine the option values using the bitwise OR operator.

alternateUserId

Specify the alternate user ID that is used to check for the required authorization to finish the operation. You must specify *alternateUserId*, if either MQC.MQOO_ALTERNATE_USER_AUTHORITY or MQC.MQSO_ALTERNATE_USER_AUTHORITY is set in the options parameter.

subscriptionName

subscriptionName is required if the options MQC.MQSO_DURABLE or MQC.MQSO_ALTER are provided. In both cases, MQTopic is implicitly opened for subscription. An exception is thrown if the MQC.MQSO_DURABLE is set, and the subscription exists, or if MQC.MQSO_ALTER is set, and the subscription does not exist.

properties

Set any of the special subscription properties listed using a hash table. Specified entries in the hash table are updated with output values. Entries are not added to the hash table to report output values.

- MQC.MQSUB_PROP_ALTERNATE_SECURITY_ID
- MQC.MQSUB_PROP_SUBSCRIPTION_EXPIRY
- MQC.MQSUB_PROP_SUBSCRIPTION_USER_DATA
- MQC.MQSUB_PROP_SUBSCRIPTION_CORRELATION_ID
- MQC.MQSUB_PROP_PUBLICATION_PRIORITY
- MQC.MQSUB_PROP_PUBLICATION_ACCOUNTING_TOKEN
- MQC.MQSUB_PROP_PUBLICATION_APPLICATIONID_DATA

IMQObjectTrigger.NET interface

Implement IMQObjectTrigger to process messages passed by the **runmqdnm**.NET monitor.

Interface

```
public interface IBM.WMQMonitor.IMQObjectTrigger();
```

Depending on whether sync point control is specified in the **runmqdnm** command the message is removed from the queue before or after the Execute method returns.

Methods

void Execute (MQQueueManager *queueManager*, MQQueue *queue*, MQMessage *message*, string *param*);

queueManager

Queue manager hosting the queue being monitored.

queue

Queue being monitored.

message
Message read from the queue.

param
Data passed from `UserParameter`.

MQC.NET interface

Refer to an `MQI` constant by prefixing the constant name with `MQC.`. `MQC` defines all the constants used by the `MQI`.

Interface

```
System.Object
        │
        └─ IBM.WMQ.MQC
```

`public interface IBM.WMQ.MQC extends System.Object;`

Example

```
MQQueue queue;
queue.closeOptions = MQC.MQCO_DELETE;
```

Character set identifiers for .NET applications

Descriptions of the character sets you can select to encode .NET IBM MQ messages

Character set	Description
37	ibm037
437	ibm437 / PC Original
500	ibm500
819	iso-8859-1 / latin1 / ibm819
1200	Unicode
1208	UTF-8
273	ibm273
277	ibm277
278	ibm278
280	ibm280
284	ibm284
285	ibm285
297	ibm297
420	ibm420
424	ibm424
737	ibm737 / PC Greek
775	ibm775 / PC Baltic

Character set	Description
813	iso-8859-7 / greek / ibm813
838	ibm838
850	ibm850 / PC Latin 1
852	ibm852 / PC Latin 2
855	ibm855 / PC Cyrillic
856	ibm856
857	ibm857 / PC Turkish
860	ibm860 / PC Portuguese
861	ibm861 / PC Icelandic
862	ibm862 / PC Hebrew
863	ibm863 / PC Canadian French
864	ibm864 / PC Arabic
865	ibm865 / PC Nordic
866	ibm866 / PC Russian
868	ibm868
869	ibm869 / PC Modern Greek
870	ibm870
871	ibm871
874	ibm874
875	ibm875
912	iso-8859-2 / latin2 / ibm912
913	iso-8859-3 / latin3 / ibm913
914	iso-8859-4 / latin4 / ibm914
915	iso-8859-5 / cyrillic / ibm915
916	iso-8859-8 / hebrew / ibm916
918	ibm918
920	iso-8859-9 / latin5 / ibm920
921	ibm921
922	ibm922
930	ibm930
932	PC Japanese
933	ibm933
935	ibm935
937	ibm937
939	ibm939

Character set	Description
942	ibm942
943	ibm943
948	ibm948
949	ibm949
950	ibm950 / Big 5 Traditional Chinese
954	EUCJIS
964	ibm964 / CNS 11643 Traditional Chinese
970	ibm970
1006	ibm1006
1025	ibm1025
1026	ibm1026
1089	iso-8859-6 / arabic / ibm1089
1097	ibm1097
1098	ibm1098
1112	ibm1112
1122	ibm1122
1123	ibm1123
1124	ibm1124
1250	Windows Latin 2
1251	Windows Cyrillic
1252	Windows Latin 1
1253	Windows Greek
1254	Windows Turkish
1255	Windows Hebrew
1256	Windows Arabic
1257	Windows Baltic
1258	Windows Vietnamese
1381	ibm1381
1383	ibm1383
2022	JIS
5601	ksc-5601 Korean
33722	ibm33722

IBM MQ C++ classes

The IBM MQ C++ classes encapsulate the IBM MQ Message Queue Interface (MQI). There is a single C++ header file, **imqi.hpp**, which covers all of these classes.

For each class, the following information is shown:

Class hierarchy diagram
: A class diagram showing the class in its inheritance relation to its immediate parent classes, if any.

Other relevant classes
: Document links to other relevant classes, such as parent classes, and the classes of objects used in method signatures.

Object attributes
: Attributes of the class. These are in addition to those attributes defined for any parent classes. Many attributes reflect IBM MQ data-structure members (see "C++ and MQI cross-reference" on page 1771). For detailed descriptions, see "Attributes of objects" on page 786.

Constructors
: Signatures of the special methods used to create an object of the class.

Object methods (public)
: Signatures of methods that require an instance of the class for their operation, and that have no usage restrictions.

Where it applies, the following information is also shown:

Class methods (public)
: Signatures of methods that do not require an instance of the class for their operation, and that have no usage restrictions.

Overloaded (parent class) methods
: Signatures of those virtual methods that are defined in parent classes, but exhibit different, polymorphic, behavior for this class.

Object methods (protected)
: Signatures of methods that require an instance of the class for their operation, and are reserved for use by the implementations of derived classes. This section is of interest only to class writers, as opposed to class users.

Object data (protected)
: Implementation details for object instance data available to the implementations of derived classes. This section is of interest only to class writers, as opposed to class users.

Reason codes
: MQRC_* values (see API completion and reason codes) that can be expected from those methods that fail. For an exhaustive list of reason codes that can occur for an object of a class, consult the parent class documentation. The documented list of reason codes for a class does not include the reason codes for parent classes.

Note:

1. Objects of these classes are not thread-safe. This ensures optimal performance, but take care not to access any object from more than one thread.
2. It is recommended that, for a multithreaded program, a separate ImqQueueManager object is used for each thread. Each manager object must have its own independent collection of other objects, ensuring that objects in different threads are isolated from one another.

The classes are:

- "ImqAuthenticationRecord C++ class" on page 1787
- "ImqBinary C++ class" on page 1789
- "ImqCache C++ class" on page 1791
- "ImqChannel C++ class" on page 1794

- “ImqCICSBridgeHeader C++ class” on page 1799
- “ImqDeadLetterHeader C++ class” on page 1805
- “ImqDistributionList C++ class” on page 1808
- “ImqError C++ class” on page 1809
- “ImqGetMessageOptions C++ class” on page 1810
- “ImqHeader C++ class” on page 1814
- “ImqIMSBridgeHeader C++ class” on page 1815
- “ImqItem C++ class” on page 1818
- “ImqMessage C++ class” on page 1820
- “ImqMessageTracker C++ class” on page 1826
- “ImqNamelist C++ class” on page 1829
- “ImqObject C++ class” on page 1830
- “ImqProcess C++ class” on page 1836
- “ImqPutMessageOptions C++ class” on page 1837
- “ImqQueue C++ class” on page 1840
- “ImqQueueManager C++ class” on page 1850
- “ImqReferenceHeader C++ class” on page 1866
- “ImqString C++ class” on page 1869
- “ImqTrigger C++ class” on page 1874
- “ImqWorkHeader C++ class” on page 1877

C++ and MQI cross-reference

This collection of topics contains information relating C++ to the MQI.

Read this information together with “Data types used in the MQI” on page 234.

This table relates MQI data structures to the C++ classes and include files. The following topics show cross-reference information for each C++ class. These cross-references relate to the use of the underlying IBM MQ procedural interfaces. The classes ImqBinary, ImqDistributionList, and ImqString have no attributes that fall into this category and are excluded.

Table 845. Data structure, class, and include-file cross-reference

Data structure	Class	Include file
MQAIR	ImqAuthenticationRecord	imqair.hpp
	ImqBinary	imqbin.hpp
	ImqCache	imqcac.hpp
MQCD	ImqChannel	imqchl.hpp
MQCIH	ImqCICSBridgeHeader	imqcih.hpp
MQDLH	ImqDeadLetterHeader	imqdlh.hpp
MQOR	ImqDistributionList	imqdst.hpp
	ImqError	imqerr.hpp
MQGMO	ImqGetMessageOptions	imqgmo.hpp
	ImqHeader	imqhdr.hpp
MQIIH	ImqIMSBridgeHeader	imqiih.hpp

Table 845. Data structure, class, and include-file cross-reference (continued)		
Data structure	**Class**	**Include file**
	ImqItem	imqitm.hpp
MQMD	ImqMessage	imqmsg.hpp
	ImqMessageTracker	imqmtr.hpp
	ImqNamelist	imqnml.hpp
MQOD, MQRR	ImqObject	imqobj.hpp
MQPMO, MQPMR, MQRR	ImqPutMessageOptions	imqpmo.hpp
	ImqProcess	imqpro.hpp
	ImqQueue	imqque.hpp
MQBO, MQCNO, MQCSP	ImqQueueManager	imqmgr.hpp
MQRMH	ImqReferenceHeader	imqrfh.hpp
	ImqString	imqstr.hpp
MQTM	ImqTrigger	imqtrg.hpp
MQTMC		
MQTMC2	ImqTrigger	imqtrg.hpp
MQXQH		
MQWIH	ImqWorkHeader	imqwih.hpp

ImqAuthenticationRecord cross-reference

Cross-reference of attributes, data structures, fields, and calls for the ImqAuthenticationRecord C++ class.

Table 846. Attributes, data structures, fields, and calls			
Attribute	**Data structure**	**Field**	**Call**
connection name	MQAIR	AuthInfoConnName	MQCONNX
password	MQAIR	LDAPPassword	MQCONNX
type	MQAIR	AuthInfoType	MQCONNX
user name	MQAIR	LDAPUserNamePtr	MQCONNX
	MQAIR	LDAPUserNameOffset	MQCONNX
	MQAIR	LDAPUserNameLength	MQCONNX

ImqCache cross-reference

Cross-reference of attributes and calls for the ImqCache C++ class.

Table 847. Attributes and calls	
Attribute	**Call**
automatic buffer	MQGET
buffer length	MQGET

Table 847. Attributes and calls (continued)	
Attribute	**Call**
buffer pointer	MQGET, MQPUT
data length	MQGET
data offset	MQGET
data pointer	MQGET
message length	MQGET, MQPUT

ImqChannel cross-reference

Cross-reference of attributes, data structures, fields, and calls for the ImqChannel C++ class.

Table 848. Attributes, data structures, fields, and calls			
Attribute	**Data structure**	**Field**	**Call**
batch heart-beat	MQCD	BatchHeartbeat	MQCONNX
channel name	MQCD	ChannelName	MQCONNX
connection name	MQCD	ConnectionName	MQCONNX
	MQCD	ShortConnectionName	MQCONNX
header compression	MQCD	HdrCompList	MQCONNX
heart-beat interval	MQCD	HeartbeatInterval	MQCONNX
keep alive interval	MQCD	KeepAliveInterval	MQCONNX
local address	MQCD	LocalAddress	MQCONNX
maximum message length	MQCD	MaxMsgLength	MQCONNX
message compression	MQCD	MsgCompList	MQCONNX
mode name	MQCD	ModeName	MQCONNX
password	MQCD	Password	MQCONNX
receive exit count	MQCD		MQCONNX
receive exit names	MQCD	ReceiveExit	MQCONNX
	MQCD	ReceiveExitsDefined	MQCONNX
	MQCD	ReceiveExitPtr	MQCONNX
receive user data	MQCD	ReceiveUserData	MQCONNX
	MQCD	ReceiveUserDataPtr	MQCONNX
security exit name	MQCD	SecurityExit	MQCONNX
security user data	MQCD	SecurityUserData	MQCONNX
send exit count	MQCD		MQCONNX
send exit names	MQCD	SendExit	MQCONNX
	MQCD	SendExitsDefined	MQCONNX
	MQCD	SendExitPtr	MQCONNX

Table 848. Attributes, data structures, fields, and calls (continued)			
Attribute	**Data structure**	**Field**	**Call**
send user data	MQCD	SendUserData	MQCONNX
	MQCD	SendUserDataPtr	MQCONNX
SSL CipherSpec	MQCD	sslCipherSpecification	MQCONNX
SSL client authentication type	MQCD	sslClientAuthentication	MQCONNX
SSL peer name	MQCD	sslPeerName	MQCONNX
transaction program name	MQCD	TpName	MQCONNX
transport type	MQCD	TransportType	MQCONNX
user id	MQCD	UserIdentifier	MQCONNX

ImqCICSBridgeHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqCICSBridgeHeader C++ class.

Table 849. Mapping of attributes, data structures, and fields		
Attribute	**Data structure**	**Field**
bridge abend code	MQCIH	AbendCode
ADS descriptor	MQCIH	AdsDescriptor
attention identifier	MQCIH	AttentionId
authenticator	MQCIH	Authenticator
bridge completion code	MQCIH	BridgeCompletionCode
bridge error offset	MQCIH	ErrorOffset
bridge reason code	MQCIH	BridgeReason
bridge cancel code	MQCIH	CancelCode
conversational task	MQCIH	ConversationalTask
cursor position	MQCIH	CursorPosition
facility token	MQCIH	Facility
facility keep time	MQCIH	FacilityKeepTime
facility like	MQCIH	FacilityLike
function	MQCIH	Function
get wait interval	MQCIH	GetWaitInterval
link type	MQCIH	LinkType
next transaction identifier	MQCIH	NextTransactionId
output data length	MQCIH	OutputDataLength
reply-to format	MQCIH	ReplyToFormat
bridge return code	MQCIH	ReturnCode
start code	MQCIH	StartCode

Table 849. Mapping of attributes, data structures, and fields (continued)		
Attribute	**Data structure**	**Field**
task end status	MQCIH	TaskEndStatus
transaction identifier	MQCIH	TransactionId
uow control	MQCIH	UowControl
version	MQCIH	Version

ImqDeadLetterHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqDeadLetterHeader C++ class.

Table 850. Mapping of attributes, data structures, and fields		
Attribute	**Data structure**	**Field**
dead-letter reason code	MQDLH	Reason
destination queue manager name	MQDLH	DestQMgrName
destination queue name	MQDLH	DestQName
put application name	MQDLH	PutApplName
put application type	MQDLH	PutApplType
put date	MQDLH	PutDate
put time	MQDLH	PutTime

ImqError cross-reference

Cross-reference of attributes and calls for the ImqError C++ class.

Table 851. Attributes and calls	
Attribute	**Call**
completion code	MQBACK, MQBEGIN, MQCLOSE, MQCMIT, MQCONN, MQCONNX, MQDISC, MQGET, MQINQ, MQOPEN, MQPUT, MQSET
reason code	MQBACK, MQBEGIN, MQCLOSE, MQCMIT, MQCONN, MQCONNX, MQDISC, MQGET, MQINQ, MQOPEN, MQPUT, MQSET

ImqGetMessageOptions cross-reference

Cross-reference of attributes, data structures, and fields for the ImqGetMessageOptions C++ class.

Table 852. Mapping of attributes, data structures, and fields		
Attribute	**Data structure**	**Field**
group status	MQGMO	GroupStatus
match options	MQGMO	MatchOptions
message token	MQGMO	MessageToken
options	MQGMO	Options
resolved queue name	MQGMO	ResolvedQName
returned length	MQGMO	ReturnedLength

Attribute	Data structure	Field
segmentation	MQGMO	Segmentation
segment status	MQGMO	SegmentStatus
	MQGMO	Signal1
	MQGMO	Signal2
syncpoint participation	MQGMO	Options
wait interval	MQGMO	WaitInterval

Table 852. Mapping of attributes, data structures, and fields (continued)

ImqHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqHeader C++ class.

Table 853. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
character set	MQDLH, MQIIH	CodedCharSetId
encoding	MQDLH, MQIIH	Encoding
format	MQDLH, MQIIH	Format
header flags	MQIIH, MQRMH	Flags

ImqIMSBridgeHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqAuthenticationRecord C++ class.

Table 854. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
authenticator	MQIIH	Authenticator
commit mode	MQIIH	CommitMode
logical terminal override	MQIIH	LTermOverride
message format services map name	MQIIH	MFSMapName
reply-to format	MQIIH	ReplyToFormat
security scope	MQIIH	SecurityScope
transaction instance id	MQIIH	TranInstanceId
transaction state	MQIIH	TranState

ImqItem cross-reference

Cross-reference of attributes and calls for the ImqItem C++ class.

Table 855. Attributes and calls

Attribute	Call
structure id	MQGET

ImqMessage cross-reference

Cross-reference of attributes, data structures, fields, and calls for the ImqMessage C++ class.

Table 856. Attributes, data structures, fields, and calls

Attribute	Data structure	Field	Call
application ID data	MQMD	ApplIdentityData	
application origin data	MQMD	ApplOriginData	
backout count	MQMD	BackoutCount	
character set	MQMD	CodedCharSetId	
encoding	MQMD	Encoding	
expiry	MQMD	Expiry	
format	MQMD	Format	
message flags	MQMD	MsgFlags	
message type	MQMD	MsgType	
offset	MQMD	Offset	
original length	MQMD	OriginalLength	
persistence	MQMD	Persistence	
priority	MQMD	Priority	
put application name	MQMD	PutApplName	
put application type	MQMD	PutApplType	
put date	MQMD	PutDate	
put time	MQMD	PutTime	
reply-to queue manager name	MQMD	ReplyToQMgr	
reply-to queue name	MQMD	ReplyToQ	
report	MQMD	Report	
sequence number	MQMD	MsgSeqNumber	
total message length		DataLength	MQGET
user id	MQMD	UserIdentifier	

ImqMessageTracker cross-reference

Cross-reference of attributes, data structures, and fields for the ImqMessageTracker C++ class.

Table 857. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
accounting token	MQMD	AccountingToken
correlation id	MQMD	CorrelId
feedback	MQMD	Feedback
group id	MQMD	GroupId

Table 857. Mapping of attributes, data structures, and fields (continued)

Attribute	Data structure	Field
message id	MQMD	MsgId

ImqNamelist cross-reference

Cross-reference of attributes, inquiries, and calls for the ImqNamelist C++ class.

Table 858. Attributes, inquiries, and calls

Attribute	Inquiry	Call
name count	MQIA_NAME_COUNT	MQINQ
namelist name	MQCA_NAMELIST_NAME	MQINQ

ImqObject cross-reference

Cross-reference of attributes, data structures, fields, inquiries, and calls for the ImqObject C++ class.

Table 859. Attributes, data structures, fields, inquiries, and calls

Attribute	Data structure	Field	Inquiry	Call
alteration date			MQCA_ALTERATION_DATE	MQINQ
alteration time			MQCA_ALTERATION_TIME	MQINQ
alternate user id	MQOD	AlternateUserId		
alternate security id				
close options				MQCLOSE
description			MQCA_Q_DESC, MQCA_Q_MGR_DESC, MQCA_PROCESS_DESC	MQINQ
name	MQOD	ObjectName	MQCA_Q_MGR_NAME, MQCQ_Q_NAME, MQCA_PROCESS_NAME	MQINQ
open options				MQOPEN
open status				MQOPEN, MQCLOSE
queue manager identifier	queue manager identifier		MQCA_Q_MGR_IDENTIFIER	MQINQ

ImqProcess cross-reference

Cross-reference of attributes, inquiries, and calls for the ImqAuthenticationRecord C++ class.

Table 860. Attributes, inquiries, and calls

Attribute	Inquiry	Call
application id	MQCA_APPL_ID	MQINQ
application type	MQIA_APPL_TYPE	MQINQ
environment data	MQCA_ENV_DATA	MQINQ

Table 860. Attributes, inquiries, and calls (continued)		
Attribute	**Inquiry**	**Call**
user data	MQCA_USER_DATA	MQINQ

ImqPutMessageOptions cross-reference

Cross-reference of attributes, data structures, and fields for the ImqAuthenticationRecord C++ class.

Table 861. Mapping of attributes, data structures, and fields		
Attribute	**Data structure**	**Field**
context reference	MQPMO	Context
	MQPMO	InvalidDestCount
	MQPMO	KnownDestCount
options	MQPMO	Options
record fields	MQPMO	PutMsgRecFields
resolved queue manager name	MQPMO	ResolvedQMgrName
resolved queue name	MQPMO	ResolvedQName
	MQPMO	Timeout
	MQPMO	UnknownDestCount
syncpoint participation	MQPMO	Options

ImqQueue cross-reference

Cross-reference of attributes, data structures, fields, inquiries, and calls for the ImqQueue C++ class.

Table 862. ImqQueue cross-reference				
Attribute	**Data structure**	**Field**	**Inquiry**	**Call**
backout requeue name			MQCA_BACKOUT_REQ_Q_NAME	MQINQ
backout threshold			MQIA_BACKOUT_THRESHOLD	MQINQ
base queue name			MQCA_BASE_Q_NAME	MQINQ
cluster name			MQCA_CLUSTER_NAME	MQINQ
cluster namelist name			MQCA_CLUSTER_NAMELIST	MQINQ
cluster workload rank			MQIA_CLWL_Q_RANK	MQINQ
cluster workload priority			MQIA_CLWL_Q_PRIORITY	MQINQ
cluster workload use queue			MQIA_CLWL_USEQ	MQINQ
creation date			MQCA_CREATION_DATE	MQINQ
creation time			MQCA_CREATION_TIME	MQINQ
current depth			MQIA_CURRENT_Q_DEPTH	MQINQ

Table 862. ImqQueue cross-reference (continued)

Attribute	Data structure	Field	Inquiry	Call
default bind			MQIA_DEF_BIND	MQINQ
default input open option			MQIA_DEF_INPUT_OPEN_OPTION	MQINQ
default persistence			MQIA_DEF_PERSISTENCE	MQINQ
default priority			MQIA_DEF_PRIORITY	MQINQ
definition type			MQIA_DEFINITION_TYPE	MQINQ
depth high event			MQIA_Q_DEPTH_HIGH_EVENT	MQINQ
depth high limit			MQIA_Q_DEPTH_HIGH_LIMIT	MQINQ
depth low event			MQIA_Q_DEPTH_LOW_EVENT	MQINQ
depth low limit			MQIA_Q_DEPTH_LOW_LIMIT	MQINQ
depth maximum event			MQIA_Q_DEPTH_MAX_LIMIT	MQINQ
distribution lists			MQIA_DIST_LISTS	MQINQ, MQSET
dynamic queue name	MQOD	DynamicQName		
harden get backout			MQIA_HARDEN_GET_BACKOUT	MQINQ
index type			MQIA_INDEX_TYPE	MQINQ
inhibit get			MQIA_INHIBIT_GET	MQINQ, MQSET
inhibit put			MQIA_INHIBIT_PUT	MQINQ, MQSET
initiation queue name			MQCA_INITIATION_Q_NAME	MQINQ
maximum depth			MQIA_MAX_Q_DEPTH	MQINQ
maximum message length			MQIA_MAX_MSG_LENGTH	MQINQ
message delivery sequence			MQIA_MSG_DELIVERY_SEQUENCE	MQINQ
next distributed queue				
non persistent message class			MQIA_NPM_CLASS	MQINQ
open input count			MQIA_OPEN_INPUT_COUNT	MQINQ
open output count			MQIA_OPEN_OUTPUT_COUNT	MQINQ
previous distributed queue				
process name			MQCA_PROCESS_NAME	MQINQ
queue accounting			MQIA_ACCOUNTING_Q	MQINQ

Table 862. ImqQueue cross-reference (continued)				
Attribute	**Data structure**	**Field**	**Inquiry**	**Call**
queue manager name	MQOD	ObjectQMgrName		
queue monitoring			MQIA_MONITORING_Q	MQINQ
queue statistics			MQIA_STATISTICS_Q	MQINQ
queue type			MQIA_Q_TYPE	MQINQ
remote queue manager name			MQCA_REMOTE_Q_MGR_NAME	MQINQ
remote queue name			MQCA_REMOTE_Q_NAME	MQINQ
resolved queue manager name	MQOD	ResolvedQMgrName		
resolved queue name	MQOD	ResolvedQName		
retention interval			MQIA_RETENTION_INTERVAL	MQINQ
scope			MQIA_SCOPE	MQINQ
service interval			MQIA_Q_SERVICE_INTERVAL	MQINQ
service interval event			MQIA_Q_SERVICE_INTERVAL_EVENT	MQINQ
shareability			MQIA_SHAREABILITY	MQINQ
storage class			MQCA_STORAGE_CLASS	MQINQ
transmission queue name			MQCA_XMIT_Q_NAME	MQINQ
trigger control			MQIA_TRIGGER_CONTROL	MQINQ, MQSET
trigger data			MQCA_TRIGGER_DATA	MQINQ, MQSET
trigger depth			MQIA_TRIGGER_DEPTH	MQINQ, MQSET
trigger message priority			MQIA_TRIGGER_MSG_PRIORITY	MQINQ, MQSET
trigger type			MQIA_TRIGGER_TYPE	MQINQ, MQSET
usage			MQIA_USAGE	MQINQ

ImqQueueManager cross-reference

Cross-reference of attributes, data structures, fields, inquiries, and calls for the ImqQueueManager C++ class.

Table 863. Attributes, data structures, fields, inquiries, and calls

Attribute	Data structure	Field	Inquiry	Call
accounting connections override			MQIA_ACCOUNTING_CONN_OVERRIDE	MQINQ
accounting interval			MQIA_ACCOUNTING_INTERVAL	MQINQ
activity recording			MQIA_ACTIVITY_RECORDING	MQINQ
adopt new mca check			MQIA_ADOPTNEWMCA_CHECK	MQINQ
adopt new mca type			MQIA_ADOPTNEWMCA_TYPE	MQINQ
authentication type	MQCSP	AuthenticationType		MQCONNX
authority event			MQIA_AUTHORITY_EVENT	MQINQ
begin options	MQBO	Options		MQBEGIN
bridge event			MQIA_BRIDGE_EVENT	MQINQ
channel auto definition			MQIA_CHANNEL_AUTO_DEF	MQINQ
channel auto definition event			MQIA_CHANNEL_AUTO_EVENT	MQIA
channel auto definition exit			MQIA_CHANNEL_AUTO_EXIT	MQIA
channel event			MQIA_CHANNEL_EVENT	MQINQ
channel initiator adapters			MQIA_CHINIT_ADAPTERS	MQINQ
channel initiator control			MQIA_CHINIT_CONTROL	MQINQ
channel initiator dispatchers			MQIA_CHINIT_DISPATCHERS	MQINQ
channel initiator trace auto start			MQIA_CHINIT_TRACE_AUTO_START	MQINQ
channel initiator trace table size			MQIA_CHINIT_TRACE_TABLE_SIZE	MQINQ
channel monitoring			MQIA_MONITORING_CHANNEL	MQINQ
channel reference	MQCD	ChannelType		MQCONNX
channel statistics			MQIA_STATISTICS_CHANNEL	MQINQ
character set			MQIA_CODED_CHAR_SET_ID	MQINQ

Table 863. Attributes, data structures, fields, inquiries, and calls (continued)				
Attribute	**Data structure**	**Field**	**Inquiry**	**Call**
cluster sender monitoring			MQIA_MONITORING_AUTO_CLUSSDR	MQINQ
cluster sender statistics			MQIA_STATISTICS_AUTO_CLUSSDR	MQINQ
cluster workload data			MQCA_CLUSTER_WORKLOAD_DATA	MQINQ
cluster workload exit			MQCA_CLUSTER_WORKLOAD_EXIT	MQINQ
cluster workload length			MQIA_CLUSTER_WORKLOAD_LENGTH	MQINQ
cluster workload mru			MQIA_CLWL_MRU_CHANNELS	MQINQ
cluster workload use queue			MQIA_CLWL_USEQ	MQINQ
command event			MQIA_COMMAND_EVENT	MQINQ
command input queue name			MQCA_COMMAND_INPUT_Q_NAME	MQINQ
command level			MQIA_COMMAND_LEVEL	MQINQ
command server control			MQIA_CMD_SERVER_CONTROL	MQINQ
connect options	MQCNO	Options		MQCONN, MQCONNX
connection id	MQCNO	ConnectionId		MQCONNX
connection status				MQCONN, MQCONNX, MQDISC
connection tag	MQCD	ConnTag		MQCONNX
cryptographic hardware	MQSCO	CryptoHardware		MQCONNX
dead-letter queue name			MQCA_DEAD_LETTER_Q_NAME	MQINQ
default transmission queue name			MQCA_DEF_XMIT_Q_NAME	MQINQ
distribution lists			MQIA_DIST_LISTS	MQINQ
dns group			MQCA_DNS_GROUP	MQINQ
dns wlm			MQIA_DNS_WLM	MQINQ
first authentication record	MQSCO	AuthInfoRecOffset		MQCONNX

Table 863. Attributes, data structures, fields, inquiries, and calls (continued)

Attribute	Data structure	Field	Inquiry	Call
	MQSCO	AuthInfoRecPtr		MQCONNX
inhibit event			MQIA_INHIBIT_EVENT	MQINQ
ip address version			MQIA_IP_ADDRESS_VERSION	MQINQ
key repository	MQSCO	KeyRepository		MQCONNX
key reset count	MQSCO	KeyResetCount		MQCONNX
listener timer			MQIA_LISTENER_TIMER	MQINQ
local event			MQIA_LOCAL_EVENT	MQINQ
logger event			MQIA_LOGGER_EVENT	MQINQ
lu group name			MQCA_LU_GROUP_NAME	MQINQ
lu name			MQCA_LU_NAME	MQINQ
lu62 arm suffix			MQCA_LU62_ARM_SUFFIX	MQINQ
lu62 channels			MQIA_LU62_CHANNELS	MQINQ
maximum active channels			MQIA_ACTIVE_CHANNELS	MQINQ
maximum channels			MQIA_MAX_CHANNELS	MQINQ
maximum handles			MQIA_MAX_HANDLES	MQINQ
maximum message length			MQIA_MAX_MSG_LENGTH	MQINQ
maximum priority			MQIA_MAX_PRIORITY	MQINQ
maximum uncommitted messages			MQIA_MAX_UNCOMMITTED_MSGS	MQINQ
mqi accounting			MQIA_ACCOUNTING_MQI	MQINQ
mqi statistics			MQIA_STATISTICS_MQI	MQINQ
outbound port maximum			MQIA_OUTBOUND_PORT_MAX	MQINQ
outbound port minimum			MQIA_OUTBOUND_PORT_MIN	MQINQ
password	MQCSP	CSPPasswordPtr		MQCONNX
	MQCSP	CSPPasswordOffset		MQCONNX
	MQCSP	CSPPasswordLength		MQCONNX
performance event			MQIA_PERFORMANCE_EVENT	MQINQ
platform			MQIA_PLATFORM	MQINQ
queue accounting			MQIA_ACCOUNTING_Q	MQINQ

Table 863. Attributes, data structures, fields, inquiries, and calls (continued)

Attribute	Data structure	Field	Inquiry	Call
queue monitoring			MQIA_MONITORING_Q	MQINQ
queue statistics			MQIA_STATISTICS_Q	MQINQ
receive timeout			MQIA_RECEIVE_TIMEOUT	MQINQ
receive timeout minimum			MQIA_RECEIVE_TIMEOUT_MIN	MQINQ
receive timeout type			MQIA_RECEIVE_TIMEOUT_TYPE	MQINQ
remote event			MQIA_REMOTE_EVENT	MQINQ
repository name			MQCA_REPOSITORY_NAME	MQINQ
repository namelist			MQCA_REPOSITORY_NAMELIST	MQINQ
shared queue queue manager name			MQIA_SHARED_Q_Q_MGR_NAME	MQINQ
ssl event			MQIA_SSL_EVENT	MQINQ
ssl fips			MQIA_SSL_FIPS_REQUIRED	MQINQ
ssl key reset count			MQIA_SSL_RESET_COUNT	MQINQ
start-stop event			MQIA_START_STOP_EVENT	MQINQ
statistics interval			MQIA_STATISTICS_INTERVAL	MQINQ
syncpoint availability			MQIA_SYNCPOINT	MQINQ
tcp channels			MQIA_TCP_CHANNELS	MQINQ
tcp keep alive			MQIA_TCP_KEEP_ALIVE	MQINQ
tcp name			MQCA_TCP_NAME	MQINQ
tcp stack type			MQIA_TCP_STACK_TYPE	MQINQ
trace route recording			MQIA_TRACE_ROUTE_RECORDING	MQINQ
trigger interval			MQIA_TRIGGER_INTERVAL	MQINQ
user id	MQCSP	CSPUserIdPtr		MQCONNX
	MQCSP	CSPUserIdOffset		MQCONNX
	MQCSP	CSPUserIdLength		MQCONNX

ImqReferenceHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqAuthenticationRecord C++ class.

Table 864. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
destination environment	MQRMH	DestEnvLength, DestEnvOffset
destination name	MQRMH	DestNameLength, DestNameOffset
instance id	MQRMH	ObjectInstanceId
logical length	MQRMH	DataLogicalLength
logical offset	MQRMH	DataLogicalOffset
logical offset 2	MQRMH	DataLogicalOffset2
reference type	MQRMH	ObjectType
source environment	MQRMH	SrcEnvLength, SrcEnvOffset
source name	MQRMH	SrcNameLength, SrcNameOffset

ImqTrigger cross-reference

Cross-reference of attributes, data structures, and fields for the ImqAuthenticationRecord C++ class.

Table 865. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
application id	MQTM	ApplId
application type	MQTM	ApplType
environment data	MQTM	EnvData
process name	MQTM	ProcessName
queue name	MQTM	QName
trigger data	MQTM	TriggerData
user data	MQTM	UserData

ImqWorkHeader cross-reference

Cross-reference of attributes, data structures, and fields for the ImqAuthenticationRecord C++ class.

Table 866. Mapping of attributes, data structures, and fields

Attribute	Data structure	Field
message token	MQWIH	MessageToken
service name	MQWIH	ServiceName
service step	MQWIH	ServiceStep

ImqAuthenticationRecord C++ class

This class encapsulates an authentication information record (MQAIR) for use during execution of the ImqQueueManager::connect method, for custom TLS client connections.

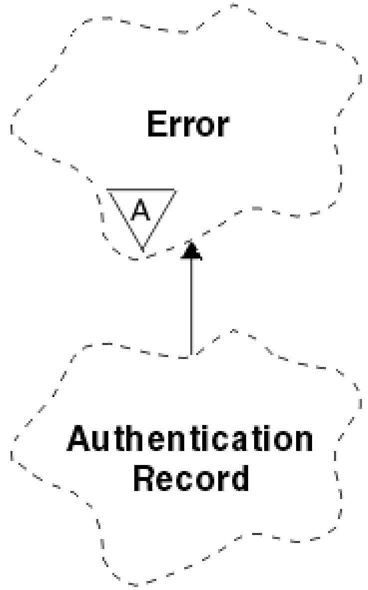


Figure 14. ImqAuthenticationRecord class

See the description of the ImqQueueManager::connect method for more details. This class is not available on the z/OS platform.

- "Object attributes" on page 1787
- "Constructors" on page 1788
- "Object methods (public)" on page 1788
- "Object methods (protected)" on page 1788

Object attributes

connection name
The name of the connection to the LDAP CRL server. This is the IP address or DNS name, followed optionally by the port number, in parentheses.

connection reference
A reference to an ImqQueueManager object that provides the required connection to a (local) queue manager. The initial value is zero. Do not confuse this with the queue manager name that identifies a queue manager (possibly remote) for a named queue.

next authentication record
Next object of this class, in no particular order, having the same **connection reference** as this object. The initial value is zero.

password
A password supplied for connection authentication to the LDAP CRL server.

previous authentication record
Previous object of this class, in no particular order, having the same **connection reference** as this object. The initial value is zero.

type
The type of authentication information contained in the record.

user name
A user identifier supplied for authorization to the LDAP CRL server.

Constructors

ImqAuthenticationRecord( );
The default constructor.

Object methods (public)

void operator = (const ImqAuthenticationRecord & *air*);
Copies instance data from *air*, replacing the existing instance data.

const ImqString & connectionName ( ) const ;
Returns the **connection name**.

void setConnectionName (const ImqString & *name*);
Sets the **connection name**.

void setConnectionName (const char * *name* = 0);
Sets the **connection name**.

ImqQueueManager * connectionReference ( ) const ;
Returns the **connection reference**.

void setConnectionReference (ImqQueueManager & *manager*);
Sets the **connection reference**.

void setConnectionReference (ImqQueueManager * *manager* = 0);
Sets the **connection reference**.

void copyOut (MQAIR * *pAir*);
Copies instance data to *pAir*, replacing the existing instance data. This might involve allocating dependent storage.

void clear (MQAIR * *pAir*);
Clears the structure and releases dependent storage referenced by *pAir*.

ImqAuthenticationRecord * nextAuthenticationRecord ( ) const ;
Returns the **next authentication record**.

const ImqString & password ( ) const ;
Returns the **password**.

void setPassword (const ImqString & *password*);
Sets the **password**.

void setPassword (const char * *password* = 0);
Sets the **password**.

ImqAuthenticationRecord * previousAuthenticationRecord ( ) const ;
Returns the **previous authentication record**.

MQLONG type ( ) const ;
Returns the **type**.

void setType (const MQLONG *type*);
Sets the **type**.

const ImqString & userName ( ) const ;
Returns the **user name**.

void setUserName (const ImqString & *name*);
Sets the **user name**.

void setUserName (const char * *name* = 0);
Sets the **user name**.

Object methods (protected)

void setNextAuthenticationRecord (ImqAuthenticationRecord * *pAir* = 0);
Sets the **next authentication record**.

Attention: Use this function only if you are sure that it will not break the authentication record list.

void setPreviousAuthenticationRecord (ImqAuthenticationRecord * *pAir* = 0);
Sets the **previous authentication record**.

Attention: Use this function only if you are sure that it will not break the authentication record list.

ImqBinary C++ class

This class encapsulates a binary byte array that can be used for ImqMessage **accounting token**, **correlation id**, and **message id** values. It allows easy assignment, copying, and comparison.

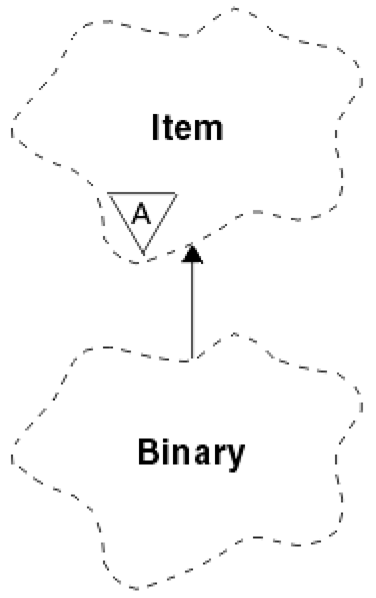


Figure 15. ImqBinary class

- “Object attributes” on page 1789
- “Constructors” on page 1789
- “Overloaded ImqItem methods” on page 1790
- “Object methods (public)” on page 1790
- “Object methods (protected)” on page 1790
- “Reason codes” on page 1790

Object attributes

data
An array of bytes of binary data. The initial value is null.

data length
The number of bytes. The initial value is zero.

data pointer
The address of the first byte of the **data**. The initial value is zero.

Constructors

ImqBinary( );
The default constructor.

ImqBinary(const ImqBinary & *binary*);
The copy constructor.

ImqBinary(const void * *data*, const size_t *length*);
Copies *length* bytes from *data*.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & *msg*);
Copies the **data** to the message buffer, replacing any existing content. Sets the *msg* **format** to MQFMT_NONE.

See the ImqItem class method description for further details.

virtual ImqBoolean pasteIn (ImqMessage & *msg*);
Sets the **data** by transferring the remaining data from the message buffer, replacing the existing **data**.

To be successful, the ImqMessage **format** must be MQFMT_NONE.

See the ImqItem class method description for further details.

Object methods (public)

void operator = (const ImqBinary & *binary*);
Copies bytes from *binary*.

ImqBoolean operator == (const ImqBinary & *binary*);
Compares this object with *binary*. It returns FALSE if not equal and TRUE otherwise. The objects are equal if they have the same **data length** and the bytes match.

ImqBoolean copyOut (void * *buffer*, const size_t *length*, const char *pad* = 0);
Copies up to *length* bytes from the **data pointer** to *buffer*. If the **data length** is insufficient, the remaining space in *buffer* is filled with *pad* bytes. *buffer* can be zero if *length* is also zero. *length* must not be negative. It returns TRUE if successful.

size_t dataLength ( ) const ;
Returns the **data length**.

ImqBoolean setDataLength (const size_t *length*);
Sets the **data length**. If the **data length** is changed as a result of this method, the data in the object is uninitialized. It returns TRUE if successful.

void * dataPointer ( ) const ;
Returns the **data pointer**.

ImqBoolean isNull ( ) const ;
Returns TRUE if the **data length** is zero, or if all the **data** bytes are zero. Otherwise it returns FALSE.

ImqBoolean set (const void * *buffer*, const size_t *length*);
Copies *length* bytes from *buffer*. It returns TRUE if successful.

Object methods (protected)

void clear ( );
Reduces the **data length** to zero.

Reason codes

- MQRC_NO_BUFFER
- MQRC_STORAGE_NOT_AVAILABLE
- MQRC_INCONSISTENT_FORMAT

ImqCache C++ class

Use this class to hold or marshal data in memory.

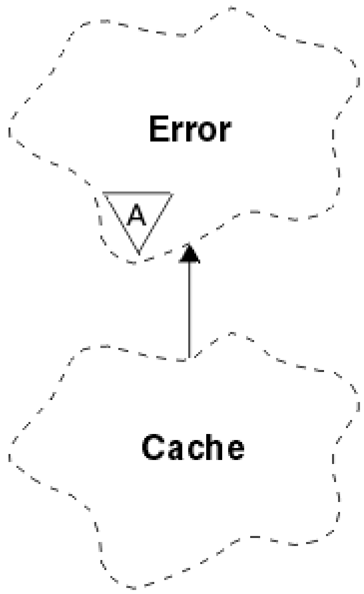


Figure 16. ImqCache class

Use this class to hold or marshal data in memory. You can nominate a buffer of memory of fixed size, or the system can provide a flexible amount of memory automatically. This class relates to the MQI calls listed in "ImqCache cross-reference" on page 1772.

- "Object attributes" on page 1791
- "Constructors" on page 1792
- "Object methods (public)" on page 1792
- "Reason codes" on page 1793

Object attributes

automatic buffer
Indicates whether buffer memory is managed automatically by the system (TRUE) or is supplied by the user (FALSE). It is initially set to TRUE.

This attribute is not set directly. It is set indirectly using either the **useEmptyBuffer** or the **useFullBuffer** method.

If user storage is supplied, this attribute is FALSE, buffer memory cannot grow, and buffer overflow errors can occur. The address and length of the buffer remain constant.

If user storage is not supplied, this attribute is TRUE, and buffer memory can grow incrementally to accommodate an arbitrary amount of message data. However, when the buffer grows, the address of the buffer might change, so be careful when using the **buffer pointer** and **data pointer**.

buffer length
The number of bytes of memory in the buffer. The initial value is zero.

buffer pointer
The address of the buffer memory. The initial value is null.

data length
The number of bytes succeeding the **data pointer**. This must be equal to or less than the **message length**. The initial value is zero.

data offset
The number of bytes preceding the **data pointer**. This must be equal to or less than the **message length**. The initial value is zero.

data pointer
The address of the part of the buffer that is to be written to or read from next. The initial value is null.

message length
The number of bytes of significant data in the buffer. The initial value is zero.

Constructors

ImqCache( );
The default constructor.

ImqCache(const ImqCache & *cache*);
The copy constructor.

Object methods (public)

void operator = (const ImqCache & *cache*);
Copies up to **message length** bytes of data from the *cache* object to the object. If **automatic buffer** is FALSE, the **buffer length** must already be sufficient to accommodate the copied data.

ImqBoolean automaticBuffer ( ) const ;
Returns the **automatic buffer** value.

size_t bufferLength ( ) const ;
Returns the **buffer length**.

char * bufferPointer ( ) const ;
Returns the **buffer pointer**.

void clearMessage ( );
Sets the **message length** and **data offset** to zero.

size_t dataLength ( ) const ;
Returns the **data length**.

size_t dataOffset ( ) const ;
Returns the **data offset**.

ImqBoolean setDataOffset (const size_t *offset*);
Sets the **data offset**. The **message length** is increased if necessary to ensure that it is no less than the **data offset**. This method returns TRUE if successful.

char * dataPointer ( ) const ;
Returns a copy of the **data pointer**.

size_t messageLength ( ) const ;
Returns the **message length**.

ImqBoolean setMessageLength (const size_t *length*);
Sets the **message length**. Increases the **buffer length** if necessary to ensure that the **message length** is no greater than the **buffer length**. Reduces the **data offset** if necessary to ensure that it is no greater than the **message length**. It returns TRUE if successful.

ImqBoolean moreBytes (const size_t *bytes-required*);
Assures that *bytes-required* more bytes are available (for writing) between the **data pointer** and the end of the buffer. It returns TRUE if successful.

If **automatic buffer** is TRUE, more memory is acquired as required; otherwise, the **buffer length** must already be adequate.

ImqBoolean read (const size_t *length*, char * & *external-buffer*);
Copies *length* bytes, from the buffer starting at the **data pointer** position, into the *external-buffer*. After the data has been copied, the **data offset** is increased by *length*. This method returns TRUE if successful.

ImqBoolean resizeBuffer (const size_t *length*);

Varies the **buffer length**, provided that **automatic buffer** is TRUE. This is achieved by reallocating the buffer memory. Up to **message length** bytes of data from the existing buffer are copied to the new one. The maximum number copied is *length* bytes. The **buffer pointer** is changed. The **message length** and **data offset** are preserved as closely as possible within the confines of the new buffer. It returns TRUE if successful, and FALSE if **automatic buffer** is FALSE.

Note: This method can fail with MQRC_STORAGE_NOT_AVAILABLE if there is any problem with system resources.

ImqBoolean useEmptyBuffer (const char * *external-buffer*, const size_t *length*);

Identifies an empty user buffer, setting the **buffer pointer** to point to *external-buffer*, the **buffer length** to *length*, and the **message length** to zero. Performs a **clearMessage**. If the buffer is fully primed with data, use the **useFullBuffer** method instead. If the buffer is partially primed with data, use the **setMessageLength** method to indicate the correct amount. This method returns TRUE if successful.

This method can be used to identify a fixed amount of memory, as described previously (*external-buffer* is not null and *length* is nonzero), in which case **automatic buffer** is set to FALSE, or it can be used to revert to system-managed flexible memory (*external-buffer* is null and *length* is zero), in which case **automatic buffer** is set to TRUE.

ImqBoolean useFullBuffer (const char * *externalBuffer*, const size_t *length*);

As for **useEmptyBuffer**, except that the **message length** is set to *length*. It returns TRUE if successful.

ImqBoolean write (const size_t *length*, const char * *external-buffer*);

Copies *length* bytes, from the *external-buffer*, into the buffer starting at the **data pointer** position. After the data has been copied, the **data offset** is increased by *length*, and the **message length** is increased if necessary to ensure that it is no less than the new **data offset** value. This method returns TRUE if successful.

If **automatic buffer** is TRUE, an adequate amount of memory is guaranteed; otherwise, the ultimate **data offset** must not exceed the **buffer length**.

Reason codes

- MQRC_BUFFER_NOT_AUTOMATIC
- MQRC_DATA_TRUNCATED
- MQRC_INSUFFICIENT_BUFFER
- MQRC_INSUFFICIENT_DATA
- MQRC_NULL_POINTER
- MQRC_STORAGE_NOT_AVAILABLE
- MQRC_ZERO_LENGTH

ImqChannel C++ class

This class encapsulates a channel definition (MQCD) for use during execution of the Manager::connect method, for custom client connections.

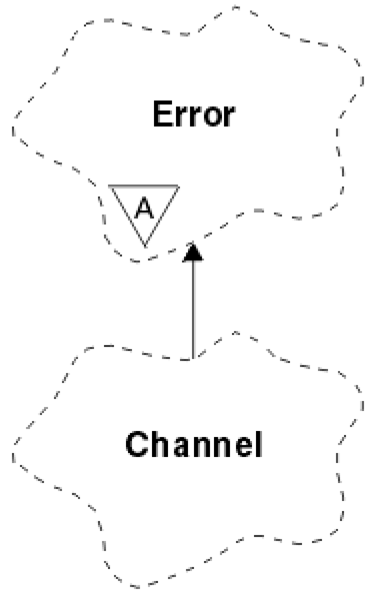


Figure 17. ImqChannel class

See the description of the Manager::connect method, and Sample program HELLO WORLD (imqwrld.cpp), for more details.

Not all the listed methods are applicable to all platforms. See the descriptions of the DEFINE CHANNEL and ALTER CHANNEL commands for more information.

The ImqChannel class is not supported on z/OS.

- "Object attributes" on page 1794
- "Constructors" on page 1795
- "Object methods (public)" on page 1796
- "Reason codes" on page 1799

Object attributes

batch heart-beat
The number of milliseconds between checks that a remote channel is active. The initial value is 0.

channel name
The name of the channel. The initial value is null.

connection name
The name of the connection. For example, the IP address of a host computer. The initial value is null.

header compression
The list of header data compression techniques supported by the channel. The initial values are all set to MQCOMPRESS_NOT_AVAILABLE.

heart-beat interval
The number of seconds between checks that a connection is still working. The initial value is 300.

keep alive interval
The number of seconds passed to the communications stack specifying the keep alive timing for the channel. The initial value is MQKAI_AUTO.

local address
The local communications address for the channel.

maximum message length
The maximum length of message supported by the channel in a single communication. The initial value is 4 194 304.

message compression
The list of message data compression techniques supported by the channel. The initial values are all set to MQCOMPRESS_NOT_AVAILABLE.

mode name
The name of the mode. The initial value is null.

password
A password supplied for connection authentication. The initial value is null.

receive exit count
The number of receive exits. The initial value is zero. This attribute is read-only.

receive exit names
The names of receive exits.

receive user data
Data associated with receive exits.

security exit name
The name of a security exit to be invoked on the server side of the connection. The initial value is null.

security user data
Data to be passed to the security exit. The initial value is null.

send exit count
The number of send exits. The initial value is zero. This attribute is read-only.

send exit names
The names of send exits.

send user data
Data associated with send exits.

SSL CipherSpec
CipherSpec for use with TLS.

SSL client authentication type
Client authentication type for use with TLS.

SSL peer name
Peer name for use with TLS.

transaction program name
The name of the transaction program. The initial value is null.

transport type
The transport type of the connection. The initial value is MQXPT_LU62.

user id
A user identifier supplied for authorization. The initial value is null.

Constructors

ImqChannel( ) ;
The default constructor.

ImqChannel(const ImqChannel & ***channel*** **);**
The copy constructor.

Object methods (public)

void operator = (const ImqChannel & *channel*);
Copies instance data from *channel*, replacing any existing instance data.

MQLONG batchHeartBeat( ) const ;
Returns the **batch heart-beat**.

ImqBoolean setBatchHeartBeat(const MQLONG *heartbeat* = 0L);
Sets the **batch heart-beat**. This method returns TRUE if successful.

ImqString channelName( ) const ;
Returns the **channel name**.

ImqBoolean setChannelName(const char * *name* = 0);
Sets the **channel name**. This method returns TRUE if successful.

ImqString connectionName( ) const ;
Returns the **connection name**.

ImqBoolean setConnectionName(const char * *name* = 0);
Sets the **connection name**. This method returns TRUE if successful.

size_t headerCompressionCount( ) const ;
Returns the supported header data compression techniques count.

ImqBoolean headerCompression(const size_t count, MQLONG compress [ ]) const ;
Returns copies of the supported header data compression techniques in **compress**. This method returns TRUE if successful.

ImqBoolean setHeaderCompression(const size_t count, const MQLONG compress [ ]);

Sets the supported header data compression techniques to **compress**.

Sets the supported header data compression techniques count to **count**.

This method returns TRUE if successful.

MQLONG heartBeatInterval( ) const ;
Returns the **heart-beat interval**.

ImqBoolean setHeartBeatInterval(const MQLONG *interval* = 300L);
Sets the **heart-beat interval**. This method returns TRUE if successful.

MQLONG keepAliveInterval( ) const ;
Returns the **keep alive interval**.

ImqBoolean setKeepAliveInterval(const MQLONG *interval* = MQKAI_AUTO);
Sets the **keep alive interval**. This method returns TRUE if successful.

ImqString localAddress() const ;
Returns the **local address**.

ImqBoolean setLocalAddress (const char * *address* = 0);
Sets the **local address**. This method returns TRUE if successful.

MQLONG maximumMessageLength( ) const ;
Returns the **maximum message length**.

ImqBoolean setMaximumMessageLength(const MQLONG *length* = 4194304L);
Sets the **maximum message length**. This method returns TRUE if successful.

size_t messageCompressionCount( ) const ;
Returns the supported message data compression techniques count.

ImqBoolean messageCompression(const size_t count, MQLONG compress [ ]) const ;
Returns copies of the supported message data compression techniques in **compress**. This method returns TRUE if successful.

ImqBoolean setMessageCompression(const size_t count, const MQLONG compress [ ]);

Sets the supported message data compression techniques to compress.

Sets the supported message data compression techniques count to count.

This method returns TRUE if successful.

ImqString modeName( ) const ;
Returns the **mode name**.

ImqBoolean setModeName(const char * *name* = 0);
Sets the **mode name**. This method returns TRUE if successful.

ImqString password( ) const ;
Returns the **password**.

ImqBoolean setPassword(const char * *password* = 0);
Sets the **password**. This method returns TRUE if successful.

size_t receiveExitCount( ) const ;
Returns the **receive exit count**.

ImqString receiveExitName( );
Returns the first of the **receive exit names**, if any. If the **receive exit count** is zero, it returns an empty string.

ImqBoolean receiveExitNames(const size_t *count*, ImqString * *names* [ ]);
Returns copies of the **receive exit names** in *names*. Sets any *names* in excess of **receive exit count** to null strings. This method returns TRUE if successful.

ImqBoolean setReceiveExitName(const char * *name* = 0);
Sets the **receive exit names** to the single *name*. *name* can be blank or null. Sets the **receive exit count** to either 1 or zero. Clears the **receive user data**. This method returns TRUE if successful.

ImqBoolean setReceiveExitNames(const size_t *count*, const char * *names* [ ]);
Sets the **receive exit names** to *names*. Individual *names* values must not be blank or null. Sets the **receive exit count** to *count*. Clears the **receive user data**. This method returns TRUE if successful.

ImqBoolean setReceiveExitNames(const size_t *count*, const ImqString * *names* [ ]);
Sets the **receive exit names** to *names*. Individual *names* values must not be blank or null. Sets the **receive exit count** to *count*. Clears the **receive user data**. This method returns TRUE if successful.

ImqString receiveUserData( );
Returns the first of the **receive user data** items, if any. If the **receive exit count** is zero, returns an empty string.

ImqBoolean receiveUserData(const size_t *count*, ImqString * *data* [ ]);
Returns copies of the **receive user data** items in *data*. Sets any *data* in excess of **receive exit count** to null strings. This method returns TRUE if successful.

ImqBoolean setReceiveUserData(const char * *data* = 0);
Sets the **receive user data** to the single item *data*. If *data* is not null, **receive exit count** must be at least 1. This method returns TRUE if successful.

ImqBoolean setReceiveUserData(const size_t *count*, const char * *data* [ ]);
Sets the **receive user data** to *data*. *count* must be no greater than the **receive exit count**. This method returns TRUE if successful.

ImqBoolean setReceiveUserData(const size_t *count*, const ImqString * *data* [ ]);
Sets the **receive user data** to *data*. *count* must be no greater than the **receive exit count**. This method returns TRUE if successful.

ImqString securityExitName( ) const ;
Returns the **security exit name**.

ImqBoolean setSecurityExitName(const char * *name* = 0);
Sets the **security exit name**. This method returns TRUE if successful.

ImqString securityUserData( ) const ;
Returns the **security user data**.

ImqBoolean setSecurityUserData(const char * *data* = 0);
Sets the **security user data**. This method returns TRUE if successful.

size_t sendExitCount( ) const ;
Returns the **send exit count**.

ImqString sendExitName( );
Returns the first of the **send exit names**, if any. Returns an empty string if the **send exit count** is zero.

ImqBoolean sendExitNames(const size_t *count*, ImqString * *names* [ ]);
Returns copies of the **send exit names** in *names*. Sets any *names* in excess of **send exit count** to null strings. This method returns TRUE if successful.

ImqBoolean setSendExitName(const char * *name* = 0);
Sets the **send exit names** to the single *name*. *name* can be blank or null. Sets the **send exit count** to either 1 or zero. Clears the **send user data**. This method returns TRUE if successful

ImqBoolean setSendExitNames(const size_t *count*, const char * *names* [ ]);
Sets the **send exit names** to *names*. Individual *names* values must not be blank or null. Sets the **send exit count** to *count*. Clears the **send user data**. This method returns TRUE if successful.

ImqBoolean setSendExitNames(const size_t *count*, const ImqString * *names* [ ]);
Sets the **send exit names** to *names*. Individual *names* values must not be blank or null. Sets the **send exit count** to *count*. Clears the **send user data**. This method returns TRUE if successful.

ImqString sendUserData( );
Returns the first of the **send user data** items, if any. , Returns an empty string if the **send exit count** is zero.

ImqBoolean sendUserData(const size_t *count*, ImqString * *data* [ ]);
Returns copies of the **send user data** items in *data*. Sets any *data* in excess of **send exit count** to null strings. This method returns TRUE if successful.

ImqBoolean setSendUserData(const char * *data* = 0);
Sets the **send user data** to the single item *data*. If *data* is not null, **send exit count** must be at least 1. This method returns TRUE if successful.

ImqBoolean setSendUserData(const size_t *count*, const char * *data* [ ]);
Sets the **send user data** to *data*. *count* must be no greater than the **send exit count**. This method returns TRUE if successful.

ImqBoolean setSendUserData(const size_t *count*, const ImqString * *data* [ ]);
Sets the **send user data** to *data*. *count* must be no greater than the **send exit count**. This method returns TRUE if successful.

ImqString sslCipherSpecification( ) const ;
Returns the TLS cipher specification.

ImqBoolean setSslCipherSpecification(const char * *name* = 0);
Sets the TLS cipher specification. This method returns TRUE if successful.

MQLONG sslClientAuthentication( ) const ;
Returns the TLS client authentication type.

ImqBoolean setSslClientAuthentication(const MQLONG *auth* = MQSCA_REQUIRED);
Sets the TLS client authentication type. This method returns TRUE if successful.

ImqString sslPeerName( ) const ;
Returns the TLS peer name.

ImqBoolean setSslPeerName(const char * *name* = 0);
Sets the TLS peer name. This method returns TRUE if successful.

ImqString transactionProgramName( ) const ;
Returns the **transaction program name**.

ImqBoolean setTransactionProgramName(const char * *name* = 0);
Sets the **transaction program name**. This method returns TRUE if successful.

MQLONG transportType( ) const ;
Returns the **transport type**.

ImqBoolean setTransportType(const MQLONG *type* = MQXPT_LU62);
Sets the **transport type**. This method returns TRUE if successful.

ImqString userId( ) const ;
Returns the **user id**.

ImqBoolean setUserId(const char * *id* = 0);
Sets the **user id**. This method returns TRUE if successful.

Reason codes

- MQRC_DATA_LENGTH_ERROR
- MQRC_ITEM_COUNT_ERROR
- MQRC_NULL_POINTER
- MQRC_SOURCE_BUFFER_ERROR

ImqCICSBridgeHeader C++ class

This class encapsulates specific features of the MQCIH data structure.

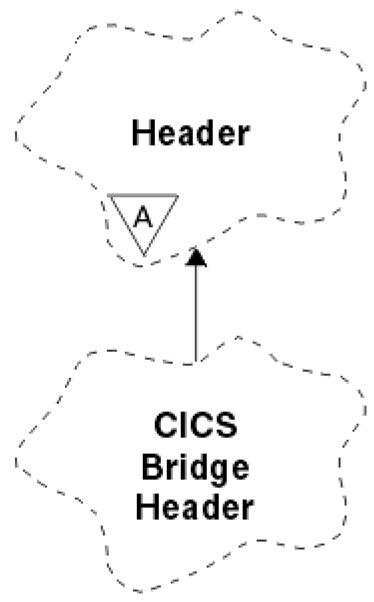


Figure 18. ImqCICSBridgeHeader class

Objects of this class are used by applications that send messages to the CICS bridge through IBM MQ for z/OS.

- "Object attributes" on page 1799
- "Constructors" on page 1802
- "Overloaded ImqItem methods" on page 1802
- "Object methods (public)" on page 1802
- "Object data (protected)" on page 1804
- "Reason codes" on page 1804
- "Return codes" on page 1804

Object attributes

ADS descriptor
Send/receive ADS descriptor. This is set using MQCADSD_NONE. The initial value is MQCADSD_NONE. The following additional values are possible:

- MQCADSD_NONE
- MQCADSD_SEND
- MQCADSD_RECV

- MQCADSD_MSGFORMAT

attention identifier
AID key. The field must be of length MQ_ATTENTION_ID_LENGTH.

authenticator
RACF password or passticket. The initial value contains blanks, of length MQ_AUTHENTICATOR_LENGTH.

bridge abend code
Bridge abend code, of length MQ_ABEND_CODE_LENGTH. The initial value is four blank characters. The value returned in this field is dependent on the return code. See Table 867 on page 1804 for more details.

bridge cancel code
Bridge abend transaction code. The field is reserved, must contain blanks, and be of length MQ_CANCEL_CODE_LENGTH.

bridge completion code
Completion code, which can contain either the IBM MQ completion code or the CICS EIBRESP value. The field has the initial value of MQCC_OK. The value returned in this field is dependent on the return code. See Table 867 on page 1804 for more details.

bridge error offset
Bridge error offset. The initial value is zero. This attribute is read-only.

bridge reason code
Reason code. This field can contain either the IBM MQ reason or the CICS EIBRESP2 value. The field has the initial value of MQRC_NONE. The value returned in this field is dependent on the return code. See Table 867 on page 1804 for more details.

bridge return code
Return code from the CICS bridge. The initial value is MQCRC_OK.

conversational task
Whether the task can be conversational. The initial value is MQCCT_NO. The following additional values are possible:

- MQCCT_YES
- MQCCT_NO

cursor position
Cursor position. The initial value is zero.

facility keep time
CICS bridge facility release time.

facility like
Terminal emulated attribute. The field must be of length MQ_FACILITY_LIKE_LENGTH.

facility token
BVT token value. The field must be of length MQ_FACILITY_LENGTH. The initial value is MQCFAC_NONE.

function
Function, which can contain either the IBM MQ call name or the CICS EIBFN function. The field has the initial value of MQCFUNC_NONE, with length MQ_FUNCTION_LENGTH. The value returned in this field is dependent on the return code. See Table 867 on page 1804 for more details.

The following additional values are possible when **function** contains an IBM MQ call name:

- MQCFUNC_MQCONN
- MQCFUNC_MQGET
- MQCFUNC_MQINQ
- MQCFUNC_NONE
- MQCFUNC_MQOPEN

- MQCFUNC_PUT
- MQCFUNC_MQPUT1

get wait interval
Wait interval for an MQGET call issued by the CICS bridge task. The initial value is MQCGWI_DEFAULT. The field applies only when **uow control** has the value MQCUOWC_FIRST. The following additional values are possible:

- MQCGWI_DEFAULT
- MQWI_UNLIMITED

link type
Link type. The initial value is MQCLT_PROGRAM. The following additional values are possible:

- MQCLT_PROGRAM
- MQCLT_TRANSACTION

next transaction identifier
ID of the next transaction to attach. The field must be of length MQ_TRANSACTION_ID_LENGTH.

output data length
COMMAREA data length. The initial value is MQCODL_AS_INPUT.

reply-to format
Format name of the reply message. The initial value is MQFMT_NONE with length MQ_FORMAT_LENGTH.

start code
Transaction start code. The field must be of length MQ_START_CODE_LENGTH. The initial value is MQCSC_NONE. The following additional values are possible:

- MQCSC_START
- MQCSC_STARTDATA
- MQCSC_TERMINPUT
- MQCSC_NONE

task end status
Task end status. The initial value is MQCTES_NOSYNC. The following additional values are possible:

- MQCTES_COMMIT
- MQCTES_BACKOUT
- MQCTES_ENDTASK
- MQCTES_NOSYNC

transaction identifier
ID of the transaction to attach. The initial value must contain blanks, and must be of length MQ_TRANSACTION_ID_LENGTH. The field applies only when **uow control** has the value MQCUOWC_FIRST or MQCUOWC_ONLY.

UOW control
UOW control. The initial value is MQCUOWC_ONLY. The following additional values are possible:

- MQCUOWC_FIRST
- MQCUOWC_MIDDLE
- MQCUOWC_LAST
- MQCUOWC_ONLY
- MQCUOWC_COMMIT
- MQCUOWC_BACKOUT
- MQCUOWC_CONTINUE

version
The MQCIH version number. The initial value is MQCIH_VERSION_2. The only other supported value is MQCIH_VERSION_1.

Constructors

ImqCICSBridgeHeader( );
The default constructor.

ImqCICSBridgeHeader(const ImqCICSBridgeHeader & ***header*** **);**
The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut(ImqMessage & ***msg*** **);**
Inserts an MQCIH data structure into the message buffer at the beginning, moving existing message data further along, and sets the message format to MQFMT_CICS.

See the parent class method description for more details.

virtual ImqBoolean pasteIn(ImqMessage & ***msg*** **);**
Reads an MQCIH data structure from the message buffer. To be successful, the encoding of the *msg* object must be MQENC_NATIVE. Retrieve messages with MQGMO_CONVERT to MQENC_NATIVE. To be successful, the ImqMessage format must be MQFMT_CICS.

See the parent class method description for more details.

Object methods (public)

void operator = (const ImqCICSBridgeHeader & ***header*** **);**
Copies instance data from the *header*, replacing the existing instance data.

MQLONG ADSDescriptor( ) const;
Returns a copy of the **ADS descriptor**.

void setADSDescriptor(const MQLONG ***descriptor*** **= MQCADSD_NONE);**
Sets the **ADS descriptor**.

ImqString attentionIdentifier( ) const;
Returns a copy of the **attention identifier**, padded with trailing blanks to length MQ_ATTENTION_ID_LENGTH.

void setAttentionIdentifier(const char * ***data*** **= 0);**
Sets the **attention identifier**, padded with trailing blanks to length MQ_ATTENTION_ID_LENGTH. If no *data* is supplied, resets **attention identifier** to the initial value.

ImqString authenticator( ) const;
Returns a copy of the **authenticator**, padded with trailing blanks to length MQ_AUTHENTICATOR_LENGTH.

void setAuthenticator(const char * ***data*** **= 0);**
Sets the **authenticator**, padded with trailing blanks to length MQ_AUTHENTICATOR_LENGTH. If no *data* is supplied, resets **authenticator** to the initial value.

ImqString bridgeAbendCode( ) const;
Returns a copy of the **bridge abend code**, padded with trailing blanks to length MQ_ABEND_CODE_LENGTH.

ImqString bridgeCancelCode( ) const;
Returns a copy of the **bridge cancel code**, padded with trailing blanks to length MQ_CANCEL_CODE_LENGTH.

void setBridgeCancelCode(const char * ***data*** **= 0);**
Sets the **bridge cancel code**, padded with trailing blanks to length MQ_CANCEL_CODE_LENGTH. If no *data* is supplied, resets the **bridge cancel code** to the initial value.

MQLONG bridgeCompletionCode( ) const;
Returns a copy of the **bridge completion code**.

MQLONG bridgeErrorOffset( ) const ;
Returns a copy of the **bridge error offset**.

MQLONG bridgeReasonCode( ) const;
Returns a copy of the **bridge reason code**.

MQLONG bridgeReturnCode( ) const;
Returns the **bridge return code**.

MQLONG conversationalTask( ) const;
Returns a copy of the **conversational task**.

void setConversationalTask(const MQLONG *task* = MQCCT_NO);
Sets the **conversational task**.

MQLONG cursorPosition( ) const ;
Returns a copy of the **cursor position**.

void setCursorPosition(const MQLONG *position* = 0);
Sets the **cursor position**.

MQLONG facilityKeepTime( ) const;
Returns a copy of the **facility keep time**.

void setFacilityKeepTime(const MQLONG *time* = 0);
Sets the **facility keep time**.

ImqString facilityLike( ) const;
Returns a copy of the **facility like**, padded with trailing blanks to length MQ_FACILITY_LIKE_LENGTH.

void setFacilityLike(const char * *name* = 0);
Sets the **facility like**, padded with trailing blanks to length MQ_FACILITY_LIKE_LENGTH. If no *name* is supplied, resets **facility like** the initial value.

ImqBinary facilityToken( ) const;
Returns a copy of the **facility token**.

ImqBoolean setFacilityToken(const ImqBinary & *token*);
Sets the **facility token**. The **data length** of *token* must be either zero or MQ_FACILITY_LENGTH. It returns TRUE if successful.

void setFacilityToken(const MQBYTE8 *token* = 0);
Sets the **facility token**. *token* can be zero, which is the same as specifying MQCFAC_NONE. If *token* is nonzero it must address MQ_FACILITY_LENGTH bytes of binary data. When using predefined values such as MQCFAC_NONE, you might need to make a cast to ensure a signature match. For example, (MQBYTE *)MQCFAC_NONE.

ImqString function( ) const;
Returns a copy of the **function**, padded with trailing blanks to length MQ_FUNCTION_LENGTH.

MQLONG getWaitInterval( ) const;
Returns a copy of the **get wait interval**.

void setGetWaitInterval(const MQLONG *interval* = MQCGWI_DEFA
Sets the **get wait interval**.

MQLONG linkType( ) const;
Returns a copy of the **link type**.

void setLinkType(const MQLONG *type* = MQCLT_PROGRAM);
Sets the **link type**.

ImqString nextTransactionIdentifier( ) const ;
Returns a copy of the **next transaction identifier** data, padded with trailing blanks to length MQ_TRANSACTION_ID_LENGTH.

MQLONG outputDataLength( ) const;
Returns a copy of the **output data length**.

void setOutputDataLength(const MQLONG *length* = MQCODL_AS_INPUT);
Sets the **output data length**.

ImqString replyToFormat( ) const;
Returns a copy of the **reply-to format** name, padded with trailing blanks to length MQ_FORMAT_LENGTH.

void setReplyToFormat(const char * *name* = 0);
Sets the **reply-to format**, padded with trailing blanks to length MQ_FORMAT_LENGTH. If no *name* is supplied, resets **reply-to format** to the initial value.

ImqString startCode( ) const;
Returns a copy of the **start code**, padded with trailing blanks to length MQ_START_CODE_LENGTH.

void setStartCode(const char * *data* = 0);
Sets the **start code** data, padded with trailing blanks to length MQ_START_CODE_LENGTH. If no *data* is supplied, resets **start code** to the initial value.

MQLONG taskEndStatus( ) const;
Returns a copy of the **task end status**.

ImqString transactionIdentifier( ) const;
Returns a copy of the **transaction identifier** data, padded with trailing blanks to the length MQ_TRANSACTION_ID_LENGTH.

void setTransactionIdentifier(const char * *data* = 0);
Sets the **transaction identifier**, padded with trailing blanks to length MQ_TRANSACTION_ID_LENGTH. If no *data* is supplied, resets **transaction identifier** to the initial value.

MQLONG UOWControl( ) const;
Returns a copy of the **UOW control**.

void setUOWControl(const MQLONG *control* = MQCUOWC_ONLY);
Sets the **UOW control**.

MQLONG version( ) const;
Returns the **version** number.

ImqBoolean setVersion(const MQLONG *version* = MQCIH_VERSION_2);
Sets the **version** number. It returns TRUE if successful.

Object data (protected)

MQLONG *olVersion*
The maximum MQCIH version number that can be accommodated in the storage allocated for *opcih*.

PMQCIH *opcih*
The address of an MQCIH data structure. The amount of storage allocated is indicated by *olVersion*.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR
- MQRC_WRONG_VERSION

Return codes

Table 867. ImqCICSBridgeHeader class return codes

Return Code	Function	CompCode	Reason	Abend Code
MQCRC_OK				
MQCRC_BRIDGE_ERROR			MQFB_CICS	

Return Code	Function	CompCode	Reason	Abend Code
MQCRC_MQ_API_ERROR	IBM MQ call name	IBM MQ CompCode	IBM MQ Reason	
MQCRC_BRIDGE_TIMEOUT	IBM MQ call name	IBM MQ CompCode	IBM MQ Reason	
MQCRC_CICS_EXEC_ERROR	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	
MQCRC_SECURITY_ERROR	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	
MQCRC_PROGRAM_NOT_AVAILABLE	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	
MQCRC_TRANSID_NOT_AVAILABLE	CICS EIBFN	CICS EIBRESP	CICS EIBRESP2	
MQCRC_BRIDGE_ABEND				CICS ABCODE
MQCRC_APPLICATION_ABEND				CICS ABCODE

Table 867. ImqCICSBridgeHeader class return codes (continued)

ImqDeadLetterHeader C++ class

This class encapsulates features of the MQDLH data structure.

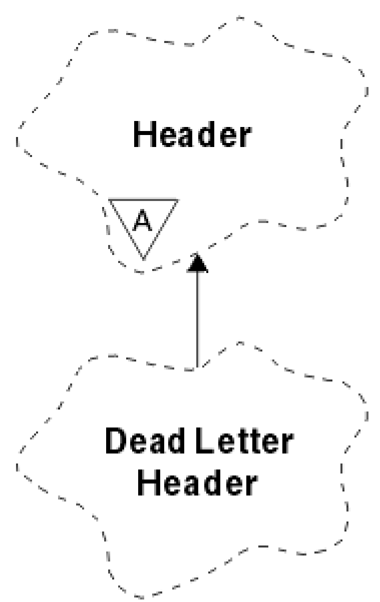


Figure 19. ImqDeadLetterHeader class

Objects of this class are typically used by an application that encounters an message that cannot be processed. A new message comprising a dead-letter header and the message content is placed on the dead-letter queue, and the message is discarded.

- “Object attributes” on page 1806
- “Constructors” on page 1806
- “Overloaded ImqItem methods” on page 1806
- “Object methods (public)” on page 1806
- “Object data (protected)” on page 1807
- “Reason codes” on page 1807

Object attributes

dead-letter reason code
The reason the message arrived on the dead-letter queue. The initial value is MQRC_NONE.

destination queue manager name
The name of the original destination queue manager. The name is a string of length MQ_Q_MGR_NAME_LENGTH. Its initial value is null.

destination queue name
The name of the original destination queue. The name is a string of length MQ_Q_NAME_LENGTH. Its initial value is null.

put application name
The name of the application that put the message on the dead-letter queue. The name is a string of length MQ_PUT_APPL_NAME_LENGTH. Its initial value is null.

put application type
The type of application that put the message on the dead-letter queue. The initial value is zero.

put date
The date when the message was put on the dead-letter queue. The date is a string of length MQ_PUT_DATE_LENGTH. Its initial value is a null string.

put time
The time when the message was put on the dead-letter queue. The time is a string of length MQ_PUT_TIME_LENGTH. Its initial value is a null string.

Constructors

ImqDeadLetterHeader( );
The default constructor.

ImqDeadLetterHeader(const ImqDeadLetterHeader & ***header*** **);**
The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & ***msg*** **);**
Inserts an MQDLH data structure into the message buffer at the beginning, moving existing message data further along. Sets the *msg* format to MQFMT_DEAD_LETTER_HEADER.

See the ImqHeader class method description on page “ImqHeader C++ class” on page 1814 for further details.

virtual ImqBoolean pasteIn (ImqMessage & ***msg*** **);**
Reads an MQDLH data structure from the message buffer.

To be successful, the ImqMessage format must be MQFMT_DEAD_LETTER_HEADER.

See the ImqHeader class method description on page “ImqHeader C++ class” on page 1814 for further details.

Object methods (public)

void operator = (const ImqDeadLetterHeader & ***header*** **);**
Copies instance data is copied from *header*, replacing the existing instance data.

MQLONG deadLetterReasonCode ( ) const ;
Returns the dead-letter reason code.

void setDeadLetterReasonCode (const MQLONG ***reason*** **);**
Sets the dead-letter reason code.

ImqString destinationQueueManagerName ( ) const ;
Returns the destination queue manager name, stripped of any trailing blanks.

void setDestinationQueueManagerName (const char * *name*);
Sets the destination queue manager name. Truncates data longer than MQ_Q_MGR_NAME_LENGTH (48 characters).

ImqString destinationQueueName ( ) const ;
Returns a copy of the destination queue name, stripped of any trailing blanks.

void setDestinationQueueName (const char * *name*);
Sets the destination queue name. Truncates data longer than MQ_Q_NAME_LENGTH (48 characters).

ImqString putApplicationName ( ) const ;
Returns a copy of the put application name, stripped of any trailing blanks.

void setPutApplicationName (const char * *name* = 0);
Sets the put application name. Truncates data longer than MQ_PUT_APPL_NAME_LENGTH (28 characters).

MQLONG putApplicationType ( ) const ;
Returns the put application type.

void setPutApplicationType (const MQLONG *type* = MQAT_NO_CONTEXT);
Sets the put application type.

ImqString putDate ( ) const ;
Returns a copy of the put date, stripped of any trailing blanks.

void setPutDate (const char * *date* = 0);
Sets the put date. Truncates data longer than MQ_PUT_DATE_LENGTH (8 characters).

ImqString putTime ( ) const ;
Returns a copy of the put time, stripped of any trailing blanks.

void setPutTime (const char * *time* = 0);
Sets the put time. Truncates data longer than MQ_PUT_TIME_LENGTH (8 characters).

Object data (protected)

MQDLH *omqdlh*
The MQDLH data structure.

Reason codes

- MQRC_INCONSISTENT_FORMAT
- MQRC_STRUC_ID_ERROR
- MQRC_ENCODING_ERROR

ImqDistributionList C++ class

This class encapsulates a dynamic distribution list that references one or more queues for the purpose of sending a message or messages to multiple destinations.

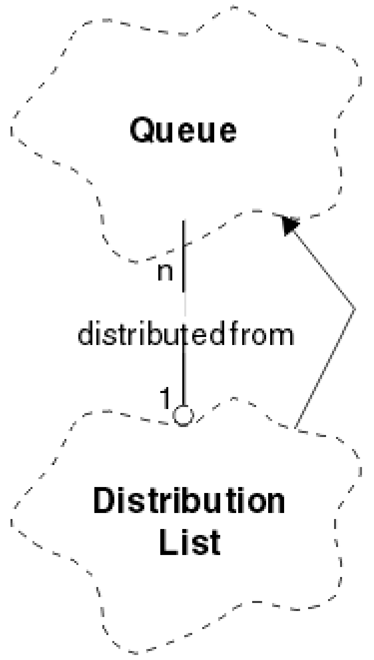


Figure 20. ImqDistributionList class

- "Object attributes" on page 1808
- "Constructors" on page 1808
- "Object methods (public)" on page 1808
- "Object methods (protected)" on page 1809

Object attributes

first distributed queue

The first of one or more objects of class , in no particular order, in which the **distribution list reference** addresses this object.

Initially there are no such objects. To open an ImqDistributionList successfully, there must be at least one such object.

Note: When an ImqDistributionList object is opened, any open objects that reference it are automatically closed.

Constructors

ImqDistributionList( );

The default constructor.

ImqDistributionList(const ImqDistributionList & *list*);

The copy constructor.

Object methods (public)

void operator = (const ImqDistributionList & *list*);

All objects that reference **this** object are dereferenced before copying. No objects will reference **this** object after the invocation of this method.

*** firstDistributedQueue ( ) const ;**
Returns the **first distributed queue**.

Object methods (protected)

void setFirstDistributedQueue (* *queue* = 0);
Sets the **first distributed queue**.

ImqError C++ class

This abstract class provides information on errors associated with an object.

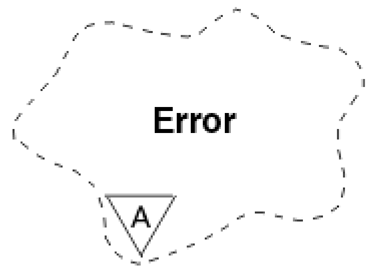


Figure 21. ImqError class

- “Object attributes” on page 1809
- “Constructors” on page 1809
- “Object methods (public)” on page 1809
- “Object methods (protected)” on page 1810
- “Reason codes” on page 1810

Object attributes

completion code
The most recent completion code. The initial value is zero. The following additional values are possible:

- MQCC_OK
- MQCC_WARNING
- MQCC_FAILED

reason code
The most recent reason code. The initial value is zero.

Constructors

ImqError( );
The default constructor.

ImqError(const ImqError & *error*);
The copy constructor.

Object methods (public)

void operator = (const ImqError & *error*);
Copies instance data from *error*, replacing the existing instance data.

void clearErrorCodes ( );
Sets the **completion code** and **reason code** both to zero.

MQLONG completionCode ( ) const ;
Returns the **completion code**.

MQLONG reasonCode ( ) const ;
Returns the **reason code**.

Object methods (protected)

ImqBoolean checkReadPointer (const void * *pointer*, const size_t *length*);
Verifies that the combination of pointer and length is valid for read-only access, and returns TRUE if successful.

ImqBoolean checkWritePointer (const void * *pointer*, const size_t *length*);
Verifies that the combination of pointer and length is valid for read-write access, and returns TRUE if successful.

void setCompletionCode (const MQLONG *code* = 0);
Sets the **completion code**.

void setReasonCode (const MQLONG *code* = 0);
Sets the **reason code**.

Reason codes

- MQRC_BUFFER_ERROR

ImqGetMessageOptions C++ class

This class encapsulates the MQGMO data structure

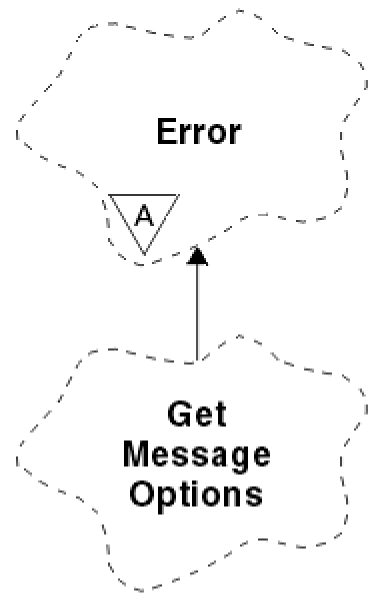


Figure 22. ImqGetMessageOptions class

- "Object attributes" on page 1811
- "Constructors" on page 1812
- "Object methods (public)" on page 1812
- "Object methods (protected)" on page 1813
- "Object data (protected)" on page 1813
- "Reason codes" on page 1813

Object attributes

group status

Status of a message for a group of messages. The initial value is MQGS_NOT_IN_GROUP. The following additional values are possible:

- MQGS_MSG_IN_GROUP
- MQGS_LAST_MSG_IN_GROUP

match options

Options for selecting incoming messages. The initial value is MQMO_MATCH_MSG_ID | MQMO_MATCH_CORREL_ID. The following additional values are possible:

- MQMO_GROUP_ID
- MQMO_MATCH_MSG_SEQ_NUMBER
- MQMO_MATCH_OFFSET
- MQMO_MSG_TOKEN
- MQMO_NONE

message token

Message token. A binary value (MQBYTE16) of length MQ_MSG_TOKEN_LENGTH. The initial value is MQMTOK_NONE.

options

Options applicable to a message. The initial value is MQGMO_NO_WAIT. The following additional values are possible:

- MQGMO_WAIT
- MQGMO_SYNCPOINT
- MQGMO_SYNCPOINT_IF_PERSISTENT
- MQGMO_NO_SYNCPOINT
- MQGMO_MARK_SKIP_BACKOUT
- MQGMO_BROWSE_FIRST
- MQGMO_BROWSE_NEXT
- MQGMO_BROWSE_MSG_UNDER_CURSOR
- MQGMO_MSG_UNDER_CURSOR
- MQGMO_LOCK
- MQGMO_UNLOCK
- MQGMO_ACCEPT_TRUNCATED_MSG
- MQGMO_SET_SIGNAL
- MQGMO_FAIL_IF_QUIESCING
- MQGMO_CONVERT
- MQGMO_LOGICAL_ORDER
- MQGMO_COMPLETE_MSG
- MQGMO_ALL_MSGS_AVAILABLE
- MQGMO_ALL_SEGMENTS_AVAILABLE
- MQGMO_NONE

resolved queue name

Resolved queue name. This attribute is read-only. Names are never longer than 48 characters and can be padded to that length with nulls. The initial value is a null string.

returned length

Returned length. The initial value is MQRL_UNDEFINED. This attribute is read-only.

segmentation
The ability to segment a message. The initial value is MQSEG_INHIBITED. The additional value, MQSEG_ALLOWED, is possible.

segment status
The segmentation status of a message. The initial value is MQSS_NOT_A_SEGMENT. The following additional values are possible:

- MQSS_SEGMENT
- MQSS_LAST_SEGMENT

syncpoint participation
TRUE when messages are retrieved under syncpoint control.

wait interval
The length of time that the class get method pauses while waiting for a suitable message to arrive, if one is not already available. The initial value is zero, which effects an indefinite wait. The additional value, MQWI_UNLIMITED, is possible. This attribute is ignored unless the options include MQGMO_WAIT.

Constructors

ImqGetMessageOptions( );
The default constructor.

ImqGetMessageOptions(const ImqGetMessageOptions & *gmo*);
The copy constructor.

Object methods (public)

void operator = (const ImqGetMessageOptions & *gmo*);
Copies instance data from *gmo*, replacing the existing instance data.

MQCHAR groupStatus ( ) const ;
Returns the group status.

void setGroupStatus (const MQCHAR *status*);
Sets the group status.

MQLONG matchOptions ( ) const ;
Returns the match options.

void setMatchOptions (const MQLONG *options*);
Sets the match options.

ImqBinary messageToken( ) const;
Returns the message token.

ImqBoolean setMessageToken(const ImqBinary & *token*);
Sets the message token. The data length of *token* must be either zero or MQ_MSG_TOKEN_LENGTH. This method returns TRUE if successful.

void setMessageToken(const MQBYTE16 *token* = 0);
Sets the message token. *token* can be zero, which is the same as specifying MQMTOK_NONE. If *token* is nonzero, then it must address MQ_MSG_TOKEN_LENGTH bytes of binary data.

When using predefined values, such as MQMTOK_NONE, you might not need to make a cast to ensure a signature match, for example (MQBYTE *)MQMTOK_NONE.

MQLONG options ( ) const ;
Returns the options.

void setOptions (const MQLONG *options*);
Sets the options, including the syncpoint participation value.

ImqString resolvedQueueName ( ) const ;
Returns a copy of the resolved queue name.

MQLONG returnedLength( ) const;
Returns the returned length.

MQCHAR segmentation ( ) const ;
Returns the segmentation.

void setSegmentation (const MQCHAR *value*);
Sets the segmentation.

MQCHAR segmentStatus ( ) const ;
Returns the segment status.

void setSegmentStatus (const MQCHAR *status*);
Sets the segment status.

ImqBoolean syncPointParticipation ( ) const ;
Returns the syncpoint participation value, which is TRUE if the options include either MQGMO_SYNCPOINT or MQGMO_SYNCPOINT_IF_PERSISTENT.

void setSyncPointParticipation (const ImqBoolean *sync*);
Sets the syncpoint participation value. If *sync* is TRUE, alters the options to include MQGMO_SYNCPOINT, and to exclude both MQGMO_NO_SYNCPOINT and MQGMO_SYNCPOINT_IF_PERSISTENT. If *sync* is FALSE, alters the options to include MQGMO_NO_SYNCPOINT, and to exclude both MQGMO_SYNCPOINT and MQGMO_SYNCPOINT_IF_PERSISTENT.

MQLONG waitInterval ( ) const ;
Returns the wait interval.

void setWaitInterval (const MQLONG *interval*);
Sets the wait interval.

Object methods (protected)

static void setVersionSupported (const MQLONG);
Sets the MQGMO version. Defaults to MQGMO_VERSION_3.

Object data (protected)

MQGMO *omqgmo*
An MQGMO Version 2 data structure. Access MQGMO fields supported for MQGMO_VERSION_2 only.

PMQGMO *opgmo*
The address of an MQGMO data structure. The version number for this address is indicated in *olVersion*. Inspect the version number before accessing MQGMO fields, to ensure that they are present.

MQLONG *olVersion*
The version number of the MQGMO data structure addressed by *opgmo*.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR

ImqHeader C++ class

This abstract class encapsulates common features of the MQDLH data structure.

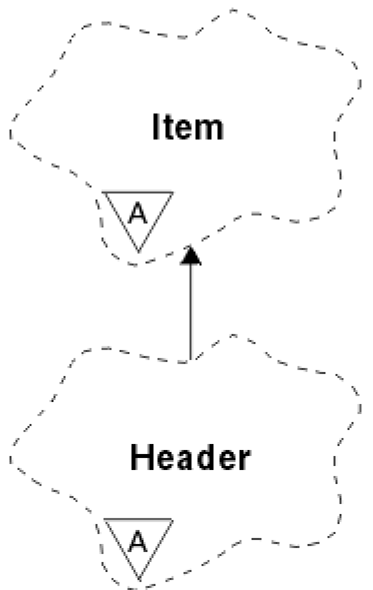


Figure 23. ImqHeader class

- “Object attributes” on page 1814
- “Constructors” on page 1814
- “Object methods (public)” on page 1815

Object attributes

character set
The original coded character set identifier. Initially MQCCSI_Q_MGR.

encoding
The original encoding. Initially MQENC_NATIVE.

format
The original format. Initially MQFMT_NONE.

header flags
The initial values are:

- Zero for objects of the ImqDeadLetterHeader class
- MQIIH_NONE for objects of the ImqIMSBridgeHeader class
- MQRMHF_LAST for objects of the ImqReferenceHeader class
- MQCIH_NONE for objects of the ImqCICSBridgeHeader class
- MQWIH_NONE for objects of the ImqWorkHeader class

Constructors

ImqHeader( );
The default constructor.

ImqHeader(const ImqHeader & *header*);
The copy constructor.

Object methods (public)

void operator = (const ImqHeader & *header*);
Copies instance data from *header*, replacing the existing instance data.

virtual MQLONG characterSet ( ) const ;
Returns the **character set**.

virtual void setCharacterSet (const MQLONG *ccsid* = MQCCSI_Q_MGR);
Sets the **character set**.

virtual MQLONG encoding ( ) const ;
Returns the **encoding**.

virtual void setEncoding (const MQLONG *encoding* = MQENC_NATIVE);
Sets the **encoding**.

virtual ImqString format ( ) const ;
Returns a copy of the **format**, including trailing blanks.

virtual void setFormat (const char * *name* = 0);
Sets the **format**, padded to 8 characters with trailing blanks.

virtual MQLONG headerFlags ( ) const ;
Returns the **header flags**.

virtual void setHeaderFlags (const MQLONG *flags* = 0);
Sets the **header flags**.

ImqIMSBridgeHeader C++ class

This class encapsulates features of the MQIIH data structure.

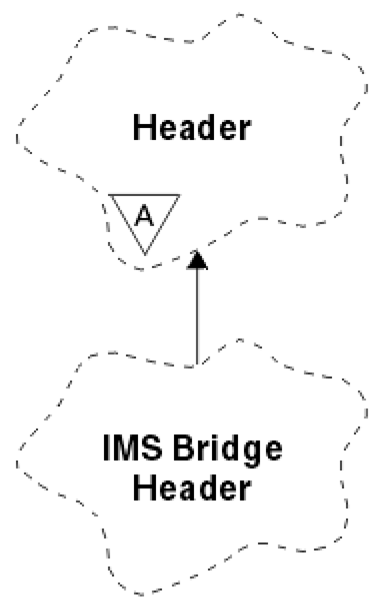


Figure 24. ImqIMSBridgeHeader class

Objects of this class are used by applications that send messages to the IMS bridge through IBM MQ for z/OS.

Note: The ImqHeader character set and encoding must have default values and must not be set to any other values.

- "Object attributes" on page 1816
- "Constructors" on page 1816
- "Overloaded ImqItem methods" on page 1816

- “Object methods (public)” on page 1817
- “Object data (protected)” on page 1817
- “Reason codes” on page 1817

Object attributes

authenticator
RACF password or passticket, of length MQ_AUTHENTICATOR_LENGTH. The initial value is MQIAUT_NONE.

commit mode
Commit mode. See the *OTMA User's Guide* for more information about IMS commit modes. The initial value is MQICM_COMMIT_THEN_SEND. The additional value, MQICM_SEND_THEN_COMMIT, is possible.

logical terminal override
Logical terminal override, of length MQ_LTERM_OVERRIDE_LENGTH. The initial value is a null string.

message format services map name
MFS map name, of length MQ_MFS_MAP_NAME_LENGTH. The initial value is a null string.

reply-to format
Format of any reply, of length MQ_FORMAT_LENGTH. The initial value is MQFMT_NONE.

security scope
Scope of IMS security processing. The initial value is MQISS_CHECK. The additional value, MQISS_FULL, is possible.

transaction instance id
Transaction instance identity, a binary (MQBYTE16) value of length MQ_TRAN_INSTANCE_ID_LENGTH. The initial value is MQITII_NONE.

transaction state
State of the IMS conversation. The initial value is MQITS_NOT_IN_CONVERSATION. The additional value, MQITS_IN_CONVERSATION, is possible.

Constructors

ImqIMSBridgeHeader( );
The default constructor.

ImqIMSBridgeHeader(const ImqIMSBridgeHeader & *header*);
The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & *msg*);
Inserts an MQIIH data structure into the message buffer at the beginning, moving existing message data further along. Sets the *msg* format to MQFMT_IMS.

See the parent class method description for further details.

virtual ImqBoolean pasteIn (ImqMessage & *msg*);
Reads an MQIIH data structure from the message buffer.

To be successful, the encoding of the *msg* object must be MQENC_NATIVE. Retrieve messages with MQGMO_CONVERT to MQENC_NATIVE.

To be successful, the ImqMessage format must be MQFMT_IMS.

See the parent class method description for further details.

Object methods (public)

void operator = (const ImqIMSBridgeHeader & *header*);
Copies instance data from *header*, replacing the existing instance data.

ImqString authenticator ( ) const ;
Returns a copy of the authenticator, padded with trailing blanks to length MQ_AUTHENTICATOR_LENGTH.

void setAuthenticator (const char * *name*);
Sets the authenticator.

MQCHAR commitMode ( ) const ;
Returns the commit mode.

void setCommitMode (const MQCHAR *mode*);
Sets the commit mode.

ImqString logicalTerminalOverride ( ) const ;
Returns a copy of the logical terminal override.

void setLogicalTerminalOverride (const char * *override*);
Sets the logical terminal override.

ImqString messageFormatServicesMapName ( ) const ;
Returns a copy of the message format services map name.

void setMessageFormatServicesMapName (const char * *name*);
Sets the message format services map name.

ImqString replyToFormat ( ) const ;
Returns a copy of the reply-to format, padded with trailing blanks to length MQ_FORMAT_LENGTH.

void setReplyToFormat (const char * *format*);
Sets the reply-to format, padded with trailing blanks to length MQ_FORMAT_LENGTH.

MQCHAR securityScope ( ) const ;
Returns the security scope.

void setSecurityScope (const MQCHAR *scope*);
Sets the security scope.

ImqBinary transactionInstanceId ( ) const ;
Returns a copy of the transaction instance id.

ImqBoolean setTransactionInstanceId (const ImqBinary & *id*);
Sets the transaction instance id. The data length of *token* must be either zero or MQ_TRAN_INSTANCE_ID_LENGTH. This method returns TRUE if successful.

void setTransactionInstanceId (const MQBYTE16 *id* = 0);
Sets the transaction instance id. *id* can be zero, which is the same as specifying MQITII_NONE. If *id* is nonzero, it must address MQ_TRAN_INSTANCE_ID_LENGTH bytes of binary data. When using predefined values such as MQITII_NONE, you might need to make a cast to ensure a signature match, for example (MQBYTE *)MQITII_NONE.

MQCHAR transactionState ( ) const ;
Returns the transaction state.

void setTransactionState (const MQCHAR *state*);
Sets the transaction state.

Object data (protected)

MQIIH *omqiih*
The MQIIH data structure.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR

- MQRC_INCONSISTENT_FORMAT
- MQRC_ENCODING_ERROR
- MQRC_STRUC_ID_ERROR

ImqItem C++ class

This abstract class represents an item, perhaps one of several, within a message.

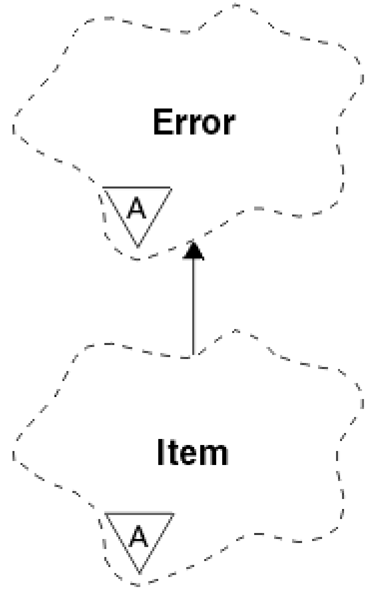


Figure 25. ImqItem class

Items are concatenated together in a message buffer. Each specialization is associated with a particular data structure that begins with a structure ID.

Polymorphic methods in this abstract class allow items to be copied to and from messages. The ImqMessage class **readItem** and **writeItem** methods provide another style of invoking these polymorphic methods that is more natural for application programs.

- "Object attributes" on page 1818
- "Constructors" on page 1818
- "Class methods (public)" on page 1819
- "Object methods (public)" on page 1819
- "Reason codes" on page 1819

Object attributes

structure id
: A string of four characters at the beginning of the data structure. This attribute is read-only. Consider this attribute for derived classes. It is not included automatically.

Constructors

ImqItem( );
: The default constructor.

ImqItem(const ImqItem & ***item*** **);**
: The copy constructor.

Class methods (public)

static ImqBoolean structureIdIs (const char * *structure-id-to-test*, const ImqMessage & *msg*);

Returns TRUE if the **structure id** of the next ImqItem in the incoming *msg* is the same as *structure-id-to-test*. The next item is identified as that part of the message buffer currently addressed by the ImqCache **data pointer**. This method relies on the **structure id** and therefore is not guaranteed to work for all ImqItem derived classes.

Object methods (public)

void operator = (const ImqItem & *item*);

Copies instance data from *item*, replacing the existing instance data.

virtual ImqBoolean copyOut (ImqMessage & *msg*) = 0 ;

Writes this object as the next item in an outgoing message buffer, appending it to any existing items. If the write operation is successful, increases the ImqCache **data length**. This method returns TRUE if successful.

Override this method to work with a specific subclass.

virtual ImqBoolean pasteIn (ImqMessage & *msg*) = 0 ;

Reads this object *destructively* from the incoming message buffer. The read is destructive in that the ImqCache **data pointer** is moved on. However, the buffer content remains the same, so data can be re-read by resetting the ImqCache **data pointer**.

The (sub)class of this object must be consistent with the **structure id** found next in the message buffer of the *msg* object.

The **encoding** of the *msg* object should be MQENC_NATIVE. It is recommended that messages be retrieved with the ImqMessage **encoding** set to MQENC_NATIVE, and with the ImqGetMessageOptions **options** including MQGMO_CONVERT.

If the read operation is successful, the ImqCache **data length** is reduced. This method returns TRUE if successful.

Override this method to work with a specific subclass.

Reason codes

- MQRC_ENCODING_ERROR
- MQRC_STRUC_ID_ERROR
- MQRC_INCONSISTENT_FORMAT
- MQRC_INSUFFICIENT_BUFFER
- MQRC_INSUFFICIENT_DATA

ImqMessage C++ class

This class encapsulates an MQMD data structure and also handles the construction and reconstruction of message data.

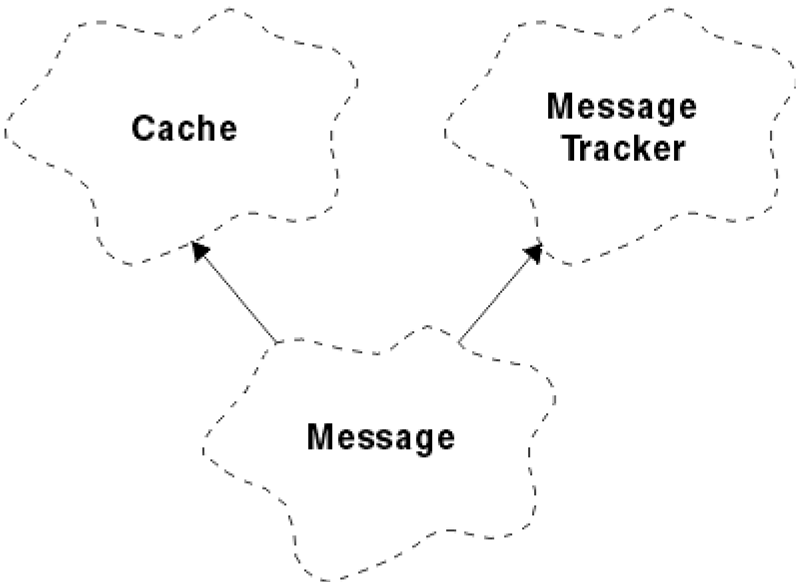


Figure 26. ImqMessage class

- “Object attributes” on page 1820
- “Constructors” on page 1824
- “Object methods (public)” on page 1824
- “Object methods (protected)” on page 1826
- “Object data (protected)” on page 1826

Object attributes

application ID data
Identity information associated with a message. The initial value is a null string.

application origin data
Origin information associated with a message. The initial value is a null string.

backout count
The number of times that a message has been tentatively retrieved and subsequently backed out. The initial value is zero. This attribute is read-only.

character set
Coded Character Set Id. The initial value is MQCCSI_Q_MGR. The following additional values are possible:

- MQCCSI_INHERIT
- MQCCSI_EMBEDDED

You can also use a Coded Character Set Id of your choice. For information about this, see “Code page conversion” on page 925.

encoding
The machine encoding of the message data. The initial value is MQENC_NATIVE.

expiry
A time-dependent quantity that controls how long IBM MQ retains an unretrieved message before discarding it. The initial value is MQEI_UNLIMITED.

format

The name of the format (template) that describes the layout of data in the buffer. Names longer than eight characters are truncated to eight characters. Names are always padded with blanks to eight characters. The initial constant value is MQFMT_NONE. The following additional constants are possible:

- MQFMT_ADMIN
- MQFMT_CICS
- MQFMT_COMMAND_1
- MQFMT_COMMAND_2
- MQFMT_DEAD_LETTER_HEADER
- MQFMT_DIST_HEADER
- MQFMT_EVENT
- MQFMT_IMS
- MQFMT_IMS_VAR_STRING
- MQFMT_MD_EXTENSION
- MQFMT_PCF
- MQFMT_REF_MSG_HEADER
- MQFMT_RF_HEADER
- MQFMT_STRING
- MQFMT_TRIGGER
- MQFMT_WORK_INFO_HEADER
- MQFMT_XMIT_Q_HEADER

You can also use an application-specific string of your choice. For more information about this, see the "Format (MQCHAR8)" on page 438 field of the message descriptor (MQMD).

message flags

Segmentation control information. The initial value is MQMF_SEGMENTATION_INHIBITED. The following additional values are possible:

- MQMF_SEGMENTATION_ALLOWED
- MQMF_MSG_IN_GROUP
- MQMF_LAST_MSG_IN_GROUP
- MQMF_SEGMENT
- MQMF_LAST_SEGMENT
- MQMF_NONE

message type

The broad categorization of a message. The initial value is MQMT_DATAGRAM. The following additional values are possible:

- MQMT_SYSTEM_FIRST
- MQMT_SYSTEM_LAST
- MQMT_DATAGRAM
- MQMT_REQUEST
- MQMT_REPLY
- MQMT_REPORT
- MQMT_APPL_FIRST
- MQMT_APPL_LAST

You can also use an application-specific value of your choice. For more information about this, see the “MsgType (MQLONG)” on page 429 field of the message descriptor (MQMD).

offset
Offset information. The initial value is zero.

original length
The original length of a segmented message. The initial value is MQOL_UNDEFINED.

persistence
Indicates that the message is important and must at all times be backed up using persistent storage. This option implies a performance penalty. The initial value is MQPER_PERSISTENCE_AS_Q_DEF. The following additional values are possible:

- MQPER_PERSISTENT
- MQPER_NOT_PERSISTENT

priority
The relative priority for transmission and delivery. Messages of the same priority are usually delivered in the same sequence as they were supplied (although there are several criteria that must be satisfied to guarantee this). The initial value is MQPRI_PRIORITY_AS_Q_DEF.

property validation
Specifies whether validation of properties should take place when a property of the message is set. The initial value is **`MQCMHO_DEFAULT_VALIDATION`**. The following additional values are possible:

- MQCMHO_VALIDATE
- MQCMHO_NO_VALIDATION

The following methods act on **property validation**:

MQLONG propertyValidation( ) const ;
Returns the **property validation** option.

void setPropertyValidation(const MQLONG *option*);
Sets the **property validation** option.

put application name
The name of the application that put a message. The initial value is a null string.

put application type
The type of application that put a message. The initial value is MQAT_NO_CONTEXT. The following additional values are possible:

- MQAT_AIX
- MQAT_CICS
- MQAT_CICS_BRIDGE
- MQAT_DOS
- MQAT_IMS
- MQAT_IMS_BRIDGE
- MQAT_MVS
- MQAT_NOTES_AGENT
- MQAT_OS2
- MQAT_OS390
- MQAT_OS400
- MQAT_QMGR
- MQAT_UNIX
- MQAT_WINDOWS
- MQAT_WINDOWS_NT

- MQAT_XCF
- MQAT_DEFAULT
- MQAT_UNKNOWN
- MQAT_USER_FIRST
- MQAT_USER_LAST

You can also use an application-specific string of your choice. For more information about this, see the “PutApplType (MQLONG)” on page 452 field of the message descriptor (MQMD).

put date
The date on which a message was put. The initial value is a null string.

put time
The time at which a message was put. The initial value is a null string.

reply-to queue manager name
The name of the queue manager to which any reply should be sent. The initial value is a null string.

reply-to queue name
The name of the queue to which any reply should be sent. The initial value is a null string.

report
Feedback information associated with a message. The initial value is MQRO_NONE. The following additional values are possible:

- MQRO_EXCEPTION
- MQRO_EXCEPTION_WITH_DATA
- MQRO_EXCEPTION_WITH_FULL_DATA *
- MQRO_EXPIRATION
- MQRO_EXPIRATION_WITH_DATA
- MQRO_EXPIRATION_WITH_FULL_DATA *
- MQRO_COA
- MQRO_COA_WITH_DATA
- MQRO_COA_WITH_FULL_DATA *
- MQRO_COD
- MQRO_COD_WITH_DATA
- MQRO_COD_WITH_FULL_DATA *
- MQRO_PAN
- MQRO_NAN
- MQRO_NEW_MSG_ID
- MQRO_NEW_CORREL_ID
- MQRO_COPY_MSG_ID_TO_CORREL_ID
- MQRO_PASS_CORREL_ID
- MQRO_DEAD_LETTER_Q
- MQRO_DISCARD_MSG

where * indicates values that are not supported on IBM MQ for z/OS.

sequence number
Sequence information identifying a message within a group. The initial value is one.

total message length
The number of bytes that were available during the most recent attempt to read a message. This number will be greater than the ImqCache **message length** if the last message was truncated, or if the last message was not read because truncation would have occurred. This attribute is read-only. The initial value is zero.

This attribute can be useful in any situation involving truncated messages.

user id
A user identity associated with a message. The initial value is a null string.

Constructors

ImqMessage( );
The default constructor.

ImqMessage(const ImqMessage & *msg*);
The copy constructor. See the **operator =** method for details.

Object methods (public)

void operator = (const ImqMessage & *msg*);
Copies the MQMD and message data from *msg*. If a buffer has been supplied by the user for this object, the amount of data copied is restricted to the available buffer size. Otherwise, the system ensures that a buffer of adequate size is made available for the copied data.

ImqString applicationIdData ( ) const ;
Returns a copy of the **application ID data**.

void setApplicationIdData (const char * *data* = 0);
Sets the **application ID data**.

ImqString applicationOriginData ( ) const ;
Returns a copy of the **application origin data**.

void setApplicationOriginData (const char * *data* = 0);
Sets the **application origin data**.

MQLONG backoutCount ( ) const ;
Returns the **backout count**.

MQLONG characterSet ( ) const ;
Returns the **character set**.

void setCharacterSet (const MQLONG *ccsid* = MQCCSI_Q_MGR);
Sets the **character set**.

MQLONG encoding ( ) const ;
Returns the **encoding**.

void setEncoding (const MQLONG *encoding* = MQENC_NATIVE);
Sets the **encoding**.

MQLONG expiry ( ) const ;
Returns the **expiry**.

void setExpiry (const MQLONG *expiry*);
Sets the **expiry**.

ImqString format ( ) const ;
Returns a copy of the **format**, including trailing blanks.

ImqBoolean formatIs (const char * *format-to-test*) const ;
Returns TRUE if the **format** is the same as *format-to-test*.

void setFormat (const char * *name* = 0);
Sets the **format**, padded to eight characters with trailing blanks.

MQLONG messageFlags ( ) const ;
Returns the **message flags**.

void setMessageFlags (const MQLONG *flags*);
Sets the **message flags**.

MQLONG messageType ( ) const ;
Returns the **message type**.

void setMessageType (const MQLONG *type*);
Sets the **message type**.

MQLONG offset ( ) const ;
Returns the **offset**.

void setOffset (const MQLONG *offset*);
Sets the **offset**.

MQLONG originalLength ( ) const ;
Returns the **original length**.

void setOriginalLength (const MQLONG *length*);
Sets the **original length**.

MQLONG persistence ( ) const ;
Returns the **persistence**.

void setPersistence (const MQLONG *persistence*);
Sets the **persistence**.

MQLONG priority ( ) const ;
Returns the **priority**.

void setPriority (const MQLONG *priority*);
Sets the **priority**.

ImqString putApplicationName ( ) const ;
Returns a copy of the **put application name**.

void setPutApplicationName (const char * *name* = 0);
Sets the **put application name**.

MQLONG putApplicationType ( ) const ;
Returns the **put application type**.

void setPutApplicationType (const MQLONG *type* = MQAT_NO_CONTEXT);
Sets the **put application type**.

ImqString putDate ( ) const ;
Returns a copy of the **put date**.

void setPutDate (const char * *date* = 0);
Sets the **put date**.

ImqString putTime ( ) const ;
Returns a copy of the **put time**.

void setPutTime (const char * *time* = 0);
Sets the **put time**.

ImqBoolean readItem (ImqItem & *item*);
Reads into the *item* object from the message buffer, using the ImqItem **pasteIn** method. It returns TRUE if successful.

ImqString replyToQueueManagerName ( ) const ;
Returns a copy of the **reply-to queue manager name**.

void setReplyToQueueManagerName (const char * *name* = 0);
Sets the **reply-to queue manager name**.

ImqString replyToQueueName ( ) const ;
Returns a copy of the **reply-to queue name**.

void setReplyToQueueName (const char * *name* = 0);
Sets the **reply-to queue name**.

MQLONG report ( ) const ;
Returns the **report**.

void setReport (const MQLONG *report*);
Sets the **report**.

MQLONG sequenceNumber ( ) const ;
Returns the **sequence number**.

void setSequenceNumber (const MQLONG *number*);
Sets the **sequence number**.

size_t totalMessageLength ( ) const ;
Returns the **total message length**.

ImqString userId ( ) const ;
Returns a copy of the **user id**.

void setUserId (const char * *id* = 0);
Sets the **user id**.

ImqBoolean writeItem (ImqItem & *item*);
Writes from the *item* object into the message buffer, using the ImqItem **copyOut** method. Writing can take the form of insertion, replacement, or an append: this depends on the class of the *item* object. This method returns TRUE if successful.

Object methods (protected)

static void setVersionSupported (const MQLONG);
Sets the **MQMD version**. Defaults to **MQMD_VERSION_2**.

Object data (protected)

z/OS **MQMD1 *omqmd***
The MQMD data structure on z/OS.

Multi **MQMD2 *omqmd***
The MQMD data structure on Multiplatforms.

ImqMessageTracker C++ class

This class encapsulates those attributes of an ImqMessage or ImqQueue object that can be associated with either object.

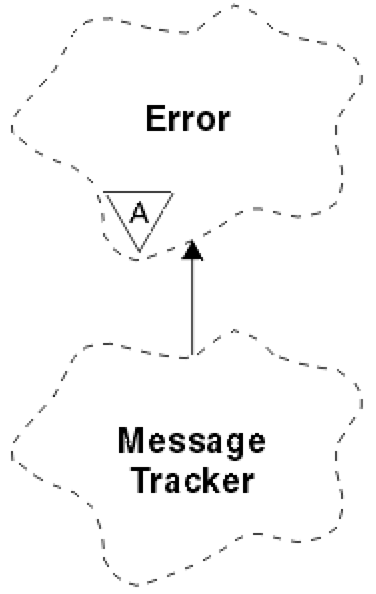


Figure 27. ImqMessageTracker class

This class relates to the MQI calls listed in "ImqMessageTracker cross-reference" on page 1777.

- "Object attributes" on page 1827

- “Constructors” on page 1828
- “Object methods (public)” on page 1828
- “Reason codes” on page 1829

Object attributes

accounting token

A binary value (MQBYTE32) of length MQ_ACCOUNTING_TOKEN_LENGTH. The initial value is MQACT_NONE.

correlation id

A binary value (MQBYTE24) of length MQ_CORREL_ID_LENGTH that you assign to correlate messages. The initial value is MQCI_NONE. The additional value, MQCI_NEW_SESSION, is possible.

feedback

Feedback information to be sent with a message. The initial value is MQFB_NONE. The following additional values are possible:

- MQFB_SYSTEM_FIRST
- MQFB_SYSTEM_LAST
- MQFB_APPL_FIRST
- MQFB_APPL_LAST
- MQFB_COA
- MQFB_COD
- MQFB_EXPIRATION
- MQFB_PAN
- MQFB_NAN
- MQFB_QUIT
- MQFB_DATA_LENGTH_ZERO
- MQFB_DATA_LENGTH_NEGATIVE
- MQFB_DATA_LENGTH_TOO_BIG
- MQFB_BUFFER_OVERFLOW
- MQFB_LENGTH_OFF_BY_ONE
- MQFB_IIH_ERROR
- MQFB_NOT_AUTHORIZED_FOR_IMS
- MQFB_IMS_ERROR
- MQFB_IMS_FIRST
- MQFB_IMS_LAST
- MQFB_CICS_APPL_ABENDED
- MQFB_CICS_APPL_NOT_STARTED
- MQFB_CICS_BRIDGE_FAILURE
- MQFB_CICS_CCSID_ERROR
- MQFB_CICS_CIH_ERROR
- MQFB_CICS_COMMAREA_ERROR
- MQFB_CICS_CORREL_ID_ERROR
- MQFB_CICS_DLQ_ERROR
- MQFB_CICS_ENCODING_ERROR
- MQFB_CICS_INTERNAL_ERROR
- MQFB_CICS_NOT_AUTHORIZED

- MQFB_CICS_UOW_BACKED_OUT
- MQFB_CICS_UOW_ERROR

You can also use an application-specific string of your choice. For more information about this, see the "Feedback (MQLONG)" on page 433 field of the message descriptor (MQMD).

group id
A binary value (MQBYTE24) of length MQ_GROUP_ID_LENGTH unique within a queue. The initial value is MQGI_NONE.

message id
A binary value (MQBYTE24) of length MQ_MSG_ID_LENGTH unique within a queue. The initial value is MQMI_NONE.

Constructors

ImqMessageTracker( );
The default constructor.

ImqMessageTracker(const ImqMessageTracker & ***tracker*** **);**
The copy constructor. See the **operator =** method for details.

Object methods (public)

void operator = (const ImqMessageTracker & ***tracker*** **);**
Copies instance data from *tracker*, replacing the existing instance data.

ImqBinary accountingToken ( ) const ;
Returns a copy of the **accounting token**.

ImqBoolean setAccountingToken (const ImqBinary & ***token*** **);**
Sets the **accounting token**. The **data length** of *token* must be either zero or MQ_ACCOUNTING_TOKEN_LENGTH. This method returns TRUE if successful.

void setAccountingToken (const MQBYTE32 ***token*** **= 0);**
Sets the **accounting token**. *token* can be zero, which is the same as specifying MQACT_NONE. If *token* is nonzero, it must address MQ_ACCOUNTING_TOKEN_LENGTH bytes of binary data. When using predefined values such as MQACT_NONE, you might need to make a cast to ensure a signature match; for example, (MQBYTE *)MQACT_NONE.

ImqBinary correlationId ( ) const ;
Returns a copy of the **correlation id**.

ImqBoolean setCorrelationId (const ImqBinary & ***token*** **);**
Sets the **correlation id**. The **data length** of *token* must be either zero or MQ_CORREL_ID_LENGTH. This method returns TRUE if successful.

void setCorrelationId (const MQBYTE24 ***id*** **= 0);**
Sets the **correlation id**. *id* can be zero, which is the same as specifying MQCI_NONE. If *id* is nonzero, it must address MQ_CORREL_ID_LENGTH bytes of binary data. When using predefined values such as MQCI_NONE, you might need to make a cast to ensure a signature match; for example, (MQBYTE *)MQCI_NONE.

MQLONG feedback ( ) const ;
Returns the **feedback**.

void setFeedback (const MQLONG ***feedback*** **);**
Sets the **feedback**.

ImqBinary groupId ( ) const ;
Returns a copy of the **group id**.

ImqBoolean setGroupId (const ImqBinary & ***token*** **);**
Sets the **group id**. The **data length** of *token* must be either zero or MQ_GROUP_ID_LENGTH. This method returns TRUE if successful.

void setGroupId (const MQBYTE24 *id* = 0);
Sets the **group id**. *id* can be zero, which is the same as specifying MQGI_NONE. If *id* is nonzero, it must address MQ_GROUP_ID_LENGTH bytes of binary data. When using predefined values such as MQGI_NONE, you might need to make a cast to ensure a signature match, for example (MQBYTE *)MQGI_NONE.

ImqBinary messageId ( ) const ;
Returns a copy of the **message id**.

ImqBoolean setMessageId (const ImqBinary & *token*);
Sets the **message id**. The **data length** of *token* must be either zero or MQ_MSG_ID_LENGTH. This method returns TRUE if successful.

void setMessageId (const MQBYTE24 *id* = 0);
Sets the **message id**. *id* can be zero, which is the same as specifying MQMI_NONE. If *id* is nonzero, it must address MQ_MSG_ID_LENGTH bytes of binary data. When using predefined values such as MQMI_NONE, you might need to make a cast to ensure a signature match, for example (MQBYTE *)MQMI_NONE.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR

ImqNamelist C++ class

This class encapsulates a namelist.

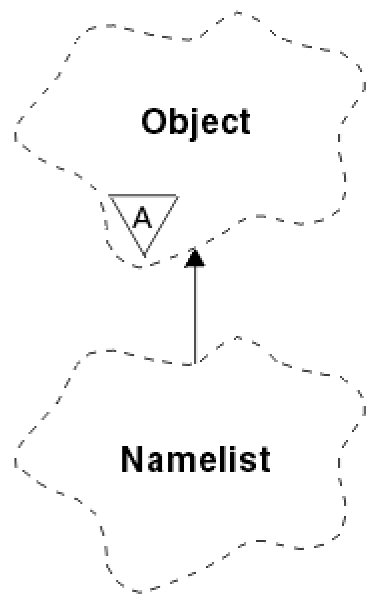


Figure 28. ImqNamelist class

This class relates to the MQI calls listed in "ImqNamelist cross-reference" on page 1778.

- "Object attributes" on page 1829
- "Constructors" on page 1830
- "Object methods (public)" on page 1830
- "Reason codes" on page 1830

Object attributes

name count
The number of object names in **namelist names**. This attribute is read-only.

namelist names
Object names, the number of which is indicated by the **name count**. This attribute is read-only.

Constructors

ImqNamelist( );
The default constructor.

ImqNamelist(const ImqNamelist & *list*);
The copy constructor. The ImqObject **open status** is false.

ImqNamelist(const char * *name*);
Sets the ImqObject name to **name**.

Object methods (public)

void operator = (const ImqNamelist & *list*);
Copies instance data from *list*, replacing the existing instance data. The ImqObject **open status** is false.

ImqBoolean nameCount(MQLONG & *count*);
Provides a copy of the **name count**. It returns TRUE if successful.

MQLONG nameCount ( );
Returns the **name count** without any indication of possible errors.

ImqBoolean namelistName (const MQLONG *index*, ImqString & *name*);
Provides a copy of one the **namelist names** by zero based index. It returns TRUE if successful.

ImqString namelistName (const MQLONG *index*);
Returns one of the **namelist names** by zero-based index without any indication of possible errors.

Reason codes

- MQRC_INDEX_ERROR
- MQRC_INDEX_NOT_PRESENT

ImqObject C++ class

This class is abstract. When an object of this class is destroyed, it is automatically closed, and its ImqQueueManager connection severed.

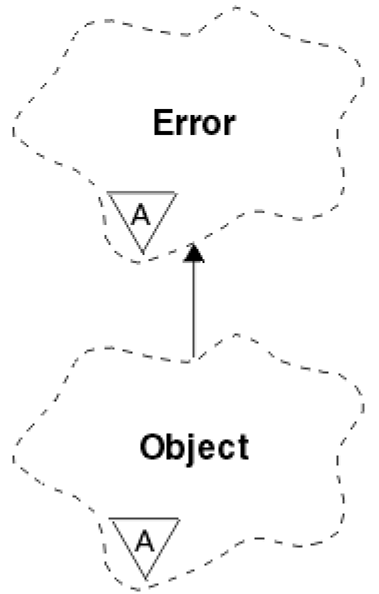


Figure 29. ImqObject class

This class relates to the MQI calls listed in “ImqObject cross-reference” on page 1778.

- “Class attributes” on page 1831
- “Object attributes” on page 1831
- “Constructors” on page 1832
- “Class methods (public)” on page 1832
- “Object methods (public)” on page 1832
- “Object methods (protected)” on page 1834
- “Object data (protected)” on page 1835
- “Reason codes” on page 1835
-

Class attributes

behavior
Controls the behavior of implicit opening.

IMQ_IMPL_OPEN (8L)
Implicit opening is allowed. This is the default.

Object attributes

alteration date
The alteration date. This attribute is read-only.

alteration time
The alteration time. This attribute is read-only.

alternate user id
The alternate user ID, up to MQ_USER_ID_LENGTH characters. The initial value is a null string.

alternate security id
The alternate security ID. A binary value (MQBYTE40) of length MQ_SECURITY_ID_LENGTH. The initial value is MQSID_NONE.

close options
Options that apply when an object is closed. The initial value is MQCO_NONE. This attribute is ignored during implicit reopen operations, where a value of MQCO_NONE is always used.

connection reference
A reference to an ImqQueueManager object that provides the required connection to a (local) queue manager. For an ImqQueueManager object, it is the object itself. The initial value is zero.

Note: Do not confuse this with the queue manager name that identifies a queue manager (possibly remote) for a named queue.

description
The descriptive name (up to 64 characters) of the queue manager, queue, namelist, or process. This attribute is read-only.

name
The name (up to 48 characters) of the queue manager, queue, namelist, or process. The initial value is a null string. The name of a model queue changes after an **open** to the name of the resulting dynamic queue.

Note: An ImqQueueManager can have a null name, representing the default queue manager. The name changes to the actual queue manager after a successful open. An ImqDistributionList is dynamic and must have a null name.

next managed object
This is the next object of this class, in no particular order, having the same connection reference as this object. The initial value is zero.

open options

Options that apply when an object is opened. The initial value is MQOO_INQUIRE. There are two ways to set appropriate values:

1. Do not set the open options and do not use the open method. IBM MQ automatically adjusts the open options and automatically opens, reopens, and closes objects as required. This can result in unnecessary reopen operations, because IBM MQ uses the openFor method, and this adds open options incrementally only.
2. Set the open options before using any methods that result in an MQI call (see "C++ and MQI cross-reference" on page 1771). This ensures that unnecessary reopen operations do not occur. Set open options explicitly if any of the potential reopen problems are likely to occur (see Reopen).

   If you use the open method, you must ensure that the open options are appropriate first. However, using the open method is not mandatory; IBM MQ still exhibits the same behavior as in case 1, but in this circumstance, the behavior is efficient.

Zero is not a valid value; set the appropriate value before attempting to open the object. This can be done using either **`setOpenOptions`** (*lOpenOptions*) followed by **open** ( ), or **`openFor`** (*lRequiredOpenOption*).

Note:

1. MQOO_OUTPUT is substituted for MQOO_INQUIRE during the **open** method for a distribution list, as MQOO_OUTPUT is the only valid **`open option`** at this time. However, it is good practice always to set MQOO_OUTPUT explicitly in application programs that use the **open** method.
2. Specify MQOO_RESOLVE_NAMES if you want to use the **`resolved queue manager name`** and **`resolved queue name`** attributes of the class.

open status

Whether the object is open (TRUE) or closed (FALSE). The initial value is FALSE. This attribute is read-only.

previous managed object

The previous object of this class, in no particular order, having the same connection reference as this object. The initial value is zero.

queue-manager-identifier

The queue manager identifier. This attribute is read-only.

Constructors

ImqObject( );

The default constructor.

ImqObject(const ImqObject & *object*);

The copy constructor. The open status will be FALSE.

Class methods (public)

static MQLONG behavior( );

Returns the behavior.

void setBehavior(const MQLONG *behavior* = 0);

Sets the behavior.

Object methods (public)

void operator = (const ImqObject & *object*);

Performs a close if necessary, and copies the instance data from *object*. The open status will be FALSE.

ImqBoolean alterationDate(ImqString & *date*);

Provides a copy of the alteration date. It returns TRUE if successful.

ImqString alterationDate( );
Returns the alteration date without any indication of possible errors.

ImqBoolean alterationTime(ImqString & *time*);
Provides a copy of the alteration time. It returns TRUE if successful.

ImqString alterationTime( );
Returns the alteration time without any indication of possible errors.

ImqString alternateUserId ( ) const ;
Returns a copy of the alternate user id.

ImqBoolean setAlternateUserId (const char * *id*);
Sets the alternate user id. The alternate user id can be set only while the open status is FALSE. This method returns TRUE if successful.

ImqBinary alternateSecurityId( ) const ;
Returns a copy of the alternate security ID.

ImqBoolean setAlternateSecurityId(const ImqBinary & *token*);
Sets the alternate security id. The alternate security id can be set only while the open status is FALSE. The data length of *token* must be either zero or MQ_SECURITY_ID_LENGTH. It returns TRUE if successful.

ImqBoolean setAlternateSecurityId(const MQBYTE* *token* = 0);
Sets the alternate security id. *token* can be zero, which is the same as specifying MQSID_NONE. If *token* is nonzero, it must address MQ_SECURITY_ID_LENGTH bytes of binary data. When using predefined values such as MQSID_NONE, you might need to make a cast to ensure signature match; for example, (MQBYTE *)MQSID_NONE.

The alternate security id can be set only while the open status is TRUE. It returns TRUE if successful.

ImqBoolean setAlternateSecurityId(const unsigned char * *id* = 0);
Sets the alternate security id.

ImqBoolean close ( );
Sets the open status to FALSE. It returns TRUE if successful.

MQLONG closeOptions ( ) const ;
Returns the close options.

void setCloseOptions (const MQLONG *options*);
Sets the close options.

ImqQueueManager * connectionReference ( ) const ;
Returns the connection reference.

void setConnectionReference (ImqQueueManager & *manager*);
Sets the connection reference.

void setConnectionReference (ImqQueueManager * *manager* = 0);
Sets the connection reference.

virtual ImqBoolean description (ImqString & *description*) = 0 ;
Provides a copy of the description. It returns TRUE if successful.

ImqString description ( );
Returns a copy of the description without any indication of possible errors.

virtual ImqBoolean name (ImqString & *name*);
Provides a copy of the name. It returns TRUE if successful.

ImqString name ( );
Returns a copy of the name without any indication of possible errors.

ImqBoolean setName (const char * *name* = 0);
Sets the name. The name can only be set while the open status is FALSE, and, for an ImqQueueManager, while the connection status is FALSE. It returns TRUE if successful.

ImqObject * nextManagedObject ( ) const ;
Returns the next managed object.

ImqBoolean open ( );

Changes the open status to TRUE by opening the object as necessary, using among other attributes the open options and the name. This method uses the connection reference information and the ImqQueueManager connect method if necessary to ensure that the ImqQueueManager connection status is TRUE. It returns the open status.

ImqBoolean openFor (const MQLONG *required-options* = 0);

Attempts to ensure that the object is open with open options, or with open options that guarantee the behavior implied by the *required-options* parameter value.

If *required-options* is zero, input is required, and any input option suffices. So, if the open options already contain one of:

- MQOO_INPUT_AS_Q_DEF
- MQOO_INPUT_SHARED
- MQOO_INPUT_EXCLUSIVE

the open options are already satisfactory and are not changed; if the open options do not already contain any of these options, MQOO_INPUT_AS_Q_DEF is set in the open options.

If *required-options* is nonzero, the required options are added to the open options ; if *required-options* is any of these options, the others are reset.

If any of the open options are changed and the object is already open, the object is closed temporarily and reopened in order to adjust the open options.

It returns TRUE if successful. Success indicates that the object is open with appropriate options.

MQLONG openOptions ( ) const ;

Returns the open options.

ImqBoolean setOpenOptions (const MQLONG *options*);

Sets the open options. The open options can be set only while the open status is FALSE. It returns TRUE if successful.

ImqBoolean openStatus ( ) const ;

Returns the open status.

ImqObject * previousManagedObject ( ) const ;

Returns the previous managed object.

ImqBoolean queueManagerIdentifier(ImqString & *id*);

Provides a copy of the queue manager identifier. It returns TRUE if successful.

ImqString queueManagerIdentifier( );

Returns the queue manager identifier without any indication of possible errors.

Object methods (protected)

virtual ImqBoolean closeTemporarily ( );

Closes an object safely before reopening. It returns TRUE if successful. This method assumes that the open status is TRUE.

MQHCONN connectionHandle ( ) const ;

Returns the MQHCONN associated with the connection reference. This value is zero if there is no connection reference or if the Manager is not connected.

ImqBoolean inquire (const MQLONG *int-attr*, MQLONG & *value*);

Returns an integer value, the index of which is an MQIA_* value. In case of error, the value is set to MQIAV_UNDEFINED.

ImqBoolean inquire (const MQLONG *char-attr*, char * & *buffer*, const size_t *length*);

Returns a character string, the index of which is an MQCA_* value.

Note: Both of these methods return only a single attribute value. If a *snapshot* is required of more than one value, where the values are consistent with each other for an instant, IBM MQ C++ does not provide this facility and you must use the MQINQ call with appropriate parameters.

virtual void openInformationDisperse ( );
Disperses information from the variable section of the MQOD data structure immediately after an MQOPEN call.

virtual ImqBoolean openInformationPrepare ( );
Prepares information for the variable section of the MQOD data structure immediately before an MQOPEN call, and returns TRUE if successful.

ImqBoolean set (const MQLONG *int-attr*, const MQLONG *value*);
Sets an IBM MQ integer attribute.

ImqBoolean set (const MQLONG *char-attr*, const char * *buffer*, const size_t *required-length*);
Sets an IBM MQ character attribute.

void setNextManagedObject (const ImqObject * *object* = 0);
Sets the next managed object.

Attention: Use this function only if you are sure it will not break the managed object list.

void setPreviousManagedObject (const ImqObject * *object* = 0);
Sets the previous managed object.

Attention: Use this function only if you are sure it will not break the managed object list.

Object data (protected)

MQHOBJ *ohobj*
The IBM MQ object handle (valid only when open status is TRUE).

MQOD *omqod*
The embedded MQOD data structure. The amount of storage allocated for this data structure is that required for an MQOD Version 2. Inspect the version number *(omqod.Version)* and access the other fields as follows:

MQOD_VERSION_1
All other fields in *omqod* can be accessed.

MQOD_VERSION_2
All other fields in *omqod* can be accessed.

MQOD_VERSION_3
omqod.pmqod is a pointer to a dynamically allocated, larger, MQOD. No other fields in *omqod* can be accessed. All fields addressed by *omqod.pmqod* can be accessed.

Note: *omqod.pmqod.Version* can be less than *omqod.Version*, indicating that the IBM MQ MQI client has more functionality than the IBM MQ server.

Reason codes

- MQRC_ATTRIBUTE_LOCKED
- MQRC_INCONSISTENT_OBJECT_STATE
- MQRC_NO_CONNECTION_REFERENCE
- MQRC_STORAGE_NOT_AVAILABLE
- MQRC_REOPEN_SAVED_CONTEXT_ERR
- (reason codes from MQCLOSE)
- (reason codes from MQCONN)
- (reason codes from MQINQ)
- (reason codes from MQOPEN)
- (reason codes from MQSET)

ImqProcess C++ class

This class encapsulates an application process (an IBM MQ object of type MQOT_PROCESS) that can be triggered by a trigger monitor.

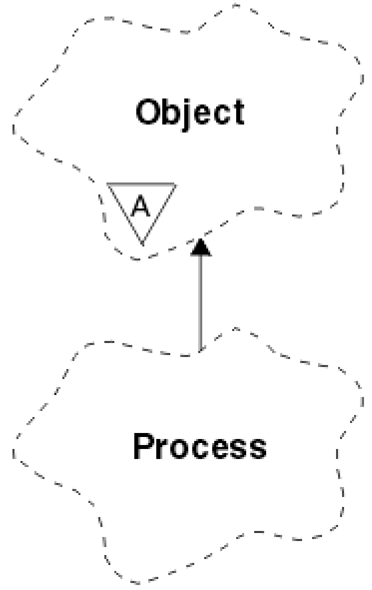


Figure 30. ImqProcess class

- “Object attributes” on page 1836
- “Constructors” on page 1836
- “Object methods (public)” on page 1836

Object attributes

application id
The identity of the application process. This attribute is read-only.

application type
The type of the application process. This attribute is read-only.

environment data
The environment information for the process. This attribute is read-only.

user data
User data for the process. This attribute is read-only.

Constructors

ImqProcess( );
The default constructor.

ImqProcess(const ImqProcess & ***process*** **);**
The copy constructor. The ImqObject **open status** is FALSE.

ImqProcess(const char * ***name*** **);**
Sets the ImqObject **name**.

Object methods (public)

void operator = (const ImqProcess & ***process*** **);**
Performs a close if necessary, and then copies instance data from *process*. The ImqObject **open status** will be FALSE.

ImqBoolean applicationId (ImqString & *id*);
Provides a copy of the **application id**. It returns TRUE if successful.

ImqString applicationId ( );
Returns the **application id** without any indication of possible errors.

ImqBoolean applicationType (MQLONG & *type*);
Provides a copy of the **application type**. It returns TRUE if successful.

MQLONG applicationType ( );
Returns the **application type** without any indication of possible errors.

ImqBoolean environmentData (ImqString & *data*);
Provides a copy of the **environment data**. It returns TRUE if successful.

ImqString environmentData ( );
Returns the **environment data** without any indication of possible errors.

ImqBoolean userData (ImqString & *data*);
Provides a copy of the **user data**. It returns TRUE if successful.

ImqString userData ( );
Returns the **user data** without any indication of possible errors.

ImqPutMessageOptions C++ class

This class encapsulates the MQPMO data structure.

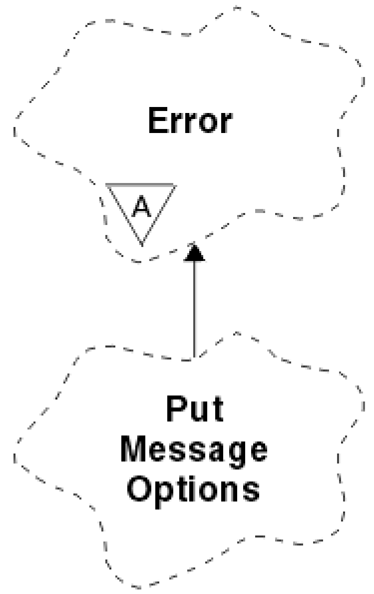


Figure 31. ImqPutMessageOptions class

- "Object attributes" on page 1837
- "Constructors" on page 1838
- "Object methods (public)" on page 1838
- "Object data (protected)" on page 1839
- "Reason codes" on page 1839

Object attributes

context reference
An ImqQueue that provides a context for messages. Initially there is no reference.

options
The put message options. The initial value is MQPMO_NONE. The following additional values are possible:

- MQPMO_SYNCPOINT
- MQPMO_NO_SYNCPOINT
- MQPMO_NEW_MSG_ID
- MQPMO_NEW_CORREL_ID
- MQPMO_LOGICAL_ORDER
- MQPMO_NO_CONTEXT
- MQPMO_DEFAULT_CONTEXT
- MQPMO_PASS_IDENTITY_CONTEXT
- MQPMO_PASS_ALL_CONTEXT
- MQPMO_SET_IDENTITY_CONTEXT
- MQPMO_SET_ALL_CONTEXT
- MQPMO_ALTERNATE_USER_AUTHORITY
- MQPMO_FAIL_IF_QUIESCING

record fields
The flags that control the inclusion of put message records when a message is put. The initial value is MQPMRF_NONE. The following additional values are possible:

- MQPMRF_MSG_ID
- MQPMRF_CORREL_ID
- MQPMRF_GROUP_ID
- MQPMRF_FEEDBACK
- MQPMRF_ACCOUNTING_TOKEN

ImqMessageTracker attributes are taken from the object for any field that is specified. ImqMessageTracker attributes are taken from the ImqMessage object for any field that is not specified.

resolved queue manager name
Name of a destination queue manager determined during a put. The initial value is null. This attribute is read-only.

resolved queue name
Name of a destination queue determined during a put. The initial value is null. This attribute is read-only.

syncpoint participation
TRUE when messages are put under syncpoint control.

Constructors

ImqPutMessageOptions( );
The default constructor.

ImqPutMessageOptions(const ImqPutMessageOptions & *pmo*);
The copy constructor.

Object methods (public)

void operator = (const ImqPutMessageOptions & *pmo*);
Copies instance data from *pmo*, replacing the existing instance data.

ImqQueue * contextReference ( ) const ;
Returns the context reference.

void setContextReference (const ImqQueue & *queue*);
Sets the context reference.

void setContextReference (const ImqQueue * *queue* = 0);
Sets the context reference.

MQLONG options ( ) const ;
Returns the options.

void setOptions (const MQLONG *options*);
Sets the options, including the syncpoint participation value.

MQLONG recordFields ( ) const ;
Returns the record fields.

void setRecordFields (const MQLONG *fields*);
Sets the record fields.

ImqString resolvedQueueManagerName ( ) const ;
Returns a copy of the resolved queue manager name.

ImqString resolvedQueueName ( ) const ;
Returns a copy of the resolved queue name.

ImqBoolean syncPointParticipation ( ) const ;
Returns the syncpoint participation value, which is TRUE if the options include MQPMO_SYNCPOINT.

void setSyncPointParticipation (const ImqBoolean *sync*);
Sets the syncpoint participation value. If *sync* is TRUE, the options are altered to include MQPMO_SYNCPOINT, and to exclude MQPMO_NO_SYNCPOINT. If *sync* is FALSE, the options are altered to include MQPMO_NO_SYNCPOINT, and to exclude MQPMO_SYNCPOINT.

Object data (protected)

MQPMO *omqpmo*
The MQPMO data structure.

Reason codes

- MQRC_STORAGE_NOT_AVAILABLE

ImqQueue C++ class

This class encapsulates a message queue (an IBM MQ object of type MQOT_Q).

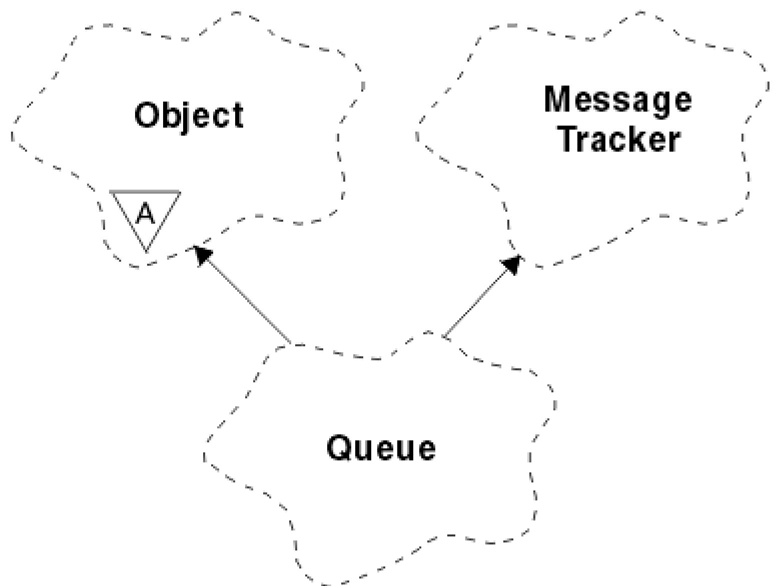


Figure 32. ImqQueue class

This class relates to the MQI calls listed in Table 862 on page 1779.

- "Object attributes" on page 1840
- "Constructors" on page 1843
- "Object methods (public)" on page 1843
- "Object methods (protected)" on page 1849
- "Reason codes" on page 1849

Object attributes

backout requeue name
Excessive backout requeue name. This attribute is read-only.

backout threshold
Backout threshold. This attribute is read-only.

base queue name
Name of the queue that the alias resolves to. This attribute is read-only.

cluster name
Cluster name. This attribute is read-only.

cluster namelist name
Cluster namelist name. This attribute is read-only.

cluster workload rank
Cluster workload rank. This attribute is read-only.

cluster workload priority
Cluster workload priority. This attribute is read-only.

cluster workload use queue
Cluster workload use queue value. This attribute is read-only.

creation date
Queue creation data. This attribute is read-only.

creation time
Queue creation time. This attribute is read-only.

current depth
Number of messages on the queue. This attribute is read-only.

default bind
Default bind. This attribute is read-only.

default input open option
Default open-for-input option. This attribute is read-only.

default persistence
Default message persistence. This attribute is read-only.

default priority
Default message priority. This attribute is read-only.

definition type
Queue definition type. This attribute is read-only.

depth high event
Control attribute for queue depth high events. This attribute is read-only.

depth high limit
High limit for the queue depth. This attribute is read-only.

depth low event
Control attribute for queue depth low events. This attribute is read-only.

depth low limit
Low limit for the queue depth. This attribute is read-only.

depth maximum event
Control attribute for queue depth maximum events. This attribute is read-only.

distribution list reference
Optional reference to an ImqDistributionList that can be used to distribute messages to more than one queue, including this one. The initial value is null.

Note: When an ImqQueue object is opened, any open ImqDistributionList object that it references is automatically closed.

distribution lists
The capability of a transmission queue to support distribution lists. This attribute is read-only.

dynamic queue name
Dynamic queue name. The initial value is AMQ.* for all Windows, UNIX, and Linux platforms.

harden get backout
Whether to harden the backout count. This attribute is read-only.

index type
Index type. This attribute is read-only.

inhibit get
Whether get operations are allowed. The initial value is dependent on the queue definition. This attribute is valid for an alias or local queue only.

inhibit put
Whether put operations are allowed. The initial value is dependent on the queue definition.

initiation queue name
Name of the initiation queue. This attribute is read-only.

maximum depth
Maximum number of messages allowed on the queue. This attribute is read-only.

maximum message length
Maximum length for any message on this queue, which can be less than the maximum for any queue managed by the associated queue manager. This attribute is read-only.

message delivery sequence
Whether message priority is relevant. This attribute is read-only.

next distributed queue
Next object of this class, in no particular order, having the same **distribution list reference** as this object. The initial value is zero.

If an object in a chain is deleted, the previous object and next object are updated so that their distributed queue links no longer point to the deleted object.

non-persistent message class
Level of reliability for non-persistent messages put to this queue. This attribute is read-only.

open input count
Number of ImqQueue objects that are open for input. This attribute is read-only.

open output count
Number of ImqQueue objects that are open for output. This attribute is read-only.

previous distributed queue
Previous object of this class, in no particular order, having the same **distribution list reference** as this object. The initial value is zero.

If an object in a chain is deleted, the previous object and next object are updated so that their distributed queue links no longer point to the deleted object.

process name
Name of the process definition. This attribute is read-only.

queue accounting
Level of accounting information for queues. This attribute is read-only.

queue-manager-name
Name of the queue manager (possibly remote) where the queue resides. Do not confuse the queue manager named here with the ImqObject **connection reference**, which references the (local) queue manager providing a connection. The initial value is null.

queue monitoring
Level of monitoring data collection for the queue. This attribute is read-only.

queue statistics
Level of statistics data for the queue. This attribute is read-only.

queue type
Queue type. This attribute is read-only.

remote queue manager name
Name of the remote queue manager. This attribute is read-only.

remote queue name
Name of the remote queue as known on the remote queue manager. This attribute is read-only.

resolved queue manager name
Resolved queue manager name. This attribute is read-only.

resolved queue name
Resolved queue name. This attribute is read-only.

retention interval
Queue retention interval. This attribute is read-only.

scope
Scope of the queue definition. This attribute is read-only.

service interval
Service interval. This attribute is read-only.

service interval event
Control attribute for service interval events. This attribute is read-only.

shareability
Whether the queue can be shared. This attribute is read-only.

storage class
Storage class. This attribute is read-only.

transmission queue name
Name of the transmission queue. This attribute is read-only.

trigger control
Trigger control. The initial value depends on the queue definition. This attribute is valid for a local queue only.

trigger data
Trigger data. The initial value depends on the queue definition. This attribute is valid for a local queue only.

trigger depth
Trigger depth. The initial value depends on the queue definition. This attribute is valid for a local queue only.

trigger message priority
Threshold message priority for triggers. The initial value depends on the queue definition. This attribute is valid for a local queue only.

trigger type
Trigger type. The initial value depends on the queue definition. This attribute is valid for a local queue only.

usage
Usage. This attribute is read-only.

Constructors

ImqQueue( );
The default constructor.

ImqQueue(const ImqQueue & ***queue*** **);**
The copy constructor. The ImqObject **open status** will be FALSE.

ImqQueue(const char * ***name*** **);**
Sets the ImqObject **name**.

Object methods (public)

void operator = (const ImqQueue & ***queue*** **);**
Performs a close if necessary, and then copies instance data from *queue*. The ImqObject **open status** will be FALSE.

ImqBoolean backoutRequeueName (ImqString & ***name*** **);**
Provides a copy of the **backout requeue name**. It returns TRUE if successful.

ImqString backoutRequeueName ( );
Returns the **backout requeue name** without any indication of possible errors.

ImqBoolean backoutThreshold (MQLONG & ***threshold*** **);**
Provides a copy of the **backout threshold**. It returns TRUE if successful.

MQLONG backoutThreshold ( );
Returns the **backout threshold** value without any indication of possible errors.

ImqBoolean baseQueueName (ImqString & ***name*** **);**
Provides a copy of the **base queue name**. It returns TRUE if successful.

ImqString baseQueueName ( );
Returns the **base queue name** without any indication of possible errors.

ImqBoolean clusterName(ImqString & ***name*** **);**
Provides a copy of the **cluster name**. It returns TRUE if successful.

ImqString clusterName( );
Returns the **cluster name** without any indication of possible errors.

ImqBoolean clusterNamelistName(ImqString & *name*);
Provides a copy of the **cluster namelist name**. It returns TRUE if successful.

ImqString clusterNamelistName( );
Returns the **cluster namelist name** without any indication of errors.

ImqBoolean clusterWorkLoadPriority (MQLONG & priority);
Provides a copy of the cluster workload priority value. It returns TRUE if successful.

MQLONG clusterWorkLoadPriority ( );
Returns the cluster workload priority value without any indication of possible errors.

ImqBoolean clusterWorkLoadRank (MQLONG & rank);
Provides a copy of the cluster workload rank value. It returns TRUE if successful.

MQLONG clusterWorkLoadRank ( );
Returns the cluster workload rank value without any indication of possible errors.

ImqBoolean clusterWorkLoadUseQ (MQLONG & useq);
Provides a copy of the cluster workload use queue value. It returns TRUE if successful.

MQLONG clusterWorkLoadUseQ ( );
Returns the cluster workload use queue value without any indication of possible errors.

ImqBoolean creationDate (ImqString & *date*);
Provides a copy of the **creation date**. It returns TRUE if successful.

ImqString creationDate ( );
Returns the **creation date** without any indication of possible errors.

ImqBoolean creationTime (ImqString & *time*);
Provides a copy of the **creation time**. It returns TRUE if successful.

ImqString creationTime ( );
Returns the **creation time** without any indication of possible errors.

ImqBoolean currentDepth (MQLONG & *depth*);
Provides a copy of the **current depth**. It returns TRUE if successful.

MQLONG currentDepth ( );
Returns the **current depth** without any indication of possible errors.

ImqBoolean defaultInputOpenOption (MQLONG & *option*);
Provides a copy of the **default input open option**. It returns TRUE if successful.

MQLONG defaultInputOpenOption ( );
Returns the **default input open option** without any indication of possible errors.

ImqBoolean defaultPersistence (MQLONG & *persistence*);
Provides a copy of the **default persistence**. It returns TRUE if successful.

MQLONG defaultPersistence ( );
Returns the **default persistence** without any indication of possible errors.

ImqBoolean defaultPriority (MQLONG & *priority*);
Provides a copy of the **default priority**. It returns TRUE if successful.

MQLONG defaultPriority ( );
Returns the **default priority** without any indication of possible errors.

ImqBoolean defaultBind (MQLONG & *bind*);
Provides a copy of the **default bind**. It returns TRUE if successful.

MQLONG defaultBind ( );
Returns the **default bind** without any indication of possible errors.

ImqBoolean definitionType (MQLONG & *type*);
Provides a copy of the **definition type**. It returns TRUE if successful.

MQLONG definitionType ( );
Returns the **definition type** without any indication of possible errors.

ImqBoolean depthHighEvent (MQLONG & *event*);
Provides a copy of the enablement state of the **depth high event**. It returns TRUE if successful.

MQLONG depthHighEvent ( );
Returns the enablement state of the **depth high event** without any indication of possible errors.

ImqBoolean depthHighLimit (MQLONG & *limit*);
Provides a copy of the **depth high limit**. It returns TRUE if successful.

MQLONG depthHighLimit ( );
Returns the **depth high limit** value without any indication of possible errors.

ImqBoolean depthLowEvent (MQLONG & *event*);
Provides a copy of the enablement state of the **depth low event**. It returns TRUE if successful.

MQLONG depthLowEvent ( );
Returns the enablement state of the **depth low event** without any indication of possible errors.

ImqBoolean depthLowLimit (MQLONG & *limit*);
Provides a copy of the **depth low limit**. It returns TRUE if successful.

MQLONG depthLowLimit ( );
Returns the **depth low limit** value without any indication of possible errors.

ImqBoolean depthMaximumEvent (MQLONG & *event*);
Provides a copy of the enablement state of the **depth maximum event**. It returns TRUE if successful.

MQLONG depthMaximumEvent ( );
Returns the enablement state of the **depth maximum event** without any indication of possible errors.

ImqDistributionList * distributionListReference ( ) const ;
Returns the **distribution list reference**.

void setDistributionListReference (ImqDistributionList & *list*);
Sets the **distribution list reference**.

void setDistributionListReference (ImqDistributionList * *list* = 0);
Sets the **distribution list reference**.

ImqBoolean distributionLists (MQLONG & *support*);
Provides a copy of the **distribution lists** value. It returns TRUE if successful.

MQLONG distributionLists ( );
Returns the **distribution lists** value without any indication of possible errors.

ImqBoolean setDistributionLists (const MQLONG *support*);
Sets the **distribution lists** value. It returns TRUE if successful.

ImqString dynamicQueueName ( ) const ;
Returns a copy of the **dynamic queue name**.

ImqBoolean setDynamicQueueName (const char * *name*);
Sets the **dynamic queue name**. The **dynamic queue name** can be set only while the ImqObject **open status** is FALSE. It returns TRUE if successful.

ImqBoolean get (ImqMessage & *msg*, ImqGetMessageOptions & *options*);
Retrieves a message from the queue, using the specified *options*. Invokes the ImqObject **openFor** method if necessary to ensure that the ImqObject **open options** include either one of the MQOO_INPUT_* values, or the MQOO_BROWSE value, depending on the *options*. If the *msg* object has an ImqCache **automatic buffer**, the buffer grows to accommodate any message retrieved. The **clearMessage** method is invoked against the *msg* object before retrieval.

This method returns TRUE if successful.

Note: The result of the method invocation is FALSE if the ImqObject **reason code** is MQRC_TRUNCATED_MSG_FAILED, even though this **reason code** is classified as a warning. If a truncated message is accepted, the ImqCache **message length** reflects the truncated length. In either event, the ImqMessage **total message length** indicates the number of bytes that were available.

ImqBoolean get (ImqMessage & *msg*);
As for the previous method, except that default get message options are used.

ImqBoolean get (ImqMessage & *msg*, ImqGetMessageOptions & *options*, const size_t *buffer-size*);
As for the previous two methods, except that an overriding *buffer-size* is indicated. If the *msg* object employs an ImqCache **automatic buffer**, the **resizeBuffer** method is invoked on the *msg* object prior to message retrieval, and the buffer does not grow further to accommodate any larger message.

ImqBoolean get (ImqMessage & *msg*, const size_t *buffer-size*);
As for the previous method, except that default get message options are used.

ImqBoolean hardenGetBackout (MQLONG & *harden*);
Provides a copy of the **harden get backout** value. It returns TRUE if successful.

MQLONG hardenGetBackout ( );
Returns the **harden get backout** value without any indication of possible errors.

ImqBoolean indexType(MQLONG & *type*);
Provides a copy of the **index type**. It returns TRUE if successful.

MQLONG indexType( );
Returns the **index type** without any indication of possible errors.

ImqBoolean inhibitGet (MQLONG & *inhibit*);
Provides a copy of the **inhibit get** value. It returns TRUE if successful.

MQLONG inhibitGet ( );
Returns the **inhibit get** value without any indication of possible errors.

ImqBoolean setInhibitGet (const MQLONG *inhibit*);
Sets the **inhibit get** value. It returns TRUE if successful.

ImqBoolean inhibitPut (MQLONG & *inhibit*);
Provides a copy of the **inhibit put** value. It returns TRUE if successful.

MQLONG inhibitPut ( );
Returns the **inhibit put** value without any indication of possible errors.

ImqBoolean setInhibitPut (const MQLONG *inhibit*);
Sets the **inhibit put** value. It returns TRUE if successful.

ImqBoolean initiationQueueName (ImqString & *name*);
Provides a copy of the **initiation queue name**. It returns TRUE if successful.

ImqString initiationQueueName ( );
Returns the **initiation queue name** without any indication of possible errors.

ImqBoolean maximumDepth (MQLONG & *depth*);
Provides a copy of the **maximum depth**. It returns TRUE if successful.

MQLONG maximumDepth ( );
Returns the **maximum depth** without any indication of possible errors.

ImqBoolean maximumMessageLength (MQLONG & *length*);
Provides a copy of the **maximum message length**. It returns TRUE if successful.

MQLONG maximumMessageLength ( );
Returns the **maximum message length** without any indication of possible errors.

ImqBoolean messageDeliverySequence (MQLONG & *sequence*);
Provides a copy of the **message delivery sequence**. It returns TRUE if successful.

MQLONG messageDeliverySequence ( );
Returns the **message delivery sequence** value without any indication of possible errors.

ImqQueue * nextDistributedQueue ( ) const ;
Returns the **next distributed queue**.

ImqBoolean nonPersistentMessageClass (MQLONG & monq);
Provides a copy of the non persistent message class value. It returns TRUE if successful.

MQLONG nonPersistentMessageClass ( );
Returns the non persistent message class value without any indication of possible errors.

ImqBoolean openInputCount (MQLONG & *count*);
Provides a copy of the **open input count**. It returns TRUE if successful.

MQLONG openInputCount ( );
Returns the **open input count** without any indication of possible errors.

ImqBoolean openOutputCount (MQLONG & ***count*** **);**
Provides a copy of the **open output count**. It returns TRUE if successful.

MQLONG openOutputCount ( );
Returns the **open output count** without any indication of possible errors.

ImqQueue * previousDistributedQueue ( ) const ;
Returns the **previous distributed queue**.

ImqBoolean processName (ImqString & ***name*** **);**
Provides a copy of the **process name**. It returns TRUE if successful.

ImqString processName ( );
Returns the **process name** without any indication of possible errors.

ImqBoolean put (ImqMessage & ***msg*** **);**
Places a message onto the queue, using default put message options. Uses the ImqObject **openFor** method if necessary to ensure that the ImqObject **open options** include MQOO_OUTPUT.

This method returns TRUE if successful.

ImqBoolean put (ImqMessage & ***msg*****, ImqPutMessageOptions &** ***pmo*** **);**
Places a message onto the queue, using the specified *pmo*. Uses the ImqObject **openFor** method as necessary to ensure that the ImqObject **open options** include MQOO_OUTPUT, and (if the *pmo* **options** include any of MQPMO_PASS_IDENTITY_CONTEXT, MQPMO_PASS_ALL_CONTEXT, MQPMO_SET_IDENTITY_CONTEXT, or MQPMO_SET_ALL_CONTEXT) corresponding MQOO_*_CONTEXT values.

This method returns TRUE if successful.

Note: If the *pmo* includes a **context reference**, the referenced object is opened, if necessary, to provide a context.

ImqBoolean queueAccounting (MQLONG & acctq);
Provides a copy of the queue accounting value. It returns TRUE if successful.

MQLONG queueAccounting ( );
Returns the queue accounting value without any indication of possible errors.

ImqString queueManagerName ( ) const ;
Returns the **queue manager name**.

ImqBoolean setQueueManagerName (const char * ***name*** **);**
Sets the **queue manager name**. The **queue manager name** can be set only while the ImqObject **open status** is FALSE. This method returns TRUE if successful.

ImqBoolean queueMonitoring (MQLONG & monq);
Provides a copy of the queue monitoring value. It returns TRUE if successful.

MQLONG queueMonitoring ( );
Returns the queue monitoring value without any indication of possible errors.

ImqBoolean queueStatistics (MQLONG & statq);
Provides a copy of the queue statistics value. It returns TRUE if successful.

MQLONG queueStatistics ( );
Returns the queue statistics value without any indication of possible errors.

ImqBoolean queueType (MQLONG & ***type*** **);**
Provides a copy of the **queue type** value. It returns TRUE if successful.

MQLONG queueType ( );
Returns the **queue type** without any indication of possible errors.

ImqBoolean remoteQueueManagerName (ImqString & ***name*** **);**
Provides a copy of the **remote queue manager name**. It returns TRUE if successful.

ImqString remoteQueueManagerName ( );
Returns the **remote queue manager name** without any indication of possible errors.

ImqBoolean remoteQueueName (ImqString & *name*);
Provides a copy of the **remote queue name**. It returns TRUE if successful.

ImqString remoteQueueName ( );
Returns the **remote queue name** without any indication of possible errors.

ImqBoolean resolvedQueueManagerName(ImqString & *name*);
Provides a copy of the **resolved queue manager name**. It returns TRUE if successful.

Note: This method fails unless MQOO_RESOLVE_NAMES is among the ImqObject **open options**.

ImqString resolvedQueueManagerName( ) ;
Returns the **resolved queue manager name**, without any indication of possible errors.

ImqBoolean resolvedQueueName(ImqString & *name*);
Provides a copy of the **resolved queue name**. It returns TRUE if successful.

Note: This method fails unless MQOO_RESOLVE_NAMES is among the ImqObject **open options**.

ImqString resolvedQueueName( ) ;
Returns the **resolved queue name**, without any indication of possible errors.

ImqBoolean retentionInterval (MQLONG & *interval*);
Provides a copy of the **retention interval**. It returns TRUE if successful.

MQLONG retentionInterval ( );
Returns the **retention interval** without any indication of possible errors.

ImqBoolean scope (MQLONG & *scope*);
Provides a copy of the **scope**. It returns TRUE if successful.

MQLONG scope ( );
Returns the **scope** without any indication of possible errors.

ImqBoolean serviceInterval (MQLONG & *interval*);
Provides a copy of the **service interval**. It returns TRUE if successful.

MQLONG serviceInterval ( );
Returns the **service interval** without any indication of possible errors.

ImqBoolean serviceIntervalEvent (MQLONG & *event*);
Provides a copy of the enablement state of the **service interval event**. It returns TRUE if successful.

MQLONG serviceIntervalEvent ( );
Returns the enablement state of the **service interval event** without any indication of possible errors.

ImqBoolean shareability (MQLONG & *shareability*);
Provides a copy of the **shareability** value. It returns TRUE if successful.

MQLONG shareability ( );
Returns the **shareability** value without any indication of possible errors.

ImqBoolean storageClass(ImqString & *class*);
Provides a copy of the **storage class**. It returns TRUE if successful.

ImqString storageClass( );
Returns the **storage class** without any indication of possible errors.

ImqBoolean transmissionQueueName (ImqString & *name*);
Provides a copy of the **transmission queue name**. It returns TRUE if successful.

ImqString transmissionQueueName ( );
Returns the **transmission queue name** without any indication of possible errors.

ImqBoolean triggerControl (MQLONG & *control*);
Provides a copy of the **trigger control** value. It returns TRUE if successful.

MQLONG triggerControl ( );
Returns the **trigger control** value without any indication of possible errors.

ImqBoolean setTriggerControl (const MQLONG *control*);
Sets the **trigger control** value. It returns TRUE if successful.

ImqBoolean triggerData (ImqString & *data*);
Provides a copy of the **trigger data**. It returns TRUE if successful.

ImqString triggerData ( );
Returns a copy of the **trigger data** without any indication of possible errors.

ImqBoolean setTriggerData (const char * *data*);
Sets the **trigger data**. It returns TRUE if successful.

ImqBoolean triggerDepth (MQLONG & *depth*);
Provides a copy of the **trigger depth**. It returns TRUE if successful.

MQLONG triggerDepth ( );
Returns the **trigger depth** without any indication of possible errors.

ImqBoolean setTriggerDepth (const MQLONG *depth*);
Sets the **trigger depth**. It returns TRUE if successful.

ImqBoolean triggerMessagePriority (MQLONG & *priority*);
Provides a copy of the **trigger message priority**. It returns TRUE if successful.

MQLONG triggerMessagePriority ( );
Returns the **trigger message priority** without any indication of possible errors.

ImqBoolean setTriggerMessagePriority (const MQLONG *priority*);
Sets the **trigger message priority**. It returns TRUE if successful.

ImqBoolean triggerType (MQLONG & *type*);
Provides a copy of the **trigger type**. It returns TRUE if successful.

MQLONG triggerType ( );
Returns the **trigger type** without any indication of possible errors.

ImqBoolean setTriggerType (const MQLONG *type*);
Sets the **trigger type**. It returns TRUE if successful.

ImqBoolean usage (MQLONG & *usage*);
Provides a copy of the **usage** value. It returns TRUE if successful.

MQLONG usage ( );
Returns the **usage** value without any indication of possible errors.

Object methods (protected)

void setNextDistributedQueue (ImqQueue * *queue* = 0);
Sets the **next distributed queue**.

Attention: Use this function only if you are sure it will not break the distributed queue list.

void setPreviousDistributedQueue (ImqQueue * *queue* = 0);
Sets the **previous distributed queue**.

Attention: Use this function only if you are sure it will not break the distributed queue list.

Reason codes

- MQRC_ATTRIBUTE_LOCKED
- MQRC_CONTEXT_OBJECT_NOT_VALID
- MQRC_CONTEXT_OPEN_ERROR
- MQRC_CURSOR_NOT_VALID
- MQRC_NO_BUFFER
- MQRC_REOPEN_EXCL_INPUT_ERROR
- MQRC_REOPEN_INQUIRE_ERROR

- MQRC_REOPEN_TEMPORARY_Q_ERROR
- (reason codes from MQGET)
- (reason codes from MQPUT)

ImqQueueManager C++ class

This class encapsulates a queue manager (an IBM MQ object of type MQOT_Q_MGR).

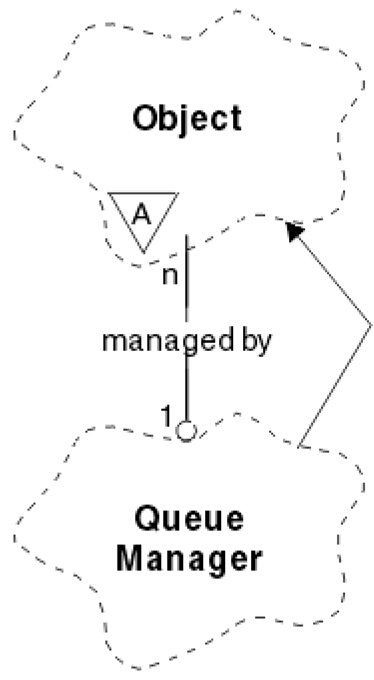


Figure 33. ImqQueueManager class

This class relates to the MQI calls listed in "ImqQueueManager cross-reference" on page 1782. Not all the listed methods are applicable to all platforms; see ALTER QMGR for more details.

- "Class attributes" on page 1850
- "Object attributes" on page 1851
- "Constructors" on page 1856
- "Destructors" on page 1856
- "Class methods (public)" on page 1856
- "Object methods (public)" on page 1856
- "Object methods (protected)" on page 1865
- "Object data (protected)" on page 1865
- "Reason codes" on page 1865

Class attributes

behavior
Controls the behavior of implicit connection and disconnection.

IMQ_EXPL_DISC_BACKOUT (0L)
An explicit call to the disconnect method implies backout. This attribute is mutually exclusive with IMQ_EXPL_DISC_COMMIT.

IMQ_EXPL_DISC_COMMIT (1L)
An explicit call to the disconnect method implies commit (the default). This attribute is mutually exclusive with IMQ_EXPL_DISC_BACKOUT.

IMQ_IMPL_CONN (2L)
Implicit connection is allowed (the default).

IMQ_IMPL_DISC_BACKOUT (0L)
An implicit call to the disconnect method, which can occur during object destruction, implies backout. This attribute is mutually exclusive with the IMQ_IMPL_DISC_COMMIT.

IMQ_IMPL_DISC_COMMIT (4L)
An implicit call to the disconnect method, which can occur during object destruction, implies commit (the default). This attribute is mutually exclusive with IMQ_IMPL_DISC_BACKOUT.

At IBM MQ V7.0 and above, C++ applications that make use of an implicit connection, need to specify IMQ_IMPL_CONN along with any other options provided in the `setBehavior()` method on an object of class `ImqQueueManager`. If your application does not use the `setBehavior()` method to explicitly set the behavior options, for example,

```
ImqQueueManager_object.setBehavior(IMQ_IMPL_DISC_COMMIT)
```

this change does not affect you since MQ_IMPL_CONN is enabled by default.

If your application explicitly sets the behavior options, for example,

```
ImqQueueManager_object.setBehavior(IMQ_IMPL_DISC_COMMIT)
```

you need to include IMQ_IMPL_CONN in the `setBehavior()` method as follows, to allow your application to complete an implicit connection:

```
ImqQueueManager_object.setBehavior(IMQ_IMPL_CONN | IMQ_IMPL_DISC_COMMIT)
```

Object attributes

accounting connections override
Allows applications to override the setting of the MQI accounting and queue accounting values.This attribute is read-only.

accounting interval
How long before intermediate accounting records are written (in seconds). This attribute is read-only.

activity recording
Controls the generation of activity reports. This attribute is read-only.

adopt new mca check
The elements checked to determine if an MCA should be adopted when a new inbound channel is detected that has the same name as an MCA that is already active. This attribute is read-only.

adopt new mca type
Whether an orphaned instance of an MCA of a particular channel type should be restarted automatically when a new inbound channel request matching the adopt new mca check parameters is detected. This attribute is read-only.

authentication type
Indicates the type of authentication which is being performed.

authority event
Controls authority events. This attribute is read-only.

begin options
Options that apply to the begin method. The initial value is MQBO_NONE.

bridge event
Whether IMS bridge events are generated. This attribute is read-only.

channel auto definition
Channel auto definition value. This attribute is read-only.

channel auto definition event
Channel auto definition event value. This attribute is read-only.

channel auto definition exit
Channel auto definition exit name. This attribute is read-only.

channel event
Whether channel events are generated. This attribute is read-only.

channel initiator adapters
The number of adapter subtasks to use for processing IBM MQ calls. This attribute is read-only.

channel initiator control
Whether the Channel Initiator should be started automatically when the Queue Manager is started. This attribute is read-only.

channel initiator dispatchers
The number of dispatchers to use for the channel initiator. This attribute is read-only.

channel initiator trace autostart
Whether channel initiator trace should start automatically or not. This attribute is read-only.

channel initiator trace table size
The size of the channel initiator's trace data space (in MB). This attribute is read-only.

channel monitoring
Controls the collection of online monitoring data for channels. This attribute is read-only.

channel reference
A reference to a channel definition for use during client connection. While connected, this attribute can be set to null, but cannot be changed to any other value. The initial value is null.

channel statistics
Controls the collection of statistics data for channels. This attribute is read-only.

character set
Coded character set identifier (CCSID). This attribute is read-only.

cluster sender monitoring
Controls the collection of online monitoring data for automatically-defined cluster sender channels. This attribute is read-only.

cluster sender statistics
Controls the collection of statistics data for automatically defined cluster sender channels. This attribute is read-only.

cluster workload data
Cluster workload exit data. This attribute is read-only.

cluster workload exit
Cluster workload exit name. This attribute is read-only.

cluster workload length
Cluster workload length. This attribute is read-only.

cluster workload mru
Cluster workload most recently used channels value. This attribute is read-only.

cluster workload use queue
Cluster workload use queue value. This attribute is read-only.

command event
Whether command events are generated. This attribute is read-only.

command input queue name
System command input queue name. This attribute is read-only.

command level
Command level supported by the queue manager. This attribute is read-only.

command server control
Whether the Command Server should be started automatically when the Queue Manager is started. This attribute is read-only.

connect options
Options that apply to the connect method. The initial value is MQCNO_NONE. The following additional values may be possible, depending on platform:

- MQCNO_STANDARD_BINDING
- MQCNO_FASTPATH_BINDING
- MQCNO_HANDLE_SHARE_NONE
- MQCNO_HANDLE_SHARE_BLOCK
- MQCNO_HANDLE_SHARE_NO_BLOCK
- MQCNO_SERIALIZE_CONN_TAG_Q_MGR
- MQCNO_SERIALIZE_CONN_TAG_QSG
- MQCNO_RESTRICT_CONN_TAG_Q_MGR
- MQCNO_RESTRICT_CONN_TAG_QSG

connection id
A unique identifier that allows MQ to reliably identify an application.

connection status
TRUE when connected to the queue manager. This attribute is read-only.

connection tag
A tag to be associated with a connection. This attribute can only be set when not connected. The initial value is null.

cryptographic hardware
Configuration details for cryptographic hardware. For MQ MQI client connections.

dead-letter queue name
Name of the dead-letter queue. This attribute is read-only.

default transmission queue name
Default transmission queue name. This attribute is read-only.

distribution lists
Capability of the queue manager to support distribution lists.

dns group
The name of the group that the TCP listener that handles inbound transmissions for the queue sharing group should join when using Workload Manager Dynamic Domain Name Services support. This attribute is read-only.

dns wlm
Whether the TCP listener that handles inbound transmissions for the queue sharing group should register with Workload Manager for Dynamic Domain Name Services. This attribute is read-only.

first authentication record
The first of one or more objects of class ImqAuthenticationRecord, in no particular order, in which the ImqAuthenticationRecord connection reference addresses this object. For MQ MQI client connections.

first managed object
The first of one or more objects of class ImqObject, in no particular order, in which the ImqObject connection reference addresses this object. The initial value is zero.

inhibit event
Controls inhibit events. This attribute is read-only.

ip address version
Which IP protocol (IPv4 or IPv6) to use for a channel connection. This attribute is read-only.

key repository
Location of the key database file in which keys and certificates are stored. For IBM MQ MQI client connections.

key reset count
The number of unencrypted bytes sent and received within a TLS conversation before the secret key is renegotiated. This attribute applies only to client connections using MQCONNX. See also ssl key reset count.

listener timer
The time interval (in seconds) between attempts by IBM MQ to restart the listener if there has been an APPC or TCP/IP failure. This attribute is read-only.

local event
Controls local events. This attribute is read-only.

logger event
Controls whether recovery log events are generated. This attribute is read-only.

lu group name
The generic LU name that the LU 6.2 listener that handles inbound transmissions for the queue sharing group should use. This attribute is read-only.

lu name
The name of the LU to use for outbound LU 6.2 transmissions. This attribute is read-only.

lu62 arm suffix
The suffix of the SYS1.PARMLIB member APPCPMxx, that nominates the LUADD for this channel initiator. This attribute is read-only.

lu62 channels
The maximum number of channels that can be current or clients that can be connected, that use the LU 6.2 transmission protocol. This attribute is read-only.

maximum active channels
The maximum number of channels that can be active at any time. This attribute is read-only.

maximum channels
The maximum number of channels that can be current (including server-connection channels with connected clients). This attribute is read-only.

maximum handles
Maximum number of handles. This attribute is read-only.

maximum message length
Maximum possible length for any message on any queue managed by this queue manager. This attribute is read-only.

maximum priority
Maximum message priority. This attribute is read-only.

maximum uncommitted messages
Maximum number of uncommitted messages within a unit or work. This attribute is read-only.

mqi accounting
Controls the collection of accounting information for MQI data. This attribute is read-only.

mqi statistics
Controls the collection of statistics monitoring information for the queue manager. This attribute is read-only.

outbound port maximum
The higher end of the range of port numbers to be used when binding outgoing channels. This attribute is read-only.

outbound port minimum
The lower end of the range of port numbers to be used when binding outgoing channels. This attribute is read-only.

password
password associated with user ID

performance event
Controls performance events. This attribute is read-only.

platform
Platform on which the queue manager resides. This attribute is read-only.

queue accounting
Controls the collection of accounting information for queues. This attribute is read-only.

queue monitoring
Controls the collection of online monitoring data for queues. This attribute is read-only.

queue statistics
Controls the collection of statistics data for queues. This attribute is read-only.

receive timeout
Approximately how long a TCP/IP message channel will wait to receive data, including heartbeats, from its partner, before returning to the inactive state. This attribute is read-only.

receive timeout minimum
The minimum time that a TCP/IP channel will wait to receive data, including heartbeats, from its partner, before returning to the inactive state. This attribute is read-only.

receive timeout type
A qualifier applied to receive timeout. This attribute is read-only.

remote event
Controls remote events. This attribute is read-only.

repository name
Repository name. This attribute is read-only.

repository namelist
Repository namelist name. This attribute is read-only.

shared queue manager name
Whether MQOPENs of a shared queue where the ObjectQMgrName is another queue manager in the queue sharing group should resolve to an open of the shared queue on the local queue manager. This attribute is read-only.

ssl event
Whether SSL events are generated. This attribute is read-only.

ssl FIPS required
Whether only FIPS-certified algorithms should be used if the cryptography is executed in IBM MQ software. This attribute is read-only.

ssl key reset count
The number of unencrypted bytes sent and received within an SSL conversation before the secret key is renegotiated. This attribute is read-only.

start-stop event
Controls start-stop events. This attribute is read-only.

statistics interval
How often statistics monitoring data is written to the monitoring queue. This attribute is read-only.

syncpoint availability
Availability of syncpoint participation. This attribute is read-only.

Note: Queue manager-coordinated global units of work are not supported on the IBM i platform.

IBM i You can program a unit of work, externally coordinated by IBM i, using the _Rcommit and _Rback native system calls. Start this type of unit of work by starting the IBM MQ application under job-level commitment control using the STRCMTCTL command. See Interfaces to the IBM i external syncpoint manager for further details. Backout and commit are supported on the IBM i platform for local units of work coordinated by a queue manager.

tcp channels
The maximum number of channels that can be current or clients that can be connected, that use the TCP/IP transmission protocol. This attribute is read-only.

tcp keepalive
Whether the TCP KEEPALIVE facility is to be used to check that the other end of the connection is still available. This attribute is read-only.

tcp name
The name of either the sole or default TCP/IP system to be used, depending on the value of tcp stack type. This attribute is read-only.

tcp stack type
Whether the channel initiator is permitted to only use the TCP/IP address space specified in tcp name or can bind to any selected TCP/IP address. This attribute is read-only.

trace route recording
Controls the recording of route tracing information. This attribute is read-only.

trigger interval
Trigger interval. This attribute is read-only.

user id
On UNIX and Linux platforms, the application's real user ID. On Windows platforms, the application's user ID.

Constructors

ImqQueueManager( );
The default constructor.

ImqQueueManager(const ImqQueueManager & *manager*);
The copy constructor. The connection status will be FALSE.

ImqQueueManager(const char * *name*);
Sets the ImqObject name to *name*.

Destructors

When an ImqQueueManager object is destroyed, it is automatically disconnected.

Class methods (public)

static MQLONG behavior( );
Returns the behavior.

void setBehavior(const MQLONG *behavior* = 0);
Sets the behavior.

Object methods (public)

void operator = (const ImqQueueManager & *mgr*);
Disconnects if necessary, and copies instance data from *mgr*. The connection status is be FALSE.

ImqBoolean accountingConnOverride (MQLONG & statint);
Provides a copy of the accounting connections override value. It returns TRUE if successful.

MQLONG accountingConnOverride ( );
Returns the accounting connections override value without any indication of possible errors.

ImqBoolean accountingInterval (MQLONG & statint);
Provides a copy of the accounting interval value. It returns TRUE if successful.

MQLONG accountingInterval ( );
Returns the accounting interval value without any indication of possible errors.

ImqBoolean activityRecording (MQLONG & rec);
Provides a copy of the activity recording value. It returns TRUE if successful.

MQLONG activityRecording ( );
Returns the activity recording value without any indication of possible errors.

ImqBoolean adoptNewMCACheck (MQLONG & check);
Provides a copy of the adopt new MCA check value. It returns TRUE if successful.

MQLONG adoptNewMCACheck ( );
Returns the adopt new MCA check value without any indication of possible errors.

ImqBoolean adoptNewMCAType (MQLONG & type);
Provides a copy of the adopt new MCA type. It returns TRUE if successful.

MQLONG adoptNewMCAType ( );
Returns the adopt new MCA type without any indication of possible errors.

QLONG authenticationType ( ) const;
Returns the authentication type.

void setAuthenticationType (const MQLONG type = MQCSP_AUTH_NONE);
Sets the authentication type.

ImqBoolean authorityEvent(MQLONG & *event*);
Provides a copy of the enablement state of the authority event. It returns TRUE if successful.

MQLONG authorityEvent( );
Returns the enablement state of the authority event without any indication of possible errors.

ImqBoolean backout( );
Backs out uncommitted changes. It returns TRUE if successful.

ImqBoolean begin( );
Begins a unit of work. The begin options affect the behavior of this method. It returns TRUE if successful, but it also returns TRUE even if the underlying MQBEGIN call returns MQRC_NO_EXTERNAL_PARTICIPANTS or MQRC_PARTICIPANT_NOT_AVAILABLE (which are both associated with MQCC_WARNING).

MQLONG beginOptions( ) const ;
Returns the begin options.

void setBeginOptions(const MQLONG *options* = MQBO_NONE);
Sets the begin options.

ImqBoolean bridgeEvent (MQLONG & event);
Provides a copy of the bridge event value. It returns TRUE if successful.

MQLONG bridgeEvent ( );
Returns the bridge event value without any indication of possible errors.

ImqBoolean channelAutoDefinition(MQLONG & *value*);
Provides a copy of the channel auto definition value. It returns TRUE if successful.

MQLONG channelAutoDefinition( );
Returns the channel auto definition value without any indication of possible errors.

ImqBoolean channelAutoDefinitionEvent(MQLONG & *value*);
Provides a copy of the channel auto definition event value. It returns TRUE if successful.

MQLONG channelAutoDefinitionEvent( );
Returns the channel auto definition event value without any indication of possible errors.

ImqBoolean channelAutoDefinitionExit(ImqString & *name*);
Provides a copy of the channel auto definition exit name. It returns TRUE if successful.

ImqString channelAutoDefinitionExit( );
Returns the channel auto definition exit name without any indication of possible errors.

ImqBoolean channelEvent (MQLONG & event);
Provides a copy of the channel event value. It returns TRUE if successful.

MQLONG channelEvent( );
Returns the channel event value without any indication of possible errors.

MQLONG channelInitiatorAdapters ( );
Returns the channel initiator adapters value without any indication of possible errors.

ImqBoolean channelInitiatorAdapters (MQLONG & adapters);
Provides a copy of the channel initiator adapters value. It returns TRUE if successful.

MQLONG channelInitiatorControl ( );
Returns the channel initiator startup value without any indication of possible errors.

ImqBoolean channelInitiatorControl (MQLONG & init);
Provides a copy of the channel initiator control startup value. It returns TRUE if successful.

MQLONG channelInitiatorDispatchers ( );
Returns the channel initiator dispatchers value without any indication of possible errors.

ImqBoolean channelInitiatorDispatchers (MQLONG & dispatchers);
Provides a copy of the channel initiator dispatchers value. It returns TRUE if successful.

MQLONG channelInitiatorTraceAutoStart ( );
Returns the channel initiator trace auto start value without any indication of possible errors.

ImqBoolean channelInitiatorTraceAutoStart (MQLONG & auto);
Provides a copy of the channel initiator trace auto start value. It returns TRUE if successful.

MQLONG channelInitiatorTraceTableSize ( );
Returns the channel initiator trace table size value without any indication of possible errors.

ImqBoolean channelInitiatorTraceTableSize (MQLONG & size);
Provides a copy of the channel initiator trace table size value. It returns TRUE if successful.

ImqBoolean channelMonitoring (MQLONG & monchl);
Provides a copy of the channel monitoring value. It returns TRUE if successful.

MQLONG channelMonitoring ( );
Returns the channel monitoring value without any indication of possible errors.

ImqBoolean channelReference(ImqChannel * & *pchannel*);
Provides a copy of the channel reference. If the channel reference is invalid, sets *pchannel* to null. This method returns TRUE if successful.

ImqChannel * channelReference( );
Returns the channel reference without any indication of possible errors.

ImqBoolean setChannelReference(ImqChannel & *channel*);
Sets the channel reference. This method returns TRUE if successful.

ImqBoolean setChannelReference(ImqChannel * *channel* = 0);
Sets or resets the channel reference. This method returns TRUE if successful.

ImqBoolean channelStatistics (MQLONG & statchl);
Provides a copy of the channel statistics value. It returns TRUE if successful.

MQLONG channelStatistics ( );
Returns the channel statistics value without any indication of possible errors.

ImqBoolean characterSet(MQLONG & *ccsid*);
Provides a copy of the character set. It returns TRUE if successful.

MQLONG characterSet( );
Returns a copy of the character set, without any indication of possible errors.

MQLONG clientSslKeyResetCount ( ) const;
Returns the SSL key reset count value used on client connections.

void setClientSslKeyResetCount(const MQLONG count);
Sets the SSL key reset count used on client connections.

ImqBoolean clusterSenderMonitoring (MQLONG & monacls);
Provides a copy of the cluster sender monitoring default value. It returns TRUE if successful.

MQLONG clusterSenderMonitoring ( );
Returns the cluster sender monitoring default value without any indication of possible errors.

ImqBoolean clusterSenderStatistics (MQLONG & statacls);
Provides a copy of the cluster sender statistics value. It returns TRUE if successful.

MQLONG clusterSenderStatistics ( );
Returns the cluster sender statistics value without any indication of possible errors.

ImqBoolean clusterWorkloadData(ImqString & *data*);
Provides a copy of the cluster workload exit data. It returns TRUE if successful.

ImqString clusterWorkloadData( );
Returns the cluster workload exit data without any indication of possible errors.

ImqBoolean clusterWorkloadExit(ImqString & *name*);
Provides a copy of the cluster workload exit name. It returns TRUE if successful.

ImqString clusterWorkloadExit( );
Returns the cluster workload exit name without any indication of possible errors.

ImqBoolean clusterWorkloadLength(MQLONG & *length*);
Provides a copy of the cluster workload length. It returns TRUE if successful.

MQLONG clusterWorkloadLength( );
Returns the cluster workload length without any indication of possible errors.

ImqBoolean clusterWorkLoadMRU (MQLONG & mru);
Provides a copy of the cluster workload most recently used channels value. It returns TRUE if successful.

MQLONG clusterWorkLoadMRU ( );
Returns the cluster workload most recently used channels value without any indication of possible errors.

ImqBoolean clusterWorkLoadUseQ (MQLONG & useq);
Provides a copy of the cluster workload use queue value. It returns TRUE if successful.

MQLONG clusterWorkLoadUseQ ( );
Returns the cluster workload use queue value without any indication of possible errors.

ImqBoolean commandEvent (MQLONG & event);
Provides a copy of the command event value. It returns TRUE if successful.

MQLONG commandEvent ( );
Returns the command event value without any indication of possible errors.

ImqBoolean commandInputQueueName(ImqString & *name*);
Provides a copy of the command input queue name. It returns TRUE if successful.

ImqString commandInputQueueName( );
Returns the command input queue name without any indication of possible errors.

ImqBoolean commandLevel(MQLONG & *level*);
Provides a copy of the command level. It returns TRUE if successful.

MQLONG commandLevel( );
Returns the command level without any indication of possible errors.

MQLONG commandServerControl ( );
Returns the command server startup value without any indication of possible errors.

ImqBoolean commandServerControl (MQLONG & server);
Provides a copy of the command server control startup value. It returns TRUE if successful.

ImqBoolean commit( );
Commits uncommitted changes. It returns TRUE if successful.

ImqBoolean connect( );
Connects to the queue manager with the given ImqObject name, the default being the local queue manager. If you want to connect to a specific queue manager, use the ImqObject setName method before connection. If there is a channel reference, it is used to pass information about the channel

definition to MQCONNX in an MQCD. The ChannelType in the MQCD is set to MQCHT_CLNTCONN. channel reference information, which is only meaningful for client connections, is ignored for server connections. The connect options affect the behavior of this method. This method sets the connection status to TRUE if successful. It returns the new connection status.

If there is a first authentication record, the chain of authentication records is used to authenticate digital certificates for secure client channels.

You can connect more than one ImqQueueManager object to the same queue manager. All use the same MQHCONN connection handle and share UOW functionality for the connection associated with the thread. The first ImqQueueManager to connect obtains the MQHCONN handle. The last ImqQueueManager to disconnect performs the MQDISC.

For a multithreaded program, it is recommended that a separate ImqQueueManager object is used for each thread.

ImqBinary connectionId ( ) const ;
Returns the connection ID.

ImqBinary connectionTag ( ) const ;
Returns the connection tag.

ImqBoolean setConnectionTag (const MQBYTE128 *tag* = 0);
Sets the connection tag. If *tag* is zero, clears the connection tag. This method returns TRUE if successful.

ImqBoolean setConnectionTag (const ImqBinary & *tag*);
Sets the connection tag. The data length of *tag* must be either zero (to clear the connection tag) or MQ_CONN_TAG_LENGTH. This method returns TRUE if successful.

MQLONG connectOptions( ) const ;
Returns the connect options.

void setConnectOptions(const MQLONG *options* = MQCNO_NONE);
Sets the connect options.

ImqBoolean connectionStatus( ) const ;
Returns the connection status.

ImqString cryptographicHardware ( );
Returns the cryptographic hardware.

ImqBoolean setCryptographicHardware (const char * *hardware* = 0);
Sets the cryptographic hardware. This method returns TRUE if successful.

ImqBoolean deadLetterQueueName(ImqString & *name*);
Provides a copy of the dead-letter queue name. It returns TRUE if successful.

ImqString deadLetterQueueName( );
Returns a copy of the dead-letter queue name, without any indication of possible errors.

ImqBoolean defaultTransmissionQueueName(ImqString & *name*);
Provides a copy of the default transmission queue name. It returns TRUE if successful.

ImqString defaultTransmissionQueueName( );
Returns the default transmission queue name without any indication of possible errors.

ImqBoolean disconnect( );
Disconnects from the queue manager and sets the connection status to FALSE. Closes all ImqProcess and ImqQueue objects associated with this object, and severs their connection reference before disconnection. If more than one ImqQueueManager object is connected to the same queue manager, only the last to disconnect performs a physical disconnection; others perform a logical disconnection. Uncommitted changes are committed on physical disconnection only.

This method returns TRUE if successful. If it is called when there is no existing connection, the return code is also true.

ImqBoolean distributionLists(MQLONG & *support*);
Provides a copy of the distribution lists value. It returns TRUE if successful.

MQLONG distributionLists( );
Returns the distribution lists value without any indication of possible errors.

ImqBoolean dnsGroup (ImqString & group);
Provides a copy of the DNS group name. It returns TRUE if successful.

ImqString dnsGroup ( );
Returns the DNS group name without any indication of possible errors.

ImqBoolean dnsWlm (MQLONG & wlm);
Provides a copy of the DNS WLM value. It returns TRUE if successful.

MQLONG dnsWlm ( );
Returns the DNS WLM value without any indication of possible errors.

ImqAuthenticationRecord * firstAuthenticationRecord ( ) const ;
Returns the first authentication record.

void setFirstAuthenticationRecord (const ImqAuthenticationRecord * *air* = 0);
Sets the first authentication record.

ImqObject * firstManagedObject( ) const ;
Returns the first managed object.

ImqBoolean inhibitEvent(MQLONG & *event*);
Provides a copy of the enablement state of the inhibit event. It returns TRUE if successful.

MQLONG inhibitEvent( );
Returns the enablement state of the inhibit event without any indication of possible errors.

ImqBoolean ipAddressVersion (MQLONG & version);
Provides a copy of the IP address version value. It returns TRUE if successful.

MQLONG ipAddressVersion ( );
Returns the IP address version value without any indication of possible errors.

ImqBoolean keepAlive (MQLONG & keepalive);
Provides a copy of the keep alive value. It returns TRUE if successful.

MQLONG keepAlive ( );
Returns the keep alive value without any indication of possible errors.

ImqString keyRepository ( );
Returns the key repository.

ImqBoolean setKeyRepository (const char * *repository* = 0);
Sets the key repository. It returns TRUE if successful.

ImqBoolean listenerTimer (MQLONG & timer);
Provides a copy of the listener timer value. It returns TRUE if successful.

MQLONG listenerTimer ( );
Returns the listener timer value without any indication of possible errors.

ImqBoolean localEvent(MQLONG & *event*);
Provides a copy of the enablement state of the local event. It returns TRUE if successful.

MQLONG localEvent( );
Returns the enablement state of the local event without any indication of possible errors.

ImqBoolean loggerEvent (MQLONG & count);
Provides a copy of the logger event value. It returns TRUE if successful.

MQLONG loggerEvent ( );
Returns the logger event value without any indication of possible errors.

ImqBoolean luGroupName (ImqString & name);.
Provides a copy of the LU group name. It returns TRUE if successful

ImqString luGroupName ( );
Returns the LU group name without any indication of possible errors.

ImqBoolean lu62ARMSuffix (ImqString & suffix);
Provides a copy of the LU62 ARM suffix. It returns TRUE if successful.

ImqString lu62ARMSuffix ( );
Returns the LU62 ARM suffix without any indication of possible errors

ImqBoolean luName (ImqString & name);
Provides a copy of the LU name. It returns TRUE if successful.

ImqString luName ( );
Returns the LU name without any indication of possible errors.

ImqBoolean maximumActiveChannels (MQLONG & channels);
Provides a copy of the maximum active channels value. It returns TRUE if successful.

MQLONG maximumActiveChannels ( );
Returns the maximum active channels value without any indication of possible errors.

ImqBoolean maximumCurrentChannels (MQLONG & channels);
Provides a copy of the maximum current channels value. It returns TRUE if successful.

MQLONG maximumCurrentChannels ( );
Returns the maximum current channels value without any indication of possible errors.

ImqBoolean maximumHandles(MQLONG & *number*);
Provides a copy of the maximum handles. It returns TRUE if successful.

MQLONG maximumHandles( );
Returns the maximum handles without any indication of possible errors.

ImqBoolean maximumLu62Channels (MQLONG & channels);
Provides a copy of the maximum LU62 channels value. It returns TRUE if successful.

MQLONG maximumLu62Channels ( );.
Returns the maximum LU62 channels value without any indication of possible errors

ImqBoolean maximumMessageLength(MQLONG & *length*);
Provides a copy of the maximum message length. It returns TRUE if successful.

MQLONG maximumMessageLength( );
Returns the maximum message length without any indication of possible errors.

ImqBoolean maximumPriority(MQLONG & *priority*);
Provides a copy of the maximum priority. It returns TRUE if successful.

MQLONG maximumPriority( );
Returns a copy of the maximum priority, without any indication of possible errors.

ImqBoolean maximumTcpChannels (MQLONG & channels);
Provides a copy of the maximum TCP channels value. It returns TRUE if successful.

MQLONG maximumTcpChannels ( );
Returns the maximum TCP channels value without any indication of possible errors.

ImqBoolean maximumUncommittedMessages(MQLONG & *number*);
Provides a copy of the maximum uncommitted messages. It returns TRUE if successful.

MQLONG maximumUncommittedMessages( );
Returns the maximum uncommitted messages without any indication of possible errors.

ImqBoolean mqiAccounting (MQLONG & statint);
Provides a copy of the MQI accounting value. It returns TRUE if successful.

MQLONG mqiAccounting ( );
Returns the MQI accounting value without any indication of possible errors.

ImqBoolean mqiStatistics (MQLONG & statmqi);
Provides a copy of the MQI statistics value. It returns TRUE if successful.

MQLONG mqiStatistics ( );
Returns the MQI statistics value without any indication of possible errors.

ImqBoolean outboundPortMax (MQLONG & max);
Provides a copy of the maximum outbound port value. It returns TRUE if successful.

MQLONG outboundPortMax ( );
Returns the maximum outbound port value without any indication of possible errors.

ImqBoolean outboundPortMin (MQLONG & min);
Provides a copy of the minimum outbound port value. It returns TRUE if successful.

MQLONG outboundPortMin ( );
Returns the minimum outbound port value without any indication of possible errors.

ImqBinary password ( ) const;
Returns the password used on client connections.

ImqBoolean setPassword (const ImqString & password);
Sets the password used on client connections.

ImqBoolean setPassword (const char * = 0 password);
Sets the password used on client connections.

ImqBoolean setPassword (const ImqBinary & password);
Sets the password used on client connections.

ImqBoolean performanceEvent(MQLONG & *event*);
Provides a copy of the enablement state of the performance event. It returns TRUE if successful.

MQLONG performanceEvent( );
Returns the enablement state of the performance event without any indication of possible errors.

ImqBoolean platform(MQLONG & *platform*);
Provides a copy of the platform. It returns TRUE if successful.

MQLONG platform( );
Returns the platform without any indication of possible errors.

ImqBoolean queueAccounting (MQLONG & acctq);
Provides a copy of the queue accounting value. It returns TRUE if successful.

MQLONG queueAccounting ( );
Returns the queue accounting value without any indication of possible errors.

ImqBoolean queueMonitoring (MQLONG & monq);
Provides a copy of the queue monitoring value. It returns TRUE if successful.

MQLONG queueMonitoring ( );
Returns the queue monitoring value without any indication of possible errors.

ImqBoolean queueStatistics (MQLONG & statq);
Provides a copy of the queue statistics value. It returns TRUE if successful.

MQLONG queueStatistics ( );
Returns the queue statistics value without any indication of possible errors.

ImqBoolean receiveTimeout (MQLONG & timeout);
Provides a copy of the receive timeout value. It returns TRUE if successful.

MQLONG receiveTimeout ( );
Returns the receive timeout value without any indication of possible errors.

ImqBoolean receiveTimeoutMin (MQLONG & min);
Provides a copy of the minimum receive timeout value. It returns TRUE if successful.

MQLONG receiveTimeoutMin ( );
Returns the minimum receive timeout value without any indication of possible errors.

ImqBoolean receiveTimeoutType (MQLONG & type);
Provides a copy of the receive timeout type. It returns TRUE if successful.

MQLONG receiveTimeoutType ( );
Returns the receive timeout type without any indication of possible errors.

ImqBoolean remoteEvent(MQLONG & *event*);
Provides a copy of the enablement state of the remote event. It returns TRUE if successful.

MQLONG remoteEvent( );
Returns the enablement state of the remote event without any indication of possible errors.

ImqBoolean repositoryName(ImqString & *name*);
Provides a copy of the repository name. It returns TRUE if successful.

ImqString repositoryName( );
Returns the repository name without any indication of possible errors.

ImqBoolean repositoryNamelistName(ImqString & *name*);
Provides a copy of the repository namelist name. It returns TRUE if successful.

ImqString repositoryNamelistName( );
Returns a copy of the repository namelist name without any indication of possible errors.

ImqBoolean sharedQueueQueueManagerName (MQLONG & name);
Provides a copy of the shared queue queue manager name value. It returns TRUE if successful.

MQLONG sharedQueueQueueManagerName ( );
Returns the shared queue queue manager name value without any indication of possible errors.

ImqBoolean sslEvent (MQLONG & event);
Provides a copy of the SSL event value. It returns TRUE if successful.

MQLONG sslEvent ( );
Returns the SSL event value without any indication of possible errors.

ImqBoolean sslFips (MQLONG & sslfips);
Provides a copy of the SSL FIPS value. It returns TRUE if successful.

MQLONG sslFips ( );
Returns the SSL FIPS value without any indication of possible errors.

ImqBoolean sslKeyResetCount (MQLONG & count);
Provides a copy of the SSL key reset count value. It returns TRUE if successful.

MQLONG sslKeyResetCount ( );
Returns the SSL key reset count value without any indication of possible errors.

ImqBoolean startStopEvent(MQLONG & *event*);
Provides a copy of the enablement state of the start-stop event. It returns TRUE if successful.

MQLONG startStopEvent( );
Returns the enablement state of the start-stop event without any indication of possible errors.

ImqBoolean statisticsInterval (MQLONG & statint);
Provides a copy of the statistics interval value. It returns TRUE if successful.

MQLONG statisticsInterval ( );
Returns the statistics interval value without any indication of possible errors.

ImqBoolean syncPointAvailability(MQLONG & *sync*);
Provides a copy of the syncpoint availability value. It returns TRUE if successful.

MQLONG syncPointAvailability( );
Returns a copy of the syncpoint availability value, without any indication of possible errors.

ImqBoolean tcpName (ImqString & name);
Provides a copy of the TCP system name. It returns TRUE if successful.

ImqString tcpName ( );
Returns the TCP system name without any indication of possible errors.

ImqBoolean tcpStackType (MQLONG & type);
Provides a copy of the TCP stack type. It returns TRUE if successful.

MQLONG tcpStackType ( );
Returns the TCP stack type without any indication of possible errors.

ImqBoolean traceRouteRecording (MQLONG & routerec);
Provides a copy of the trace route recording value. It returns TRUE if successful.

MQLONG traceRouteRecording ( );
Returns the trace route recording value without any indication of possible errors.

ImqBoolean triggerInterval(MQLONG & *interval*);
Provides a copy of the trigger interval. It returns TRUE if successful.

MQLONG triggerInterval( );
Returns the trigger interval without any indication of possible errors.

ImqBinary userId ( ) const;
Returns the user ID used on client connections.

ImqBoolean setUserId (const ImqString & id);
Sets the user ID used on client connections.

ImqBoolean setUserId (const char * = 0 id);
Sets the user ID used on client connections.

ImqBoolean setUserId (const ImqBinary & id);
Sets the user ID used on client connections.

Object methods (protected)

void setFirstManagedObject (const ImqObject * *object* = 0);
Sets the first managed object.

Object data (protected)

MQHCONN *ohconn*
The IBM MQ connection handle (meaningful only while the connection status is TRUE).

Reason codes

- MQRC_ATTRIBUTE_LOCKED
- MQRC_ENVIRONMENT_ERROR
- MQRC_FUNCTION_NOT_SUPPORTED
- MQRC_REFERENCE_ERROR
- (reason codes for MQBACK)
- (reason codes for MQBEGIN)
- (reason codes for MQCMIT)
- (reason codes for MQCONNX)
- (reason codes for MQDISC)
- (reason codes for MQCONN)

ImqReferenceHeader C++ class

This class encapsulates features of the MQRMH data structure.

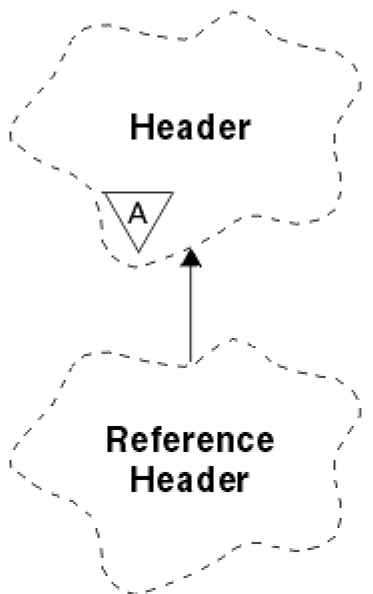


Figure 34. ImqReferenceHeader class

This class relates to the MQI calls listed in "ImqReferenceHeader cross-reference" on page 1786.

- "Object attributes" on page 1866
- "Constructors" on page 1867
- "Overloaded ImqItem methods" on page 1867
- "Object methods (public)" on page 1867
- "Object data (protected)" on page 1868
- "Reason codes" on page 1868

Object attributes

destination environment
: Environment for the destination. The initial value is a null string.

destination name
: Name of the data destination. The initial value is a null string.

instance id
: Instance identifier. A binary value (MQBYTE24) of length MQ_OBJECT_INSTANCE_ID_LENGTH. The initial value is MQOII_NONE.

logical length
: Logical, or intended, length of message data that follows this header. The initial value is zero.

logical offset
: Logical offset for the message data that follows, to be interpreted in the context of the data as a whole, at the ultimate destination. The initial value is zero.

logical offset 2
: High-order extension to the logical offset. The initial value is zero.

reference type
: Reference type. The initial value is a null string.

source environment
: Environment for the source. The initial value is a null string.

source name
Name of the data source. The initial value is a null string.

Constructors

ImqReferenceHeader( );
The default constructor.

ImqReferenceHeader(const ImqReferenceHeader & *header*);
The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & *msg*);
Inserts an MQRMH data structure into the message buffer at the beginning, moving existing message data further along, and sets the *msg* format to MQFMT_REF_MSG_HEADER.

See the ImqHeader class method description on "ImqHeader C++ class" on page 1814 for further details.

virtual ImqBoolean pasteIn (ImqMessage & *msg*);
Reads an MQRMH data structure from the message buffer.

To be successful, the ImqMessage format must be MQFMT_REF_MSG_HEADER.

See the ImqHeader class method description on "ImqHeader C++ class" on page 1814 for further details.

Object methods (public)

void operator = (const ImqReferenceHeader & *header*);
Copies instance data from *header*, replacing the existing instance data.

ImqString destinationEnvironment ( ) const ;
Returns a copy of the destination environment.

void setDestinationEnvironment (const char * *environment* = 0);
Sets the destination environment.

ImqString destinationName ( ) const ;
Returns a copy of the destination name.

void setDestinationName (const char * *name* = 0);
Sets the destination name.

ImqBinary instanceId ( ) const ;
Returns a copy of the instance id.

ImqBoolean setInstanceId (const ImqBinary & *id*);
Sets the instance id. The data length of *token* must be either 0 or MQ_OBJECT_INSTANCE_ID_LENGTH. This method returns TRUE if successful.

void setInstanceId (const MQBYTE24 *id* = 0);
Sets the instance id. *id* can be zero, which is the same as specifying MQOII_NONE. If *id* is nonzero, it must address MQ_OBJECT_INSTANCE_ID_LENGTH bytes of binary data. When using pre-defined values such as MQOII_NONE, you might need to make a cast to ensure a signature match, for example (MQBYTE *)MQOII_NONE.

MQLONG logicalLength ( ) const ;
Returns the logical length.

void setLogicalLength (const MQLONG *length*);
Sets the logical length.

MQLONG logicalOffset ( ) const ;
Returns the logical offset.

void setLogicalOffset (const MQLONG *offset*);
Sets the logical offset.

MQLONG logicalOffset2 ( ) const ;
Returns the logical offset 2.

void setLogicalOffset2 (const MQLONG *offset*);
Sets the logical offset 2.

ImqString referenceType ( ) const ;
Returns a copy of the reference type.

void setReferenceType (const char * *name* = 0);
Sets the reference type.

ImqString sourceEnvironment ( ) const ;
Returns a copy of the source environment.

void setSourceEnvironment (const char * *environment* = 0);
Sets the source environment.

ImqString sourceName ( ) const ;
Returns a copy of the source name.

void setSourceName (const char * *name* = 0);
Sets the source name.

Object data (protected)

MQRMH *omqrmh*
The MQRMH data structure.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR
- MQRC_STRUC_LENGTH_ERROR
- MQRC_STRUC_ID_ERROR
- MQRC_INSUFFICIENT_DATA
- MQRC_INCONSISTENT_FORMAT
- MQRC_ENCODING_ERROR

ImqString C++ class

This class provides character string storage and manipulation for null-terminated strings.

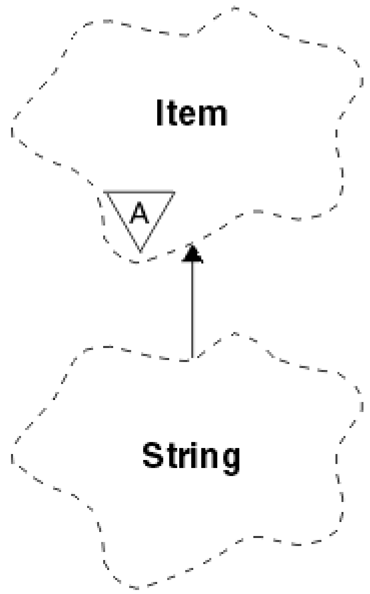


Figure 35. ImqString class

Use an ImqString in place of a **char *** in most situations where a parameter calls for a **char ***.

- "Object attributes" on page 1869
- "Constructors" on page 1869
- "Class methods (public)" on page 1870
- "Overloaded ImqItem methods" on page 1870
- "Object methods (public)" on page 1870
- "Object methods (protected)" on page 1873
- "Reason codes" on page 1873

Object attributes

characters
Characters in the **storage** that precede a trailing null.

length
Number of bytes in the **characters**. If there is no **storage**, the **length** is zero. The initial value is zero.

storage
A volatile array of bytes of arbitrary size. A trailing null must always be present in the **storage** after the **characters**, so that the end of the **characters** can be detected. Methods ensure that this situation is maintained, but ensure, when setting bytes in the array directly, that a trailing null exists after modification. Initially, there is no **storage** attribute.

Constructors

ImqString( );
The default constructor.

ImqString(const ImqString & *string*);
The copy constructor.

ImqString(const char *c*);
The **characters** comprise *c*.

ImqString(const char * *text*);
The **characters** are copied from *text*.

ImqString(const void * *buffer*, const size_t *length*);
Copies *length* bytes starting from *buffer* and assigns them to the **characters**. Substitution is made for any null characters copied. The substitution character is a period (.). No special consideration is given to any other non-printable or non-displayable characters copied.

Class methods (public)

static ImqBoolean copy(char * *destination-buffer*, const size_t *length*, const char * *source-buffer*, const char *pad* = 0);
Copies up to *length* bytes from *source-buffer* to *destination-buffer*. If the number of characters in *source-buffer* is insufficient, fills the remaining space in *destination-buffer* with *pad* characters. *source-buffer* can be zero. *destination-buffer* can be zero if *length* is also zero. Any error codes are lost. This method returns TRUE if successful.

static ImqBoolean copy (char * *destination-buffer*, const size_t *length*, const char * *source-buffer*, ImqError & *error-object*, const char *pad* = 0);
Copies up to *length* bytes from *source-buffer* to *destination-buffer*. If the number of characters in *source-buffer* is insufficient, fills the remaining space in *destination-buffer* with *pad* characters. *source-buffer* can be zero. *destination-buffer* can be zero if *length* is also zero. Any error codes are set in *error-object*. This method returns TRUE if successful.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & *msg*);
Copies the **characters** to the message buffer, replacing any existing content. Sets the *msg* **format** to MQFMT_STRING.

See the parent class method description for further details.

virtual ImqBoolean pasteIn (ImqMessage & *msg*);
Sets the **characters** by transferring the remaining data from the message buffer, replacing the existing **characters**.

To be successful, the **encoding** of the *msg* object must be MQENC_NATIVE. Retrieve messages with MQGMO_CONVERT to MQENC_NATIVE.

To be successful, the ImqMessage **format** must be MQFMT_STRING.

See the parent class method description for further details.

Object methods (public)

char & operator [ ] (const size_t *offset*) const ;
References the character at offset *offset* in the **storage**. Ensure that the relevant byte exists and is addressable.

ImqString operator ( ) (const size_t *offset*, const size_t *length* = 1) const ;
Returns a substring by copying bytes from the **characters** starting at *offset*. If *length* is zero, returns the rest of the **characters**. If the combination of *offset* and *length* does not produce a reference within the **characters**, returns an empty ImqString.

void operator = (const ImqString & *string*);
Copies instance data from *string*, replacing the existing instance data.

ImqString operator + (const char *c*) const ;
Returns the result of appending *c* to the **characters**.

ImqString operator + (const char * *text*) const ;
Returns the result of appending *text* to the **characters**. This can also be inverted. For example:

```
strOne + "string two" ;
"string one" + strTwo ;
```

Note: Although most compilers accept **strOne + "string two";** Microsoft Visual C++ requires **strOne + (char *)"string two" ;**

ImqString operator + (const ImqString & *string1*) const ;
Returns the result of appending *string1* to the **characters**.

ImqString operator + (const double *number*) const ;
Returns the result of appending *number* to the **characters** after conversion to text.

ImqString operator + (const long *number*) const ;
Returns the result of appending *number* to the **characters** after conversion to text.

void operator += (const char *c*);
Appends *c* to the **characters**.

void operator += (const char * *text*);
Appends *text* to the **characters**.

void operator += (const ImqString & *string*);
Appends *string* to the **characters**.

void operator += (const double *number*);
Appends *number* to the **characters** after conversion to text.

void operator += (const long *number*);
Appends *number* to the **characters** after conversion to text.

operator char * ( ) const ;
Returns the address of the first byte in the **storage**. This value can be zero, and is volatile. Use this method only for read-only purposes.

ImqBoolean operator < (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. The result is TRUE if less than and FALSE if greater than or equal to.

ImqBoolean operator > (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. The result is TRUE if greater than and FALSE if less than or equal to.

ImqBoolean operator <= (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. The result is TRUE if less than or equal to and FALSE if greater than.

ImqBoolean operator >= (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. The result is TRUE if greater than or equal to and FALSE if less than.

ImqBoolean operator == (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. It returns either TRUE or FALSE.

ImqBoolean operator != (const ImqString & *string*) const ;
Compares the **characters** with those of *string* using the **compare** method. It returns either TRUE or FALSE.

short compare(const ImqString & *string*) const ;
Compares the **characters** with those of *string*. The result is zero if the **characters** are equal, negative if less than and positive if greater than. Comparison is case sensitive. A null ImqString is regarded as less than a nonnull ImqString.

ImqBoolean copyOut(char * *buffer*, const size_t *length*, const char *pad* = 0);

Copies up to *length* bytes from the **characters** to the *buffer*. If the number of **characters** is insufficient, fills the remaining space in *buffer* with *pad* characters. *buffer* can be zero if *length* is also zero. It returns TRUE if successful.

size_t copyOut(long & *number*) const ;

Sets *number* from the **characters** after conversion from text, and returns the number of characters involved in the conversion. If this is zero, no conversion has been performed and *number* is not set. A convertible character sequence must begin with the following values:

```
<blank(s)>
<+|->
digit(s)
```

size_t copyOut(ImqString & *token*, const char *c* = ' ') const ;

If the **characters** contain one or more characters that are different from *c*, identifies a token as the first contiguous sequence of such characters. In this case *token* is set to that sequence, and the value returned is the sum of the number of leading characters *c* and the number of bytes in the sequence. Otherwise, returns zero and does not set *token*.

size_t cutOut(long & *number*);

Sets *number* as for the **copy** method, but also removes from **characters** the number of bytes indicated by the return value. For example, the string shown in the following example can be cut into three numbers by using **cutOut** (*number*) three times:

```
strNumbers = "-1 0   +55 "

while ( strNumbers.cutOut( number ) );
number becomes -1, then 0, then 55
leaving strNumbers == " "
```

size_t cutOut(ImqString & *token*, const char *c* = ' ' '

Sets *token* as for the **copyOut** method, and removes from **characters** the *strToken* characters and also any characters *c* that precede the *token* characters. If *c* is not a blank, removes characters *c* that directly succeed the *token* characters. Returns the number of characters removed. For example, the string shown in the following example can be cut into three tokens by using **cutOut** (*token*) three times:

```
strText = " Program Version 1.1 "

while ( strText.cutOut( token ) );

// token becomes "Program", then "Version",
// then "1.1" leaving strText == " "
```

The following example shows how to parse a DOS path name:

```
strPath = "C:\OS2\BITMAP\OS2LOGO.BMP"

strPath.cutOut( strDrive, ':' );
strPath.stripLeading( ':' );
while ( strPath.cutOut( strFile, '\' ) );

// strDrive becomes "C".
// strFile becomes "OS2", then "BITMAP",
// then "OS2LOGO.BMP" leaving strPath empty.
```

ImqBoolean find(const ImqString & *string*);

Searches for an exact match for *string* anywhere within the **characters**. If no match is found, it returns FALSE. Otherwise, it returns TRUE. If *string* is null, it returns TRUE.

ImqBoolean find(const ImqString & *string*, size_t & *offset*);
Searches for an exact match for *string* somewhere within the **characters** from offset *offset* onwards. If *string* is null, it returns TRUE without updating *offset*. If no match is found, it returns FALSE (the value of *offset* might have been increased). If a match is found, it returns TRUE and updates *offset* to the offset of *string* within the **characters**.

size_t length( ) const ;
Returns the **length**.

ImqBoolean pasteIn(const double *number*, const char * *format* = "%f");
Appends *number* to the **characters** after conversion to text. It returns TRUE if successful.

The specification *format* is used to format the floating point conversion. If specified, it must be one suitable for use with **printf** and floating point numbers, for example **%.3f**.

ImqBoolean pasteIn(const long *number*);
Appends *number* to the **characters** after conversion to text. It returns TRUE if successful.

ImqBoolean pasteIn(const void * *buffer*, const size_t *length*);
Appends *length* bytes from *buffer* to the **characters**, and adds a final trailing null. Substitutes any null characters copied. The substitution character is a period (.). No special consideration is given to any other nonprintable or nondisplayable characters copied. This method returns TRUE if successful.

ImqBoolean set(const char * *buffer*, const size_t *length*);
Sets the **characters** from a fixed-length character field, which might contain a null. Appends a null to the characters from the fixed-length field if necessary. This method returns TRUE if successful.

ImqBoolean setStorage(const size_t *length*);
Allocates (or reallocates) the **storage**. Preserves any original **characters**, including any trailing null, if there is still room for them, but does not initialize any additional storage.

This method returns TRUE if successful.

size_t storage( ) const ;
Returns the number of bytes in the **storage**.

size_t stripLeading(const char *c* = ' ');
Strips leading characters *c* from the **characters** and returns the number removed.

size_t stripTrailing(const char *c* = ' ');
Strips trailing characters *c* from the **characters** and returns the number removed.

ImqString upperCase( ) const ;
Returns an uppercase copy of the **characters**.

Object methods (protected)

ImqBoolean assign (const ImqString & *string*);
Equivalent to the equivalent **operator =** method, but non-virtual. It returns TRUE if successful.

Reason codes

- MQRC_DATA_TRUNCATED
- MQRC_NULL_POINTER
- MQRC_STORAGE_NOT_AVAILABLE
- MQRC_BUFFER_ERROR
- MQRC_INCONSISTENT_FORMAT

ImqTrigger C++ class

This class encapsulates the MQTM (trigger message) data structure.

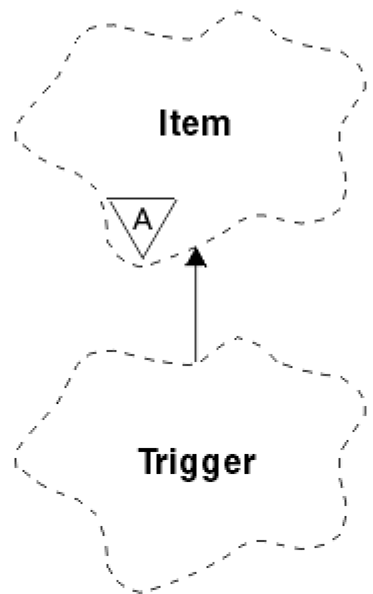


Figure 36. ImqTrigger class

Objects of this class are typically used by a trigger monitor program. The task of a trigger monitor program is to wait for these particular messages and act on them to ensure that other IBM MQ applications are started when messages are waiting for them.

See the IMQSTRG sample program for a usage example.

- "Object attributes" on page 1874
- "Constructors" on page 1875
- "Overloaded ImqItem methods" on page 1875
- "Object methods (public)" on page 1875
- "Object data (protected)" on page 1876
- "Reason codes" on page 1876

Object attributes

application id
Identity of the application that sent the message. The initial value is a null string.

application type
Type of application that sent the message. The initial value is zero. The following additional values are possible:

- MQAT_AIX
- MQAT_CICS
- MQAT_DOS
- MQAT_IMS
- MQAT_MVS
- MQAT_NOTES_AGENT
- MQAT_OS2
- MQAT_OS390
- MQAT_OS400

- MQAT_UNIX
- MQAT_WINDOWS
- MQAT_WINDOWS_NT
- MQAT_USER_FIRST
- MQAT_USER_LAST

environment data
Environment data for the process. The initial value is a null string.

process name
Process name. The initial value is a null string.

queue name
Name of the queue to be started. The initial value is a null string.

trigger data
Trigger data for the process. The initial value is a null string.

user data
User data for the process. The initial value is a null string.

Constructors

ImqTrigger( );
The default constructor.

ImqTrigger(const ImqTrigger & *trigger*);
The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut (ImqMessage & *msg*);
Writes an MQTM data structure to the message buffer, replacing any existing content. Sets the *msg* format to MQFMT_TRIGGER.

See the ImqItem class method description at "ImqItem C++ class" on page 1818 for further details.

virtual ImqBoolean pasteIn (ImqMessage & *msg*);
Reads an MQTM data structure from the message buffer.

To be successful, the ImqMessage format must be MQFMT_TRIGGER.

See the ImqItem class method description at "ImqItem C++ class" on page 1818 for further details.

Object methods (public)

void operator = (const ImqTrigger & *trigger*);
Copies instance data from *trigger*, replacing the existing instance data.

ImqString applicationId ( ) const ;
Returns a copy of the application id.

void setApplicationId (const char * *id*);
Sets the application id.

MQLONG applicationType ( ) const ;
Returns the application type.

void setApplicationType (const MQLONG *type*);
Sets the application type.

ImqBoolean copyOut (MQTMC2 * *ptmc2*);
Encapsulates the MQTM data structure, which is the one received on initiation queues. Fills in an equivalent MQTMC2 data structure provided by the caller, and sets the QMgrName field (which is not present in the MQTM data structure) to all blanks. The MQTMC2 data structure is traditionally used as a parameter to applications started by a trigger monitor. This method returns TRUE if successful.

ImqString environmentData ( ) const ;
Returns a copy of the environment data.

void setEnvironmentData (const char * *data*);
Sets the environment data.

ImqString processName ( ) const ;
Returns a copy of the process name.

void setProcessName (const char * *name*);
Sets the process name, padded with blanks to 48 characters.

ImqString queueName ( ) const ;
Returns a copy of the queue name.

void setQueueName (const char * *name*);
Sets the queue name, padding with blanks to 48 characters.

ImqString triggerData ( ) const ;
Returns a copy of the trigger data.

void setTriggerData (const char * *data*);
Sets the trigger data.

ImqString userData ( ) const ;
Returns a copy of the user data.

void setUserData (const char * *data*);
Sets the user data.

Object data (protected)

MQTM *omqtm*
The MQTM data structure.

Reason codes

- MQRC_NULL_POINTER
- MQRC_INCONSISTENT_FORMAT
- MQRC_ENCODING_ERROR
- MQRC_STRUC_ID_ERROR

ImqWorkHeader C++ class

This class encapsulates specific features of the MQWIH data structure.

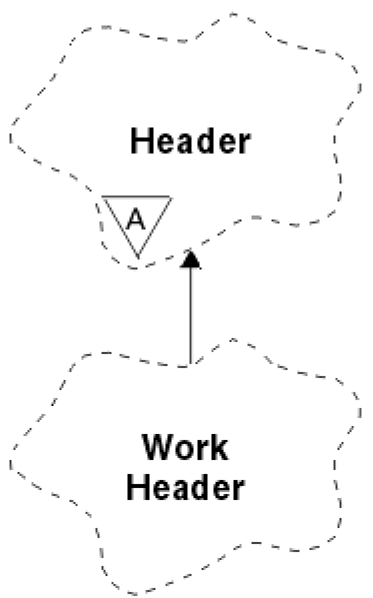


Figure 37. ImqWorkHeader class

Objects of this class are used by applications putting messages to the queue managed by the z/OS Workload Manager.

- "Object attributes" on page 1877
- "Constructors" on page 1877
- "Overloaded ImqItem methods" on page 1878
- "Object methods (public)" on page 1878
- "Object data (protected)" on page 1878
- "Reason codes" on page 1878

Object attributes

message token
: Message token for the z/OS Workload Manager, of length MQ_MSG_TOKEN_LENGTH. The initial value is MQMTOK_NONE.

service name
: The 32-character name of a process. The name is initially blanks.

service step
: The 8-character name of a step within the process. The name is initially blanks.

Constructors

ImqWorkHeader( );
: The default constructor.

ImqWorkHeader(const ImqWorkHeader & *header*);
: The copy constructor.

Overloaded ImqItem methods

virtual ImqBoolean copyOut(ImqMessage & *msg*);
Inserts an MQWIH data structure into the beginning of the message buffer, moving the existing message data further along, and sets the *msg* **format** to MQFMT_WORK_INFO_HEADER.

See the parent class method description for more details.

virtual ImqBoolean pasteIn(ImqMessage & *msg*);
Reads an MQWIH data structure from the message buffer.

To be successful, the encoding of the *msg* object must be MQENC_NATIVE. Retrieve messages with MQGMO_CONVERT to MQENC_NATIVE.

The ImqMessage format must be MQFMT_WORK_INFO_HEADER.

See the parent class method description for more details.

Object methods (public)

void operator = (const ImqWorkHeader & *header*);
Copies instance data from *header*, replacing the existing instance data.

ImqBinary messageToken ( ) const;
Returns the **message token**.

ImqBoolean setMessageToken(const ImqBinary & *token*);
Sets the **message token**. The data length of *token* must be either zero or MQ_MSG_TOKEN_LENGTH. It returns TRUE if successful.

void setMessageToken(const MQBYTE16 *token* = 0);
Sets the **message token**. *token* can be zero, which is the same as specifying MQMTOK_NONE. If *token* is nonzero, it must address MQ_MSG_TOKEN_LENGTH bytes of binary data.

When using predefined values such as MQMTOK_NONE, you might need make a cast to ensure a signature match; for example, (MQBYTE *)MQMTOK_NONE.

ImqString serviceName ( ) const;
Returns the **service name**, including trailing blanks.

void setServiceName(const char * *name*);
Sets the **service name**.

ImqString serviceStep ( ) const;
Returns the **service step**, including trailing blanks.

void setServiceStep(const char * *step*);
Sets the **service step**.

Object data (protected)

MQWIH omqwih
The MQWIH data structure.

Reason codes

- MQRC_BINARY_DATA_LENGTH_ERROR

Properties of IBM MQ classes for JMS objects

All objects in IBM MQ classes for JMS have properties. Different properties apply to different object types. Different properties have different allowable values, and symbolic property values differ between the administration tool and program code.

IBM MQ classes for JMS provides facilities to set and query the properties of objects using the IBM MQ JMS administration tool, IBM MQ Explorer, or in an application. Many of the properties are relevant only to a specific subset of the object types.

For information on how you use the IBM MQ JMS administration tool, see Configuring JMS objects using the administration tool.

Table 868 on page 1879 gives a brief description of each property and shows for each property which object types it applies to. The object types are identified using keywords; see Configuring JMS objects using the administration tool for an explanation of these objects.

Numbers refer to notes at the end of the table. See also “Dependencies between properties of IBM MQ classes for JMS objects” on page 1882.

A property consists of a name-value pair in the format:

```
PROPERTY_NAME(property_value)
```

The topics in this section list, for each property, the name of the property and a brief description, and shows the valid property values used in the administration tool. and the set method that is used to set the value of the property in an application. The topics also show the valid property values for each property and the mapping between symbolic property values used in the tool and their programmable equivalents.

Property names are not case-sensitive, and are restricted to the set of recognized names shown in these topics.

Table 868. Property names and applicable object types

Property	Short form	Object type							
		CF	QCF	TCF	Q	T	XACF	XAQCF	XATCF
“APPLICATIONNAME” on page 1884	APPNAME	Y	Y	Y			Y	Y	Y
“ASYNCEXCEPTION” on page 1884	AEX	Y	Y	Y			Y	Y	Y
“BROKERCCDURSUBQ” on page 1885 [1]	CCDSUB					Y			
“BROKERCCSUBQ” on page 1886 [1]	CCSUB	Y		Y			Y		Y
“BROKERCONQ” on page 1886 [1]	BCON	Y		Y			Y		Y
“BROKERDURSUBQ” on page 1887 [1]	BDSUB					Y			
“BROKERPUBQ” on page 1887 [1]	BPUB	Y		Y		Y	Y		Y
“BROKERPUBQMGR” on page 1888 [1]	BPQM					Y			
“BROKERQMGR” on page 1888 [1]	BQM	Y		Y			Y		Y
“BROKERSUBQ” on page 1888 [1]	BSUB	Y		Y			Y		Y
“BROKERVER” on page 1889 [1]	BVER	Y [2]		Y [2]		Y	Y		Y
“CCDTURL” on page 1890 [3]	CCDT	Y	Y	Y			Y	Y	Y
“CCSID” on page 1890	CCS	Y	Y	Y	Y	Y	Y	Y	Y
“CHANNEL” on page 1891 [3]	CHAN	Y	Y	Y			Y	Y	Y

Table 868. Property names and applicable object types (continued)

Property	Short form	Object type							
		CF	QCF	TCF	Q	T	XACF	XAQCF	XATCF
"CLEANUP" on page 1891 [1]	CL	Y		Y			Y		Y
"CLEANUPINT" on page 1892 [1]	CLINT	Y		Y			Y		Y
"CONNECTIONNAMELIST" on page 1892	CNLIST	Y	Y	Y					
"CLIENTRECONNECTOPTIONS" on page 1892	CROPT	Y	Y	Y					
"CLIENTRECONNECTTIMEOUT" on page 1893	CRT	Y	Y	Y					
"CLIENTID" on page 1894	CID	Y [2]	Y	Y [2]			Y	Y	Y
"CLONESUPP" on page 1894	CLS	Y		Y			Y		Y
"COMPHDR" on page 1895	HC	Y		Y			Y		Y
"COMPMSG" on page 1895	MC	Y	Y	Y			Y	Y	Y
"CONNOPT" on page 1896	CNOPT	Y	Y	Y			Y	Y	Y
"CONNTAG" on page 1897	CNTAG	Y	Y	Y			Y	Y	Y
"DESCRIPTION" on page 1897	DESC	Y [2]	Y	Y [2]	Y	Y	Y	Y	Y
"DIRECTAUTH" on page 1898	DAUTH	Y [2]		Y [2]					
"ENCODING" on page 1898	ENC				Y	Y			
"EXPIRY" on page 1899	EXP				Y	Y			
"FAILIFQUIESCE" on page 1899	FIQ	Y	Y	Y	Y	Y	Y	Y	Y
"HOSTNAME" on page 1900	HOST	Y [2]	Y	Y [2]			Y	Y	Y
"LOCALADDRESS" on page 1901	LA	Y [2]	Y	Y [2]			Y	Y	Y
"MAPNAMESTYLE" on page 1901	MNST	Y	Y	Y			Y	Y	Y
"MAXBUFFSIZE" on page 1902	MBSZ	Y [2]		Y [2]					
"MDREAD" on page 1902	MDR				Y	Y			
"MDWRITE" on page 1903	MDW				Y	Y			
"MDMSGCTX" on page 1903	MDCTX				Y	Y			
"MSGBATCHSZ" on page 1904 [1]	MBS	Y	Y	Y			Y	Y	Y
"MSGBODY" on page 1904	MBODY				Y	Y			
"MSGRETENTION" on page 1905	MRET	Y	Y				Y	Y	
"MSGSELECTION" on page 1905 [1]	MSEL	Y		Y			Y		Y
"MULTICAST" on page 1906	MCAST	Y [2]		Y [2]		Y			
"OPTIMISTICPUBLICATION" on page 1907 [1]	OPTPUB	Y		Y					
"OUTCOMENOTIFICATION" on page 1907 [1]	NOTIFY	Y		Y					

Table 868. Property names and applicable object types (continued)

Property	Short form	Object type							
		CF	QCF	TCF	Q	T	XACF	XAQCF	XATCF
"PERSISTENCE" on page 1908	PER				Y	Y			
"POLLINGINT" on page 1908 [1]	PINT	Y	Y	Y			Y	Y	Y
"PORT" on page 1909	PORT	Y [2]	Y	Y [2]			Y	Y	Y
"PRIORITY" on page 1909	PRI				Y	Y			
"PROCESSDURATION" on page 1910 [1]	PROCDUR	Y		Y					
"PROVIDERVERSION" on page 1910	PVER	Y	Y	Y			Y	Y	Y
"PROXYHOSTNAME" on page 1913	PHOST	Y [2]		Y [2]					
"PROXYPORT" on page 1913	PPORT	Y [2]		Y [2]					
"PUBACKINT" on page 1914 [1]	PAI	Y		Y			Y		Y
"PUTASYNCALLOWED" on page 1914	PAALD				Y	Y			
"QMANAGER" on page 1915	QMGR	Y	Y	Y	Y		Y	Y	Y
"QUEUE" on page 1915	QU				Y				
"READAHEADALLOWED" on page 1916	RAALD				Y	Y			
"READAHEADCLOSEPOLICY" on page 1916	RACP				Y	Y			
"RECEIVECCSID" on page 1917	RCCS				Y	Y			
"RECEIVECONVERSION" on page 1917	RCNV				Y	Y			
"RECEIVEISOLATION" on page 1918 [1]	RCVISOL	Y		Y					
"RECEXIT" on page 1918	RCX	Y	Y	Y			Y	Y	Y
"RECEXITINIT" on page 1919	RCXI	Y	Y	Y			Y	Y	Y
"REPLYTOSTYLE" on page 1919	RTOST				Y	Y			
"RESCANINT" on page 1920 [1]	RINT	Y	Y				Y	Y	
"SECEXIT" on page 1920	SCX	Y	Y	Y			Y	Y	Y
"SECEXITINIT" on page 1921	SCXI	Y	Y	Y			Y	Y	Y
"SENDCHECKCOUNT" on page 1921	SCC	Y	Y	Y			Y	Y	Y
"SENDEXIT" on page 1922	SDX	Y	Y	Y			Y	Y	Y
"SENDEXITINIT" on page 1922	SDXI	Y	Y	Y			Y	Y	Y
"SHARECONVALLOWED" on page 1923	SCALD	Y	Y	Y			Y	Y	Y
"SPARSESUBS" on page 1923 [1]	SSUBS	Y		Y					
"SSLCIPHERSUITE" on page 1924	SCPHS	Y	Y	Y			Y	Y	Y
"SSLCRL" on page 1924	SCRL	Y	Y	Y			Y	Y	Y

Table 868. Property names and applicable object types (continued)									
Property	**Short form**	**Object type**							
		CF	**QCF**	**TCF**	**Q**	**T**	**XACF**	**XAQCF**	**XATCF**
"SSLFIPSREQUIRED" on page 1925	SFIPS	Y	Y	Y			Y	Y	Y
"SSLPEERNAME" on page 1925	SPEER	Y	Y	Y			Y	Y	Y
"SSLRESETCOUNT" on page 1926	SRC	Y	Y	Y			Y	Y	Y
"STATREFRESHINT" on page 1926 [1]	SRI	Y		Y			Y		Y
"SUBSTORE" on page 1927 [1]	SS	Y		Y			Y		Y
"SYNCPOINTALLGETS" on page 1927	SPAG	Y	Y	Y			Y	Y	Y
"TARGCLIENT" on page 1928	TC				Y	Y			
"TARGCLIENTMATCHING" on page 1928	TCM	Y	Y				Y	Y	
"TEMPMODEL" on page 1929	TM	Y	Y				Y	Y	
"TEMPQPREFIX" on page 1929	TQP	Y	Y				Y	Y	
"TEMPTOPICPREFIX" on page 1930	TTP	Y		Y			Y		Y
"TOPIC" on page 1930	TOP					Y			
"TRANSPORT" on page 1930	TRAN	Y [2]	Y	Y [2]			Y	Y	Y
"WILDCARDFORMAT" on page 1931	WCFMT	Y		Y			Y		Y

Note:

1. This property can be used with version 7.0 of IBM MQ classes for JMS but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the PROVIDERVERSION property of the connection factory is set to a version number less than 7.
2. Only the BROKERVER, CLIENTID, DESCRIPTION, DIRECTAUTH, HOSTNAME, LOCALADDRESS, MAXBUFFSIZE, MULTICAST, PORT, PROXYHOSTNAME, PROXYPORT, and TRANSPORT properties are supported for a ConnectionFactory or TopicConnectionFactory object when using a real-time connection to a broker.
3. The CCDTURL and CHANNEL properties of an object must not both be set at the same time.

Dependencies between properties of IBM MQ classes for JMS objects

The validity of some properties is dependent on the particular values of other properties.

This dependency can occur in the following groups of properties:

- Client properties
- Properties for a real-time connection to a broker
- Exit initialization strings

Client properties

For a connection to a queue manager, the following properties are relevant only if TRANSPORT has the value CLIENT:

- HOSTNAME
- PORT
- CHANNEL

- LOCALADDRESS
- CCDTURL
- CCSID
- COMPHDR
- COMPMSG
- RECEXIT
- RECEXITINIT
- SECEXIT
- SECEXITINIT
- SENDEXIT
- SENDEXITINIT
- SHARECONVALLOWED
- SSLCIPHERSUITE
- SSLCRL
- SSLFIPSREQUIRED
- SSLPEERNAME
- SSLRESETCOUNT
- APPLICATIONNAME

You cannot set values for these properties by using the administration tool if TRANSPORT has the value BIND.

If TRANSPORT has the value CLIENT, the default value of the BROKERVER property is V1 and the default value of the PORT property is 1414. If you set the value of BROKERVER or PORT explicitly, a later change to the value of TRANSPORT does not override your choices.

Properties for a real-time connection to a broker

Only the following properties are relevant if TRANSPORT has the value DIRECT or DIRECTHTTP:

- BROKERVER
- CLIENTID
- DESCRIPTION
- DIRECTAUTH
- HOSTNAME
- LOCALADDRESS
- MAXBUFFSIZE
- MULTICAST (supported only for DIRECT)
- PORT
- PROXYHOSTNAME (supported only for DIRECT)
- PROXYPORT (supported only for DIRECT)

If TRANSPORT has the value DIRECT or DIRECTHTTP, the default value of the BROKERVER property is V2, and the default value of the PORT property is 1506. If you set the value of BROKERVER or PORT explicitly, a later change to the value of TRANSPORT does not override your choices.

Exit initialization strings

Do not set any of the exit initialization strings without supplying the corresponding exit name. The exit initialization properties are:

- RECEXITINIT
- SECEXITINIT

- SENDEXITINIT

For example, specifying RECEXITINIT(myString) without specifying RECEXIT(some.exit.classname) causes an error.

Related reference

"TRANSPORT" on page 1930
The nature of a connection to a queue manager or broker.

APPLICATIONNAME

An application can set a name that identifies its connection to the queue manager. This application name is shown by the **DISPLAY CONN MQSC/PCF** command (where the field is called **APPLTAG**) or in the IBM MQ Explorer **Application Connections** display (where the field is called **App name**).

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: APPLICATIONNAME

JMS administration tool short name: APPNAME

Programmatic access

Setters/getters

- MQConnectionFactory.setAppName()
- MQConnectionFactory.getAppName()

Values

Any valid string that is no longer than 28 characters. Longer names are adjusted to fit by removing leading package names, if necessary. For example, if the invoking class is `com.example.MainApp`, the full name is used, but if the invoking class is `com.example.dictionaryAndThesaurus.multilingual.mainApp`, the name `multilingual.mainApp` is used, because it is the longest combination of class name and rightmost package name that fits into the available length.

If the class name itself is more than 28 characters long, it is truncated to fit. For example, `com.example.mainApplicationForSecondTestCase` becomes `mainApplicationForSecondTest`.

z/OS V 9.1.2 On z/OS, the APPNAME in:

- Bindings mode is ignored if set and, if set, can only be set to blanks.
- Client mode can be set and used.

ASYNCEXCEPTION

This property determines whether IBM MQ classes for JMS informs an ExceptionListener only when a connection is broken, or when any exception occurs asynchronously to a JMS API call. This applies to all Connections created from this ConnectionFactory that have an ExceptionListener registered.

Applicable objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: ASYNCEXCEPTION

JMS administration tool short name: AEX

Programmatic access

Setters/Getters

- MQConnectionFactory.setAsyncExceptions()
- MQConnectionFactory.getAsyncExceptions()

Values

ASYNC_EXCEPTIONS_ALL

Any exception detected asynchronously, outside the scope of a synchronous API call, and all connection broken exceptions are sent to the ExceptionListener.

Table 869. All async exceptions: environments and related constant names

Environment	Value
JMS Administration Tool	ALL
Programmatic	WMQCONSTANTS.ASYNC_EXCEPTIONS_ALL = -1
IBM MQ Explorer	All

ASYNC_EXCEPTIONS_CONNECTIONBROKEN

Only exceptions indicating a broken connection are sent to the ExceptionListener. Any other exceptions occurring during asynchronous processing are not reported to the ExceptionListener, and hence the application is not informed of these exceptions. This is the default value from IBM MQ 8.0.0 Fix Pack 2. See JMS: Exception listener changes in IBM MQ 8.0.

Table 870. Exceptions indicating a broken connection: environments and related constant names

Environment	Value
JMS Administration Tool	CONNECTIONBROKEN
Programmatic	WMQCONSTANTS.ASYNC_EXCEPTIONS_CONNECTIONBROKEN = 1
IBM MQ Explorer	Connection Broken

The following additional constant is defined:

- From IBM MQ 8.0.0 Fix Pack 2: WMQCONSTANTS.ASYNC_EXCEPTIONS_DEFAULT = ASYNC_EXCEPTIONS_CONNECTIONBROKEN
- Before IBM MQ 8.0.0 Fix Pack 2: WMQCONSTANTS.ASYNC_EXCEPTIONS_DEFAULT = ASYNC_EXCEPTIONS_ALL

Related concepts

Exceptions in IBM MQ classes for JMS

BROKERCCDURSUBQ

The name of the queue from which durable subscription messages are retrieved for a ConnectionConsumer.

Applicable objects

Topic

JMS administration tool long name: BROKERCCDURSUBQ

JMS administration tool short name: CCDSUB

Programmatic access

Setters/getters

- MQTopic.setBrokerCCDurSubQueue()
- MQTopic.getBrokerCCDurSubQueue()

Values

SYSTEM.JMS.D.CC.SUBSCRIBER.QUEUE
This is the default value.

Any valid string

BROKERCCSUBQ

The name of the queue from which non-durable subscription messages are retrieved for a ConnectionConsumer.

Applicable objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERCCSUBQ

JMS administration tool short name: CCSUB

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerCCSubQueue()
- MQConnectionFactory.getBrokerCCSubQueue()

Values

SYSTEM.JMS.ND.CC.SUBSCRIBER.QUEUE
This is the default value.

Any valid string

BROKERCONQ

The control queue name of the broker.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERCONQ

JMS administration tool short name: BCON

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerControlQueue()
- MQConnectionFactory.getBrokerControlQueue()

Values

SYSTEM.BROKER.CONTROL.QUEUE
This is the default value.

Any valid string

BROKERDURSUBQ

When the IBM MQ classes for JMS are being used in IBM MQ messaging provider migration mode, this property specifies the name of the queue from which durable subscription messages are retrieved.

Applicable objects

Topic

JMS administration tool long name: BROKERDURSUBQ

JMS administration tool short name: BDSUB

Programmatic access

Setters/getters

- MQTopic.setBrokerDurSubQueue()
- MQTopic.getBrokerDurSubQueue()

Values

SYSTEM.JMS.D.SUBSCRIBER.QUEUE
This is the default value.

Any valid string
Starting with SYSTEM.JMS.D

Related tasks
Configuring the JMS **PROVIDERVERSION** property

BROKERPUBQ

The name of the queue where published messages are sent (the stream queue).

Applicable Objects

ConnectionFactory, TopicConnectionFactory, Topic, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERPUBQ

JMS administration tool short name: BPUB

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerPubQueue
- MQConnectionFactory.getBrokerPubQueue

Values

SYSTEM.BROKER.DEFAULT.STREAM
This is the default value.

Any valid string

BROKERPUBQMGR

The name of the queue manager that owns the queue where messages published on the topic are sent.

Applicable Objects

Topic

JMS administration tool long name: BROKERPUBQMGR

JMS administration tool short name: BPQM

Programmatic access

Setters/getters

- MQTopic.setBrokerPubQueueManager()
- MQTopic.getBrokerPubQueueManager()

Values

null
This is the default value.

Any valid string

BROKERQMGR

The name of the queue manager on which the broker is running.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERQMGR

JMS administration tool short name: BQM

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerQueueManager()
- MQConnectionFactory.getBrokerQueueManager()

Values

null
This is the default value.

Any valid string

BROKERSUBQ

When the IBM MQ classes for JMS are being used in IBM MQ messaging provider migration mode, this property specifies the name of the queue from which non-durable subscription messages are retrieved.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERSUBQ

JMS administration tool short name: BSUB

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerSubQueue()
- MQConnectionFactory.getBrokerSubQueue()

Values

SYSTEM.JMS.ND.SUBSCRIBER.QUEUE
This is the default value.

Any valid string
Starting with SYSTEM.JMS.ND

Related tasks

Configuring the JMS **PROVIDERVERSION** property

BROKERVER

The version of the broker being used.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, Topic, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: BROKERVER

JMS administration tool short name: BVER

Programmatic access

Setters/getters

- MQConnectionFactory.setBrokerVersion()
- MQConnectionFactory.getBrokerVersion()

Values

V1
To use an IBM MQ Publish/Subscribe broker, or to use a broker of IBM MQ Integrator, WebSphere Event Broker, WebSphere Business Integration Event Broker, or WebSphere Business Integration Message Broker in compatibility mode. This is the default value if TRANSPORT is set to BIND or CLIENT.

V2
To use a broker of IBM MQ Integrator, WebSphere Event Broker, WebSphere Business Integration Event Broker, or WebSphere Business Integration Message Broker in native mode. This is the default value if TRANSPORT is set to DIRECT or DIRECTHTTP.

unspecified
After the broker has migrated from V6 to V7, set this property so that RFH2 headers are no longer used. After migration this property is no longer relevant.

CCDTURL

A Uniform Resource Locator (URL) that identifies the name and location of the file containing the client channel definition table and specifies how the file can be accessed.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CCDTURL

JMS administration tool short name: CCDT

Programmatic access

Setters/getters

- MQConnectionFactory.setCCDTURL()
- MQConnectionFactory.getCCDTURL()

Values

null
This is the default value.

A Uniform Resource Locator (URL)

CCSID

For connection factories, this property specifies the coded character set ID (CCSID) to be used for internal data flows with the queue manager. For destinations, the property defines the CCSID to be used to encode string data in MapMessages, StreamMessages, and TextMessages put to that destination.

Note: It is not normally necessary to change this property for connection factories.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, Queue, Topic, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CCSID

JMS administration tool short name: CCS

Programmatic access

Setters/getters

- MQConnectionFactory.setCCSID()
- MQConnectionFactory.getCCSID()

Values

819
The default value for a connection factory.

1208
The default value for a destination.

Any positive integer

Related concepts

JMS message conversion

CHANNEL

The name of the client connection channel being used.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CHANNEL

JMS administration tool short name: CHAN

Programmatic access

Setters/getters

- MQConnectionFactory.setChannel()
- MQConnectionFactory.getChannel()

Values

SYSTEM.DEF.SVRCONN
This is the default value.

Any valid string

CLEANUP

Cleanup Level for BROKER or MIGRATE Subscription Stores.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CLEANUP

JMS administration tool short name: CL

Programmatic access

Setters/getters

- MQConnectionFactory.setCleanupLevel()
- MQConnectionFactory.getCleanupLevel()

Values

SAFE
Use safe cleanup. This is the default value.

ASPROP
Use safe, strong, or no cleanup according to a property set on the Java command line.

NONE
Use no cleanup.

STRONG
Use strong cleanup.

CLEANUPINT

The interval, in milliseconds, between background executions of the publish/subscribe cleanup utility.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CLEANUPINT

JMS administration tool short name: CLINT

Programmatic access

Setters/getters

- MQConnectionFactory.setCleanupInterval()
- MQConnectionFactory.getCleanupInterval()

Values

3600000
This is the default value.

Any positive integer

CONNECTIONNAMELIST

List of TCP/IP connection names. The list is tried in order, once per each reconnection retry attempt.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory

JMS administration tool long name: CONNECTIONNAMELIST

JMS administration tool short name: CNLIST

Programmatic access

Setters/getters

- MQConnectionFactory.setconnectionNameList()
- MQConnectionFactory.getconnectionNameList()

Values

Comma separated list of HOSTNAME(PORT). HOSTNAME can be either a DNS name or IP address.

PORT defaults to 1414.

CLIENTRECONNECTOPTIONS

Options governing reconnection.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory

JMS administration tool long name: CLIENTRECONNECTOPTIONS

JMS administration tool short name: CROPT

Programmatic access

Setters/getters

- MQConnectionFactory.setClientReconnectOptions()
- MQConnectionFactory.getClientReconnectOptions()

Values

QMGR

The application can reconnect to the same queue manager that it is originally connected to.

An error with reason code `MQRC_RECONNECT_QMID_MISMATCH` is returned if the queue manager that the application tries to connect to, as specified in the connection name list, has a different QMID to the queue manager that it originally connected to.

Use this value if an application can be reconnected, but there is an affinity between the IBM MQ classes for JMS application, and the queue manager to which it first established a connection.

Choose this value if you want an application to automatically reconnect to the standby instance of a highly available queue manager.

To use this value programmatically, use the constant WMQConstants.WMQ_CLIENT_RECONNECT_Q_MGR.

ANY

The application can reconnect to any of the queue managers specified in the connection name list.

Use the reconnect option only if there is no affinity between the IBM MQ classes for JMS application and the queue manager with which it initially established a connection.

To use this value from a program, use the constant WMQConstants.WMQ_CLIENT_RECONNECT.

DISABLED

The application will not be reconnected.

To use this value programmatically, use the constant WMQConstants.WMQ_CLIENT_RECONNECT_DISABLED.

ASDEF

Whether the application will reconnect automatically depends on the value of the IBM MQ channel attribute DefReconnect.

This is the default value.

To use this value from a program, use the constant WMQConstants.WMQ_CLIENT_RECONNECT_AS_DEF.

CLIENTRECONNECTTIMEOUT

Time before reconnection retries cease.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory

JMS administration tool long name: CLIENTRECONNECTTIMEOUT

JMS administration tool short name: CRT

Programmatic access

Setters/getters

- MQConnectionFactory.setClientReconnectTimeout()
- MQConnectionFactory.setClientReconnectTimeout()

Values

Interval in seconds. Default 1800 (30 minutes).

CLIENTID

The client identifier is used to uniquely identify the application connection for durable subscriptions.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CLIENTID

JMS administration tool short name: CID

Programmatic access

Setters/getters

- MQConnectionFactory.setClientId()
- MQConnectionFactory.getClientId()

Values

null
This is the default value.

Any valid string

CLONESUPP

Whether two or more instances of the same durable topic subscriber can run simultaneously.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CLONESUPP

JMS administration tool short name: CLS

Programmatic access

Setters/getters

- MQConnectionFactory.setCloneSupport()
- MQConnectionFactory.getCloneSupport()

Values

DISABLED
Only one instance of a durable topic subscriber can run at a time. This is the default value.

ENABLED
Two or more instances of the same durable topic subscriber can run simultaneously, but each instance must run in a separate Java virtual machine (JVM).

COMPHDR

A list of the techniques that can be used for compressing header data on a connection.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: COMPHDR

JMS administration tool short name: HC

Programmatic access

Setters/getters

- MQConnectionFactory.setHdrCompList()
- MQConnectionFactory.getHdrCompList()

Values

NONE
This is the default value.

SYSTEM
RLE message header compression is performed.

COMPMSG

A list of the techniques that can be used for compressing message data on a connection.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: COMPMSG

JMS administration tool short name: MC

Programmatic access

Setters/getters

- MQConnectionFactory.setMsgCompList()
- MQConnectionFactory.getMsgCompList()

Values

NONE
This is the default value.

A list of one or more of the following values separated by blank characters:
RLE ZLIBFAST ZLIBHIGH

CONNOPT

Controls how IBM MQ classes for JMS applications that use the bindings transport connect to the queue manager.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory.

JMS administration tool long name: CONNOPT

JMS administration tool short name: CNOPT

Programmatic access

Setters/getters

- MQConnectionFactory.setMQConnectionOptions()
- MQConnectionFactory.getMQConnectionOptions()

Values

STANDARD
The nature of the binding between the application and the queue manager depends on the value of the *DefaultBindType* attribute of the queue manager. The STANDARD value maps to the IBM MQ *ConnectOption* MQCNO_STANDARD_BINDING.

SHARED
The application and the local queue manager agent run in separate units of execution but share some resources. This value maps to the IBM MQ *ConnectOption* MQCNO_SHARED_BINDING.

ISOLATED
The application and the local queue manager agent run in separate units of execution and share no resources. The ISOLATED value maps to the IBM MQ *ConnectOption* MQCNO_ISOLATED_BINDING.

FASTPATH
The application and the local queue manager agent run in the same unit of execution. This value maps to the IBM MQ *ConnectOption* MQCNO_FASTPATH_BINDING.

SERIALQM
The application requests exclusive use of the connection tag within the scope of the queue manager. This value maps to the IBM MQ *ConnectOption* MQCNO_SERIALIZE_CONN_TAG_Q_MGR.

SERIALQSG
The application requests exclusive use of the connection tag within the scope of the queue sharing group to which the queue manager belongs. The SERIALQSG value maps to the IBM MQ *ConnectOption* MQCNO_SERIALIZE_CONN_TAG_QSG.

RESTRICTQM
The application requests shared use of the connection tag, but there are restrictions on the shared use of the connection tag within the scope of the queue manager. This value maps to the IBM MQ *ConnectOption* MQCNO_RESTRICT_CONN_TAG_Q_MGR.

RESTRICTQSG
The application requests shared use of the connection tag, but there are restrictions on the shared use of the connection tag within the scope of the queue sharing group to which the queue manager belongs. This value maps to the IBM MQ *ConnectOption* MQCNO_RESTRICT_CONN_TAG_QSG.

For further information on IBM MQ connection options, see Connecting to a queue manager using the MQCONNX call.

CONNTAG

A tag that the queue manager associates with the resources updated by the application within a unit of work while the application is connected to the queue manager.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: CONNTAG

JMS administration tool short name: CNTAG

Programmatic access

Setters/getters

- MQConnectionFactory.setConnTag()
- MQConnectionFactory.getConnTag()

Values

A byte array of 128 elements, where each element is 0
This is the default value.

Any string
The value is truncated if it is longer than 128 bytes.

DESCRIPTION

A description of the stored object.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, Queue, Topic, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: DESCRIPTION

JMS administration tool short name: DESC

Programmatic access

Setters/getters

- MQConnectionFactory.setDescription()
- MQConnectionFactory.getDescription()

Values

null
This is the default value.

Any valid string

DIRECTAUTH

Whether TLS authentication is used on a real-time connection to a broker.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: DIRECTAUTH

JMS administration tool short name: DAUTH

Programmatic access

Setters/getters

- MQConnectionFactory.setDirectAuth()
- MQConnectionFactory.getDirectAuth()

Values

BASIC
No authentication, username authentication, or password authentication. This is the default value.

CERTIFICATE
Public key certificate authentication.

ENCODING

How numeric data in the body of a message is represented when the message is sent to this destination. The property specifies the representation of binary integers, packed decimal integers, and floating point numbers.

Applicable Objects

Queue, Topic

JMS administration tool long name: ENCODING

JMS administration tool short name: ENC

Programmatic access

Setters/getters

- MQDestination.setEncoding()
- MQDestination.getEncoding()

Values

ENCODING property

The valid values that the `ENCODING` property can take are constructed from the three sub-properties:

integer encoding
Either normal or reversed

decimal encoding
Either normal or reversed

floating-point encoding
IEEE normal, IEEE reversed, or z/OS

The ENCODING property is expressed as a three-character string with the following syntax:

```
{N|R}{N|R}{N|R|3}
```

In this string:

- N denotes normal
- R denotes reversed
- 3 denotes z/OS
- The first character represents *integer encoding*
- The second character represents *decimal encoding*
- The third character represents *floating-point encoding*

This provides a set of twelve possible values for the ENCODING property.

There is an additional value, the string NATIVE, which sets appropriate encoding values for the Java platform.

The following examples show valid combinations for ENCODING:

```
ENCODING(NNR)
ENCODING(NATIVE)
ENCODING(RR3)
```

EXPIRY

The time after which messages at a destination expire.

Applicable Objects

Queue, Topic

JMS administration tool long name: EXPIRY

JMS administration tool short name: EXP

Programmatic access

Setters/getters

- MQDestination.setExpiry()
- MQDestination.getExpiry()

Values

APP
Expiry can be defined by the JMS application. This is the default value.

UNLIM
No expiry occurs.

0
No expiry occurs.

Any positive integer representing expiry in milliseconds.

FAILIFQUIESCE

This property determines whether calls to certain methods fail if either the queue manager is in a quiescing state, or an application is connecting to a queue manager using the CLIENT transport and the

channel that the application is using has been put into a quiescing state, for example, by using the **STOP CHANNEL** or **STOP CHANNEL MODE(QUIESCE)** MQSC command.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, Queue, Topic, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: FAILIFQUIESCE

JMS administration tool short name: FIQ

Programmatic access

Setters/getters

- MQConnectionFactory.setFailIfQuiesce()
- MQConnectionFactory.getFailIfQuiesce()

Values

YES
: Calls to certain methods fail if either the queue manager is in a quiescing state, or the channel being used to connect to a queue manager is quiescing. If an application detects either of these conditions, the application can complete its immediate task and close the connection, allowing the queue manager or channel instance to stop. This is the default value.

NO
: No method call fails because either the queue manager, or the channel being used to connect to a queue manager, is in a quiescing state. If you specify this value, an application cannot detect that the queue manager or channel is quiescing. The application might continue to perform operations against the queue manager, and therefore prevent the queue manager from stopping.

HOSTNAME

For a connection to a queue manager, the host name or IP address of the system on which the queue manager is running or, for a real-time connection to a broker, the host name or IP address of the system on which the broker is running.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: HOSTNAME

JMS administration tool short name: HOST

Programmatic access

Setters/getters

- MQConnectionFactory.setHostName()
- MQConnectionFactory.getHostName()

Values

localhost
: This is the default value.

Any valid string

LOCALADDRESS

For a connection to a queue manager, this property specifies either the local network interface to be used, or the local port, or range of local ports, to be used.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: LOCALADDRESS

JMS administration tool short name: LA

Programmatic access

Setters/getters

- MQConnectionFactory.setLocalAddress()
- MQConnectionFactory.getLocalAddress()

Values

"" (empty string)
This is the default value.

A string in the format [ip-addr][(low-port[,high-port])]
Here are some examples:

`192.0.2.0`

The channel binds to address 192.0.2.0 locally.

`192.0.2.0(1000)`

The channel binds to address 192.0.2.0 locally and uses port 1000.

`192.0.2.0(1000,2000)`

The channel binds to address 192.0.2.0 locally and uses a port in the range 1000 to 2000.

`(1000)`

The channel binds to port 1000 locally.

`(1000,2000)`

The channel binds to a port in the range 1000 to 2000 locally.

You can specify a host name instead of an IP address. For a real-time connection to a broker, this property is relevant only when multicast is used, and the value of the property must not contain a port number, or a range of port numbers. The only valid values of the property in this case are null, an IP address, or a host name.

MAPNAMESTYLE

Allows compatibility style to be used for MapMessage element names.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: MAPNAMESTYLE

JMS administration tool short name: MNST

Programmatic access

Setters/getters

- MQConnectionFactory.setMapNameStyle()
- MQConnectionFactory.getMapNameStyle()

Values

STANDARD
The standard com.ibm.jms.JMSMapMessage element naming format is to be used. This is the default value and allows non-legal Java identifiers to be used as the element name.

COMPATIBLE
The older com.ibm.jms.JMSMapMessage element naming format is to be used. Only legal Java identifiers can be used as the element name. This is needed only if map messages are being sent to an application that is using a version of IBM MQ classes for JMS earlier than 5.3.

MAXBUFFSIZE

The maximum number of received messages that can be stored in an internal message buffer while waiting to be processed by the application. This property applies only when TRANSPORT has the value DIRECT or DIRECTHTTP.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: MAXBUFFSIZE

JMS administration tool short name: MBSZ

Programmatic access

Setters/getters

- MQConnectionFactory.setMaxBufferSize()
- MQConnectionFactory.getMaxBufferSize()

Values

1000
This is the default value.

Any positive integer

MDREAD

This property determines whether a JMS application can extract the values of MQMD fields.

Applicable Objects

JMS administration tool long name: MDREAD

JMS administration tool short name: MDR

Programmatic access

Setters/getters

- MQDestination.setMQMDReadEnabled()
- MQDestination.getMQMDReadEnabled()

Values

NO
: When sending messages, the JMS_IBM_MQMD* properties on a sent message are not updated to reflect the updated field values in the MQMD. When receiving messages, none of the JMS_IBM_MQMD* properties are available on a received message, even if the sender had set some or all of them. This is the default value for administrative tools.

  For programs, use False.

Yes
: When sending messages, all of the JMS_IBM_MQMD* properties on a sent message are updated to reflect the updated field values in the MQMD, including the properties that the sender did not set explicitly. When receiving messages, all of the JMS_IBM_MQMD* properties are available on a received message, including the properties that the sender did not set explicitly.

  For programs, use True.

MDWRITE

This property determines whether a JMS application can set the values of MQMD fields.

Applicable Objects

Queue, Topic

JMS administration tool long name: MDWRITE

JMS administration tool short name: MDR

Programmatic access

Setters/getters

- MQDestination.setMQMDWriteEnabled()
- MQDestination.getMQMDWriteEnabled()

Values

NO
: All JMS_IBM_MQMD* properties are ignored and their values are not copied into the underlying MQMD structure. This is the default value for administrative tools.

  For programs, use False.

YES
: JMS_IBM_MQMD* properties are processed. Their values are copied into the underlying MQMD structure.

  For programs, use True.

MDMSGCTX

What level of message context is to be set by the JMS application. The application must be running with appropriate context authority for this property to take effect.

Applicable Objects

JMS administration tool long name: MDMSGCTX

JMS administration tool short name: MDCTX

Programmatic access

Setters/getters

- MQDestination.setMQMDMessageContext()
- MQDestination.getMQMDMessageContext()

Values

DEFAULT
: The MQOPEN API call and the MQPMO structure specify no explicit message context options. This is the default value for administrative tools.

  For programs, use WMQ_MDCTX_DEFAULT.

SET_IDENTITY_CONTEXT
: The MQOPEN API call specifies the message context option MQOO_SET_IDENTITY_CONTEXT and the MQPMO structure specifies MQPMO_SET_IDENTITY_CONTEXT.

  For programs, use WMQ_MDCTX_SET_IDENTITY_CONTEXT.

SET_ALL_CONTEXT
: The MQOPEN API call specifies the message context option MQOO_SET_ALL_CONTEXT and the MQPMO structure specifies MQPMO_SET_ALL_CONTEXT.

  For programs, use WMQ_MDCTX_SET_ALL_CONTEXT.

MSGBATCHSZ

The maximum number of messages to be taken from a queue in one packet when using asynchronous message delivery.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: MAXBUFFSIZE

JMS administration tool short name: MBSZ

Programmatic access

Setters/getters

- MQConnectionFactory.setMsgBatchSize()
- MQConnectionFactory.getMsgBatchSize()

Values

10
: This is the default value.

Any positive integer

MSGBODY

Determines whether a JMS application accesses the MQRFH2 of an IBM MQ message as part of the message payload.

Applicable Objects

Queue, Topic

JMS administration tool long name: WMQ_MESSAGE_BODY

JMS administration tool short name: MBODY

Programmatic access

Setters/getters

- MQConnectionFactory.setMessageBodyStyle()
- MQConnectionFactory.getMessageBodyStyle()

Values

UNSPECIFIED
When sending, IBM MQ classes for JMS does or does not generate and include an MQRFH2 header, depending on the value of WMQ_TARGET_CLIENT. When receiving, acts as value JMS.

JMS
When sending, IBM MQ classes for JMS automatically generates an MQRFH2 header and includes it in the IBM MQ message.

When receiving, IBM MQ classes for JMS set the JMS message properties according to values in the MQRFH2 (if present); it does not present the MQRFH2 as part of the JMS message body.

MQ
When sending, IBM MQ classes for JMS does not generate an MQRFH2.

When receiving, IBM MQ classes for JMS presents the MQRFH2 as part of the JMS message body.

MSGRETENTION

Whether the connection consumer keeps undelivered messages on the input queue.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory,

JMS administration tool long name: MSGRETENTION

JMS administration tool short name: MRET

Programmatic access

Setters/getters

- MQConnectionFactory.setMessageRetention()
- MQConnectionFactory.getMessageRetention()

Values

Yes
Undelivered messages remain on the input queue. This is the default value.

No
Undelivered messages are dealt with according to their disposition options.

MSGSELECTION

Determines whether message selection is done by the IBM MQ classes for JMS or by the broker. If TRANSPORT has the value DIRECT, message selection is always done by the broker and the value of

MSGSELECTION is ignored. Message selection by the broker is not supported when BROKERVER has the value V1.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: MSGSELECTION

JMS administration tool short name: MSEL

Programmatic access

Setters/getters

- MQConnectionFactory.setMessageSelection()
- MQConnectionFactory.getMessageSelection()

Values

CLIENT
Message selection is done by IBM MQ classes for JMS. This is the default value.

BROKER
Message selection is done by the broker.

MULTICAST

To enable multicast on a real-time connection to a broker and, if enabled, to specify the precise way in which multicast is used to deliver messages from the broker to a message consumer. The property has no effect on how a message producer sends messages to a broker.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, Topic

JMS administration tool long name: MULTICAST

JMS administration tool short name: MCAST

Programmatic access

Setters/getters

- MQConnectionFactory.setMulticast()
- MQConnectionFactory.getMulticast()

Values

DISABLED
Messages are not delivered to a message consumer using multicast transport. This is the default value for ConnectionFactory and TopicConnectionFactory objects.

ASCF
Messages are delivered to a message consumer according to the multicast setting for the connection factory associated with the message consumer. The multicast setting for the connection factory is noted at the time that the message consumer is created. This value is valid only for Topic objects, and is the default value for Topic objects.

ENABLED
: If the topic is configured for multicast in the broker, messages are delivered to a message consumer using multicast transport. A reliable quality of service is used if the topic is configured for reliable multicast.

RELIABLE
: If the topic is configured for reliable multicast in the broker, messages are delivered to the message consumer using multicast transport with a reliable quality of service. If the topic is not configured for reliable multicast, you cannot create a message consumer for the topic.

NOTR
: If the topic is configured for multicast in the broker, messages are delivered to the message consumer using multicast transport. A reliable quality of service is not used even if the topic is configured for reliable multicast.

OPTIMISTICPUBLICATION

This property determines whether IBM MQ classes for JMS returns control immediately to a publisher that has published a message, or whether it returns control only after it has completed all the processing associated with the call and can report the outcome to the publisher.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: OPTIMISTICPUBLICATION

JMS administration tool short name: OPTPUB

Programmatic access

Setters/getters

- MQConnectionFactory.setOptimisticPublication()
- MQConnectionFactory.getOptimisticPublication()

Values

NO
: When a publisher publishes a message, IBM MQ classes for JMS do not return control to the publisher until it has completed all the processing associated with the call and can report the outcome to the publisher. This is the default value.

YES
: When a publisher publishes a message, IBM MQ classes for JMS returns control to the publisher immediately, before it has completed all the processing associated with the call and can report the outcome to the publisher. IBM MQ classes for JMS reports the outcome only when the publisher commits the message.

OUTCOMENOTIFICATION

This property determines whether IBM MQ classes for JMS return control immediately to a subscriber that has just acknowledged or committed a message, or whether it returns control only after it has completed all the processing associated with the call and can report the outcome to the subscriber.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: OUTCOMENOTIFICATION

JMS administration tool short name: NOTIFY

Programmatic access

Setters/getters

- MQConnectionFactory.setOutcomeNotification()
- MQConnectionFactory.getOutcomeNotification()

Values

YES
When a subscriber acknowledges or commits a message, IBM MQ classes for JMS do not return control to the subscriber until it has completed all the processing associated with the call and can report the outcome to the subscriber. This is the default value.

NO
When a subscriber acknowledges or commits a message, IBM MQ classes for JMS returns control to the subscriber immediately, before it has completed all the processing associated with the call and can report the outcome to the subscriber.

PERSISTENCE

The persistence of messages sent to a destination.

Applicable Objects

Queue, Topic

JMS administration tool long name: PERSISTENCE

JMS administration tool short name: PER

Programmatic access

Setters/getters

- MQDestination.setPersistence()
- MQDestination.getPersistence()

Values

APP
Persistence is defined by the JMS application. This is the default value.

QDEF
Persistence takes the value of the queue default.

PERS
Messages are persistent.

NON
Messages are nonpersistent.

HIGH
See JMS persistent messages for further information on the use of this value.

POLLINGINT

If each message listener within a session has no suitable message on its queue, this is the maximum interval, in milliseconds, that elapses before each message listener tries again to get a message from its queue. If it frequently happens that no suitable message is available for any of the message listeners in a session, consider increasing the value of this property. This property is relevant only if TRANSPORT has the value BIND or CLIENT.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: POLLINGINT

JMS administration tool short name: PINT

Programmatic access

Setters/getters

- MQConnectionFactory.setPollingInterval()
- MQConnectionFactory.getPollingInterval()

Values

5000
This is the default value.

Any positive integer

PORT

For a connection to a queue manager, the number of the port on which the queue manager is listening or, for a real-time connection to a broker, the number of the port on which the broker is listening for real-time connections.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: PORT

JMS administration tool short name: PORT

Programmatic access

Setters/getters

- MQConnectionFactory.setPort()
- MQConnectionFactory.getPort()

Values

1414
This is the default value if TRANSPORT is set to CLIENT.

1506
This is the default value if TRANSPORT is set to DIRECT or DIRECTHTTP.

Any positive integer

PRIORITY

The priority for messages sent to a destination.

Applicable Objects

Queue, Topic

JMS administration tool long name: PRIORITY

JMS administration tool short name: PRI

Programmatic access

Setters/getters

- MQDestination.setPriority()
- MQDestination.getPriority()

Values

APP
Priority is defined by the JMS application. This is the default value.

QDEF
Priority takes the value of the queue default.

Any integer in the range 0-9
Lowest to highest.

PROCESSDURATION

This property determines whether a subscriber guarantees to process quickly any message it receives before returning control to IBM MQ classes for JMS.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: PROCESSDURATION

JMS administration tool short name: PROCDUR

Programmatic access

Setters/getters

- MQConnectionFactory.setProcessDuration()
- MQConnectionFactory.getProcessDuration()

Values

UNKNOWN
A subscriber can give no guarantee about how quickly it can process any message it receives. This is the default value.

SHORT
A subscriber guarantees to process quickly any message it receives before returning control to IBM MQ classes for JMS.

PROVIDERVERSION

This property differentiates between the three IBM MQ messaging modes of operation: IBM MQ messaging provider normal mode, IBM MQ messaging provider normal mode with restrictions, and IBM MQ messaging provider migration mode.

The IBM MQ messaging provider normal mode uses all the features of an IBM MQ queue manager to implement JMS. This mode is optimized to use the JMS 2.0 API and functionality. The IBM MQ messaging provider normal mode with restrictions uses the JMS 2.0 API, but not the new features such as shared subscriptions, delayed delivery, or asynchronous send.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnection Factory, XATopicConnectionFactory

JMS administration tool long name: PROVIDERVERSION

JMS administration tool short name: PVER

Programmatic access

Setters/getters

- MQConnectionFactory.setProviderVersion()
- MQConnectionFactory.getProviderVersion()

Values

You can set the **PROVIDERVERSION** property to any of the values 8 (normal mode), 7 (normal mode with restrictions), 6 (migration mode), or `unspecified` (the default value). The value that you specify for the **PROVIDERVERSION** property must be a string. If you are specifying an option of 8, 7 or 6, you can do this in any of the following formats:

- V.R.M.F
- V.R.M
- V.R
- V

where V, R, M and F are integer values greater than or equal to zero. The extra R, M and F values are optional and are available for you to use in case fine grained control is needed. For example, if you wanted to use a **PROVIDERVERSION** level of 7, you could set **PROVIDERVERSION**=7, `7.0`, `7.0.0` or `7.0.0.0`.

8 - Normal mode

The JMS application uses the IBM MQ messaging provider normal mode. Normal mode uses all the features of an IBM MQ queue manager to implement JMS. This mode is optimized to use the JMS 2.0 API and functionality.

If you are connecting to a queue manager with a command level of 800, then all of the JMS 2.0 API and features, such as asynchronous send, delayed delivery, or shared subscription, can be used.

If the queue manager specified in the connection factory settings is not an IBM MQ 8.0.0 queue manager, the `createConnection` method fails with an exception `JMSFMQ0003`.

The IBM MQ messaging provider normal mode uses the sharing conversations feature and the number of conversations that can be shared is controlled by the **SHARECNV()** property on the server connection channel. If this property is set to `0`, you cannot use IBM MQ messaging provider normal mode and the `createConnection` method fails with an exception `JMSCC5007`.

7 - Normal mode with restrictions

The JMS application uses the IBM MQ messaging provider normal mode with restrictions. This mode uses the JMS 2.0 API, but not the new features such as shared subscriptions, delayed delivery, or asynchronous send.

If you set **PROVIDERVERSION** to 7 only the IBM MQ messaging provider normal with restrictions mode of operation is available. If the queue manager specified in the connection factory settings is not an IBM WebSphere MQ 7.0.1 or later queue manager, the `createConnection` method fails with exception `JMSFCC5008`.

If you are connecting using normal mode with restrictions, to a queue manager with a command level between 700 and 800 then you can use the JMS 2.0 API, but not the asynchronous send, delayed delivery, or shared subscription features.

The IBM MQ messaging provider normal mode with restrictions uses the sharing conversations feature and the number of conversations that can be shared is controlled by the **SHARECNV()** property on the server connection channel. If this property is set to 0, you cannot use IBM MQ messaging provider normal mode with restrictions and the `createConnection` method fails with an exception JMSCC5007.

6 - Migration mode

The JMS application uses the IBM MQ messaging provider migration mode.

The IBM MQ classes for JMS use the features and algorithms supplied with IBM WebSphere MQ 6.0. If you want to connect to WebSphere Message Broker 6.0 or 6.1 using IBM WebSphere MQ Enterprise Transport 6.0, you must use this mode. You can connect to an IBM MQ 8.0 queue manager using this mode, but none of the new features of an IBM MQ classes for JMS queue manager are used, for example, read ahead or streaming.

If you have an IBM MQ 8.0 or later client connecting to an IBM MQ 8.0 or later queue manager, then the message selection is done by the queue manager rather than on the client system.

If IBM MQ messaging provider migration mode is specified and you attempt to use any of the JMS 2.0 API, the API method call fails with the exception JMSCC5007.

unspecified (default)

The **PROVIDERVERSION** property is set to *unspecified* by default.

A connection factory that was created with a previous version of IBM MQ classes for JMS in JNDI takes this value when the connection factory is used with the new version of IBM MQ classes for JMS. The following algorithm is used to determine which mode of operation is used. This algorithm is used when the `createConnection` method is called and uses other aspects of the connection factory to determine if IBM MQ messaging provider normal mode, normal mode with restrictions, or IBM MQ messaging provider migration mode is required.

1. First, an attempt to use IBM MQ messaging provider normal mode is made.
2. If the queue manager connected is not IBM MQ 8.0 or later, an attempt to use IBM MQ messaging provider normal mode with restrictions is made.
3. If the queue manager connected is not IBM WebSphere MQ 7.0.1, or later, the connection is closed and IBM MQ messaging provider migration mode is used instead.
4. If the **SHARECNV** property on the server connection channel is set to 0, the connection is closed and IBM MQ messaging provider migration mode is used instead.
5. If **BROKERVER** is set to V1 or the default *unspecified* value, IBM MQ messaging provider normal mode continues to be used, and therefore any publish/subscribe operations use the new IBM WebSphere MQ 7.0.1, or later, features.

   See ALTER QMGR for information about the PSMODE parameter of the ALTER QMGR command for further information on compatibility.
6. If **BROKERVER** is set to V2 the action taken depends on the value of **BROKERQMGR** :
   - If the **BROKERQMGR** is `blank`:

     If the queue specified by the **BROKERCONQ** property can be opened for output (that is, MQOPEN for output succeeds) and **PSMODE** on the queue manager is set to COMPAT or DISABLED, then IBM MQ messaging provider migration mode is used.
   - If the queue specified by the **BROKERCONQ** property cannot be opened for output, or the **PSMODE** attribute is set to ENABLED:

     IBM MQ messaging provider normal mode is used.
   - If **BROKERQMGR** is `non-blank` :

     IBM MQ messaging provider migration mode is used.

If you cannot change the connection factory that you are using, you can use the `com.ibm.msg.client.wmq.overrideProviderVersion` property to override any setting on the

connection factory. This override applies to all connection factories in the JVM but the actual connection factory objects are not modified.

Related tasks

Configuring the JMS **PROVIDERVERSION** property

PROXYHOSTNAME

The host name or IP address of the system on which the proxy server is running when using a real-time connection to a broker through a proxy server.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: PROXYHOSTNAME

JMS administration tool short name: PHOST

Programmatic access

Setters/getters

- MQConnectionFactory.setProxyHostName()
- MQConnectionFactory.getProxyHostName()

Values

null

The host name of the proxy server. This is the default value.

PROXYPORT

The number of the port on which the proxy server is listening when using a real-time connection to a broker through a proxy server.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: PROXYPORT

JMS administration tool short name: PPORT

Programmatic access

Setters/getters

MQConnectionFactory.setProxyPort()

MQConnectionFactory.getProxyPort()

Values

443

The port number of the proxy server. This is the default value.

PUBACKINT

The number of messages published by a publisher before IBM MQ classes for JMS requests an acknowledgment from the broker.

When you lower the value of this property, IBM MQ classes for JMS requests acknowledgments more often, therefore the performance of the publisher decreases. When you raise the value, IBM MQ classes for JMS take a longer time to throw an exception if the broker fails. This property is relevant only if TRANSPORT has the value BIND or CLIENT.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: PROXYPORT

JMS administration tool short name: PPORT

Programmatic access

Setters/getters

MQConnectionFactory.setPubAckInterval()

MQConnectionFactory.getPubAckInterval()

Values

25
Any positive integer may be the default value.

PUTASYNCALLOWED

This property determines whether message producers are allowed to use asynchronous puts to send messages to this destination.

Applicable Objects

Queue, Topic

JMS administration tool long name: PUTASYNCALLOWED

JMS administration tool short name: PAALD

Programmatic access

Setters/getters

MQDestination.setPutAsyncAllowed()

MQDestination.getPutAsyncAllowed()

Values

AS_DEST
Determine whether asynchronous puts are allowed by referring to the queue or topic definition. This is the default value.

AS_Q_DEF
Determine whether asynchronous puts are allowed by referring to the queue definition.

AS_TOPIC_DEF
Determine whether asynchronous puts are allowed by referring to the topic definition.

NO
Asynchronous puts are not allowed.

YES
Asynchronous puts are allowed.

QMANAGER

The name of the queue manager to connect to.

However, if your application uses a client channel definition table to connect to a queue manager, see Using a client channel definition table with IBM MQ classes for JMS.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, Queue, XAConnectionFactory, XAQueueConnection Factory, XATopicConnectionFactory

JMS administration tool long name: QMANAGER

JMS administration tool short name: QMGR

Programmatic access

Setters/getters

- MQConnectionFactory.setQueueManager()
- MQConnectionFactory.getQueueManager()

Values

" " (empty string)
Any string can be the default value.

QUEUE

The name of the JMS queue destination. This matches the name of the queue used by the queue manager.

Applicable Objects

Queue

JMS administration tool long name: QUEUE

JMS administration tool short name: QU

Values

Any string
Any valid IBM MQ queue name.

Related concepts
Rules for naming IBM MQ objects>

READAHEADALLOWED

This property determines whether message consumers and queue browsers are allowed to use read ahead to get nonpersistent messages from this destination into an internal buffer before receiving them.

Applicable Objects

Queue, Topic

JMS administration tool long name: READAHEADALLOWED

JMS administration tool short name: RAALD

Programmatic access

Setters/getters

- MQDestination.setReadAheadAllowed()
- MQDestination.getReadAheadAllowed()

Values

AS_DEST
Determine whether read ahead is allowed by referring to the queue or topic definition. This is the default value in administrative tools.

Use WMQConstants.WMQ_READ_AHEAD_ALLOWED_AS_DEST in programs.

AS_Q_DEF
Determine whether read ahead is allowed by referring to the queue definition.

Use WMQConstants.WMQ_READ_AHEAD_ALLOWED_AS_Q_DEF in programs.

AS_TOPIC_DEF
Determine whether read ahead is allowed by referring to the topic definition.

Use WMQConstants.WMQ_READ_AHEAD_ALLOWED_AS_TOPIC_DEF in programs.

NO
Read ahead is not allowed.

Use WMQConstants.WMQ_READ_AHEAD_ALLOWED_DISABLED in programs.

YES
Read ahead is allowed.

Use WMQConstants.WMQ_READ_AHEAD_ALLOWED_ENABLED in programs.

READAHEADCLOSEPOLICY

For messages being delivered to an asynchronous message listener, what happens to messages in the internal read ahead buffer when the message consumer is closed.

Applicable Objects

Queue, Topic

JMS administration tool long name: READAHEADCLOSEPOLICY

JMS administration tool short name: RACP

Programmatic access

Setters/getters

- MQDestination.setReadAheadClosePolicy()

- MQDestination.getReadAheadClosePolicy()

Values

DELIVER_ALL
All messages in the internal read ahead buffer are delivered to the message listener of the application before returning. This is the default value in administrative tools.

Use WMQConstants.WMQ_READ_AHEAD_DELIVERALL in programs.

DELIVER_CURRENT
Only the current message listener invocation completes before returning, potentially leaving messages in the internal read ahead buffer, which are then discarded.

Use WMQConstants.WMQ_READ_AHEAD_DELIVERCURRENT in programs.

RECEIVECCSID

Destination property that sets the target CCSID for queue manager message conversion. The value is ignored unless RECEIVECONVERSION is set to `WMQ_RECEIVE_CONVERSION_QMGR`

Applicable Objects

Queue, Topic

JMS administration tool long name: RECEIVECCSID

JMS administration tool short name: RCCS

Programmatic access

Setters/Getters

- `MQDestination.setReceiveCCSID`
- `MQDestination.getReceiveCCSID`

Values

`WMQConstants.WMQ_RECEIVE_CCSID_JVM_DEFAULT`
0 - Use JVM `Charset.defaultCharset`

1208
`UTF-8`

CCSID
Supported coded character set identifier.

RECEIVECONVERSION

Destination property that determines if data conversion is going to be performed by the queue manager.

Applicable Objects

Queue, Topic

JMS administration tool long name: RECEIVECONVERSION

JMS administration tool short name: RCNV

Programmatic access

Setters/Getters

- `MQDestination.setReceiveConversion`

- `MQDestination.getReceiveConversion`

Values

`WMQConstants.WMQ_RECEIVE_CONVERSION_CLIENT_MSG`
1 - Only perform data conversion on the JMS client. The default value from up to V7.0, and from, and including, 7.0.1.5.

`WMQConstants.WMQ_RECEIVE_CONVERSION_QMGR`
2 - Perform data conversion on the queue manager before sending a message to the client. The default (and only) value from V7.0 to V7.0.1.4 inclusive, except if APAR IC72897 is applied.

RECEIVEISOLATION

This property determines whether a subscriber might receive messages that have not been committed on the subscriber queue.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: RECEIVEISOLATION

JMS administration tool short name: RCVISOL

Values

COMMITTED
A subscriber receives only those messages on the subscriber queue that have been committed. This is the default value in administrative tools.

Use WMQConstants.WMQ_RCVISOL_COMMITTED in programs.

UNCOMMITTED
A subscriber can receive messages that have not been committed on the subscriber queue.

Use WMQConstants.WMQ_RCVISOL_UNCOMMITTED in programs.

RECEXIT

Identifies a channel receive exit, or a sequence of receive exits, to be run in succession.

Additional configuration might be required in order for the IBM MQ classes for JMS to locate receive exits. For more information, see Configuring the IBM MQ classes for JMS to use channel exits.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: RECEXIT

JMS administration tool short name: RCX

Programmatic access

Setters/getters

- MQConnectionFactory.setReceiveExit()
- MQConnectionFactory.getReceiveExit()

Values

- `null`. This is the default value.

- A string comprising one or more items separated by commas, where each item is either:
  - The name of a class that implements the `WMQReceiveExit` interface (for a channel receive exit written in Java).
  - A string in the format *libraryName(entryPointName)* (for a channel receive exit not written in Java).

RECEXITINIT

The user data that is passed to channel receive exits when they are called.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: RECEXITINIT

JMS administration tool short name: RCXI

Programmatic access

Setters/getters

- MQConnectionFactory.setReceiveExitInit()
- MQConnectionFactory.getReceiveExitInit()

Values

null
A string comprising one or more items of user data separated by commas. This is the default value.

REPLYTOSTYLE

Determines how the JMSReplyTo field in a received message is constructed.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: REPLYTOSTYLE

JMS administration tool short name: RTOST

Programmatic access

Setters/getters

- MQConnectionFactory.setReplyToStyle()
- MQConnectionFactory.getReplyToStyle()

Values

DEFAULT
Equivalent to `MQMD`.

RFH2
Use the value supplied in the RFH2 header. If a JMSReplyTo value has been set in the sending application, use that value.

MQMD
: Use the MQMD supplied value. This behavior is equivalent to the default behavior of IBM WebSphere MQ 6.0.2 Fix Pack 4 and 6.0.2.5.

If the JMSReplyTo value set by the sending application does not contain a queue manager name, the receiving queue manager inserts its own name in the MQMD. If you set this parameter to `MQMD`, the reply-to queue you use is on the receiving queue manager. If you set this parameter to RFH2, the reply-to queue you use is on the queue manager specified in the RFH2 of the sent message as originally set by the sending application.

If the JMSReplyTo value set by the sending application contains a queue manager name, the value of this parameter is unimportant because both the MQMD and RFH2 contain the same value.

RESCANINT

When a message consumer in the point-to-point domain uses a message selector to select which messages it wants to receive, IBM MQ classes for JMS search the IBM MQ queue for suitable messages in the sequence determined by the `MsgDeliverySequence` attribute of the queue.

After IBM MQ classes for JMS find a suitable message and deliver it to the consumer, IBM MQ classes for JMS resume the search for the next suitable message from its current position in the queue. IBM MQ classes for JMS continue to search the queue in this way until it reaches the end of the queue, or until the interval of time in milliseconds, as determined by the value of this property, has expired. In each case, IBM MQ classes for JMS return to the beginning of the queue to continue the search, and a new time interval commences.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory

JMS administration tool long name: RESCANINT

JMS administration tool short name: RINT

Programmatic access

Setters/getters

- MQConnectionFactory.setRescanInterval()
- MQConnectionFactory.getRescanInterval()

Values

5000
: Any positive integer can be the default value.

SECEXIT

Identifies a channel security exit.

Additional configuration might be required in order for the IBM MQ classes for JMS to locate security exits. For more information, see Configuring the IBM MQ classes for JMS to use channel exits.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SECEXIT

JMS administration tool short name: SXC

Programmatic access

Setters/getters

- MQConnectionFactory.setSecurityExit()
- MQConnectionFactory.getSecurityExit()

Values

- `null`. This is the default value.
- A string comprising one or more items separated by commas, where each item is either:
  - The name of a class that implements the `WMQSecurityExit` interface (for a channel security exit written in Java).
  - A string in the format *libraryName(entryPointName)* (for a channel security exit not written in Java).

SECEXITINIT

The user data that is passed to a channel security exit when it is called.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SECEXITINIT

JMS administration tool short name: SCXI

Programmatic access

Setters/getters

- MQConnectionFactory.setSecurityExitInit()
- MQConnectionFactory.getSecurityExitInit()

Values

null
    Any string can be the default value.

SENDCHECKCOUNT

The number of send calls to allow between checking for asynchronous put errors, within a single non-transacted JMS session.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SENDCHECKCOUNT

JMS administration tool short name: SCC

Programmatic access

Setters/getters

- MQConnectionFactory.setSendCheckCount()
- MQConnectionFactory.getSendCheckCount()

Values

null
Any string can be the default value.

SENDEXIT

Identifies a channel send exit, or a sequence of send exits to be run in succession.

Additional configuration might be required in order for the IBM MQ classes for JMS to locate send exits. For more information, see Configuring the IBM MQ classes for JMS to use channel exits.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SENDEXIT

JMS administration tool short name: SDX

Programmatic access

Setters/getters

- MQConnectionFactory.setSendExit()
- MQConnectionFactory.getSendExit()

Values

- `null`. This is the default value.
- A string comprising one or more items separated by commas, where each item is either:
  - The name of a class that implements the `WMQSendExit` interface (for a channel send exit written in Java).
  - A string in the format *libraryName(entryPointName)* (for a channel send exit not written in Java).

SENDEXITINIT

The user data that is passed to channel send exits when they are called.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SENDEXITINIT

JMS administration tool short name: SDXI

Programmatic access

Setters/getters

- MQConnectionFactory.setSendExitInit()
- MQConnectionFactory.getSendExitInit()

Values

null
Any string comprising one or more items of user data separated by commas can be the default value.

SHARECONVALLOWED

For applications that use IBM MQ messaging provider normal mode or normal mode with restrictions, this property determines whether the sharing conversations function is used for JMS connections, sessions, and contexts created from the connection factory.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SHARECONVALLOWED

JMS administration tool short name: SCALD

Programmatic access

Setters/getters

- MQConnectionFactory.setShareConvAllowed()
- MQConnectionFactory.getShareConvAllowed()

Values

YES

JMS connections, sessions, and contexts that are created from the connection factory within the same JVM can share a channel instance (which maps to a TCP/IP connection) where appropriate.

This is the default value for administrative tools.

For programs, use WMQConstants.WMQ_SHARE_CONV_ALLOWED_YES.

NO

Every JMS connection created from the connection factory, and every JMS session that is created from those JMSconnections, has its own channel instance (TCP/IP connection) to a queue manager.

For JMS contexts, the first context that is created from the connection factory creates two channel instances (TCP/IP connections). Other JMS contexts that are created from the first one have their own channel instance (TCP/IP connection).

For programs, use WMQConstants.WMQ_SHARE_CONV_ALLOWED_NO.

Related concepts

IBM MQ messaging provider modes of operation
Sharing a TCP/IP connection in IBM MQ classes for JMS

SPARSESUBS

Controls the message retrieval policy of a TopicSubscriber object.

Applicable Objects

ConnectionFactory, TopicConnectionFactory

JMS administration tool long name: SPARSESUBS

JMS administration tool short name: SSUBS

Programmatic access

Setters/getters

- MQConnectionFactory.setSparseSubscriptions()
- MQConnectionFactory.getSparseSubscriptions()

Values

NO
: Subscriptions receive frequent matching messages. This is the default value for administrative tools.

  For programs, use false.

YES
: Subscriptions receive infrequent matching messages. This value requires that the subscription queue can be opened for browse.

  For programs, use true.

SSLCIPHERSUITE

The CipherSuite to use for a TLS connection.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SSLCIPHERSUITE

JMS administration tool short name: SCPHS

Programmatic access

Setters/getters

- MQConnectionFactory.setSSLCipherSuite()
- MQConnectionFactory.getSSLCipherSuite()

Values

null
: This is the default value. For more information, see TLS properties of JMS objects.

SSLCRL

CRL servers to check for TLS certificate revocation.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SSLCRL

JMS administration tool short name: SCRL

Programmatic access

Setters/getters

- MQConnectionFactory.setSSLCertStores()
- MQConnectionFactory.getSSLCertStores()

Values

null
: Space-separated list of LDAP URLs. This is the default value. For more information, see TLS properties of JMS objects.

SSLFIPSREQUIRED

This property determines whether a TLS connection must use a CipherSuite that is supported by the IBM Java JSSE FIPS provider (IBMJSSEFIPS).

Note: On UNIX, Linux, and Windows, IBM MQ provides FIPS 140-2 compliance through the "IBM Crypto for C" cryptographic module. The certificate for this module has been moved to the Historical status. Customers should view the IBM Crypto for C certificate and be aware of any advice provided by NIST. A replacement FIPS 140-3 module is currently in progress and its status can be viewed by searching for it in the NIST CMVP modules in process list.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SSLFIPSREQUIRED

JMS administration tool short name: SFIPS

Programmatic access

Setters/getters

- MQConnectionFactory.setSSLFipsRequired()
- MQConnectionFactory.getSSLFipsRequired()

Values

NO

A TLS connection can use any CipherSuite that is not supported by the IBM Java JSSE FIPS provider (IBMJSSEFIPS).

This is the default value. In programs, use false.

YES

A TLS connection must use a CipherSuite that is supported by IBMJSSEFIPS.

In programs, use true.

SSLPEERNAME

For TLS, a *distinguished name* skeleton that must match that provided by the queue manager.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SSLPEERNAME

JMS administration tool short name: SPEER

Programmatic access

Setters/getters

- MQConnectionFactory.setSSLPeerName()
- MQConnectionFactory.getSSLPeerName()

Values

null
This is the default value. For more information, see TLS properties of JMS objects.

SSLRESETCOUNT

For TLS, the total number of bytes sent and received by a connection before the secret key that is used for encryption is renegotiated.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SSLRESETCOUNT

JMS administration tool short name: SRC

Programmatic access

Setters/getters

- MQConnectionFactory.setSSLResetCount()
- MQConnectionFactory.getSSLResetCount()

Values

0
Zero, or any positive integer less than or equal to 999, 999, 999. This is the default value. For more information, see TLS properties of JMS objects.

STATREFRESHINT

The interval, in milliseconds, between refreshes of the long running transaction that detects when a subscriber loses its connection to the queue manager.

This property is relevant only if SUBSTORE has the value QUEUE.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: STATREFRESHINT

JMS administration tool short name: SRI

Programmatic access

Setters/getters

- MQConnectionFactory.setStatusRefreshInterval()
- MQConnectionFactory.getStatusRefreshInterval()

Values

60000
Any positive integer can be the default value. For more information, see TLS properties of JMS objects.

SUBSTORE

Where IBM MQ classes for JMS stores persistent data relating to active subscriptions.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SUBSTORE

JMS administration tool short name: SS

Programmatic access

Setters/getters

- MQConnectionFactory.setSubscriptionStore()
- MQConnectionFactory.getSubscriptionStore()

Values

BROKER
Use the broker-based subscription store to hold details of subscriptions. This is the default value for administrative tools.

For programs, use WMQConstants.WMQ_SUBSTORE_BROKER.

MIGRATE
Transfer subscription information from the queue-based subscription store to the broker-based subscription store.

For programs, use WMQConstants.WMQ_SUBSTORE_MIGRATE.

QUEUE
Use the queue-based subscription store to hold details of subscriptions.

For programs, use WMQConstants.WMQ_SUBSTORE_QUEUE.

SYNCPOINTALLGETS

This property determines whether all gets are to be performed under syncpoint.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: SYNCPOINTALLGETS

JMS administration tool short name: SPAG

Programmatic access

Setters/getters

- MQConnectionFactory.setSyncpointAllGets()
- MQConnectionFactory.getSyncpointAllGets()

Values

No
This is the default value.

Yes

TARGCLIENT

This property determines whether the IBM MQ RFH2 format is used to exchange information with target applications.

Applicable Objects

Queue, Topic

JMS administration tool long name: TARGCLIENT

JMS administration tool short name: TC

Programmatic access

Setters/getters

- MQDestination.setTargetClient()
- MQDestination.getTargetClient()

Values

JMS
The target of the message is a JMS application. This is the default value for administrative tools.

For programs, use WMQConstants.WMQ_CLIENT_JMS_COMPLIANT.

MQ
The target of the message is a non-JMS IBM MQ application.

For programs, use WMQConstants.WMQ_CLIENT_NONJMS_MQ.

TARGCLIENTMATCHING

This property determines whether a reply message, sent to the queue identified by the JMSReplyTo header field of an incoming message, has an MQRFH2 header only if the incoming message has an MQRFH2 header.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory

JMS administration tool long name: TARGCLIENTMATCHING

JMS administration tool short name: TCM

Programmatic access

Setters/getters

- MQConnectionFactory.setTargetClientMatching()
- MQConnectionFactory.getTargetClientMatching()

Values

YES
If an incoming message does not have an MQRFH2 header, the TARGCLIENT property of the Queue object derived from the JMSReplyTo header field of the message is sent to MQ. If the message does have an MQRFH2 header, the TARGCLIENT property is set to JMS instead. This is the default value for administrative tools.

For programs, use true.

NO
: The TARGCLIENT property of the Queue object derived from the JMSReplyTo header field of an incoming message is always set to JMS.

For programs, use false.

TEMPMODEL

The name of the model queue from which JMS temporary queues are created.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory

JMS administration tool long name: TEMPMODEL

JMS administration tool short name: TM

Programmatic access

Setters/getters

- MQConnectionFactory.setTemporaryModel()
- MQConnectionFactory.getTemporaryModel()

Values

SYSTEM.DEFAULT.MODEL.QUEUE
Any string can be the default value.

TEMPQPREFIX

The prefix that is used to form the name of an IBM MQ dynamic queue.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory

JMS administration tool long name: TEMPQPREFIX

JMS administration tool short name: TQP

Programmatic access

Setters/getters

- MQConnectionFactory.setTempQPrefix()
- MQConnectionFactory.getTempQPrefix()

Values

" " (empty string)
The prefix used is `CSQ.*` on z/OS and `AMQ.*` on all other platforms. These are the default values.

queue prefix
The queue prefix is any string that conforms to the rules for forming contents of the *DynamicQName* field in an IBM MQ object descriptor (structure MQOD), but the last non-blank character must be an asterisk.

TEMPTOPICPREFIX

When creating temporary topics, JMS generates a topic string of the form ''TEMP */TEMPTOPICPREFIX/ unique_id* '', or if this property is left with the default value, just ''TEMP */unique_id* ''. Specifying a non-empty TEMPTOPICPREFIX allows specific model queues to be defined for creating the managed queues for subscribers to temporary topics created under this connection.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: TEMPTOPICPREFIX

JMS administration tool short name: TTP

Programmatic access

Setters/getters

- MQConnectionFactory.setTempTopicPrefix()
- MQConnectionFactory.getTempTopicPrefix()

Values

Any non-null string consisting only of valid characters for an IBM MQ topic string. The default value is '' '' (empty string).

TOPIC

The name of the JMS topic destination, this value is used by the queue manager as the topic string of a publication or subscription.

Applicable Objects

Topic

JMS administration tool long name: TOPIC

JMS administration tool short name: TOP

Values

Any string

A string that forms a valid IBM MQ topic string. When using IBM MQ as a messaging provider with WebSphere Application Server, specify a value that matches the name by which the topic is known for administrative purposes within WebSphere Application Server.

Related concepts

Topic strings

TRANSPORT

The nature of a connection to a queue manager or broker.

Applicable Objects

ConnectionFactory, QueueConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XAQueueConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: TRANSPORT

JMS administration tool short name: TRAN

Programmatic access

Setters/getters

- MQConnectionFactory.setTransportType()
- MQConnectionFactory.getTransportType()

Values

BIND
For a connection to a queue manager in bindings mode. This is the default value for administrative tools.

For programs, use WMQConstants.WMQ_CM_BINDINGS.

CLIENT
For a connection to a queue manager in client mode.

For programs, use WMQConstants.WMQ_CM_CLIENT.

DIRECT
For a real-time connection to a broker not using HTTP tunnelling.

For programs, use WMQConstants.WMQ_CM_DIRECT_TCPIP.

DIRECTHTTP
For a real-time connection to a broker using HTTP tunnelling. Only HTTP 1.0 is supported.

For programs, use WMQConstants.WMQ_CM_DIRECT_HTTP.

Related concepts

"Dependencies between properties of IBM MQ classes for JMS objects" on page 1882
The validity of some properties is dependent on the particular values of other properties.

WILDCARDFORMAT

This property determines which version of wildcard syntax is to be used.

Applicable Objects

ConnectionFactory, TopicConnectionFactory, XAConnectionFactory, XATopicConnectionFactory

JMS administration tool long name: WILDCARDFORMAT

JMS administration tool short name: WCFMT

Programmatic access

Setters/getters

- MQConnectionFactory.setWildCardFormat()
- MQConnectionFactory.getWildCardFormat()

Values

TOPIC_ONLY
Recognizes topic level wildcards only, as used in broker version 2. This is the default value for administrative tools.

For programs, use WMQConstants.WMQ_WILDCARD_TOPIC_ONLY.

CHAR_ONLY
Recognizes character wildcards only, as used in broker version 1.

For programs, use WMQConstants.WMQ_WILDCARD_CHAR_ONLY.

The ENCODING property

The ENCODING property comprises three sub-properties, in twelve possible combinations.

The valid values that the ENCODING property can take are constructed from the three sub-properties:

integer encoding
Either normal or reversed

decimal encoding
Either normal or reversed

floating-point encoding
IEEE normal, IEEE reversed, or z/OS

The ENCODING property is expressed as a three-character string with the following syntax:

```
{N|R}{N|R}{N|R|3}
```

In this string:

- N denotes normal
- R denotes reversed
- 3 denotes z/OS
- The first character represents *integer encoding*
- The second character represents *decimal encoding*
- The third character represents *floating-point encoding*

This provides a set of twelve possible values for the ENCODING property.

There is an additional value, the string NATIVE, which sets appropriate encoding values for the Java platform.

The following examples show valid combinations for ENCODING:

```
ENCODING(NNR)
ENCODING(NATIVE)
ENCODING(RR3)
```

TLS properties of JMS objects

Enable Transport Layer Security (TLS) encryption using the SSLCIPHERSUITE property. You can then change the characteristics of the TLS encryption using several other properties.

When you specify TRANSPORT(CLIENT), you can enable TLS encrypted communication using the SSLCIPHERSUITE property. Set this property to a valid CipherSuite provided by your JSSE provider; it must match the CipherSpec named on the SVRCONN channel named by the CHANNEL property.

However, CipherSpecs (as specified on the SVRCONN channel) and CipherSuites (as specified on ConnectionFactory objects) use different naming schemes to represent the same TLS encryption algorithms. If a recognized CipherSpec name is specified on the SSLCIPHERSUITE property, JMSAdmin issues a warning and maps the CipherSpec to its equivalent CipherSuite. See TLS CipherSpecs and CipherSuites in IBM MQ classes for JMS for a list of CipherSpecs recognized by IBM MQ and JMSAdmin.

If you require a connection to use a CipherSuite that is supported by the IBM Java JSSE FIPS provider (IBMJSSEFIPS), set the SSLFIPSREQUIRED property of the connection factory to YES. The default value of this property is NO, which means that a connection can use any supported CipherSuite. The property is ignored if SSLCIPHERSUITE is not set.

The SSLPEERNAME matches the format of the SSLPEER parameter, which can be set on channel definitions. It is a list of attribute name-value pairs separated by commas or semicolons. For example:

```
SSLPEERNAME(CN=QMGR.*, OU=IBM, OU=WEBSPHERE)
```

The set of names and values makes up a *distinguished name*. For more details about distinguished names and their use with IBM MQ, see Securing IBM MQ.

The example given checks the identifying certificate presented by the server at connect-time. For the connection to succeed, the certificate must have a Common Name beginning QMGR., and must have at least two Organizational Unit names, the first of which is IBM and the second WEBSPHERE. Checking is not case-sensitive.

If SSLPEERNAME is not set, no such checking is performed. SSLPEERNAME is ignored if SSLCIPHERSUITE is not set.

The SSLCRL property specifies zero or more CRL (Certificate Revocation List) servers. Use of this property requires a JVM at Java 2 v1.4. This is a space-delimited list of entries of the form:

```
ldap:// hostname:[ port ]
```

optionally followed by a single /. If `port` is omitted, the default LDAP port of 389 is assumed. At connect-time, the TLS certificate presented by the server is checked against the specified CRL servers. See Securing IBM MQ for more about CRL security.

If SSLCRL is not set, no such checking is performed. SSLCRL is ignored if SSLCIPHERSUITE is not set.

The SSLRESETCOUNT property represents the total number of bytes sent and received by a connection before the secret key that is used for encryption is renegotiated. The number of bytes sent is the number before encryption, and the number of bytes received is the number after decryption. The number of bytes also includes control information sent and received by IBM MQ classes for JMS.

For example, to configure a ConnectionFactory object that can be used to create a connection over an TLS enabled MQI channel with a secret key that is renegotiated after 4 MB of data have flowed, issue the following command to JMSAdmin:

```
ALTER CF(my.cf) SSLRESETCOUNT(4194304)
```

If the value of SSLRESETCOUNT is zero, which is the default value, the secret key is never renegotiated. The SSLRESETCOUNT property is ignored if SSLCIPHERSUITE is not set.

IBM Message Service Client for .NET reference

This reference section provides information about the IBM Message Service Client for .NET (XMS .NET) class interfaces and about the object properties defined by XMS.

.NET interfaces

This section describes the .NET class interfaces and their properties and methods.

The following table summarizes the interfaces, which are defined within the `IBM.XMS` namespace.

Table 871. Summary of the .NET class interfaces

Interface	Description
"IBytesMessage" on page 1936	A bytes message is a message whose body comprises a stream of bytes.
"IConnection" on page 1945	A Connection object represents the active connection of the application to a messaging server.

Table 871. Summary of the .NET class interfaces (continued)

Interface	Description
"IConnectionFactory" on page 1948	An application uses a connection factory to create a connection.
"IConnectionMetaData" on page 1949	A ConnectionMetaData object provides information about a connection.
"IDestination" on page 1950	A destination is where an application sends messages, or it is a source from which an application receives messages, or both.
"ExceptionListener" on page 1951	An application uses an exception listener to be notified asynchronously of a problem with a connection.
"IllegalStateException" on page 1952	XMS throws this exception if an application calls a method at an incorrect or inappropriate time, or if XMS is not in an appropriate state for the requested operation.
"InitialContext" on page 1952	An application uses an InitialContext object to create objects from object definitions that are retrieved from a repository of administered objects.
"InvalidClientIDException" on page 1954	XMS throws this exception if an application attempts to set a client identifier for a connection, but the client identifier is not valid or is already in use.
"InvalidDestinationException" on page 1954	XMS throws this exception if an application specifies a destination that is not valid.
"InvalidSelectorException" on page 1954	XMS throws this exception if an application provides a message selector expression whose syntax is not valid.
"IMapMessage" on page 1955	A map message is a message whose body comprises a set of name-value pairs, where each value has an associated data type.
"IMessage" on page 1963	A Message object represents a message that an application sends or receives. IMessage is a superclass for the message classes such as IMapMessage.
"IMessageConsumer" on page 1969	An application uses a message consumer to receive messages sent to a destination.
"MessageEOFException" on page 1971	XMS throws this exception if XMS encounters the end of a bytes message stream when an application is reading the body of a bytes message.
"MessageFormatException" on page 1972	XMS throws this exception if XMS encounters a message with a format that is not valid.
"IMessageListener (delegate)" on page 1972	An application uses a message listener to receive messages asynchronously.

Table 871. Summary of the .NET class interfaces (continued)

Interface	Description
“MessageNotReadableException” on page 1972	XMS throws this exception if an application attempts to read the body of a message that is write only.
“MessageNotWritableException” on page 1973	XMS throws this exception if an application attempts to write to the body of a message that is read-only.
“IMessageProducer” on page 1973	An application uses a message producer to send messages to a destination.
“IObjectMessage” on page 1978	An object message is a message whose body comprises a serialized Java or .NET object.
“IPropertyContext” on page 1979	IPropertyContext is an abstract superclass that contains methods that get and set properties. These methods are inherited by other classes.
“IQueueBrowser” on page 1988	An application uses a queue browser to browse messages on a queue without removing them.
“Requestor” on page 1990	An application uses a requestor to send a request message and then wait for, and receive, the reply.
“ResourceAllocationException” on page 1991	XMS throws this exception if XMS cannot allocate the resources required by a method.
“SecurityException” on page 1991	XMS throws this exception if the user identifer and password provided to authenticate an application are rejected. XMS also throws this exception if an authority check fails and prevents a method from completing.
“ISession” on page 1992	A session is a single threaded context for sending and receiving messages.
“IStreamMessage” on page 2002	A stream message is a message whose body comprises a stream of values, where each value has an associated data type.
“ITextMessage” on page 2010	A text message is a message whose body comprises a string.
“TransactionInProgressException” on page 2011	XMS throws this exception if an application requests an operation that is not valid because a transaction is in progress.
“TransactionRolledBackException” on page 2012	XMS throws this exception if an application calls Session.commit() to commit the current transaction, but the transaction is then rolled back.
XMSC	For .NET, XMS property names and values are defined in this class as public constants. For further details, see “Properties of XMS objects” on page 2014.

Interface	Description
“XMSException” on page 2012	If XMS detects an error while processing a call to a .NET method, XMS throws an exception. An exception is an object that encapsulates information about the error. There are different types of XMS exception, and an XMSException object is just one type of exception. However, the XMSException class is a superclass of the other XMS exception classes. XMS throws an XMSException object in situations where none of the other types of exception are appropriate.
“XMSFactoryFactory” on page 2013	If an application is not using administered objects, use this class to create connection factories, queues, and topics.

Table 871. Summary of the .NET class interfaces (continued)

The definition of each method lists the exception codes that XMS might return if it detects an error while processing a call to the method. Each exception code is represented by its named constant, which has a corresponding exception.

IBytesMessage

A bytes message is a message whose body comprises a stream of bytes.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
    |
    +----IBM.XMS.IMessage
             |
             +----IBM.XMS.IBytesMessage
```

.NET properties

BodyLength - Get Body Length

Interface:

```
Int64 BodyLength
     {
       get;
     }
```

Get the length of the body of the message in bytes when the body of the message is read-only.

The value returned is the length of the whole body regardless of where the cursor for reading the message is currently positioned.

Exceptions:

- XMSException
- MessageNotReadableException

Methods

ReadBoolean - Read Boolean Value

Interface:

```
Boolean ReadBoolean();
```

Read a boolean value from the bytes message stream.

Parameters:
None

Returns:
The boolean value that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadSignedByte - Read Byte

Interface:

```
Int16   ReadSignedByte();
```

Read the next byte from the bytes message stream as a signed 8-bit integer.

Parameters:
None

Returns:
The byte that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadBytes - Read Bytes

Interface:

```
Int32   ReadBytes(Byte[] array);
Int32   ReadBytes(Byte[] array, Int32 length);
```

Read an array of bytes from the bytes message stream starting from the current position of the cursor.

Parameters:

array (output)
The buffer to contain the array of bytes that is read. If the number of bytes remaining to be read from the stream before the call is greater than or equal to the length of the buffer, the buffer is filled. Otherwise, the buffer is partially filled with all the remaining bytes.

If you specify a null pointer on input, the method skips over the bytes without reading them. If the number of bytes remaining to be read from the stream before the call is greater than or equal to the length of the buffer, the number of bytes skipped is equal to the length of the buffer. Otherwise, all the remaining bytes are skipped. The cursor remains at the next position to read in the byte message stream.

length (input)
The length of the buffer in bytes

Returns:
The number of bytes that are read into the buffer. If the buffer is partially filled, the value is less than the length of the buffer, indicating that there are no more bytes remaining to be read. If there are no bytes remaining to be read from the stream before the call, the value is `XMSC_END_OF_STREAM`.

If you specify a null pointer on input, the method returns no value.

Exceptions:

- XMSException
- MessageNotReadableException

ReadChar - Read Character

Interface:

```
Char    ReadChar();
```

Read the next 2 bytes from the bytes message stream as a character.

Parameters:
None

Returns:
The character that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadDouble - Read Double Precision Floating Point Number

Interface:

```
Double  ReadDouble();
```

Read the next 8 bytes from the bytes message stream as a double precision floating point number.

Parameters:
None

Returns:
The double precision floating point number that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadFloat - Read Floating Point Number

Interface:

```
Single  ReadFloat();
```

Read the next 4 bytes from the bytes message stream as a floating point number.

Parameters:
None

Returns:
The floating point number that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadInt - Read Integer

Interface:

```
Int32   ReadInt();
```

Read the next 4 bytes from the bytes message stream as a signed 32-bit integer.

Parameters:
None

Returns:
The integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadLong - Read Long Integer

Interface:

```
Int64   ReadLong();
```

Read the next 8 bytes from the bytes message stream as a signed 64-bit integer.

Parameters:
None

Returns:
The long integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadShort - Read Short Integer

Interface:

```
Int16   ReadShort();
```

Read the next 2 bytes from the bytes message stream as a signed 16-bit integer.

Parameters:
None

Returns:
The short integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadByte - Read Unsigned Byte

Interface:

```
Byte    ReadByte();
```

Read the next byte from the bytes message stream as an unsigned 8-bit integer.

Parameters:
None

Returns:
The byte that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadUnsignedShort - Read Unsigned Short Integer

Interface:

```
Int32   ReadUnsignedShort();
```

Read the next 2 bytes from the bytes message stream as an unsigned 16-bit integer.

Parameters:
None

Returns:
The unsigned short integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadUTF - Read UTF String

Interface:

```
String  ReadUTF();
```

Read a string, encoded in UTF-8, from the bytes message stream.

Note: Before calling ReadUTF(), ensure that the cursor of the buffer is pointing to beginning of the byte message stream.

Parameters:
None

Returns:
A String object encapsulating the string that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

Reset - Reset

Interface:

```
void Reset();
```

Put the body of the message into read-only mode and reposition the cursor at the beginning of the bytes message stream.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- MessageNotReadableException

WriteBoolean - Write Boolean Value

Interface:

```
void  WriteBoolean(Boolean value);
```

Write a boolean value to the bytes message stream.

Parameters:

value (input)
The boolean value to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteByte - Write Byte

Interface:

```
void  WriteByte(Byte value);
void  WriteSignedByte(Int16 value);
```

Write a byte to the bytes message stream.

Parameters:

value (input)
The byte to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteBytes - Write Bytes

Interface:

```
void  WriteBytes(Byte[] value);
```

Write an array of bytes to the bytes message stream.

Parameters:

value (input)
The array of bytes to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteBytes - Write Partial Bytes Array

Interface:

```
void  WriteBytes(Byte[] value, int offset, int length);
```

Write a partial array of bytes to the bytes message stream, as defined by the specified length.

Parameters:

value (input)
The array of bytes to be written.

offset (input)
The starting point for the array of bytes to be written.

length (input)
The number of bytes to write.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteChar - Write Character

Interface:

```
void  WriteChar(Char value);
```

Write a character to the bytes message stream as 2 bytes, high-order byte first.

Parameters:

value (input)
The character to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteDouble - Write Double Precision Floating Point Number

Interface:

```
void  WriteDouble(Double value);
```

Convert a double precision floating point number to a long integer and write the long integer to the bytes message stream as 8 bytes, high-order byte first.

Parameters:

value (input)
The double precision floating point number to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteFloat - Write Floating Point Number

Interface:

```
void  WriteFloat(Single value);
```

Convert a floating point number to an integer and write the integer to the bytes message stream as 4 bytes, high-order byte first.

Parameters:

value (input)
The floating point number to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteInt - Write Integer

Interface:

```
void  WriteInt(Int32 value);
```

Write an integer to the bytes message stream as 4 bytes, high-order byte first.

Parameters:

value (input)
The integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteLong - Write Long Integer

Interface:

```
void  WriteLong(Int64 value);
```

Write a long integer to the bytes message stream as 8 bytes, high-order byte first.

Parameters:

value (input)
The long integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteObject - Write Object

Interface:

```
void  WriteObject(Object value);
```

Write the specified object into the byte message stream.

Parameters:

value (input)
The object to be written, which must be a reference to a primitive type.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteShort - Write Short Integer

Interface:

```
void  WriteShort(Int16 value);
```

Write a short integer to the bytes message stream as 2 bytes, high-order byte first.

Parameters:

value (input)
The short integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteUTF - Write UTF String

Interface:

```
void  WriteUTF(String value);
```

Write a string, encoded in UTF-8, to the bytes message stream.

Parameters:

value (input)
A String object encapsulating the string to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

Inherited properties and methods

The following properties are inherited from the IMessage interface:

JMSCorrelationID, JMSDeliveryMode, JMSDestination, JMSExpiration, JMSMessageID, JMSPriority, JMSRedelivered, JMSReplyTo, JMSTimestamp, JMSType, Properties

The following methods are inherited from the IMessage interface:

clearBody, clearProperties, PropertyExists

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IConnection

A Connection object represents the active connection of the application to a messaging server.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IConnection
```

For a list of the XMS defined properties of a Connection object, see “Properties of Connection” on page 2015.

.NET properties

ClientID - Get and Set Client ID

Interface:

```
String ClientID
      {
        get;
        set;
      }
```

Get and set the client identifier for the connection.

The client identifier can either be preconfigured by the administrator in a ConnectionFactory, or assigned by setting ClientID.

A client identifier is used only to support durable subscriptions in the publish/subscribe domain, and is ignored in the point-to-point domain.

If an application sets a client identifier for a connection, the application must do so immediately after creating the connection, and before performing any other operation on the connection. If the application tries to set a client identifier after this point, the call throws exception IllegalStateException.

This property is not valid for a real-time connection to a broker.

Exceptions:

- XMSException
- IllegalStateException
- InvalidClientIDException

ExceptionListener - Get and Set Exception Listener

Interface:

```
    ExceptionListener ExceptionListener
        {
          get;
          set;
        }
```

Get the exception listener that is registered with the connection, and register an exception listener with the connection.

If no exception listener is registered with the connection, the method returns null. If an exception listener is already registered with the connection, you can cancel the registration by specifying a null instead of the exception listener.

For more information about using exception listeners, see Using message and exception listeners in .NET.

Exceptions:

- XMSException

Metadata - Get Metadata

Interface:

```
IConnectionMetaData MetaData
    {
      get;
    }
```

Get the metadata for the connection.

Exceptions:

- XMSException

Methods

Close - Close Connection

Interface:

```
void  Close();
```

Close the connection.

If an application tries to close a connection that is already closed, the call is ignored.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

CreateSession - Create Session

Interface:

```
    ISession CreateSession(Boolean transacted,
                          AcknowledgeMode acknowledgeMode);
```

Create a session.

Parameters:

transacted (input)
The value `True` means that the session is transacted. The value `False` means that the session is not transacted.

For a real-time connection to a broker, the value must be `False`.

acknowledgeMode (input)
Indicates that how messages received by an application are acknowledged. The value must be one of the following from the AcknowledgeMode enumerator:

`AcknowledgeMode.AutoAcknowledge`
`AcknowledgeMode.ClientAcknowledge`
`AcknowledgeMode.DupsOkAcknowledge`

For a real-time connection to a broker, the value must be `AcknowledgeMode.AutoAcknowledge` or `AcknowledgeMode.DupsOkAcknowledge`

This parameter is ignored if the session is transacted. For more information about acknowledgment modes, see Message acknowledgment.

Returns:
The Session object

Exceptions:

- XMSException

Start - Start Connection

Interface:

```
void  Start();
```

Start or restart the delivery of incoming messages for the connection. The call is ignored if the connection is already started.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

Stop - Stop Connection

Interface:

```
void  Stop();
```

Stop the delivery of incoming messages for the connection. The call is ignored if the connection is already stopped.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IConnectionFactory

An application uses a connection factory to create a connection.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IConnectionFactory
```

For a list of the XMS defined properties of a ConnectionFactory object, see “Properties of ConnectionFactory” on page 2016.

Methods

CreateConnection - Create Connection Factory (using the default user identity)

Interface:

```
IConnection CreateConnection();
```

Create a connection factory with the default properties.

If you are connecting to IBM MQ and XMSC_USERID is not set, then the queue manager uses the userID of the logged on user by default. If you require further connection-level authentication of individual users you can write a client authentication exit which is configured in IBM MQ.

Parameters:
None

Exceptions:

- XMSException

CreateConnection - Create Connection (using a specified user identity)

Interface:

```
IConnection CreateConnection(String userId, String password);
```

Create a connection using a specified user identity.

If you are connecting to IBM MQ and XMSC_USERID is not set, then the queue manager uses the userID of the logged on user by default. If you require further connection-level authentication of individual users you can write a client authentication exit which is configured in IBM MQ.

The connection is created in stopped mode. No messages are delivered until the application calls **Connection.start()**.

Parameters:

userID (input)
A String object encapsulating the user identifier to be used to authenticate the application. If you provide a null, an attempt is made to create the connection without authentication.

password (input)
A String object encapsulating the password to be used to authenticate the application. If you provide a null, an attempt is made to create the connection without authentication.

Returns:
The Connection object.

Exceptions:

- XMSException
- XMS_X_SECURITY_EXCEPTION

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IConnectionMetaData

A ConnectionMetaData object provides information about a connection.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IConnectionMetaData
```

For a list of the XMS defined properties of a ConnectionMetaData object, see “Properties of ConnectionMetaData” on page 2021.

.NET properties

JMSXPropertyNames - Get JMS Defined Message Properties

Interface:

```
System.Collections.IEnumerator JMSXPropertyNames
    {
      get;
    }
```

Return an enumeration of the names of the JMS defined message properties supported by the connection.

JMS defined message properties are not supported by a real-time connection to a broker.

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IDestination

A destination is where an application sends messages, or it is a source from which an application receives messages, or both.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IDestination
```

For a list of the XMS defined properties of a Destination object, see “Properties of Destination” on page 2021.

.NET properties

Name - Get Destination Name

Interface:

```
String Name
{
  get;
}
```

Get the name of the destination. The name is a string encapsulating either the name of a queue or the name of a topic.

Exceptions:

- XMSException

TypeId - Get Destination Type

Interface:

```
DestinationType TypeId
{
  get;
}
```

Get the type of the destination. The type of the destination is one of the following values:

```
DestinationType.Queue
DestinationType.Topic
```

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

ExceptionListener

An application uses an exception listener to be notified asynchronously of a problem with a connection.

Inheritance hierarchy:
None

If an application uses a connection only to consume messages asynchronously, and for no other purpose, then the only way the application can learn about a problem with the connection is by using an exception listener. In other situations, an exception listener can provide a more immediate way of learning about a problem with a connection than waiting until the next synchronous call to XMS.

Delegate

ExceptionListener - Exception Listener

Interface:

```
public delegate void ExceptionListener(Exception ex)
```

Notify the application of a problem with a connection.

Methods that implement this delegate can be registered with the connection.

For more information about using exception listeners, see Using message and exception listeners in .NET.

Parameters:

exception (input)
A pointer to an exception created by XMS.

Returns:
Void

IllegalStateException

XMS throws this exception if an application calls a method at an incorrect or inappropriate time, or if XMS is not in an appropriate state for the requested operation.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.Exception
           |
           +----IBM.XMS.IllegalStateException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

InitialContext

An application uses an InitialContext object to create objects from object definitions that are retrieved from a repository of administered objects.

Inheritance hierarchy:
None

.NET properties

Environment - Get the environment

Interface:

```
Hashtable Environment
{
     get;
}
```

Get the environment.

Exceptions:

- Exceptions are specific to the directory service being used.

Constructors

InitialContext - Create Initial Context

Interface:

```
InitialContext(Hashtable env);
```

Create an InitialContext object.

Parameters:

The information required to establish a connection to the repository of administered objects is provided to the constructor in an environment Hashtable.

Exceptions:

- XMSException

Methods

AddToEnvironment - Add a New Property to the Environment

Interface:

```
Object AddToEnvironment(String propName, Object propVal);
```

Add a new property to the environment.

Parameters:

propName (input)
A String object encapsulating the name of the property to be added.

propVal (input)
The value of the property to be added.

Returns:
The old value of the property.

Exceptions:

- Exceptions are specific to the directory service being used.

Close - Close this context

Interface:

```
void Close()
```

Close this context.

Parameters:
None

Returns:
None

Exceptions:

- Exceptions are specific to the directory service being used.

Lookup - Look Up Object in Initial Context

Interface:

```
Object Lookup(String name);
```

Create an object from an object definition that is retrieved from the repository of administered objects.

Parameters:

name (input)
A String object encapsulating the name of the administered object to be retrieved. The name can be either a simple name or a complex name. For further details, see Retrieval of administered objects.

Returns:
Either an IConnectionFactory or an IDestination, depending on the type of object being retrieved. If the function can access the directory, but cannot find the required object, a null is returned.

Exceptions:

- Exceptions are specific to the directory service being used.

RemoveFromEnvironment - Remove a Property from the Environment

Interface:

```
Object RemoveFromEnvironment(String propName);
```

Remove a property from the environment.

Parameters:

propName (input)
A String object encapsulating the name of the property to be removed.

Returns:
The object that was removed.

Exceptions:

- Exceptions are specific to the directory service being used.

InvalidClientIDException

XMS throws this exception if an application attempts to set a client identifier for a connection, but the client identifier is not valid or is already in use.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.InvalidClientIDException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

InvalidDestinationException

XMS throws this exception if an application specifies a destination that is not valid.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.InvalidDestinationException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

InvalidSelectorException

XMS throws this exception if an application provides a message selector expression whose syntax is not valid.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
```

```
   +----IBM.XMS.XMSException
            |
            +----IBM.XMS.InvalidSelectorException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

IMapMessage

A map message is a message whose body comprises a set of name-value pairs, where each value has an associated data type.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessage
            |
            +----IBM.XMS.IMapMessage
```

When an application gets the value of name-value pair, the value can be converted by XMS into another data type. For more information about this form of implicit conversion, see the information about map messages in The body of an XMS message.

.NET properties

MapNames - Get Map Names

Interface:

```
System.Collections.IEnumerator MapNames
{
  get;
}
```

Get an enumeration of the names in the body of the map message.

Exceptions:

- XMSException

Methods

GetBoolean - Get Boolean Value

Interface:

```
Boolean GetBoolean(String name);
```

Get the boolean value identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the boolean value.

Returns:
The boolean value retrieved from the body of the map message.

Exceptions:

- XMSException

GetByte - Get Byte

Interface:

```
Byte    GetByte(String name);
    Int16   GetSignedByte(String name);
```

Get the byte identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the byte.

Returns:
The byte retrieved from the body of the map message. No data conversion is performed on the byte.

Exceptions:

- XMSException

GetBytes - Get Bytes

Interface:

```
Byte[]  GetBytes(String name);
```

Get the array of bytes identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the array of bytes.

Returns:
The number of bytes in the array.

Exceptions:

- XMSException

GetChar - Get Character

Interface:

```
Char    GetChar(String name);
```

Get the character identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the character.

Returns:
The character retrieved from the body of the map message.

Exceptions:

- XMSException

GetDouble - Get Double Precision Floating Point Number

Interface:

```
Double  GetDouble(String name);
```

Get the double precision floating point number identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the double precision floating point number.

Returns:
The double precision floating point number retrieved from the body of the map message.

Exceptions:

- XMSException

GetFloat - Get Floating Point Number

Interface:

```
Single  GetFloat(String name);
```

Get the floating point number identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the floating point number.

Returns:
The floating point number retrieved from the body of the map message.

Exceptions:

- XMSException

GetInt - Get Integer

Interface:

```
Int32   GetInt(String name);
```

Get the integer identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the integer.

Returns:
The integer retrieved from the body of the map message.

Exceptions:

- XMSException

GetLong - Get Long Integer

Interface:

```
Int64   GetLong(String name);
```

Get the long integer identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the long integer.

Returns:
The long integer retrieved from the body of the map message.

Exceptions:

- XMSException

GetObject - Get Object

Interface:

```
Object  GetObject(String name);
```

Get a reference to the value of a name-value pair, from the body of the map message. The name-value pair is identified by name.

Parameters:

name (input)
A String object encapsulating the name of the name-value pair.

Returns:
The value, which is one of the following object types:

```
Boolean
Byte
Byte[]
Char
Double
Single
Int32
Int64
Int16
String
```

Exceptions:
XMSException

GetShort - Get Short Integer

Interface:

```
Int16   GetShort(String name);
```

Get the short integer identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the short integer.

Returns:
The short integer retrieved from the body of the map message.

Exceptions:

- XMSException

GetString - Get String

Interface:

```
String  GetString(String name);
```

Get the string identified by name from the body of the map message.

Parameters:

name (input)
A String object encapsulating the name that identifies the string in the body of the map message.

Returns:
A String object encapsulating the string retrieved from the body of the map message. If data conversion is required, this value is the string after conversion.

Exceptions:

- XMSException

ItemExists - Check Name-Value Pair Exists

Interface:

```
Boolean ItemExists(String name);
```

Check whether the body of the map message contains a name-value pair with the specified name.

Parameters:

name (input)
A String object encapsulating the name of the name-value pair.

Returns:

- `True`, if the body of the map message contains a name-value pair with the specified name.
- `False`, if the body of the map message does not contain a name-value pair with the specified name.

Exceptions:

- XMSException

SetBoolean - Set Boolean Value

Interface:

```
void  SetBoolean(String name, Boolean value);
```

Set a boolean value in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the boolean value in the body of the map message.

value (input)
The boolean value to be set.

Returns:
Void

Exceptions:

- XMSException

SetByte - Set Byte

Interface:

```
void  SetByte(String name, Byte value);
void  SetSignedByte(String name, Int16 value);
```

Set a byte in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the byte in the body of the map message.

value (input)
The byte to be set.

Returns:
Void

Exceptions:

- XMSException

SetBytes - Set Bytes

Interface:

```
void  SetBytes(String name, Byte[] value);
```

Set an array of bytes in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the array of bytes in the body of the map message.

value (input)
The array of bytes to be set.

Returns:
Void

Exceptions:

- XMSException

SetChar - Set Character

Interface:

```
void  SetChar(String name, Char value);
```

Set a 2-byte character in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the character in the body of the map message.

value (input)
The character to be set.

Returns:
Void

Exceptions:

- XMSException

SetDouble - Set Double Precision Floating Point Number

Interface:

```
void  SetDouble(String name, Double value);
```

Set a double precision floating point number in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the double precision floating point number in the body of the map message.

value (input)
The double precision floating point number to be set.

Returns:
Void

Exceptions:

- XMSException

SetFloat - Set Floating Point Number

Interface:

```
void  SetFloat(String name, Single value);
```

Set a floating point number in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the floating point number in the body of the map message.

value (input)
The floating point number to be set.

Returns:
Void

Exceptions:

- XMSException

SetInt - Set Integer

Interface:

```
void  SetInt(String name, Int32 value);
```

Set an integer in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the integer in the body of the map message.

value (input)
The integer to be set.

Returns:
Void

Exceptions:

- XMSException

SetLong - Set Long Integer

Interface:

```
void  SetLong(String name, Int64 value);
```

Set a long integer in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the long integer in the body of the map message.

value (input)
The long integer to be set.

Returns:
Void

Exceptions:

- XMSException

SetObject - Set Object

Interface:

```
void  SetObject(String name, Object value);
```

Set a value, which must be an XMS primitive type, in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the value in the body of the map message.

value (input)
An array of bytes containing the value to be set.

Returns:
Void

Exceptions:

- XMSException

SetShort - Set Short Integer

Interface:

```
void  SetShort(String name, Int16 value);
```

Set a short integer in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the short integer in the body of the map message.

value (input)
The short integer to be set.

Returns:
Void

Exceptions:

- XMSException

SetString - Set String

Interface:

```
void  SetString(String name, String value);
```

Set a string in the body of the map message.

Parameters:

name (input)
A String object encapsulating the name to identify the string in the body of the map message.

value (input)
A String object encapsulating the string to be set.

Returns:
Void

Exceptions:

- XMSException

Inherited properties and methods

The following properties are inherited from the IMessage interface:

JMSCorrelationID, JMSDeliveryMode, JMSDestination, JMSExpiration, JMSMessageID, JMSPriority, JMSRedelivered, JMSReplyTo, JMSTimestamp, JMSType, Properties

The following methods are inherited from the IMessage interface:

clearBody, clearProperties, PropertyExists

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IMessage

A Message object represents a message that an application sends or receives. IMessage is a superclass for the message classes such as IMapMessage.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessage
```

For a list of the JMS message header fields in a Message object, see Header fields of an XMS message. For a list of the JMS defined properties of a Message object, see JMS-defined properties of a message. For a list of the IBM defined properties of a Message object, see IBM-defined properties of a message. For a list of JMS_IBM_MQMD* properties for the Message object, see “JMS_IBM_MQMD* properties” on page 2025

Messages are deleted by the garbage collector. When a message is deleted, this frees the resources it was using.

.NET properties

GetJMSCorrelationID - Get and Set JMSCorrelationID

Interface:

```
String JMSCorrelationID
{
  get;
  set;
}
```

Get and set the correlation identifier of the message as a String object.

Exceptions:

- XMSException

JMSDeliveryMode - Get and Set JMSDeliveryMode

Interface:

```
DeliveryMode JMSDeliveryMode
{
  get;
  set;
}
```

Get and set the delivery mode of the message.

The delivery mode of the message is one of the following values:

`DeliveryMode.Persistent`
`DeliveryMode.NonPersistent`

For a newly created message that was not sent, the delivery mode is `DeliveryMode.Persistent`, except for a real-time connection to a broker for which the delivery mode is `DeliveryMode.NonPersistent`. For a message that is received, the method returns the delivery mode that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the delivery mode by setting JMSDeliveryMode.

Exceptions:

- XMSException

JMSDestination - Get and Set JMSDestination

Interface:

```
IDestination JMSDestination
{
  get;
  set;
}
```

Get and set the destination of the message.

The destination is set by the IMessageProducer.send() call when the message is sent. The value of JMSDestination is ignored. However, you can use JMSDestination to change the destination of a message that was received.

For a newly created message that was not sent, the method returns a null Destination object, unless the sending application sets a destination by setting JMSDestination. For a message that was received, the method returns a Destination object for the destination that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the destination by setting JMSDestination.

Exceptions:

- XMSException

JMSExpiration - Get and Set JMSExpiration

Interface:

```
Int64 JMSExpiration
{
  get;
  set;
}
```

Get and set the expiration time of the message.

The expiration time is set by the IMessageProducer.send() call when the message is sent. Its value is calculated by adding the time to live, as specified by the sending application, to the time when the message is sent. The expiration time is expressed in milliseconds since 00:00:00 GMT on the 1 January 1970.

For a newly created message that was not sent, the expiration time is 0 unless the sending application sets a different expiration time by setting JMSExpiration. For a message that was received, the method returns the expiration time that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the expiration time by setting JMSExpiration.

If the time to live is 0, the IMessageProducer.send() call sets the expiration time to 0 to indicate that the message does not expire.

XMS discards expired messages and does not deliver them to applications.

Exceptions:

- XMSException

JMSMessageID - Get and Set JMSMessageID

Interface:

```
String JMSMessageID
{
  get;
  set;
}
```

Get and set the message identifier of the message as a string object encapsulating the message identifier.

The message identifier is set by the IMessageProducer.send() call when the message is sent. For a message that was received, the method returns the message identifier that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the message identifier by setting JMSMessageID.

If the message has no message identifier, the method returns a null.

Exceptions:

- XMSException

JMSPriority - Get and Set JMSPriority

Interface:

```
Int32 JMSPriority
{
  get;
  set;
}
```

Get and set the priority of the message.

The priority is set by the IMessageProducer.send() call when the message is sent. The value is an integer in the range 0, the lowest priority, to 9, the highest priority.

For a newly created message that was not sent, the priority is 4 unless the sending application sets a different priority by setting JMSPriority. For a message that was received, the method returns the priority that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the priority by setting JMSPriority.

Exceptions:

- XMSException

JMSRedelivered - Get and Set JMSRedelivered

Interface:

```
Boolean JMSRedelivered
{
  get;
  set;
}
```

Get an indication of whether the message is being redelivered, and indicate whether the message is being redelivered. The indication is set by the IMessageConsumer.receive() call when the message is received.

This property has the following values:

- `True`, if the message is being redelivered.
- `False`, if the message is not being redelivered.

For a real-time connection to a broker, the value is always `False`.

An indication of redelivery set by JMSRedelivered before the message is sent is ignored by the IMessageProducer.send() call when the message is sent, and is ignored and replaced by the IMessageConsumer.receive() call when the message is received. However, you can use JMSRedelivered to change the indication for a message that was received.

Exceptions:

- XMSException

JMSReplyTo - Get and Set JMSReplyTo

Interface:

```
IDestination JMSReplyTo
{
  get;
  set;
}
```

Get and set the destination where a reply to the message is to be sent.

The value of this property is a Destination object for the destination where a reply to the message is to be sent. A null Destination object means that no reply is expected.

Exceptions:

- XMSException

JMSTimestamp - Get and Set JMSTimestamp

Interface:

```
Int64 JMSTimestamp
```

```
{
  get;
  set;
}
```

Get and set the time when the message was sent.

The time stamp is set by the IMessageProducer.send() call when the message is sent and is expressed in milliseconds since 00:00:00 GMT on the 1 January 1970.

For a newly created message that was not sent, the time stamp is 0 unless the sending application sets a different time stamp by setting JMSTimestamp. For a message that was received, the method returns the time stamp that was set by the IMessageProducer.send() call when the message was sent unless the receiving application changes the time stamp by setting JMSTimestamp.

Exceptions:

- XMSException

Notes:

1. If the time stamp is undefined, the method returns 0 but throws no exception.

JMSType - Get and Set JMSType

Interface:

```
String JMSType
{
  get;
  set;
}
```

Get and set the type of the message.

The value of JMSType is a string encapsulating the type of the message. If data conversion is required, this value is the type after conversion.

Exceptions:

- XMSException

PropertyNames - Get Properties

Interface:

```
System.Collections.IEnumerator PropertyNames
{
  get;
}
```

Get an enumeration of the names properties of the message.

Exceptions:

- XMSException

Methods

Acknowledge - Acknowledge

Interface:

```
void  Acknowledge();
```

Acknowledge this message and all previously unacknowledged messages received by the session.

An application can call this method if the acknowledgment mode of the session is AcknowledgeMode.ClientAcknowledge. Calls to the method are ignored if the session has any other acknowledgment mode or is transacted.

Messages that were received but not acknowledged might be redelivered.

For more information about acknowledging messages, see ../com.ibm.mq.dev.doc/xms_cmesack.dita#xms_cmesack.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- IllegalStateException

ClearBody - Clear Body

Interface:

```
void  ClearBody();
```

Clear the body of the message. The header fields and message properties are not cleared.

If an application clears a message body, the body remains in the same state as an empty body in a newly created message. The state of an empty body in a newly created message depends on the type of message body. For more information, see The body of an XMS message.

An application can clear a message body at any time, no matter what state the body is in. If a message body is read-only, the only way that an application can write to the body is for the application to clear the body first.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

ClearProperties - Clear Properties

Interface:

```
void  ClearProperties();
```

Clear the properties of the message. The header fields and the message body are not cleared.

If an application clears the properties of a message, the properties become readable and writable.

An application can clear the properties of a message at any time, no matter what state the properties are in. If the properties of a message are read-only, the only way that the properties can become writable is for the application to clear the properties first.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

PropertyExists - Check Property Exists

Interface:

```
Boolean PropertyExists(String propertyName);
```

Check whether the message has a property with the specified name.

Parameters:

propertyName (input)
A String object encapsulating the name of the property.

Returns:

- `True`, if the message has a property with the specified name.
- `False`, if the message does not have a property with the specified name.

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IMessageConsumer

An application uses a message consumer to receive messages sent to a destination.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessageConsumer
```

For a list of the XMS defined properties of a MessageConsumer object, see "Properties of MessageConsumer" on page 2029.

.NET properties

MessageListener - Get and Set Message Listener

Interface:

```
MessageListener MessageListener
{
  get;
  set;
}
```

Get the message listener that is registered with the message consumer, and register a message listener with the message consumer.

If no message listener is registered with the message consumer, MessageListener is null. If a message listener is already registered with the message consumer, you can cancel the registration by specifying a null instead.

For more information about using message listeners, see Using message and exception listeners in .NET.

Exceptions:

- XMSException

MessageSelector - Get Message Selector

Interface:

```
String MessageSelector
{
  get;
}
```

Get the message selector for the message consumer. The return value is a String object encapsulating the message selector expression. If data conversion is required, this value is the message selector expression after conversion. If the message consumer does not have a message selector, the value of MessageSelector is a null String object.

Exceptions:

- XMSException

Methods

Close - Close Message Consumer

Interface:

```
void  Close();
```

Close the message consumer.

If an application tries to close a message consumer that is already closed, the call is ignored.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

Receive - Receive

Interface:

```
IMessage Receive();
```

Receive the next message for the message consumer. The call waits indefinitely for a message, or until the message consumer is closed.

Parameters:
None

Returns:
A pointer to the Message object. If the message consumer is closed while the call is waiting for a message, the method returns a pointer to a null Message object.

Exceptions:

- XMSException

Receive - Receive (with a wait interval)

Interface:

```
IMessage Receive(Int64 delay);
```

Receive the next message for the message consumer. The call waits only a specified period for a message, or until the message consumer is closed.

Parameters:

delay (input)
The time, in milliseconds, that the call waits for a message. If you specify a wait interval of 0, the call waits indefinitely for a message.

Returns:
A pointer to the Message object. If no message arrives during the wait interval, or if the message consumer is closed while the call is waiting for a message, the method returns a pointer to a null Message object but throws no exception.

Exceptions:

- XMSException

ReceiveNoWait - Receive with No Wait

Interface:

```
IMessage ReceiveNoWait();
```

Receive the next message for the message consumer if one is available immediately.

Parameters:
None

Returns:
A pointer to a Message object. If no message is available immediately, the method returns a pointer to a null Message object.

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

MessageEOFException

XMS throws this exception if XMS encounters the end of a bytes message stream when an application is reading the body of a bytes message.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
```

```
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.MessageEOFException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

MessageFormatException

XMS throws this exception if XMS encounters a message with a format that is not valid.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.MessageFormatException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

IMessageListener (delegate)

An application uses a message listener to receive messages asynchronously.

Inheritance hierarchy:
None

Delegate

MessageListener - Message Listener

Interface:

```
public delegate void MessageListener(IMessage msg);
```

Deliver a message asynchronously to the message consumer.

Methods that implement this delegate can be registered with the connection.

For more information about using message listeners, see Using message and exception listeners in .NET.

Parameters:

mesg (input)
The Message object.

Returns:
Void

MessageNotReadableException

XMS throws this exception if an application attempts to read the body of a message that is write only.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
```

```
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.MessageNotReadableException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

MessageNotWritableException

XMS throws this exception if an application attempts to write to the body of a message that is read-only.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.MessageNotWritableException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

IMessageProducer

An application uses a message producer to send messages to a destination.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessageProducer
```

For a list of the XMS defined properties of a MessageProducer object, see “Properties of MessageProducer” on page 2029.

.NET properties

DeliveryMode - Get and Set Default Delivery Mode

Interface:

```
DeliveryMode DeliveryMode
{
  get;
  set;
}
```

Get and set the default delivery mode for messages sent by the message producer.

The default delivery mode has one of the following values:

`DeliveryMode.Persistent`
`DeliveryMode.NonPersistent`

For a real-time connection to a broker, the value must be `DeliveryMode.NonPersistent`.

The default value is `DeliveryMode.Persistent`, except for a real-time connection to a broker for which the default value is `DeliveryMode.NonPersistent`.

Exceptions:

- XMSException

Destination - Get Destination

Interface:

```
IDestination Destination
{
  get;
}
```

Get the destination for the message producer.

Parameters:
None

Returns:
The Destination object. If the message producer does not have a destination, the method returns a null Destination object.

Exceptions:

- XMSException

DisableMsgID - Get and Set Disable Message ID Flag

Interface:

```
Boolean DisableMessageID
{
  get;
  set;
}
```

Get an indication of whether a receiving application requires message identifiers to be included in messages sent by the message producer, and indicate whether a receiving application requires message identifiers to be included in messages sent by the message producer.

On a connection to a queue manager, or on a real-time connection to a broker, this flag is ignored. On a connection to a service integration bus, the flag is honored.

DisabledMsgID has the following values:

- `True`, if a receiving application does not require message identifiers to be included in messages sent by the message producer.
- `False`, if a receiving application does require message identifiers to be included in messages sent by the message producer.

Exceptions:

- XMSException

DisableMsgTS - Get and Set Disable Time Stamp Flag

Interface:

```
Boolean DisableMessageTimestamp
{
  get;
  set;
}
```

Get an indication of whether a receiving application requires time stamps to be included in messages sent by the message producer, and indicate whether a receiving application requires time stamps to be included in messages sent by the message producer.

On a real-time connection to a broker, this flag is ignored. On a connection to a queue manager, or on a connection to a service integration bus, the flag is honored.

DisableMsgTS has the following values:

- `True`, if a receiving application does not require time stamps to be included in messages sent by the message producer.
- `False`, if a receiving application does require time stamps to be included in messages sent by the message producer.

Returns:

Exceptions:

- XMSException

Priority - Get and Set Default Priority

Interface:

```
Int32 Priority
{
  get;
  set;
}
```

Get and set the default priority for messages sent by the message producer.

The value of the default message priority is an integer in the range 0, the lowest priority, to 9, the highest priority.

On a real-time connection to a broker, the priority of a message is ignored.

Exceptions:

- XMSException

TimeToLive - Get and Set Default Time to Live

Interface:

```
Int64 TimeToLive
{
  get;
  set;
}
```

Get and set the default length of time that a message exists before it expires.

The time is measured from when the message producer sends the message and is the default time to live in milliseconds. A value of 0 means that a message never expires.

For a real-time connection to a broker, this value is always 0.

Exceptions:

- XMSException

Methods

Close - Close Message Producer

Interface:

```
void  Close();
```

Close the message producer.

If an application tries to close a message producer that is already closed, the call is ignored.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

Send - Send

Interface:

```
void Send(IMessage msg) ;
```

Send a message to the destination that was specified when the message producer was created. Send the message using the message producer default delivery mode, priority, and time to live.

Parameters:

msg (input)
The Message object.

Returns:
Void

Exceptions:

- XMSException
- MessageFormatException
- InvalidDestinationException

Send - Send (specifying a delivery mode, priority, and time to live)

Interface:

```
void Send(IMessage msg,
          DeliveryMode deliveryMode,
          Int32 priority,
          Int64 timeToLive);
```

Send a message to the destination that was specified when the message producer was created. Send the message using the specified delivery mode, priority, and time to live.

Parameters:

msg (input)
The Message object.

deliveryMode (input)
The delivery mode for the message, which must be one of the following values:

`DeliveryMode.Persistent`
`DeliveryMode.NonPersistent`

For a real-time connection to a broker, the value must be `DeliveryMode.NonPersistent`.

priority (input)
The priority of the message. The value can be an integer in the range 0, for the lowest priority, to 9, for the highest priority. On a real-time connection to a broker, the value is ignored.

timeToLive (input)
The time to live for the message in milliseconds. A value of 0 means that the message never expires. For a real-time connection to a broker, the value must be 0.

Returns:
Void

Exceptions:

- XMSException
- MessageFormatException
- InvalidDestinationException
- IllegalStateException

Send - Send (to a specified destination)

Interface:

```
void Send(IDestination dest, IMessage msg) ;
```

Send a message to a specified destination if you are using a message producer for which no destination was specified when the message producer was created. Send the message using the message producer default delivery mode, priority, and time to live.

Typically, you specify a destination when you create a message producer but, if you do not, you must specify a destination every time you send a message.

Parameters:

dest (input)
The Destination object.

msg (input)
The Message object.

Returns:
Void

Exceptions:

- XMSException
- MessageFormatException
- InvalidDestinationException

Send - Send (to a specified destination, specifying a delivery mode, priority, and time to live)

Interface:

```
void Send(IDestination dest,
          IMessage msg,
          DeliveryMode deliveryMode,
          Int32 priority,
          Int64 timeToLive) ;
```

Send a message to a specified destination if you are using a message producer for which no destination was specified when the message producer was created. Send the message using the specified delivery mode, priority, and time to live.

Typically, you specify a destination when you create a message producer but, if you do not, you must specify a destination every time you send a message.

Parameters:

dest (input)
The Destination object.

msg (input)
The Message object.

deliveryMode (input)
The delivery mode for the message, which must be one of the following values:

DeliveryMode.Persistent
DeliveryMode.NonPersistent

For a real-time connection to a broker, the value must be DeliveryMode.NonPersistent.

priority (input)
The priority of the message. The value can be an integer in the range 0, for the lowest priority, to 9, for the highest priority. On a real-time connection to a broker, the value is ignored.

timeToLive (input)
The time to live for the message in milliseconds. A value of 0 means that the message never expires. For a real-time connection to a broker, the value must be 0.

Returns:
Void

Exceptions:

- XMSException
- MessageFormatException
- InvalidDestinationException
- IllegalStateException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IObjectMessage

An object message is a message whose body comprises a serialized Java or .NET object.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessage
           |
           +----IBM.XMS.IObjectMessage
```

.NET properties

Object - Get and Set Object as Bytes

Interface:

```
System.Object Object
    {
      get;
      set;
    }

    Byte[] GetObject();
```

Get and set the object that forms the body of the object message.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException
- MessageNotWritableException

Inherited properties and methods

The following properties are inherited from the IMessage interface:

JMSCorrelationID, JMSDeliveryMode, JMSDestination, JMSExpiration, JMSMessageID, JMSPriority, JMSRedelivered, JMSReplyTo, JMSTimestamp, JMSType, Properties

The following methods are inherited from the IMessage interface:

clearBody, clearProperties, PropertyExists

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IPropertyContext

IPropertyContext is an abstract superclass that contains methods that get and set properties. These methods are inherited by other classes.

Inheritance hierarchy:
None

Methods

GetBooleanProperty - Get Boolean Property

Interface:

```
Boolean GetBooleanProperty(String property_name);
```

Get the value of the boolean property with the specified name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetByteProperty - Get Byte Property

Interface:

```
Byte    GetByteProperty(String property_name) ;
Int16   GetSignedByteProperty(String property_name) ;
```

Get the value of the byte property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetBytesProperty - Get Byte Array Property

Interface:

```
Byte[]  GetBytesProperty(String property_name) ;
```

Get the value of the byte array property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The number of bytes in the array.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetCharProperty - Get Character Property

Interface:

```
Char    GetCharProperty(String property_name) ;
```

Get the value of the 2-byte character property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetDoubleProperty - Get Double Precision Floating Point Property

Interface:

```
Double  GetDoubleProperty(String property_name) ;
```

Get the value of the double precision floating point property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetFloatProperty - Get Floating Point Property

Interface:

```
Single  GetFloatProperty(String property_name) ;
```

Get the value of the floating point property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetIntProperty - GetIntProperty

Interface:

```
Int32   GetIntProperty(String property_name) ;
```

Get the value of the integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetLongProperty - Get Long Integer Property

Interface:

```
Int64   GetLongProperty(String property_name) ;
```

Get the value of the long integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetObjectProperty - Get Object Property

Interface:

```
Object  GetObjectProperty( String property_name) ;
```

Get the value and data type of the property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property, which is one of the following object types:

```
Boolean
Byte
Byte[]
Char
Double
Single
Int32
Int64
Int16
String
```

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetShortProperty - Get Short Integer Property

Interface:

```
Int16   GetShortProperty(String property_name) ;
```

Get the value of the short integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
The value of the property.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

GetStringProperty - GetStringProperty

Interface:

```
String  GetStringProperty(String property_name) ;
```

Get the value of the string property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

Returns:
A String object encapsulating the string that is the value of the property. If data conversion is required, this value is the string after conversion.

Thread context:
Determined by the subclass

Exceptions:

- XMSException

SetBooleanProperty - Set Boolean Property

Interface:

```
void SetBooleanProperty( String property_name,  Boolean value) ;
```

Set the value of the boolean property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetByteProperty - Set Byte Property

Interface:

```
void SetByteProperty( String property_name,  Byte value) ;
      void SetSignedByteProperty( String property_name,  Int16 value) ;
```

Set the value of the byte property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetBytesProperty - Set Byte Array Property

Interface:

```
void SetBytesProperty( String property_name, Byte[] value ) ;
```

Set the value of the byte array property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property, which is an array of bytes.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetCharProperty - Set Character Property

Interface:

```
void SetCharProperty( String property_name,  Char value) ;
```

Set the value of the 2-byte character property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetDoubleProperty - Set Double Precision Floating Point Property

Interface:

```
void SetDoubleProperty( String property_name,  Double value) ;
```

Set the value of the double precision floating point property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetFloatProperty - Set Floating Point Property

Interface:

```
void SetFloatProperty( String property_name,  Single value) ;
```

Set the value of the floating point property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetIntProperty - Set Integer Property

Interface:

```
void SetIntProperty( String property_name,  Int32 value) ;
```

Set the value of the integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetLongProperty - Set Long Integer Property

Interface:

```
void SetLongProperty( String property_name,  Int64 value) ;
```

Set the value of the long integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetObjectProperty - Set Object Property

Interface:

```
void SetObjectProperty( String property_name,  Object value) ;
```

Set the value and data type of a property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

objectType (input)
The value of the property, which must be one of the following object types:

```
Boolean
Byte
Byte[]
Char
Double
Single
Int32
Int64
Int16
String
```

value (input)
The value of the property as an array of bytes.

length (input)
The number of bytes in the array.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetShortProperty - Set Short Integer Property

Interface:

```
void SetShortProperty( String property_name,  Int16 value) ;
```

Set the value of the short integer property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
The value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

SetStringProperty - Set String Property

Interface:

```
void SetStringProperty( String property_name,  String value);
```

Set the value of the string property identified by name.

Parameters:

property_name (input)
A String object encapsulating the name of the property.

value (input)
A String object encapsulating the string that is the value of the property.

Returns:
Void

Thread context:
Determined by the subclass

Exceptions:

- XMSException
- MessageNotWritableException

IQueueBrowser

An application uses a queue browser to browse messages on a queue without removing them.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
System.Collections.IEnumerable
   |
   +----IBM.XMS.IQueueBrowser
```

.NET properties

MessageSelector - Get Message Selector

Interface:

```
String MessageSelector
{
  get;
}
```

Get the message selector for the queue browser.

The message selector is a String object encapsulating the message selector expression. If data conversion is required, this value is the message selector expression after conversion. If the queue browser does not have a message selector, the method returns a null String object.

Exceptions:

- XMSException

Queue - Get Queue

Interface:

```
IDestination Queue
{
  get;
}
```

Get the queue associated with the queue browser as a destination object representing the queue.

Exceptions:

- XMSException

Methods

Close - Close Queue Browser

Interface:

```
void  Close();
```

Close the queue browser.

If an application tries to close a queue browser that is already closed, the call is ignored.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException

GetEnumerator - Get Messages

Interface:

```
IEnumerator GetEnumerator();
```

Get a list of the messages on the queue.

The method returns an enumerator that encapsulates a list of Message objects. The order of the Message objects is the same as the order in which the messages would be retrieved from the queue. The application can then use the enumerator to browse each message in turn.

The enumerator is updated dynamically as messages are put on the queue and removed from the queue. Each time the application calls IEnumerator.MoveNext() to browse the next message on the queue, the message reflects the current contents of the queue.

If an application calls this method more than once for a queue browser, each call returns a new enumerator. The application can therefore use more than one enumerator to browse the messages on a queue and maintain multiple positions within the queue.

Parameters:
None

Returns:
The Iterator object.

Exceptions:

- XMSException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

Requestor

An application uses a requestor to send a request message and then wait for, and receive, the reply.

Inheritance hierarchy:
None

Constructors

Requestor - Create Requestor

Interface:

```
Requestor(ISession sess, IDestination dest);
```

Create a requestor.

Parameters:

sess (input)
A Session object. The session must not be transacted and must have one of the following acknowledgment modes:

`AcknowledgeMode.AutoAcknowledge`
`AcknowledgeMode.DupsOkAcknowledge`

dest (input)
A Destination object representing the destination where the application can send request messages.

Thread context:
The session associated with the requestor

Exceptions:

- XMSException

Methods

Close - Close Requestor

Interface:

```
void  Close();
```

Close the requestor.

If an application tries to close a requestor that is already closed, the call is ignored.

Note: When an application closes a requestor, the associated session does not close as well. In this respect, XMS behaves differently compared to JMS.

Parameters:
None

Returns:
Void

Thread context:
Any

Exceptions:

- XMSException

Request - Request Response

Interface:

```
IMessage Request(IMessage requestMessage);
```

Send a request message and then wait for, and receive, a reply from the application that receives the request message.

A call to this method blocks until a reply is received or until the session ends, whichever is the sooner.

Parameters:

requestMessage (input)
The Message object encapsulating the request message.

Returns:
A pointer to the Message object encapsulating the reply message.

Thread context:
The session associated with the requestor

Exceptions:

- XMSException

ResourceAllocationException

XMS throws this exception if XMS cannot allocate the resources required by a method.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.ResourceAllocationException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

SecurityException

XMS throws this exception if the user identifer and password provided to authenticate an application are rejected. XMS also throws this exception if an authority check fails and prevents a method from completing.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.SecurityException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

ISession

A session is a single threaded context for sending and receiving messages.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.ISession
```

For a list of the XMS defined properties of a Session object, see “Properties of Session” on page 2029.

.NET properties

AcknowledgeMode - Get Acknowledgement Mode

Interface:

```
AcknowledgeMode AcknowledgeMode
    {
      get;
    }
```

Get the acknowledgment mode for the session.

The acknowledgment mode is specified when the session is created.

Provided the session is not transacted, the acknowledgment mode is one of the following values:

`AcknowledgeMode.AutoAcknowledge`
`AcknowledgeMode.ClientAcknowledge`
`AcknowledgeMode.DupsOkAcknowledge`

For more information about acknowledgment modes, see Message acknowledgment.

A session that is transacted has no acknowledgment mode. If the session is transacted, the method returns `AcknowledgeMode.SessionTransacted` instead.

Exceptions:

- XMSException

Transacted - Determine Whether Transacted

Interface:

```
Boolean Transacted
    {
      get;
    }
```

Determine whether the session is transacted.

The transacted stated is:

- True, if the session is transacted.
- False, if the session is not transacted.

For a real-time connection to a broker, the method always returns False.

Exceptions:

- XMSException

Methods

Close - Close Session

Interface:

```
void Close();
```

Close the session. If the session is transacted, any transaction in progress is rolled back.

If an application tries to close a session that is already closed, the call is ignored.

Parameters:
None

Returns:
Void

Thread context:
Any

Exceptions:

- XMSException

Commit - Commit

Interface:

```
void Commit();
```

Commit all messages processed in the current transaction.

The session must be a transacted session.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- IllegalStateException
- TransactionRolledBackException

CreateBrowser - Create Queue Browser

Interface:

```
IQueueBrowser CreateBrowser(IDestination queue) ;
```

Create a queue browser for the specified queue.

Parameters:

queue (input)
A Destination object representing the queue.

Returns:
The QueueBrowser object.

Exceptions:

- XMSException
- InvalidDestinationException

CreateBrowser - Create Queue Browser (with message selector)

Interface:

```
IQueueBrowser CreateBrowser(IDestination queue, String selector) ;
```

Create a queue browser for the specified queue using a message selector.

Parameters:

queue (input)
A Destination object representing the queue.

selector (input)
A String object encapsulating a message selector expression. Only those messages with properties that match the message selector expression are delivered to the queue browser.

A null String object means that there is no message selector for the queue browser.

Returns:
The QueueBrowser object.

Exceptions:

- XMSException
- InvalidDestinationException
- InvalidSelectorException

CreateBytesMessage - Create Bytes Message

Interface:

```
IBytesMessage CreateBytesMessage();
```

Create a bytes message.

Parameters:
None

Returns:
The BytesMessage object.

Exceptions:

- XMSException
- IllegalStateException (The session is closed)

CreateConsumer - Create Consumer

Interface:

```
IMessageConsumer CreateConsumer(IDestination dest) ;
```

Create a message consumer for the specified destination.

Parameters:

dest (input)
The Destination object.

Returns:
The MessageConsumer object.

Exceptions:

- XMSException

- InvalidDestinationException

CreateConsumer - Create Consumer (with message selector)

Interface:

```
IMessageConsumer CreateConsumer(IDestination dest,
                                String selector) ;
```

Create a message consumer for the specified destination using a message selector.

Parameters:

dest (input)
The Destination object.

selector (input)
A String object encapsulating a message selector expression. Only those messages with properties that match the message selector expression are delivered to the message consumer.

A null String object means that there is no message selector for the message consumer.

Returns:
The MessageConsumer object.

Exceptions:

- XMSException
- InvalidDestinationException
- InvalidSelectorException

CreateConsumer - Create Consumer (with message selector and local message flag)

Interface:

```
IMessageConsumer CreateConsumer(IDestination dest,
                                String selector,
                                Boolean noLocal) ;
```

Create a message consumer for the specified destination using a message selector and, if the destination is a topic, specifying whether the message consumer receives the messages published by its own connection.

Parameters:

dest (input)
The Destination object.

selector (input)
A String object encapsulating a message selector expression. Only those messages with properties that match the message selector expression are delivered to the message consumer.

A null String object means that there is no message selector for the message consumer.

noLocal (input)
The value True means that the message consumer does not receive the messages published by its own connection. The value False means that the message consumer does receive the messages published by its own connection. The default value is False.

Returns:
The MessageConsumer object.

Exceptions:

- XMSException
- InvalidDestinationException

- InvalidSelectorException

CreateDurableSubscriber - Create Durable Subscriber

Interface:

```
IMessageConsumer CreateDurableSubscriber(IDestination dest,
                                         String subscription) ;
```

Create a durable subscriber for the specified topic.

This method is not valid for a real-time connection to a broker.

For more information about durable subscribers, see Durable subscribers.

Parameters:

dest (input)
A Destination object representing the topic. The topic must not be a temporary topic.

subscription (input)
A String object encapsulating a name that identifies the durable subscription. The name must be unique within the client identifier for the connection.

Returns:
The MessageConsumer object representing the durable subscriber.

Exceptions:

- XMSException
- InvalidDestinationException

CreateDurableSubscriber - Create Durable Subscriber (with message selector and local message flag)

Interface:

```
IMessageConsumer CreateDurableSubscriber(IDestination dest,
                                         String subscription,
                                         String selector,
                                         Boolean noLocal) ;
```

Create a durable subscriber for the specified topic using a message selector and specifying whether the durable subscriber receives the messages published by its own connection.

This method is not valid for a real-time connection to a broker.

For more information about durable subscribers, see Durable subscribers.

Parameters:

dest (input)
A Destination object representing the topic. The topic must not be a temporary topic.

subscription (input)
A String object encapsulating a name that identifies the durable subscription. The name must be unique within the client identifier for the connection.

selector (input)
A String object encapsulating a message selector expression. Only those messages with properties that match the message selector expression are delivered to the durable subscriber.

A null String object means that there is no message selector for the durable subscriber.

noLocal (input)
The value True means that the durable subscriber does not receive the messages published by its own connection. The value False means that the durable subscriber does receive the messages published by its own connection. The default value is False.

Returns:
The MessageConsumer object representing the durable subscriber.

Exceptions:

- XMSException
- InvalidDestinationException
- InvalidSelectorException

CreateMapMessage - Create Map Message

Interface:

```
IMapMessage CreateMapMessage();
```

Create a map message.

Parameters:
None

Returns:
The MapMessage object.

Exceptions:

- XMSException
- IllegalStateException (The session is closed)

CreateMessage - Create Message

Interface:

```
IMessage CreateMessage();
```

Create a message that has no body.

Parameters:
None

Returns:
The Message object.

Exceptions:

- XMSException
- IllegalStateException (The session is closed)

CreateObjectMessage - Create Object Message

Interface:

```
IObjectMessage CreateObjectMessage();
```

Create an object message.

Parameters:
None

Returns:
The ObjectMessage object.

Exceptions:

- XMSException
- IllegalStateException (The session is closed)

CreateProducer - Create Producer

Interface:

```
IMessageProducer CreateProducer(IDestination dest) ;
```

Create a message producer to send messages to the specified destination.

Parameters:

dest (input)
The Destination object.

If you specify a null Destination object, the message producer is created without a destination. In this case, the application must specify a destination every time it uses the message producer to send a message.

Returns:
The MessageProducer object.

Exceptions:

- XMSException
- InvalidDestinationException

CreateQueue - Create Queue

Interface:

```
IDestination CreateQueue(String queue) ;
```

Create a Destination object to represent a queue in the messaging server.

This method does not create the queue in the messaging server. You must create the queue before an application can call this method.

Parameters:

queue (input)
A String object encapsulating the name of the queue, or encapsulating a uniform resource identifier (URI) that identifies the queue.

Returns:
The Destination object representing the queue.

Exceptions:

- XMSException

CreateStreamMessage - Create Stream Message

Interface:

```
IStreamMessage CreateStreamMessage();
```

Create a stream message.

Parameters:
None

Returns:
The StreamMessage object.

Exceptions:

- XMSException
- XMS_ILLEGAL_STATE_EXCEPTION

CreateTemporaryQueue - Create Temporary Queue

Interface:

```
IDestination CreateTemporaryQueue() ;
```

Create a temporary queue.

The scope of the temporary queue is the connection. Only the sessions created by the connection can use the temporary queue.

The temporary queue remains until it is explicitly deleted, or the connection ends, whichever is the sooner.

For more information about temporary queues, see Temporary destinations.

Parameters:
None

Returns:
The Destination object representing the temporary queue.

Exceptions:

- XMSException

CreateTemporaryTopic - Create Temporary Topic

Interface:

```
IDestination CreateTemporaryTopic() ;
```

Create a temporary topic.

The scope of the temporary topic is the connection. Only the sessions created by the connection can use the temporary topic.

The temporary topic remains until it is explicitly deleted, or the connection ends, whichever is the sooner.

For more information about temporary topics, see Temporary destinations.

Parameters:
None

Returns:
The Destination object representing the temporary topic.

Exceptions:

- XMSException

CreateTextMessage - Create Text Message

Interface:

```
ITextMessage CreateTextMessage();
```

Create a text message with an empty body.

Parameters:
None

Returns:
The TextMessage object.

Exceptions:

- XMSException

CreateTextMessage - Create Text Message (initialized)

Interface:

```
ITextMessage CreateTextMessage(String initialValue);
```

Create a text message whose body is initialized with the specified text.

Parameters:

initialValue (input)
A String object encapsulating the text to initialize the body of the text message.

None

Returns:
The TextMessage object.

Exceptions:

- XMSException

CreateTopic - Create Topic

Interface:

```
IDestination CreateTopic(String topic) ;
```

Create a Destination object to represent a topic.

Parameters:

topic (input)
A String object encapsulating the name of the topic, or encapsulating a uniform resource identifier (URI) that identifies the topic.

Returns:
The Destination object representing the topic.

Exceptions:

- XMSException

Recover - Recover

Interface:

```
void Recover();
```

Recover the session. Message delivery is stopped and then restarted with the oldest unacknowledged message.

The session must not be a transacted session.

For more information about recovering a session, see Message acknowledgment.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- IllegalStateException

Rollback - Rollback

Interface:

```
void Rollback();
```

Roll back all messages processed in the current transaction.

The session must be a transacted session.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- IllegalStateException

Unsubscribe - Unsubscribe

Interface:

```
void Unsubscribe(String subscription);
```

Delete a durable subscription. The messaging server deletes the record of the durable subscription that it is maintaining and does not send any more messages to the durable subscriber.

An application cannot delete a durable subscription in any of the following circumstances:

- While there is an active message consumer for the durable subscription
- While a consumed message is part of a pending transaction
- While a consumed message was not acknowledged

This method is not valid for a real-time connection to a broker.

Parameters:

subscription (input)
A String object encapsulating the name that identifies the durable subscription.

Returns:
Void

Exceptions:

- XMSException
- InvalidDestinationException
- IllegalStateException

Inherited properties and methods

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

IStreamMessage

A stream message is a message whose body comprises a stream of values, where each value has an associated data type. The contents of the body are written and read sequentially.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessage
           |
           +----IBM.XMS.IStreamMessage
```

When an application reads a value from the message stream, the value can be converted by XMS into another data type. For more information about this form of implicit conversion, see The body of an XMS message.

Methods

ReadBoolean - Read Boolean Value

Interface:

```
Boolean ReadBoolean();
```

Read a boolean value from the message stream.

Parameters:
None

Returns:
The boolean value that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadByte - Read Byte

Interface:

```
Int16   ReadSignedByte();
    Byte    ReadByte();
```

Read a signed 8-bit integer from the message stream.

Parameters:
None

Returns:
The byte that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadBytes - Read Bytes

Interface:

```
Int32   ReadBytes(Byte[] array);
```

Read an array of bytes from the message stream.

Parameters:

array (input)
The buffer containing the array of bytes that is read and the length of the buffer in bytes.

If the number of bytes in the array is less than or equal to the length of the buffer, the whole array is read into the buffer. If the number of bytes in the array is greater than the length of the buffer, the buffer is filled with part of the array, and an internal cursor marks the position of the next byte to be read. A subsequent call to readBytes() reads bytes from the array starting from the current position of the cursor.

If you specify a null pointer on input, the call skips over the array of bytes without reading it.

Returns:
The number of bytes that are read into the buffer. If the buffer is partially filled, the value is less than the length of the buffer, indicating that there are no more bytes in the array remaining to be read. If there are no bytes remaining to be read from the array before the call, the value is `XMSC_END_OF_BYTEARRAY`.

If you specify a null pointer on input, the method returns no value.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadChar - Read Character

Interface:

```
Char    ReadChar();
```

Read a 2-byte character from the message stream.

Parameters:
None

Returns:
The character that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadDouble - Read Double Precision Floating Point Number

Interface:

```
Double  ReadDouble();
```

Read an 8-byte double precision floating point number from the message stream.

Parameters:
None

Returns:
The double precision floating point number that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadFloat - Read Floating Point Number

Interface:

```
Single  ReadFloat();
```

Read a 4-byte floating point number from the message stream.

Parameters:
None

Returns:
The floating point number that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadInt - Read Integer

Interface:

```
Int32   ReadInt();
```

Read a signed 32-bit integer from the message stream.

Parameters:
None

Returns:
The integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadLong - Read Long Integer

Interface:

```
Int64   ReadLong();
```

Read a signed 64-bit integer from the message stream.

Parameters:
None

Returns:
The long integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadObject - Read Object

Interface:

```
Object  ReadObject();
```

Read a value from the message stream, and return its data type.

Parameters:
None

Returns:
The value, which is one of the following object types:

```
Boolean
Byte
Byte[]
Char
Double
Single
Int32
Int64
Int16
String
```

Exceptions:
XMSException

ReadShort - Read Short Integer

Interface:

```
Int16   ReadShort();
```

Read a signed 16-bit integer from the message stream.

Parameters:
None

Returns:
The short integer that is read.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

ReadString - Read String

Interface:

```
String  ReadString();
```

Read a string from the message stream. If required, XMS converts the characters in the string into the local code page.

Parameters:
None

Returns:
A String object encapsulating the string that is read. If data conversion is required, this is the string after conversion.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

Reset - Reset

Interface:

```
void  Reset();
```

Put the body of the message into read-only mode and reposition the cursor at the beginning of the message stream.

Parameters:
None

Returns:
Void

Exceptions:

- XMSException
- MessageNotReadableException
- MessageEOFException

WriteBoolean - Write Boolean Value

Interface:

```
void  WriteBoolean(Boolean value);
```

Write a boolean value to the message stream.

Parameters:

value (input)
The boolean value to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteByte - Write Byte

Interface:

```
void  WriteByte(Byte value);
void  WriteSignedByte(Int16 value);
```

Write a byte to the message stream.

Parameters:

value (input)
The byte to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteBytes - Write Bytes

Interface:

```
void  WriteBytes(Byte[] value);
```

Write an array of bytes to the message stream.

Parameters:

value (input)
The array of bytes to be written.

length (input)
The number of bytes in the array.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteChar - Write Character

Interface:

```
void  WriteChar(Char value);
```

Write a character to the message stream as 2 bytes, high-order byte first.

Parameters:

value (input)
The character to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteDouble - Write Double Precision Floating Point Number

Interface:

```
void  WriteDouble(Double value);
```

Convert a double precision floating point number to a long integer and write the long integer to the message stream as 8 bytes, high-order byte first.

Parameters:

value (input)
The double precision floating point number to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteFloat - Write Floating Point Number

Interface:

```
void  WriteFloat(Single value);
```

Convert a floating point number to an integer and write the integer to the message stream as 4 bytes, high-order byte first.

Parameters:

value (input)
The floating point number to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteInt - Write Integer

Interface:

```
void  WriteInt(Int32 value);
```

Write an integer to the message stream as 4 bytes, high-order byte first.

Parameters:

value (input)
The integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteLong - Write Long Integer

Interface:

```
void  WriteLong(Int64 value);
```

Write a long integer to the message stream as 8 bytes, high-order byte first.

Parameters:

value (input)
The long integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteObject - Write Object

Interface:

```
void  WriteObject(Object value);
```

Write a value, with a specified data type, to the message stream.

Parameters:

objectType (input)
The value, which must be one of the following object types:

```
Boolean
Byte
Byte[]
Char
Double
Single
Int32
Int64
Int16
String
```

value (input)
An array of bytes containing the value to be written.

length (input)
The number of bytes in the array.

Returns:
Void

Exceptions:

- XMSException

WriteShort - Write Short Integer

Interface:

```
void  WriteShort(Int16 value);
```

Write a short integer to the message stream as 2 bytes, high-order byte first.

Parameters:

value (input)
The short integer to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

WriteString - Write String

Interface:

```
void  WriteString(String value);
```

Write a string to the message stream.

Parameters:

value (input)
A String object encapsulating the string to be written.

Returns:
Void

Exceptions:

- XMSException
- MessageNotWritableException

Inherited properties and methods

The following properties are inherited from the IMessage interface:

JMSCorrelationID, JMSDeliveryMode, JMSDestination, JMSExpiration, JMSMessageID, JMSPriority, JMSRedelivered, JMSReplyTo, JMSTimestamp, JMSType, Properties

The following methods are inherited from the IMessage interface:

clearBody, clearProperties, PropertyExists

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

ITextMessage

A text message is a message whose body comprises a string.

Inheritance hierarchy:

```
IBM.XMS.IPropertyContext
   |
   +----IBM.XMS.IMessage
           |
           +----IBM.XMS.ITextMessage
```

.NET properties

Text - Get and Set Text

Interface:

```
String Text
{
  get;
  set;
}
```

Get and set the string that forms the body of the text message.

If required, XMS converts the characters in the string into the local code page.

Exceptions:

- XMSException
- MessageNotReadableException
- MessageNotWritableException
- MessageEOFException

Inherited properties and methods

The following properties are inherited from the IMessage interface:

JMSCorrelationID, JMSDeliveryMode, JMSDestination, JMSExpiration, JMSMessageID, JMSPriority, JMSRedelivered, JMSReplyTo, JMSTimestamp, JMSType, Properties

The following methods are inherited from the IMessage interface:

clearBody, clearProperties, PropertyExists

The following methods are inherited from the IPropertyContext interface:

GetBooleanProperty, GetByteProperty, GetBytesProperty, GetCharProperty, GetDoubleProperty, GetFloatProperty, GetIntProperty, GetLongProperty, GetObjectProperty, GetShortProperty, GetStringProperty, SetBooleanProperty, SetByteProperty, SetBytesProperty, SetCharProperty, SetDoubleProperty, SetFloatProperty, SetIntProperty, SetLongProperty, SetObjectProperty, SetShortProperty, SetStringProperty

TransactionInProgressException

XMS throws this exception if an application requests an operation that is not valid because a transaction is in progress.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.TransactionInProgressException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

TransactionRolledBackException

XMS throws this exception if an application calls Session.commit() to commit the current transaction, but the transaction is then rolled back.

Inheritance hierarchy:

```
IBM.XMS.XMSException
   |
   +----IBM.XMS.XMSException
           |
           +----IBM.XMS.TransactionRolledBackException
```

Inherited properties and methods

The following methods are inherited from the XMSException interface:

GetErrorCode, GetLinkedException

XMSException

If XMS detects an error while processing a call to a .NET method, XMS throws an exception. An exception is an object that encapsulates information about the error.

Inheritance hierarchy:

```
System.Exception
   |
   +----IBM.XMS.XMSException
```

There are different types of XMS exception, and an XMSException object is just one type of exception. However, the XMSException class is a superclass of the other XMS exception classes. XMS throws an XMSException object in situations where none of the other types of exception are appropriate.

.NET properties

ErrorCode - Get Error Code

Interface:

```
public String ErrorCode
{
  get {return errorCode_;}
}
```

Get the error code.

Exceptions:

- XMSException

LinkedException - Get Linked Exception

Interface:

```
public Exception LinkedException
{
  get { return linkedException_;}
  set { linkedException_ = value;}
}
```

Get the next exception in the chain of exceptions.

The method returns a null if there are no more exceptions in the chain.

Exceptions:

- XMSException

XMSFactoryFactory

If an application is not using administered objects, use this class to create connection factories, queues, and topics.

Inheritance hierarchy:
None

.NET properties

Metadata - Retrieve metadata

Interface:

```
IConnectionMetaData MetaData
```

Get the metadata that is appropriate to the connection type of the XMSFactoryFactory object.

Exceptions:
None

Methods

CreateConnectionFactory - Create Connection Factory

Interface:

```
IConnectionFactory CreateConnectionFactory();
```

Create a ConnectionFactory object of the declared type.

Parameters:
None

Returns:
The ConnectionFactory object.

Exceptions:

- XMSException

CreateQueue - Create Queue

Interface:

```
IDestination CreateQueue(String name);
```

Create a Destination object to represent a queue in the messaging server.

This method does not create the queue in the messaging server. You must create the queue before an application can call this method.

Parameters:

name (input)
A String object encapsulating the name of the queue, or encapsulating a uniform resource identifier (URI) that identifies the queue.

Returns:
The Destination object representing the queue.

Exceptions:

- XMSException

CreateTopic - Create Topic

Interface:

```
IDestination CreateTopic(String name);
```

Create a Destination object to represent a topic.

Parameters:

name (input)
A String object encapsulating the name of the topic, or encapsulating a uniform resource identifier (URI) that identifies the topic.

Returns:
The Destination object representing the topic.

Exceptions:

- XMSException

GetInstance - Get an instance of XMSFactoryFactory

Interface:

```
static XMSFactoryFactory GetInstance(int connectionType);
```

Create an instance of XMSFactoryFactory. An XMS application uses an XMSFactoryFactory object to get a reference to a ConnectionFactory object that is appropriate to the required type of protocol. This ConnectionFactory object can then produce connections for that protocol type only.

Parameters:

connectionType (input)
The type of connection for which the ConnectionFactory object produces connections:

- XMSC.CT_WPM
- XMSC.CT_RTT
- XMSC.CT_WMQ

Returns:
The XMSFactoryFactory object dedicated to the declared connection type.

Exceptions:

- NotSupportedException

Properties of XMS objects

This section documents the object properties defined by XMS.

This section contains information about the following types of object:

- “Properties of Connection” on page 2015
- “Properties of ConnectionFactory” on page 2016
- “Properties of ConnectionMetaData” on page 2021
- “Properties of Destination” on page 2021
- “Properties of InitialContext” on page 2023
- “Properties of Message” on page 2024

- “Properties of MessageConsumer” on page 2029
- “Properties of MessageProducer” on page 2029
- “Properties of Session” on page 2029

The description of each object type lists the properties of an object of the specified type and provides a short description of each property.

This section also provides a definition of each property (see “Property definitions” on page 2029).

If an application defines its own properties of the objects described in this section, it does not cause an error, but it might cause unpredictable results.

Note: The property names and values in this section are shown in the form XMSC.*NAME*, which is the form used for C and C++. However, in .NET, the form of the property name can be either XMSC.*NAME* or XMSC_*NAME*, depending on how you are using it:

- If you are specifying a property, the property name must be in the form XMSC.*NAME* as shown in the following example:

```
cf.SetStringProperty(XMSC.WMQ_CHANNEL, "DOTNET.SVRCONN");
```

- If you are specifying a string, the property name must be in the form XMSC_*NAME* as shown in the following example:

```
cf.SetStringProperty("XMSC_WMQ_CHANNEL", "DOTNET.SVRCONN");
```

  In .NET, property names and values are provided as constants in the XMSC class. These constants identify strings and would be used by any XMS .NET application. If you are using these predefined constants, the property names and values are in the form XMSC.*NAME*, so, for example, you would use XMSC.USERID, rather than XMSC_USERID.

The data types are also in the form used for C/C++. You can find the corresponding values for .NET in Data types for .NET.

Properties of Connection

An overview of the properties of the Connection object, with links to more detailed reference information.

Table 872. Properties of Connection

Name of property	Description
“XMSC_WMQ_RESOLVED_QUEUE_MANAGER” on page 2062	This property is used to obtain the name of the queue manager to which it is connected.
“XMSC_WMQ_RESOLVED_QUEUE_MANAGER_ID” on page 2062	This property is populated with the ID of the queue manager after the connection.
XMSC_WPM_CONNECTION_PROTOCOL	The communications protocol used for the connection to the messaging engine. This property is read-only.
XMSC_WPM_HOST_NAME	The host name or IP address of the system that contains the messaging engine to which the application is connected. This property is read-only.
XMSC_WPM_ME_NAME	The name of the messaging engine to which the application is connected. This property is read-only.
XMSC_WPM_PORT	The number of the port listened on by the messaging engine to which the application is connected. This property is read-only.

A Connection object also has read-only properties that are derived from the properties of the connection factory that was used to create the connection. These properties are derived not only from the connection

factory properties that were set at the time the connection was created, but also from the default values of the properties that were not set. The properties include only the ones that are relevant for the type of messaging server that the application is connected to. The names of the properties are the same as the names of the connection factory properties.

Properties of ConnectionFactory

An overview of the properties of the ConnectionFactory object, with links to more detailed reference information.

Table 873. Properties of ConnectionFactory

Name of property	Description
"XMSC_ASYNC_EXCEPTIONS" on page 2039	This property determines whether XMS informs an ExceptionListener only when a connection is broken, or when any exception occurs asynchronously to an XMS API call. This property applies to all Connections created from this ConnectionFactory that have an ExceptionListener registered.
XMSC_CLIENT_ID	The client identifier for a connection.
XMSC_CONNECTION_TYPE	The type of messaging server to which an application connects.
XMSC_PASSWORD	A password that can be used to authenticate the application when it attempts to connect to a messaging server.
"XMSC_RTT_BROKER_PING_INTERVAL" on page 2044	The time interval, in milliseconds, after which XMS .NET checks the connection to a Real Time messaging server to detect any activity.
XMSC_RTT_CONNECTION_PROTOCOL	The communications protocol used for a real-time connection to a broker.
XMSC_RTT_HOST_NAME	The host name or IP address of the system on which a broker runs.
XMSC_RTT_LOCAL_ADDRESS	The host name or IP address of the local network interface to be used for a real-time connection to a broker.
XMSC_RTT_MULTICAST	The multicast setting for a connection factory or destination.
XMSC_RTT_PORT	The number of the port on which a broker listens for incoming requests.
XMSC_USERID	A user identifier that can be used to authenticate the application when it attempts to connect to a messaging server.
XMSC_WMQ_BROKER_CONTROLQ	The name of the control queue used by a broker. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.

Table 873. Properties of ConnectionFactory (continued)	
Name of property	**Description**
XMSC_WMQ_BROKER_PUBQ	The name of the queue monitored by a broker where applications send messages that they publish. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_BROKER_QMGR	The name of the queue manager to which a broker is connected. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_BROKER_SUBQ	The name of the subscriber queue for a nondurable message consumer. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_BROKER_VERSION	The type of broker used by the application for a connection or for the destination. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
"XMSC_WMQ_CCDTURL" on page 2049	A Uniform Resource Locator (URL) that identifies the name and location of the file that contains the client channel definition table and also specifies how the file can be accessed.
XMSC_WMQ_CHANNEL	The name of the channel to be used for a connection.
"XMSC_WMQ_CLIENT_RECONNECT_OPTIONS" on page 2049	This property specifies the client reconnect options for new connections created by this factory
"XMSC_WMQ_CLIENT_RECONNECT_TIMEOUT" on page 2050	This property specifies the duration of time, in seconds, that a client connection attempts to reconnect.
XMSC_WMQ_CONNECTION_MODE	The mode by which an application connects to a queue manager.
"XMSC_WMQ_CONNECTION_NAME_LIST" on page 2051	This property specifies the hosts to which the client attempts to reconnect to after its connection are broken.

Table 873. Properties of ConnectionFactory (continued)

Name of property	Description
XMSC_WMQ_FAIL_IF_QUIESCE	Whether calls to certain methods fail if the queue manager to which the application is connected is in a quiescing state.
XMSC_WMQ_HOST_NAME	The host name or IP address of the system on which a queue manager runs.
XMSC_WMQ_LOCAL_ADDRESS	For a connection to a queue manager, this property specifies the local network interface to be used, or the local port or range of local ports to be used, or both.
XMSC_WMQ_MESSAGE_SELECTION	Determines whether message selection is done by the XMS client or by the broker. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_MSG_BATCH_SIZE	The maximum number of messages to be retrieved from a queue in one batch when using asynchronous message delivery. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_POLLING_INTERVAL	If each message listener within a session has no suitable message on its queue, this value is the maximum interval, in milliseconds, that elapses before each message listener tries again to get a message from its queue. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
“XMSC_WMQ_PROVIDER_VERSION” on page 2059	The version, release, modification level and fix pack of the queue manager to which the application intends to connect.
XMSC_WMQ_PORT	The number of the port on which a queue manager listens for incoming requests.

Name of property	Description
XMSC_WMQ_PUB_ACK_INTERVAL	The number of messages published by a publisher before the XMS client requests an acknowledgment from the broker. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
"XMSC_WMQ_PUT_ASYNC_ALLOWED" on page 2055	This property determines whether message producers are allowed to use asynchronous puts to send messages to this destination.
XMSC_WMQ_QMGR_CCSID	The identifier (CCSID) of the coded character set, or code page, in which fields of character data defined in the Message Queue Interface (MQI) are exchanged between the XMS client and the IBM MQ client.
XMSC_WMQ_QUEUE_MANAGER	The name of the queue manager to connect to.
XMSC_WMQ_RECEIVE_EXIT	Identifies a channel receive exit to be run.
XMSC_WMQ_RECEIVE_EXIT_INIT	The user data that is passed to a channel receive exit when it is called.
XMSC_WMQ_SECURITY_EXIT	Identifies a channel security exit.
XMSC_WMQ_SECURITY_EXIT_INIT	The user data that is passed to a channel security exit when it is called.
"XMSC_WMQ_SEND_CHECK_COUNT" on page 2064	The number of send calls to allow between checking for asynchronous put errors, within a single non-transacted XMS session.
XMSC_WMQ_SEND_EXIT	Identifies a channel send exit.
XMSC_WMQ_SEND_EXIT_INIT	The user data that is passed to channel send exits when they are called.
"XMSC_WMQ_SHARE_CONV_ALLOWED" on page 2064	Whether a client connection can share its socket with other top-level XMS connections from the same process to the same queue manager, if the channel definitions match. This property is provided to allow complete isolation of Connections in separate sockets if required for application development, maintenance, or operational reasons.
XMSC_WMQ_SSL_CERT_STORES	The locations of the servers that hold the certificate revocation lists (CRLs) to be used on an SSL connection to a queue manager.
XMSC_WMQ_SSL_CIPHER_SPEC	The name of the CipherSpec to be used on a secure connection to a queue manager.
XMSC_WMQ_SSL_CIPHER_SUITE	The name of the CipherSuite to be used on a TLS connection to a queue manager. The protocol used in negotiating the secure connection depends on the specified CipherSuite.

Table 873. Properties of ConnectionFactory (continued)

Name of property	Description
XMSC_WMQ_SSL_CRYPTO_HW	Configuration details for the cryptographic hardware connected to the client system.
XMSC_WMQ_SSL_FIPS_REQUIRED	The value of this property determines whether an application can or cannot use non-FIPS compliant cipher suites. If this property is set to true, only FIPS algorithms are used for the client-server connection.
XMSC_WMQ_SSL_KEY_REPOSITORY	The location of the key database file in which keys and certificates are stored.
XMSC_WMQ_SSL_KEY_RESETCOUNT	The KeyResetCount represents the total number of unencrypted bytes sent and received within an SSL conversation before the secret key is renegotiated.
XMSC_WMQ_SSL_PEER_NAME	The peer name to be used on an SSL connection to a queue manager.
XMSC_WMQ_SYNCPOINT_ALL_GETS	Whether all messages must be retrieved from queues within sync point control.
"XMSC_WMQ_TARGET_CLIENT" on page 2070	
XMSC_WMQ_TEMP_Q_PREFIX	The prefix used to form the name of the IBM MQ dynamic queue that is created when the application creates an XMS temporary queue.
XMSC_WMQ_TEMP_TOPIC_PREFIX	When creating temporary topics, XMS generates a topic string of the form "`TEMP/TEMPTOPICPREFIX/unique_id`", or if this property contains the default value, then this string, "`TEMP/unique_id`", is generated. Specifying a non-empty value allows specific model queues to be defined for creating the managed queues for subscribers to temporary topics created under this connection.
XMSC_WMQ_TEMPORARY_MODEL	The name of the IBM MQ model queue from which a dynamic queue is created when the application creates an XMS temporary queue.
XMSC_WPM_BUS_NAME	For a connection factory, the name of the service integration bus that the application connects to or, for a destination, the name of the service integration bus in which the destination exists.
XMSC_WPM_CONNECTION_PROXIMITY	The connection proximity setting for the connection.
XMSC_WPM_DUR_SUB_HOME	The name of the messaging engine where all durable subscriptions for a connection or a destination are managed.
XMSC_WPM_LOCAL_ADDRESS	For a connection to a service integration bus, this property specifies the local network interface to be used, or the local port or range of local ports to be used, or both.
XMSC_WPM_NON_PERSISTENT_MAP	The reliability level of nonpersistent messages that are sent using the connection.

Table 873. Properties of ConnectionFactory (continued)	
Name of property	**Description**
XMSC_WPM_PERSISTENT_MAP	The reliability level of persistent messages that are sent using the connection.
XMSC_WPM_PROVIDER_ENDPOINTS	A sequence of one or more endpoint addresses of bootstrap servers.
XMSC_WPM_TARGET_GROUP	The name of a target group of messaging engines.
XMSC_WPM_TARGET_SIGNIFICANCE	The significance of the target group of messaging engines.
XMSC_WPM_TARGET_TRANSPORT_CHAIN	The name of the inbound transport chain that the application must use to connect to a messaging engine.
XMSC_WPM_TARGET_TYPE	The type of the target group of messaging engines.
XMSC_WPM_TEMP_Q_PREFIX	The prefix used to form the name of the temporary queue that is created in the service integration bus when the application creates an XMS temporary queue.
XMSC_WPM_TEMP_TOPIC_PREFIX	The prefix used to form the name of a temporary topic that is created by the application.

Properties of ConnectionMetaData

An overview of the properties of the ConnectionMetaData object, with links to more detailed reference information.

Table 874. Properties of ConnectionMetaData	
Name of property	**Description**
XMSC_JMS_MAJOR_VERSION	The major version number of the JMS specification upon which XMS is based. This property is read-only.
XMSC_JMS_MINOR_VERSION	The minor version number of the JMS specification upon which XMS is based. This property is read-only.
XMSC_JMS_VERSION	The version identifier of the JMS specification upon which XMS is based. This property is read-only.
XMSC_MAJOR_VERSION	The version number of the XMS client. This property is read-only.
XMSC_MINOR_VERSION	The release number of the XMS client. This property is read-only.
XMSC_PROVIDER_NAME	The provider of the XMS client. This property is read-only.
XMSC_VERSION	The version identifier of the cliXMSent. This property is read-only.

Properties of Destination

An overview of the properties of the Destination object, with links to more detailed reference information.

Table 875. Properties of Destination	
Name of property	**Description**
XMSC_DELIVERY_MODE	The delivery mode of messages sent to the destination.
XMSC_PRIORITY	The priority of messages sent to the destination.

Table 875. Properties of Destination (continued)

Name of property	Description
XMSC_RTT_MULTICAST	The multicast setting for a connection factory or destination.
XMSC_TIME_TO_LIVE	The time to live for messages sent to the destination.
XMSC_WMQ_BROKER_VERSION	The type of broker used by the application for a connection or for the destination.
XMSC_WMQ_CCSID	The identifier (CCSID) of the coded character set, or code page, that the strings of character data in the body of a message are in when the XMS client forwards the message to the destination.
XMSC_WMQ_DUR_SUBQ	The name of the subscriber queue for a durable subscriber that is receiving messages from the destination. **Note:** This property can be used with version 2.0 of IBM Message Service Client for .NET but has no effect for an application connected to an IBM WebSphere MQ 7.0 queue manager unless the XMSC_WMQ_PROVIDER_VERSION property of the connection factory is set to a version number less than 7.
XMSC_WMQ_ENCODING	How numerical data in the body of a message is represented when the XMS client forwards the message to the destination.
XMSC_WMQ_FAIL_IF_QUIESCE	Whether calls to certain methods fail if the queue manager to which the application is connected is in a quiescing state.
"XMSC_WMQ_MESSAGE_BODY" on page 2053	This property determines whether an XMS application processes the MQRFH2 of an IBM MQ message as part of the message payload (that is, as part of the message body).
"XMSC_WMQ_MQMD_MESSAGE_CONTEXT" on page 2053	Determines what level of message context is to be set by the XMS application. The application must be running with appropriate context authority for this property to take effect.
"XMSC_WMQ_MQMD_READ_ENABLED" on page 2054	This property determines whether an XMS application can extract the values of MQMD fields or not.
"XMSC_WMQ_MQMD_WRITE_ENABLED" on page 2055	This property determines whether an XMS application can set the values of MQMD fields or not.
"XMSC_WMQ_READ_AHEAD_ALLOWED" on page 2056	This property determines whether message consumers and queue browsers are allowed to use read ahead to get non-persistent, non-transactional messages from this destination into an internal buffer before receiving them.
"XMSC_WMQ_READ_AHEAD_CLOSE_POLICY" on page 2056	This property determines, for messages being delivered to an asynchronous message listener, what happens to messages in the internal read ahead buffer when the message consumer is closed.

Table 875. Properties of Destination (continued)	
Name of property	**Description**
"XMSC_WMQ_RECEIVE_CCSID" on page 2061	Destination property that sets the target CCSID for queue manager message conversion. The value is ignored unless XMSC_WMQ_RECEIVE_CONVERSION is set to WMQ_RECEIVE_CONVERSION_QMGR.
"XMSC_WMQ_RECEIVE_CONVERSION" on page 2061	Destination property that determines whether data conversion is going to be performed by the queue manager.
XMSC_WMQ_TARGET_CLIENT	Whether messages sent to the destination contain an MQRFH2 header.
XMSC_WMQ_TEMP_TOPIC_PREFIX	When creating temporary topics, XMS generates a topic string of the form "`TEMP/TEMPTOPICPREFIX/unique_id`", or if this property contains the default value, then this string, "`TEMP/unique_id`", is generated. Specifying a non-empty value allows specific model queues to be defined for creating the managed queues for subscribers to temporary topics created under this connection.
XMSC_WPM_BUS_NAME	For a connection factory, the name of the service integration bus that the application connects to or, for a destination, the name of the service integration bus in which the destination exists.
XMSC_WPM_TOPIC_SPACE	The name of the topic space that contains the topic.

Properties of InitialContext

An overview of the properties of the InitialContext object, with links to more detailed reference information.

Table 876. Properties of InitialContext	
Name of property	**Description**
XMSC_IC_PROVIDER_URL	Used to locate the JNDI naming directory so that the COS naming service does not need to be on the same server as the web service.
XMSC_IC_SECURITY_AUTHENTICATION	Based on the Java Context interface SECURITY_AUTHENTICATION. This property is only applicable to the COS naming context.
XMSC_IC_SECURITY_CREDENTIALS	Based on the Java Context interface SECURITY_CREDENTIALS. This property is only applicable to the COS naming context.
XMSC_IC_SECURITY_PRINCIPAL	Based on the Java Context interface SECURITY_PRINCIPAL. This property is only applicable to the COS naming context.
XMSC_IC_SECURITY_PROTOCOL	Based on the Java Context interface SECURITY_PROTOCOL This property is only applicable to the COS naming context.
XMSC_IC_URL	For LDAP and FileSystem contexts, the address of the repository containing administered objects. For COS naming contexts, the address of the web service that looks up the objects in the directory.

Properties of Message

An overview of the properties of the Message object, with links to more detailed reference information.

Table 877. Properties of Message

Name of property	Description
JMS_IBM_CHARACTER_SET	The identifier (CCSID) of the coded character set, or code page, that the strings of character data in the body of the message is in when the XMS client forwards the message to its intended destination. In XMS, this property has a numeric value and maps to CCSID. However, this property is based on a JMS property so has a string type value and maps to the Java character set that represents this numeric CCSID.
JMS_IBM_ENCODING	How numerical data in the body of the message is represented when the XMS client forwards the message to its intended destination.
JMS_IBM_EXCEPTIONMESSAGE	Text that describes why the message was sent to the exception destination. This property is read-only.
JMS_IBM_EXCEPTIONPROBLEMDESTINATION	The name of the destination that the message was at before the message was sent to the exception destination.
JMS_IBM_EXCEPTIONREASON	A reason code indicating the reason why the message was sent to the exception destination.
JMS_IBM_EXCEPTIONTIMESTAMP	The time when the message was sent to the exception destination.
JMS_IBM_FEEDBACK	A code that indicates the nature of a report message.
JMS_IBM_FORMAT	The nature of the application data in the message.
JMS_IBM_LAST_MSG_IN_GROUP	Indicate whether the message is the last message in a message group.
JMS_IBM_MSGTYPE	The type of the message.
JMS_IBM_PUTAPPLTYPE	The type of application that sent the message.
JMS_IBM_PUTDATE	The date when the message was sent.
JMS_IBM_PUTTIME	The time when the message was sent.
JMS_IBM_REPORT_COA	Request 'confirm on arrival' report messages, specifying how much application data from the original message must be included in a report message.
JMS_IBM_REPORT_COD	Request 'confirm on delivery' report messages, specifying how much application data from the original message must be included in a report message.
JMS_IBM_REPORT_DISCARD_MSG	Request that the message is discarded if it cannot be delivered to its intended destination.
JMS_IBM_REPORT_EXCEPTION	Request exception report messages, specifying how much application data from the original message must be included in a report message.
JMS_IBM_REPORT_EXPIRATION	Request expiration report messages, specifying how much application data from the original message must be included in a report message.

Name of property	Description
JMS_IBM_REPORT_NAN	Request negative action notification report messages.
JMS_IBM_REPORT_PAN	Request positive action notification report messages.
JMS_IBM_REPORT_PASS_CORREL_ID	Request that the correlation identifier of any report or reply message is the same as the correlation identifier of the original message.
JMS_IBM_REPORT_PASS_MSG_ID	Request that the message identifier of any report or reply message is the same as the message identifier of the original message.
JMS_IBM_RETAIN	Setting this property indicates to the queue manager to treat a message as Retained Publication.
JMS_IBM_SYSTEM_MESSAGEID	An identifier that identifies the message uniquely within the service integration bus. This property is read-only.
JMSX_APPID	The name of the application that sent the message.
JMSX_DELIVERY_COUNT	The number of attempts to deliver the message.
JMSX_GROUPID	The identifier of the message group to which the message belongs.
JMSX_GROUPSEQ	The sequence number of the message within a message group.
JMSX_USERID	The user identifier associated with the application that sent the message.

Table 877. Properties of Message (continued)

JMS_IBM_MQMD* properties

IBM Message Service Client for .NET enables client applications to read/write MQMD fields using APIs. It also allows access to MQ message data. By default access to MQMD is disabled and must be enabled explicitly by the application using Destination properties XMSC_WMQ_MQMD_WRITE_ENABLED and XMSC_WMQ_MQMD_READ_ENABLED. These two properties are independent of each other.

All MQMD fields except StrucId and Version are exposed as additional Message object properties and are prefixed JMS_IBM_MQMD.

JMS_IBM_MQMD* properties take higher precedence over other properties like JMS_IBM* described in the previous table.

Sending messages

All MQMD fields except StrucId and Version are represented. These properties refer only to the MQMD fields; where a property occurs both in the MQMD and in the MQRFH2 header, the version in the MQRFH2 is not set or extracted. Any of these properties can be set, except JMS_IBM_MQMD_BackoutCount. Any value set for JMS_IBM_MQMD_BackoutCount is ignored.

If a property has a maximum length and you supply a value that is too long, the value is truncated.

For certain properties, you must also set the XMSC_WMQ_MQMD_MESSAGE_CONTEXT property on the Destination object. The application must be running with appropriate context authority for this property to take effect. If you do not set XMSC_WMQ_MQMD_MESSAGE_CONTEXT to an appropriate value, the property value is ignored. If you set XMSC_WMQ_MQMD_MESSAGE_CONTEXT to an appropriate value but you do not have sufficient context authority for the queue manager, an exception is issued. Properties requiring specific values of XMSC_WMQ_MQMD_MESSAGE_CONTEXT are as follows.

The following properties require XMSC_WMQ_MQMD_MESSAGE_CONTEXT to be set to XMSC_WMQ_MDCTX_SET_IDENTITY_CONTEXT or XMSC_WMQ_MDCTX_SET_ALL_CONTEXT:

- JMS_IBM_MQMD_UserIdentifier
- JMS_IBM_MQMD_AccountingToken
- JMS_IBM_MQMD_ApplIdentityData

The following properties require XMSC_WMQ_MQMD_MESSAGE_CONTEXT to be set to XMSC_WMQ_MDCTX_SET_ALL_CONTEXT:

- JMS_IBM_MQMD_PutApplType
- JMS_IBM_MQMD_PutApplName
- JMS_IBM_MQMD_PutDate
- JMS_IBM_MQMD_PutTime
- JMS_IBM_MQMD_ApplOriginData

Receiving messages

All these properties are available on a received message if XMSC_WMQ_MQMD_READ_ENABLED property is set to true, irrespective of the actual properties that the producing application set. An application cannot modify the properties of a received message unless all properties are cleared first, according to the JMS specification. The received message can be forwarded without modifying the properties.

Note: If your application receives a message from a destination with XMSC_WMQ_MQMD_READ_ENABLED property set to true, and forwards it to a destination with XMSC_WMQ_MQMD_WRITE_ENABLED set to true, this results in all the MQMD field values of the received message being copied into the forwarded message. Table of properties

Table 878. Properties of the Message object representing the MQMD fields

Property	Description	Type
JMS_IBM_MQMD_REPORT	Options for report messages	System.Int32
JMS_IBM_MQMD_MSGTYPE	Message type	System.Int32
JMS_IBM_MQMD_EXPIRY	message lifetime	System.Int32
JMS_IBM_MQMD_FEEDBACK	Feedback or reason code	System.Int32
JMS_IBM_MQMD_ENCODING	Numeric encoding of message data	System.Int32
JMS_IBM_MQMD_CODEDCHARSETID	Character set identifier of message data	System.Int32
JMS_IBM_MQMD_FORMAT	Format name of message data	System.String
JMS_IBM_MQMD_PRIORITY **Note:** If you assign a value to JMS_IBM_MQMD_PRIORITY that is not within the range 0-9, this value violates the JMS specification.	Message priority	System.Int32
JMS_IBM_MQMD_PERSISTENCE	Message persistence	System.Int32

Table 878. Properties of the Message object representing the MQMD fields (continued)		
Property	**Description**	**Type**
JMS_IBM_MQMD_MSGID **Note:** The JMS specification states that the message ID must be set by the JMS provider and that it must either be unique or null. If you assign a value to JMS_IBM_MQMD_MSGID, this value is copied to the JMSMessageID. Thus it is not set by the JMS provider and might not be unique: this value violates the JMS specification.	Message identifier	Byte Array **Note:** The use of byte array properties on a message violates the JMS specification.
JMS_IBM_MQMD_CORRELID **Note:** If you assign a value to JMS_IBM_MQMD_CORRELID that starts with the string 'ID:', this value violates the JMS specification.	Correlation identifier	Byte Array **Note:** The use of byte array properties on a message violates the JMS specification.
JMS_IBM_MQMD_BACKOUTCOUNT	Backout counter	System.Int32
JMS_IBM_MQMD_REPLYTOQ	Name of reply queue	System.String
JMS_IBM_MQMD_REPLYTOQMGR	Name of reply queue manager	System.String
JMS_IBM_MQMD_USERIDENTIFIER	User identifier	System.String
JMS_IBM_MQMD_ACCOUNTINGTOKEN	Accounting token	Byte Array **Note:** The use of byte array properties on a message violates the JMS specification.
JMS_IBM_MQMD_APPLIDENTITYDATA	Application data relating to identity	System.String
JMS_IBM_MQMD_PUTAPPLTYPE	Type of application that put the message	System.Int32
JMS_IBM_MQMD_PUTAPPLNAME	Name of the application that put the message	System.String
JMS_IBM_MQMD_PUTDATE	Date when message was put	System.String
JMS_IBM_MQMD_PUTTIME	Time when message was put	System.String
JMS_IBM_MQMD_APPLORIGINDATA	Application data relating to origin	System.String
JMS_IBM_MQMD_GROUPID	Group identifier	Byte Array **Note:** The use of byte array properties on a message violates the JMS specification.
JMS_IBM_MQMD_MSGSEQNUMBER	Sequence number of local message within group	System.Int32
JMS_IBM_MQMD_OFFSET	Offset of data in physical message from start of logical message	System.Int32

Table 878. Properties of the Message object representing the MQMD fields (continued)		
Property	**Description**	**Type**
JMS_IBM_MQMD_MSGFLAGS	Message flags	System.Int32
JMS_IBM_MQMD_ORIGINALLENGTH	Length of original message	System.Int32

See MQMD for further details.

Examples

This example results in a message being put to a queue or topic with MQMD.UserIdentifier set to "JoeBloggs".

```
// Create a ConnectionFactory, connection, session, producer, message
// ...

// Create a destination
// ...

// Enable MQMD write
dest.setBooleanProperty(XMSC_WMQ_MQMD_WRITE_ENABLED,
      XMSC_WMQ_MQMD_WRITE_ENABLED_YES);

// Optionally, set a message context if applicable for this MD field
dest.setIntProperty(XMSC_WMQ_MQMD_MESSAGE_CONTEXT,
  XMSC_WMQ_MDCTX_SET_IDENTITY_CONTEXT);

// On the message, set property to provide custom UserId
msg.setStringProperty(JMS_IBM_MQMD_USERIDENTIFIER, "JoeBloggs");

// Send the message
// ...
```

It is necessary to set XMSC_WMQ_MQMD_MESSAGE_CONTEXT before setting JMS_IBM_MQMD_USERIDENTIFIER. For more information about the use of XMSC_WMQ_MQMD_MESSAGE_CONTEXT, see Message object properties.

Similarly, you can extract the contents of the MQMD fields by setting XMSC_WMQ_MQMD_READ_ENABLED to true before receiving a message and then using the get methods of the message, such as getStringProperty. Any properties received are read-only.

This example results in the value field holding the value of the MQMD.ApplIdentityData field of a message got from a queue or a topic.

```
// Create a ConnectionFactory, connection, session, consumer
// ...

// Create a destination
// ...

// Enable MQMD read
dest.setBooleanProperty(XMSC_WMQ_MQMD_READ_ENABLED, XMSC_WMQ_MQMD_READ_ENABLED_YES);

// Receive a message
// ...

// Get required MQMD field value using a property
System.String value = rcvMsg.getStringProperty(JMS_IBM_MQMD_APPLIDENTITYDATA);
```

Properties of MessageConsumer

An overview of the properties of the MessageConsumer object, with links to more detailed reference information.

Table 879. Properties of MessageConsumer	
Name of property	**Description**
XMSC_IS_SUBSCRIPTION_MULTICAST	Indicates whether messages are being delivered to the message consumer using WebSphere MQ Multicast Transport. This property is read-only.
XMSC_IS_SUBSCRIPTION_RELIABLE_MULTICAST	Indicates whether messages are being delivered to the message consumer using WebSphere MQ Multicast Transport with a reliable quality of service. This property is read-only.

Refer to .NET properties of IMessageConsumer for more details.

Properties of MessageProducer

An overview of the properties of the MessageProducer object, with links to more detailed reference information.

See .NET properties of IMessageProducer for more details.

Properties of Session

An overview of the properties of the Session object, with links to more detailed reference information.

See .NET properties of ISession for more details.

Property definitions

This section provides a definition of each object property.

Each property definition includes the following information:

- The data type of the property
- The types of object that have the property
- For a property of Destination, the name that can be used in a uniform resource identifier (URI)
- A more detailed description of the property
- The valid values of the property
- The default value of the property

Properties whose names commence with one of the following prefixes are relevant only for the specified type of connection:

XMSC_RTT
The properties are relevant only for a real-time connection to a broker. The names of the properties are defined as named constants in the header file `xmsc_rtt.h`.

XMSC_WMQ
The properties are relevant only when an application connects to an IBM MQ queue manager. The names of the properties are defined as named constants in the header file `xmsc_wmq.h`.

XMSC_WPM
The properties are relevant only when an application connects to a WebSphere service integration bus. The names of the properties are defined as named constants in the header file `xmsc_wpm.h`.

Unless stated otherwise in their definitions, the remaining properties are relevant for all types of connection. The names of the properties are defined as named constants in the header file `xmsc.h`.

Properties whose names commence with the prefix JMSX are JMS defined properties of a message, and properties whose names commence with the prefix JMS_IBM are IBM defined properties of a message. For more information about the properties of messages, see Properties of an XMS message.

Unless stated otherwise in its definition, each property is relevant in both the point-to-point and publish subscribe domains.

An application can get and set the value of any property, unless the property is designated as read-only.

JMS_IBM_CHARACTER_SET

Data type:
System.Int32

Property of:
Message

The identifier (CCSID) of the coded character set, or code page, that the strings of character data in the body of the message is in when the XMS client forwards the message to its intended destination. In XMS, this property has a numeric value and maps to CCSID. However, this property is based on a JMS property so has a string type value and maps to the Java character set that represents this numeric CCSID. This property overrides any CCSID specified for the destination by the XMSC_WMQ_CCSID property.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_ENCODING

Data type:
System.Int32

Property of:
Message

How numerical data in the body of the message is represented when the XMS client forwards the message to its intended destination. This property overrides any encoding specified for the destination by the XMSC_WMQ_ENCODING property. The property specifies the representation of binary integers, packed decimal integers, and floating point numbers.

The valid values of the property are the same as the values that can be specified in the **`Encoding`** field of a message descriptor.

An application can use the following named constants to set the property:

Named constant	Meaning
MQENC_INTEGER_NORMAL	Normal integer encoding
MQENC_INTEGER_REVERSED	Reversed integer encoding
MQENC_DECIMAL_NORMAL	Normal packed decimal encoding
MQENC_DECIMAL_REVERSED	Reversed packed decimal encoding
MQENC_FLOAT_IEEE_NORMAL	Normal IEEE floating point encoding
MQENC_FLOAT_IEEE_REVERSED	Reversed IEEE floating point encoding
MQENC_FLOAT_S390	z/OS architecture floating point encoding
MQENC_NATIVE	Native machine encoding

To form a value for the property, the application can add three of these constants as follows:

- A constant whose name commences with MQENC_INTEGER, to specify the representation of binary integers

- A constant whose name commences with MQENC_DECIMAL, to specify the representation of packed decimal integers
- A constant whose name commences with MQENC_FLOAT, to specify the representation of floating point numbers

Alternatively, the application can set the property to MQENC_NATIVE, whose value is environment-dependent.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_EXCEPTIONMESSAGE

Data type:
String

Property of:
Message

Text that describes why the message was sent to the exception destination. This property is read-only.

This property is relevant only when an application connects to a service integration bus and receives a message from an exception destination.

JMS_IBM_EXCEPTIONPROBLEMDESTINATION

Data type:
String

Property of:
Message

The name of the destination that the message was at before the message was sent to the exception destination.

This property is relevant only when an application connects to a service integration bus and receives a message from an exception destination.

JMS_IBM_EXCEPTIONREASON

Data type:
System.Int32

Property of:
Message

A reason code indicating the reason why the message was sent to the exception destination.

This property is relevant only when an application connects to a service integration bus and receives a message from an exception destination.

JMS_IBM_EXCEPTIONTIMESTAMP

Data type:
System.Int64

Property of:
Message

The time when the message was sent to the exception destination.

The time is expressed in milliseconds since 00:00:00 GMT on the 1 January 1970.

This property is relevant only when an application connects to a service integration bus and receives a message from an exception destination.

JMS_IBM_FEEDBACK

Data type:
System.Int32

Property of:
Message

A code that indicates the nature of a report message.

The valid values of the property are the feedback codes and reason codes that can be specified in the **`Feedback`** field of a message descriptor.

By default, the property is not set.

JMS_IBM_FORMAT

Data type:
String

Property of:
Message

The nature of the application data in the message.

The valid values of the property are the same as the values that can be specified in the **`Format`** field of a message descriptor.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_LAST_MSG_IN_GROUP

Data type:
System.Boolean

Property of:
Message

Indicate whether the message is the last message in a message group.

Set the property to true if the message is the last message in a message group. Otherwise, set the property to false, or do not set the property. By default, the property is not set.

The value true corresponds to the status flag MQMF_LAST_MSG_IN_GROUP, which can be specified in the **`MsgFlags`** field of a message descriptor. .

This property is ignored in the publish/subscribe domain and is not relevant when an application connects to a service integration bus.

JMS_IBM_MSGTYPE

Data type:
System.Int32

Property of:
Message

The type of the message.

The valid values of the property are as follows:

Valid value	Meaning
MQMT_DATAGRAM	The message is one that does not require a reply.
MQMT_REQUEST	The message is one that requires a reply.
MQMT_REPLY	The message is a reply message.

Valid value	Meaning
MQMT_REPORT	The message is a report message.

These values correspond to the message types that can be specified in the **MsgType** field of a message descriptor.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_PUTAPPLTYPE

Data type:
System.Int32

Property of:
Message

The type of application that sent the message.

The valid values of the property are the application types that can be specified in the **PutApplType** field of a message descriptor.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_PUTDATE

Data type:
String

Property of:
Message

The date when the message was sent.

The valid values of the property are the same as the values that can be specified in the **PutDate** field of a message descriptor.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_PUTTIME

Data type:
String

Property of:
Message

The time when the message was sent.

The valid values of the property are the same as the values that can be specified in the **PutTime** field of a message descriptor.

By default, the property is not set.

This property is not relevant when an application connects to a service integration bus.

JMS_IBM_REPORT_COA

Data type:
System.Int32

Property of:
Message

Request 'confirm on arrival' report messages, specifying how much application data from the original message must be included in a report message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_COA	Request 'confirm on arrival' report messages, with no application data from the original message included in a report message.
MQRO_COA_WITH_DATA	Request 'confirm on arrival' report messages, with the first 100 bytes of application data from the original message included in a report message.
MQRO_COA_WITH_FULL_DATA	Request 'confirm on arrival' report messages, with all the application data from the original message included in a report message.

These values correspond to report options that can be specified in the **Report** field of a message descriptor. For more information about these options, see Report (MQLONG).

By default, the property is not set.

JMS_IBM_REPORT_COD

Data type:
System.Int32

Property of:
Message

Request 'confirm on delivery' report messages, specifying how much application data from the original message must be included in a report message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_COD	Request 'confirm on delivery' report messages, with no application data from the original message included in a report message.
MQRO_COD_WITH_DATA	Request 'confirm on delivery' report messages, with the first 100 bytes of application data from the original message included in a report message.
MQRO_COD_WITH_FULL_DATA	Request 'confirm on delivery' report messages, with all the application data from the original message included in a report message.

These values correspond to report options that can be specified in the **Report** field of a message descriptor.

By default, the property is not set.

JMS_IBM_REPORT_DISCARD_MSG

Data type:
System.Int32

Property of:
Message

Request that the message is discarded if it cannot be delivered to its intended destination.

Set the property to MQRO_DISCARD_MSG to request that the message is discarded if it cannot be delivered to its intended destination. If you require the message to be put on a dead letter queue instead, or sent to an exception destination, do not set the property. By default, the property is not set.

The value MQRO_DISCARD_MSG corresponds to a report option that can be specified in the **Report** field of a message descriptor.

JMS_IBM_REPORT_EXCEPTION

Data type:
System.Int32

Property of:
Message

Request exception report messages, specifying how much application data from the original message must be included in a report message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_EXCEPTION	Request exception report messages, with no application data from the original message included in a report message.
MQRO_EXCEPTION_WITH_DATA	Request exception report messages, with the first 100 bytes of application data from the original message included in a report message.
MQRO_EXCEPTION_WITH_FULL_DATA	Request exception report messages, with all the application data from the original message included in a report message.

These values correspond to report options that can be specified in the **Report** field of a message descriptor.

By default, the property is not set.

JMS_IBM_REPORT_EXPIRATION

Data type:
System.Int32

Property of:
Message

Request expiration report messages, specifying how much application data from the original message must be included in a report message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_EXPIRATION	Request expiration report messages, with no application data from the original message included in a report message.
MQRO_EXPIRATION_WITH_DATA	Request expiration report messages, with the first 100 bytes of application data from the original message included in a report message.
MQRO_EXPIRATION_WITH_FULL_DATA	Request expiration report messages, with all the application data from the original message included in a report message.

These values correspond to report options that can be specified in the **Report** field of a message descriptor.

By default, the property is not set.

JMS_IBM_REPORT_NAN

Data type:
System.Int32

Property of:
Message

Request negative action notification report messages.

Set the property to MQRO_NAN to request negative action notification report messages. If you do not require negative action notification report messages, do not set the property. By default, the property is not set.

The value MQRO_NAN corresponds to a report option that can be specified in the **Report** field of a message descriptor.

JMS_IBM_REPORT_PAN

Data type:
System.Int32

Property of:
Message

Request positive action notification report messages.

Set the property to MQRO_PAN to request positive action notification report messages. If you do not require positive action notification report messages, do not set the property. By default, the property is not set.

The value MQRO_PAN corresponds to a report option that can be specified in the **Report** field of a message descriptor.

JMS_IBM_REPORT_PASS_CORREL_ID

Data type:
System.Int32

Property of:
Message

Request that the correlation identifier of any report or reply message is the same as the correlation identifier of the original message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_PASS_CORREL_ID	Request that the correlation identifier of any report or reply message is the same as the correlation identifier of the original message.
MQRO_COPY_MSG_ID_TO_CORREL_ID	Request that the correlation identifier of any report or reply message is the same as the message identifier of the original message.

These values correspond to report options that can be specified in the **Report** field of a message descriptor. .

The default value of the property is MQRO_COPY_MSG_ID_TO_CORREL_ID.

JMS_IBM_REPORT_PASS_MSG_ID

Data type:
System.Int32

Property of:
Message

Request that the message identifier of any report or reply message is the same as the message identifier of the original message.

The valid values of the property are as follows:

Valid value	Meaning
MQRO_PASS_MSG_ID	Request that the message identifier of any report or reply message is the same as the message identifier of the original message.
MQRO_NEW_MSG_ID	Request that a new message identifier is generated for each report or reply message.

These values correspond to report options that can be specified in the Report field of a message descriptor.

The default value of the property is MQRO_NEW_MSG_ID.

JMS_IBM_RETAIN

Data type:
System.Int32

Property of:
Message

Setting this property indicates to the queue manager to treat a message as Retained Publication. When a subscriber receives messages from topics, it might receive additional messages immediately after subscribing, beyond the messages received in previous releases. These messages are the optional retained publications for the topics subscribed. For each topic matching the subscription, if there is a retained publication the publication is made available for delivery to the subscribing message consumer.

RETAIN_PUBLICATION is the only valid value for this property. By default this property is not set.

Note: This property is relevant only in publish/subscribe domain only

JMS_IBM_SYSTEM_MESSAGEID

Data type:
String

Property of:
Message

An identifier that identifies the message uniquely within the service integration bus. This property is read-only.

This property is relevant only when an application connects to a service integration bus.

JMSX_APPID

Data type:
String

Property of:
Message

The name of the application that sent the message.

This property is the JMS defined property with the JMS name JMSXAppID. For more information about the property, see the *Java Message Service Specification, Version 1.1*.

By default, the property is not set.

This property is not valid for a real-time connection to a broker.

JMSX_DELIVERY_COUNT

Data type:
System.Int32

Property of:
Message

The number of attempts to deliver the message.

This property is the JMS defined property with the JMS name JMSXDeliveryCount. For more information about the property, see the *Java Message Service Specification, Version 1.1*.

By default, the property is not set.

This property is not valid for a real-time connection to a broker.

JMSX_GROUPID

Data type:
String

Property of:
Message

The identifier of the message group to which the message belongs.

This property is the JMS defined property with the JMS name JMSXGroupID. For more information about the property, see the *Java Message Service Specification, Version 1.1*.

By default, the property is not set.

This property is not valid for a real-time connection to a broker.

JMSX_GROUPSEQ

Data type:
System.Int32

Property of:
Message

The sequence number of the message within a message group.

This property is the JMS defined property with the JMS name JMSXGroupSeq. For more information about the property, see the *Java Message Service Specification, Version 1.1*.

By default, the property is not set.

This property is not valid for a real-time connection to a broker.

JMSX_USERID

Data type:
String

Property of:
Message

The user identifier associated with the application that sent the message.

This property is the JMS defined property with the JMS name JMSXUserID. For more information about the property, see the *Java Message Service Specification, Version 1.1*.

By default, the property is not set.

This property is not valid for a real-time connection to a broker.

XMSC_ASYNC_EXCEPTIONS

Data type:
System.Int32

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: ASYNCEXCEPTION

JMS administration tool short name: AEX

This property determines whether XMS informs an ExceptionListener only when a connection is broken, or when any exception occurs asynchronously to an XMS API call. This property applies to all Connections created from this ConnectionFactory that have an ExceptionListener registered.

Valid values for this property are:

XMSC_ASYNC_EXCEPTIONS_ALL
Any exception detected asynchronously, outside the scope of a synchronous API call, and all connection broken exceptions are sent to the ExceptionListener.

XMSC_ASYNC_EXCEPTIONS_CONNECTIONBROKEN
Only exceptions indicating a broken connection are sent to the ExceptionListener. Any other exceptions occurring during asynchronous processing are not reported to the ExceptionListener, and hence the application is not informed of these exceptions.

By default this property is set to XMSC_ASYNC_EXCEPTIONS_ALL.

XMSC_CLIENT_ID

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CLIENTID

JMS administration tool short name: CID

The client identifier for a connection.

A client identifier is used only to support durable subscriptions in the publish/subscribe domain, and is ignored in the point-to-point domain. For more information about setting client identifiers, see ConnectionFactories and Connection objects.

This property is not relevant for a real-time connection to a broker.

XMSC_CONNECTION_TYPE

Data type:
System.Int32

Property of:
ConnectionFactory

The type of messaging server to which an application connects.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_CT_RTT	A real-time connection to a broker.

Valid value	Meaning
XMSC_CT_WMQ	A connection to an IBM MQ queue manager.
XMSC_CT_WPM	A connection to a WebSphere Application Server service integration bus.

By default, the property is not set.

XMSC_DELIVERY_MODE

Data type:
System.Int32

Property of:
Destination

Name used in a URI:

`persistence` (for an IBM MQ destination)
`deliveryMode` (for a WebSphere default messaging provider destination)

Applicable objects:
JMS administration tool long name: PERSISTENCE

JMS administration tool short name: PER

The delivery mode of messages sent to the destination.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_DELIVERY_NOT_PERSISTENT	A message sent to the destination is nonpersistent. The default delivery mode of the message producer, or any delivery mode specified on the Send call, is ignored. If the destination is an IBM MQ queue, the value of the queue attribute *DefPersistence* is also ignored.
XMSC_DELIVERY_PERSISTENT	A message sent to the destination is persistent. The default delivery mode of the message producer, or any delivery mode specified on the Send call, is ignored. If the destination is an IBM MQ queue, the value of the queue attribute *DefPersistence* is also ignored.
XMSC_DELIVERY_AS_APP	A message sent to the destination has the delivery mode specified on the Send call. If the Send call specifies no delivery mode, the default delivery mode of the message producer is used instead. If the destination is an IBM MQ queue, the value of the queue attribute *DefPersistence* is ignored.
XMSC_DELIVERY_AS_DEST	If the destination is an IBM MQ queue, a message put on the queue has the delivery mode specified by the value of the queue attribute *DefPersistence*. The default delivery mode of the message producer, or any delivery mode specified on the Send call, is ignored. If the destination is not an IBM MQ queue, the meaning is the same as that of XMSC_DELIVERY_AS_APP.

The default value is XMSC_DELIVERY_AS_APP.

XMSC_IC_PROVIDER_URL

Data type:
String

Property of:
InitialContext

Used to locate the JNDI naming directory so that the COS naming service does not need to be on the same server as the web service.

XMSC_IC_SECURITY_AUTHENTICATION

Data type:
String

Property of:
InitialContext

Based on the Java Context interface SECURITY_AUTHENTICATION. This property is only applicable to the COS naming context.

XMSC_IC_SECURITY_CREDENTIALS

Data type:
String

Property of:
InitialContext

Based on the Java Context interface SECURITY_CREDENTIALS. This property is only applicable to the COS naming context.

XMSC_IC_SECURITY_PRINCIPAL

Data type:
String

Property of:
InitialContext

Based on the Java Context interface SECURITY_PRINCIPAL. This property is only applicable to the COS naming context.

XMSC_IC_SECURITY_PROTOCOL

Data type:
String

Property of:
InitialContext

Based on the Java Context interface SECURITY_PROTOCOL This property is only applicable to the COS naming context.

XMSC_IC_URL

Data type:
String

Property of:
InitialContext

For LDAP and FileSystem contexts, the address of the repository containing administered objects.

For LDAP and FileSystem contexts, the address of the repository containing administered objects.

XMSC_IS_SUBSCRIPTION_MULTICAST

Data type:
System.Boolean

Property of:
MessageConsumer

Indicates whether messages are being delivered to the message consumer using WebSphere MQ Multicast Transport. This property is read-only.

The value of the property is true if messages are being delivered to the message consumer using WebSphere MQ Multicast Transport. Otherwise, the value is false.

This property is relevant only for a real-time connection to a broker.

XMSC_IS_SUBSCRIPTION_RELIABLE_MULTICAST

Data type:
System.Boolean

Property of:
MessageConsumer

Indicates whether messages are being delivered to the message consumer using WebSphere MQ Multicast Transport with a reliable quality of service. This property is read-only.

The value of the property is true if messages are being delivered to the message consumer using WebSphere MQ Multicast Transport with a reliable quality of service. Otherwise, the value is false.

This property is relevant only for a real-time connection to a broker.

XMSC_JMS_MAJOR_VERSION

Data type:
System.Int32

Property of:
ConnectionMetaData

The major version number of the JMS specification upon which XMS is based. This property is read-only.

XMSC_JMS_MINOR_VERSION

Data type:
System.Int32

Property of:
ConnectionMetaData

The minor version number of the JMS specification upon which XMS is based. This property is read-only.

XMSC_JMS_VERSION

Data type:
String

Property of:
ConnectionMetaData

The version identifier of the JMS specification upon which XMS is based. This property is read-only.

XMSC_MAJOR_VERSION

Data type:
System.Int32

Property of:
ConnectionMetaData

The version number of the XMS client. This property is read-only.

XMSC_MINOR_VERSION

Data type:
System.Int32

Property of:
ConnectionMetaData

The release number of the XMS client. This property is read-only.

XMSC_PASSWORD

Data type:
Byte array

Property of:
ConnectionFactory

A password that can be used to authenticate the application when it attempts to connect to a messaging server. The password is used with the XMSC_USERID property.

By default, the property is not set.

Multi If you are connecting to IBM MQ on Multiplatforms, and you set the XMSC_USERID property of the connection factory, it must match the **userid** of the logged on user. If you do not set these properties, the queue manager uses the **userid** of the logged on user by default. If you require further connection-level authentication of individual users you can write a client authentication exit which is configured in IBM MQ. For more information about creating a client authentication exit, see Planning authentication for a client application.

z/OS To authenticate the user when connecting to IBM MQ for z/OS you need to use a security exit.

XMSC_PRIORITY

Data type:
System.Int32

Property of:
Destination

Name used in a URI:
priority

The priority of messages sent to the destination.

The valid values of the property are as follows:

Valid value	Meaning
An integer in the range 0, the lowest priority, to 9, the highest priority	A message sent to the destination has the specified priority. The default priority of the message producer, or any priority specified on the Send call, is ignored. If the destination is an IBM MQ queue, the value of the queue attribute **DefPriority** is also ignored.
XMSC_PRIORITY_AS_APP	A message sent to the destination has the priority specified on the Send call. If the Send call specifies no priority, the default priority of the message producer is used instead. If the destination is an IBM MQ queue, the value of the queue attribute **DefPriority** is ignored.

Valid value	Meaning
XMSC_PRIORITY_AS_DEST	If the destination is an IBM MQ queue, a message put on the queue has the priority specified by the value of the queue attribute **DefPriority**. The default priority of the message producer, or any priority specified on the Send call, is ignored. If the destination is not an IBM MQ queue, the meaning is the same as that of XMSC_PRIORITY_AS_APP.

The default value is XMSC_PRIORITY_AS_APP.

WebSphere MQ Real-Time Transport and WebSphere MQ Multicast Transport take no action based upon the priority of a message.

XMSC_PROVIDER_NAME

Data type:
String

Property of:
ConnectionMetaData

The provider of the XMS client. This property is read-only.

XMSC_RTT_BROKER_PING_INTERVAL

Data type:
System.Int32

Property of:
ConnectionFactory

The time interval, in milliseconds, after which XMS .NET checks the connection to a Real Time messaging server to detect any activity. If no activity is detected, the client initiates a ping; the connection is closed if no response is detected to the ping.

The default value of the property is 30000.

XMSC_RTT_CONNECTION_PROTOCOL

Data type:
System.Int32

Property of:
ConnectionFactory

The communications protocol used for a real-time connection to a broker.

The value of the property must be XMSC_RTT_CP_TCP, which means a real-time connection to a broker over TCP/IP. The default value is XMSC_RTT_CP_TCP.

XMSC_RTT_HOST_NAME

Data type:
String

Property of:
ConnectionFactory

The host name or IP address of the system on which a broker runs.

This property is used with the XMSC_RTT_PORT property to identify the broker.

By default, the property is not set.

XMSC_RTT_LOCAL_ADDRESS

Data type:
String

Property of:
ConnectionFactory

The host name or IP address of the local network interface to be used for a real-time connection to a broker.

This property is useful only if the system on which the application is running has two or more network interfaces and you need to be able to specify which interface must be used for a real-time connection. If the system has only one network interface, only that interface can be used. If the system has two or more network interfaces and the property is not set, the interface is selected at random.

By default, the property is not set.

XMSC_RTT_MULTICAST

Data type:
System.Int32

Property of:
ConnectionFactory and Destination

Name used in a URI:
mulicast

The multicast setting for a connection factory or destination. Only a destination that is a topic can have this property.

An application uses this property to enable multicast in association with a real-time connection to a broker and, if multicast is enabled, to specify the precise way in which multicast is used to deliver messages from the broker to a message consumer. The property has no effect on how a message producer sends messages to the broker.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_RTT_MULTICAST_DISABLED	Messages are not delivered to a message consumer using WebSphere MQ Multicast Transport. This value is the default value for a ConnectionFactory object.
XMSC_RTT_MULTICAST_ASCF	Messages are delivered to a message consumer according to the multicast setting for the connection factory associated with the message consumer. The multicast setting for the connection factory is noted at the time that the connection is created. This value is valid only for a Destination object, and is the default value for a Destination object.
XMSC_RTT_MULTICAST_ENABLED	If the topic is configured for multicast in the broker, messages are delivered to a message consumer using WebSphere MQ Multicast Transport. A reliable quality of service is used if the topic is configured for reliable multicast.

Valid value	Meaning
XMSC_RTT_MULTICAST_RELIABLE	If the topic is configured for reliable multicast in the broker, messages are delivered to a message consumer using WebSphere MQ Multicast Transport with a reliable quality of service. If the topic is not configured for reliable multicast, you cannot create a message consumer for the topic.
XMSC_RTT_MULTICAST_NOT_RELIABLE	If the topic is configured for multicast in the broker, messages are delivered to a message consumer using WebSphere MQ Multicast Transport. A reliable quality of service is not used even if the topic is configured for reliable multicast.

XMSC_RTT_PORT

Data type:
System.Int32

Property of:
ConnectionFactory

The number of the port on which a broker listens for incoming requests. On the broker, you must configure a Real-timeInput or Real-timeOptimizedFlow message processing node to listen on this port.

This property is used with the XMSC_RTT_HOST_NAME property to identify the broker.

The default value of the property is XMSC_RTT_DEFAULT_PORT, or 1506.

XMSC_TIME_TO_LIVE

Data type:
System.Int32

Property of:
Destination

Name used in a URI:

expiry (for an IBM MQ destination)
timeToLive (for a WebSphere default messaging provider destination)

The time to live for messages sent to the destination.

The valid values of the property are as follows:

Valid value	Meaning
0	A message sent to the destination never expires.
A positive integer	A message sent to the destination has the specified time to live in milliseconds. The default time to live of the message producer, or any time to live specified on the Send call, is ignored.
XMSC_TIME_TO_LIVE_AS_APP	A message sent to the destination has the time to live specified on the Send call. If the Send call specifies no time to live, the default time to live of the message producer is used instead.

The default value is XMSC_TIME_TO_LIVE_AS_APP.

XMSC_USERID

Data type:
String

Property of:
ConnectionFactory

A user identifier that can be used to authenticate the application when it attempts to connect to a messaging server. The user identifier is used with the XMSC_PASSWORD property.

By default, the property is not set.

Multi If you are connecting to IBM MQ for Multiplatforms, and you set the XMSC_USERID property of the connection factory, it must match the **userid** of the logged on user. If you do not set these properties, the queue manager uses the **userid** of the logged on user by default. If you require further connection-level authentication of individual users, you can write a client authentication exit that is configured in IBM MQ. For more information about creating a client authentication exit, see Planning authentication for a client application.

z/OS To authenticate the user when connecting to IBM MQ for z/OS you need to use a security exit.

XMSC_VERSION

Data type:
String

Property of:
ConnectionMetaData

The version identifier of the cliXMSent. This property is read-only.

XMSC_WMQ_BROKER_CONTROLQ

Data type:
String

Property of:
ConnectionFactory

The name of the control queue used by a broker.

The default value of the property is SYSTEM.BROKER.CONTROL.QUEUE.

This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_BROKER_PUBQ

Data type:
String

Property of:
ConnectionFactory

The name of the queue monitored by a broker where applications send messages that they publish.

The default value of the property is SYSTEM.BROKER.DEFAULT.STREAM.

This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_BROKER_QMGR

Data type:
String

Property of:
ConnectionFactory

The name of the queue manager to which a broker is connected.

By default, the property is not set.

This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_BROKER_SUBQ

Data type:
String

Property of:
ConnectionFactory

The name of the subscriber queue for a nondurable message consumer.

The name of the subscriber queue must start with the following characters:

SYSTEM.JMS.ND.

If you want all nondurable message consumers to share a subscriber queue, specify the complete name of the shared queue. A queue with the specified name must exist before an application can create a nondurable message consumer.

If you want each nondurable message consumer to retrieve messages from its own exclusive subscriber queue, specify a queue name that ends with an asterisk (*). Then, when an application creates a nondurable message consumer, the XMS client creates a dynamic queue for exclusive use by the message consumer. The XMS client uses the value of the property to set the contents of the **DynamicQName** field in the object descriptor that is used to create the dynamic queue.

The default value of the property is SYSTEM.JMS.ND.SUBSCRIBER.QUEUE, which means that XMS uses the shared queue approach by default.

This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_BROKER_VERSION

Data type:
System.Int32

Property of:
ConnectionFactory and Destination

Name used in a URI:
brokerVersion

The type of broker used by the application for a connection or for the destination. Only a destination that is a topic can have this property.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WMQ_BROKER_V1	The application is using an IBM MQ publish/subscribe broker. The application can also use this value if you migrate from IBM MQ publish/subscribe to WebSphere Message Broker but did not change the application.
XMSC_WMQ_BROKER_V2	The application is using a broker of IBM Integration Bus.
XMSC_WMQ_BROKER_UNSPECIFIED	After the broker is migrated, set this property so that RFH2 headers are no longer used. After migration, this property is no longer relevant.

The default value for a connectionfactory is XMSC_WMQ_BROKER_UNSPECIFIED but, by default, the property is not set for a destination. Setting the property for a destination overrides any value specified by the connection factory property.

XMSC_WMQ_CCDTURL

Data type:
System.String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CCDTURL

JMS administration tool short name: CCDT

A Uniform Resource Locator (URL) that identifies the name and location of the file that contains the client channel definition table and also specifies how the file can be accessed.

By default, this property is not set.

XMSC_WMQ_CCSID

Data type:
System.Int32

Property of:
Destination

Name used in a URI:
CCSID

The identifier (CCSID) of the coded character set, or code page, that the strings of character data in the body of a message are in when the XMS client forwards the message to the destination. If set for an individual message, the JMS_IBM_CHARACTER_SET property overrides the CCSID specified for the destination by this property.

The default value of the property is 1208.

This property is relevant only to messages sent to the destination, not to messages received from the destination.

XMSC_WMQ_CHANNEL

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CHANNEL

JMS administration tool short name: CHAN

The name of the channel to be used for a connection.

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in client mode.

XMSC_WMQ_CLIENT_RECONNECT_OPTIONS

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CLIENTRECONNECTOPTIONS

JMS administration tool short name: CROPT

This property specifies the client reconnect options for new connections created by this factory. It is found in XMSC, and is one of:

- WMQ_CLIENT_RECONNECT_AS_DEF (default). Use the value specified in the `mqclient.ini` file. Set the value by using the **`DefRecon`** property within the Channels stanza. It can be set to one of:
  1. YES. Behaves as the WMQ_CLIENT_RECONNECT option
  2. NO. Default. Does not specify any reconnection options
  3. QMGR. Behaves as the WMQ_CLIENT_RECONNECT_Q_MGR option
  4. DISABLED. Behaves as the WMQ_CLIENT_RECONNECT_DISABLED option
- WMQ_CLIENT_RECONNECT. Reconnect to any of the queue managers specified in the connection name list.
- WMQ_CLIENT_RECONNECT_Q_MGR. Reconnects to the same queue manager that it is originally connected to. It returns `MQRC_RECONNECT_QMID_MISMATCH` if the queue manager it tries to connect to (specified in the connection name list) has a different QMID to the queue manager originally connected to.
- WMQ_CLIENT_RECONNECT_DISABLED. Reconnection is disabled.

XMSC_WMQ_CLIENT_RECONNECT_TIMEOUT

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CLIENTRECONNECTTIMEOUT

JMS administration tool short name: CRT

The XMSC_WMQ_CLIENT_RECONNECT_TIMEOUT property is valid only for the Managed XMS .NET client.

This property specifies the duration of time, in seconds, that a client connection attempts to reconnect.

After attempting to reconnect for this duration of time, the client will fail with MQRC_RECONNECT_FAILED. The default setting for this property is XMSC.WMQ_CLIENT_RECONNECT_TIMEOUT_DEFAULT.

The default value of this property is 1800.

XMSC_WMQ_CONNECTION_MODE

Data type:
System.Int32

Property of:
ConnectionFactory

The mode by which an application connects to a queue manager.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WMQ_CM_BINDINGS	A connection to a queue manager in bindings mode, for optimal performance. This value is the default value for C/C++.
XMSC_WMQ_CM_CLIENT	A connection to a queue manager in client mode, to ensure a fully managed stack. This value is the default value for .NET.

Valid value	Meaning
XMSC_WMQ_CM_CLIENT_UNMANAGED (for .NET only)	A connection to a queue manager which forces an unmanaged client stack.

XMSC_WMQ_CONNECTION_NAME_LIST

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: CONNECTIONNAMELIST

JMS administration tool short name: CNLIST

This property specifies the hosts to which the client attempts to reconnect to after its connection are broken.

The connection name list is a comma-separated list of host/ip port pairs. The default setting for this property is WMQ_CONNECTION_NAME_LIST_DEFAULT.

For example,`127.0.0.1(1414),host2.example.com(1400)`

The default setting of this property is `localhost(1414)`.

XMSC_WMQ_DUR_SUBQ

Data type:
String

Property of:
Destination

The name of the subscriber queue for a durable subscriber that is receiving messages from the destination. Only a destination that is a topic can have this property.

The name of the subscriber queue must start with the following characters:

SYSTEM.JMS.D.

If you want all durable subscribers to share a subscriber queue, specify the complete name of the shared queue. A queue with the specified name must exist before an application can create a durable subscriber.

If you want each durable subscriber to retrieve messages from its own exclusive subscriber queue, specify a queue name that ends with an asterisk (*). Then, when an application creates a durable subscriber, the XMS client creates a dynamic queue for exclusive use by the durable subscriber. The XMS client uses the value of the property to set the contents of the **`DynamicQName`** field in the object descriptor that is used to create the dynamic queue.

The default value of the property is SYSTEM.JMS.D.SUBSCRIBER.QUEUE, which means that XMS uses the shared queue approach by default.

This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_ENCODING

Data type:
System.Int32

Property of:
Destination

How numerical data in the body of a message is represented when the XMS client forwards the message to the destination. If set for an individual message, the JMS_IBM_ENCODING property overrides the

encoding specified for the destination by this property. The property specifies the representation of binary integers, packed decimal integers, and floating point numbers.

The valid values of the property are the same as the values that can be specified in the **Encoding** field of a message descriptor.

An application can use the following named constants to set the property:

Named constant	Meaning
MQENC_INTEGER_NORMAL	Normal integer encoding
MQENC_INTEGER_REVERSED	Reversed integer encoding
MQENC_DECIMAL_NORMAL	Normal packed decimal encoding
MQENC_DECIMAL_REVERSED	Reversed packed decimal encoding
MQENC_FLOAT_IEEE_NORMAL	Normal IEEE floating point encoding
MQENC_FLOAT_IEEE_REVERSED	Reversed IEEE floating point encoding
MQENC_FLOAT_S390	z/OS architecture floating point encoding
MQENC_NATIVE	Native machine encoding

To form a value for the property, the application can add three of these constants as follows:

- A constant whose name commences with MQENC_INTEGER, to specify the representation of binary integers
- A constant whose name commences with MQENC_DECIMAL, to specify the representation of packed decimal integers
- A constant whose name commences with MQENC_FLOAT, to specify the representation of floating point numbers

Alternatively, the application can set the property to MQENC_NATIVE, whose value is environment-dependent.

The default value of the property is MQENC_NATIVE.

This property is relevant only to messages sent to the destination, not to messages received from the destination.

XMSC_WMQ_FAIL_IF_QUIESCE

Data type:
System.Int32

Property of:
ConnectionFactory and Destination

Name used in a URI:
failIfQuiesce

Applicable objects:
JMS administration tool long name: FAILIFQUIESCE

JMS administration tool short name: FIQ

Whether calls to certain methods fail if the queue manager to which the application is connected is in a quiescing state.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WMQ_FIQ_YES	Calls to certain methods fail if the queue manager is in a quiescing state. When the application detects that the queue manager is quiescing, the application can complete its immediate task and close the connection, allowing the queue manager to stop.
XMSC_WMQ_FIQ_NO	No method calls fail because the queue manager is in a quiescing state. If you specify this value, the application cannot detect that the queue manager is quiescing. The application might continue to perform operations against the queue manager and therefore prevent the queue manager from stopping.

The default value for a connection factory is XMSC_WMQ_FIQ_YES but, by default, the property is not set for a destination. Setting the property for a destination overrides any value specified by the connection factory property.

XMSC_WMQ_MESSAGE_BODY

Data type:
System.Int32

Property of:
Destination

This property determines whether an XMS application processes the MQRFH2 of an IBM MQ message as part of the message payload (that is, as part of the message body).

Note: When sending messages to a destination, XMSC_WMQ_MESSAGE_BODY property supersedes existing XMS Destination property XMSC_WMQ_TARGET_CLIENT.

Valid values for this property are:

XMSC_WMQ_MESSAGE_BODY_JMS
Receive: The inbound XMS message type and body are determined by the contents of the MQRFH2 (if present) or the MQMD (if there is no MQRFH2) in the received IBM MQ message.

Send: The outbound XMS message body contains a prepended and auto-generated MQRFH2 header based on XMS Message properties and header fields.

XMSC_WMQ_MESSAGE_BODY_MQ
Receive: The inbound XMS message type is always ByteMessage, irrespective of the contents of received IBM MQ message or the format field of the received MQMD. The XMS message body is the unaltered message data returned by the underlying messaging provider API call. The character set and encoding of the data in the message body is determined by the CodedCharSetId and Encoding fields of the MQMD. The format of the data in the message body is determined by the Format field of the MQMD.

Send: The outbound XMS message body contains the application payload as-is; and no auto-generated IBM MQ header is added to the body.

XMSC_WMQ_MESSAGE_BODY_UNSPECIFIED
Receive: The XMS client determines a suitable value for this property. On receive path, this value is the WMQ_MESSAGE_BODY_JMS property value.

Send: The XMS client determines a suitable value for this property. On send path, this value is the XMSC_WMQ_TARGET_CLIENT property value.

By default this property is set to XMSC_WMQ_MESSAGE_BODY_UNSPECIFIED.

XMSC_WMQ_MQMD_MESSAGE_CONTEXT

Data type:
System.Int32

Property of:
Destination

Determines what level of message context is to be set by the XMS application. The application must be running with appropriate context authority for this property to take effect.

The valid values for this property are:

XMSC_WMQ_MDCTX_DEFAULT
For outbound messages, the MQOPEN API call and the MQPMO structure specifies no explicit message context options.

XMSC_WMQ_MDCTX_SET_IDENTITY_CONTEXT
The MQOPEN API call specifies the message context option MQOO_SET_IDENTITY_CONTEXT and the MQPMO structure specifies MQPMO_SET_IDENTITY_CONTEXT.

XMSC_WMQ_MDCTX_SET_ALL_CONTEXT
The MQOPEN API call specifies the message context option MQOO_SET_ALL_CONTEXT and the MQPMO structure specifies MQPMO_SET_ALL_CONTEXT.

By default this property is set to XMSC_WMQ_MDCTX_DEFAULT.

Note: This property is not relevant when an application connects to WebSphere Application Server service integration bus.

The following properties require XMSC_WMQ_MQMD_MESSAGE_CONTEXT property to be set to XMSC_WMQ_MDCTX_SET_IDENTITY_CONTEXT property value or XMSC_WMQ_MDCTX_SET_ALL_CONTEXT property value when sending a message for in order to have wanted effect:

- JMS_IBM_MQMD_USERIDENTIFIER
- JMS_IBM_MQMD_ACCOUNTINGTOKEN
- JMS_IBM_MQMD_APPLIDENTITYDATA

Following properties require XMSC_WMQ_MQMD_MESSAGE_CONTEXT property to be set to XMSC_WMQ_MDCTX_SET_ALL_CONTEXT property value when sending a message for in order to have wanted effect:

- JMS_IBM_MQMD_PUTAPPLTYPE
- JMS_IBM_MQMD_PUTAPPLNAME
- JMS_IBM_MQMD_PUTDATE
- JMS_IBM_MQMD_PUTTIME
- JMS_IBM_MQMD_APPLORIGINDATA

XMSC_WMQ_MQMD_READ_ENABLED

Data type:
System.Int32

Property of:
Destination

This property determines whether an XMS application can extract the values of MQMD fields or not.

The valid values for this property are:

XMSC_WMQ_READ_ENABLED_NO
When sending messages, the JMS_IBM_MQMD* properties on a sent message are not updated to reflect the updated field values in the MQMD.

When receiving messages, none of the JMS_IBM_MQMD* properties are available on a received message, even if some or all of them are set by the sender.

XMSC_WMQ_READ_ENABLED_YES
When sending messages, all of the JMS_IBM_MQMD* properties on a sent message are updated to reflect the updated field values in the MQMD, including those properties that the sender did not set explicitly.

When receiving messages, all of the JMS_IBM_MQMD* properties are available on a received message, including those properties that the sender did not set explicitly.

By default this property is set to XMSC_WMQ_READ_ENABLED_NO.

XMSC_WMQ_MQMD_WRITE_ENABLED

Data type:
System.Int32

Property of:
Destination

This property determines whether an XMS application can set the values of MQMD fields or not.

The valid values for this property are:

XMSC_WMQ_WRITE_ENABLED_NO
All JMS_IBM_MQMD* properties are ignored and their values are not copied into the underlying MQMD structure.

XMSC_WMQ_WRITE_ENABLED_YES
JMS_IBM_MQMD* properties are processed. Their values are copied into the underlying MQMD structure.

By default this property is set to XMSC_WMQ_WRITE_ENABLED_NO.

XMSC_WMQ_PUT_ASYNC_ALLOWED

Data type:
System.Int32

Property of:
Destination

This property determines whether message producers are allowed to use asynchronous puts to send messages to this destination.

The valid values for this property are:

XMSC_WMQ _PUT_ASYNC_ALLOWED_AS_DEST
Determine whether asynchronous puts are allowed by referring to the queue or topic definition.

XMSC_WMQ _PUT_ASYNC_ALLOWED_AS_Q_DEF
Determine whether asynchronous puts are allowed by referring to the queue definition.

XMSC_WMQ _PUT_ASYNC_ALLOWED_AS_TOPIC_DEF
Determine whether asynchronous puts are allowed by referring to the topic definition.

XMSC_WMQ _PUT_ASYNC_ALLOWED_DISABLED
Asynchronous puts are not allowed.

XMSC_WMQ _PUT_ASYNC_ALLOWED_ENABLED
Asynchronous puts are allowed.

By default this property is set to XMSC_WMQ _PUT_ASYNC_ALLOWED_AS_DEST.

Note: This property is not relevant when an application is connecting to WebSphere Application Server service integration bus.

XMSC_WMQ_READ_AHEAD_ALLOWED

Data type:
System.Int32

Property of:
Destination

This property determines whether message consumers and queue browsers are allowed to use read ahead to get non-persistent, non-transactional messages from this destination into an internal buffer before receiving them.

The valid values for this property are:

XMSC_WMQ_READ_AHEAD_ALLOWED_AS_Q_DEF
Determine whether read ahead is allowed by referring to the queue definition.

XMSC_WMQ_READ_AHEAD_ALLOWED_AS_ TOPIC _DEF
Determine whether read ahead is allowed by referring to the topic definition.

XMSC_WMQ_READ_AHEAD_ALLOWED_AS_DEST
Determine whether read ahead is allowed by referring to the queue or topic definition.

XMSC_WMQ_READ_AHEAD_ALLOWED_DISABLED
Read ahead is not allowed while consuming or browsing messages.

XMSC_WMQ_READ_AHEAD_ALLOWED_ENABLED
Read ahead is allowed.

By default this property is set to XMSC_WMQ _READ_AHEAD_ALLOWED_AS_DEST.

XMSC_WMQ_READ_AHEAD_CLOSE_POLICY

Data type:
System.Int32

Property of:
Destination

This property determines, for messages being delivered to an asynchronous message listener, what happens to messages in the internal read ahead buffer when the message consumer is closed.

This property is applicable in specifying closing queue options when consuming messages from a destination and not applicable when sending messages to a destination.

This property is ignored for queue browsers since during browse the messages are still available in the queues.

The valid values for this property are:

XMSC_WMQ_READ_AHEAD_CLOSE_POLICY_DELIVER_CURRENT
Only the current message listener invocation completes before returning, potentially leaving messages in the internal read ahead buffer, which are then discarded.

XMSC_WMQ_READ_AHEAD_CLOSE_POLICY_DELIVER_ALL
All messages in the internal read ahead buffer are delivered to the application message listener before returning.

By default this property is set to XMSC_WMQ _READ_AHEAD_CLOSE_POLICY_DELIVER_CURRENT.

Note:

Abnormal application termination
All the messages in the read ahead buffer are lost when an XMS application terminates abruptly.

Implications for transactions
The read ahead is disabled when the applications use transactions. So, the application is not seeing any difference in the behavior when they use transacted sessions.

Implications of session scknowledgement modes
The read ahead is enabled on a non-transacted session when the acknowledgment modes are either XMSC_AUTO_ACKNOWLEDGE or XMSC_DUPS_OK_ACKNOWLEDGE. The read ahead is disabled if the session acknowledgment mode is XMSC_CLIENT_ACKNOWLEDGE irrespective of transacted or non-transacted sessions.

Implications for queue browsers and queue browser selectors
The queue browsers and queue browser selectors, used in XMS applications, get the performance advantage from read ahead. Closing the queue browser does not degrade performance because the message is still available in the queue for ay further operations. There are no other implications for queue browsers and queue browser selectors apart from performance benefits of read ahead.

XMSC_WMQ_HOST_NAME

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: HOSTNAME

JMS administration tool short name: HOST

The host name or IP address of the system on which a queue manager runs.

This property is used only when an application connects to a queue manager in client mode. The property is used with the XMSC_WMQ_PORT property to identify the queue manager.

The default value of the property is `localhost`.

XMSC_WMQ_LOCAL_ADDRESS

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: LOCALADDRESS

JMS administration tool short name: LA

For a connection to a queue manager, this property specifies the local network interface to be used, or the local port or range of local ports to be used, or both.

The value of the property is a string with the following format:

[*host_name*][(*low_port*)[,*high_port*])]

The meanings of the variables are as follows:

host_name
The host name or IP address of the local network interface to be used for the connection.

Providing this information is necessary only if the system on which the application is running has two or more network interfaces and you need to be able to specify which interface must be used for the connection. If the system has only one network interface, only that interface can be used. If the system has two or more network interfaces and you do not specify which interface must be used, the interface is selected at random.

low_port
The number of the local port to be used for the connection.

If *high_port* is also specified, *low_port* is interpreted the lowest port number in a range of port numbers.

high_port
The highest port number in a range of port numbers. One of the ports in the specified range must be used for the connection.

The maximum length of the string is 48 characters.

Here are some examples of valid values of the property:

JUPITER
9.20.4.98
JUPITER(1000)
9.20.4.98(1000,2000)
(1000)
(1000,2000)

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in client mode.

XMSC_WMQ_MESSAGE_SELECTION

Data type:
System.Int32

Property of:
ConnectionFactory

Determines whether message selection is done by the XMS client or by the broker.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WMQ_MSEL_CLIENT	Message selection is done by the XMS client.
XMSC_WMQ_MSEL_BROKER	Message selection is done by the broker.

The default value is XMSC_WMQ_MSEL_CLIENT.

This property is relevant only in the publish/subscribe domain. Message selection by the broker is not supported if the XMSC_WMQ_BROKER_VERSION property is set to XMSC_WMQ_BROKER_V1.

XMSC_WMQ_MSG_BATCH_SIZE

Data type:
System.Int32

Property of:
ConnectionFactory

The maximum number of messages to be retrieved from a queue in one batch when using asynchronous message delivery.

When an application is using asynchronous message delivery, under certain conditions, the XMS client retrieves a batch of messages from a queue before forwarding each message individually to the application. This property specifies the maximum number of messages that can be in the batch.

The value of the property is a positive integer, and the default value is 10. Consider setting the property to a different value only if you have a specific performance problem that you need to address.

If an application is connected to a queue manager over a network, raising the value of this property can reduce network overheads and response times, but increase the amount of memory required to store the messages on the client system. Conversely, lowering the value of this property might increase network overheads and response times, but reduce the amount of memory required to store the messages.

XMSC_WMQ_POLLING_INTERVAL

Data type:
System.Int32

Property of:
ConnectionFactory

If each message listener within a session has no suitable message on its queue, this value is the maximum interval, in milliseconds, that elapses before each message listener tries again to get a message from its queue.

If it frequently happens that no suitable message is available for any of the message listeners in a session, consider increasing the value of this property.

The value of the property is a positive integer. The default value is 5000.

XMSC_WMQ_PORT

Data type:
System.Int32

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: PORT

JMS administration tool short name: PORT

The number of the port on which a queue manager listens for incoming requests.

This property is used only when an application connects to a queue manager in client mode. The property is used with the XMSC_WMQ_HOST_NAME property to identify the queue manager.

The default value of the property is XMSC_WMQ_DEFAULT_CLIENT_PORT, or 1414.

XMSC_WMQ_PROVIDER_VERSION

Data type:
String

Property of:
ConnectionFactory

The version, release, modification level and fix pack of the queue manager to which the application intends to connect. Valid values for this property are:

- Unspecified

Or a string in one of the following formats

- V.R.M.F
- V.R.M
- V.R
- V

Where V, R, M and F are integer values greater than or equal to zero.

A value of 7 or greater indicates that this version is intended as an IBM WebSphere MQ 7.0 ConnectionFactory for connections to an IBM WebSphere MQ 7.0 queue manager. A value earlier than 7 (for example "6.0.2.0"), indicates that it is intended for use with queue managers earlier than Version 7.0. The default value, unspecified, allows connections to any level of queue manager, determining the applicable properties and functionality available based on the queue manager's capabilities.

By default this property is set to "unspecified".

Note:

- No socket sharing happens if XMSC_WMQ_PROVIDER_VERSION is set to 6. 2.
- Connection fails if XMSC_WMQ_PROVIDER_VERSION is set to 7 and on the server SHARECNV for the channel is set to 0.
- IBM WebSphere MQ 7.0 specific features are disabled if XMSC_WMQ_PROVIDER_VERSION is set to UNSPECIFIED and SHARECNV is set to 0.

The version of IBM MQ Client also plays major role in whether an XMS client application can use IBM WebSphere MQ 7.0 specific features. The following table describes the behavior.

Note: A system property XMSC_WMQ_OVERRIDEPROVIDERVERSION overrides the XMSC_WMQ_PROVIDER_VERSION property. This property can be used if you are unable to change connection factory setting.

Table 880. XMS client - Ability to use IBM WebSphere MQ 7.0 specific features.

#	XMSC_WMQ_PROVIDER_VERSION	IBM MQ client version	IBM WebSphere MQ 7.0 features
1	unspecified	7	ON
2	unspecified	6	OFF
3	7	7	ON
4	7	6	Exception
5	6	6	OFF
6	6	7	OFF

XMSC_WMQ_PUB_ACK_INTERVAL

Data type:
System.Int32

Property of:
ConnectionFactory

The number of messages published by a publisher before the XMS client requests an acknowledgment from the broker.

If you decrease the value of this property, the client requests acknowledgments more often, and therefore the performance of the publisher decreases. If you raise the value, the client takes a longer time to throw an exception if the broker fails.

The value of the property is a positive integer. The default value is 25.

XMSC_WMQ_QMGR_CCSID

Data type:
System.Int32

Property of:
ConnectionFactory

The identifier (CCSID) of the coded character set, or code page, in which fields of character data defined in the Message Queue Interface (MQI) are exchanged between the XMS client and the IBM MQ client. This property does not apply to the strings of character data in the bodies of messages.

When XMS application connects to a queue manager in client mode, the XMS client links to the IBM MQ client. The information exchanged between the two clients contains fields of character data that are defined in the MQI. Under normal circumstances, the IBM MQ client assumes that these fields are in the code page of the system on which the clients are running. If the XMS client provides and expects to receive these fields in a different code page, you must set this property to inform the IBM MQ client.

When the IBM MQ client forwards these fields of character data to the queue manager, the data in them must be converted if necessary into the code page used by the queue manager. Similarly, when the IBM MQ client receives these fields from the queue manager, the data in them must be converted if necessary into the code page in which the XMS client expects to receive the data. The IBM MQ client uses this property to perform these data conversions.

By default, the property is not set.

Setting this property is equivalent to setting the MQCCSID environment variable for an IBM MQ client that is supporting native IBM MQ client applications. For more information about this environment variable, see MQCCSID.

XMSC_WMQ_QUEUE_MANAGER

Data type:
String

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: QMANAGER

JMS administration tool short name: QMGR

The name of the queue manager to connect to.

By default, the property is not set.

XMSC_WMQ_RECEIVE_CCSID

Destination property that sets the target CCSID for queue manager message conversion. The value is ignored unless XMSC_WMQ_RECEIVE_CONVERSION is set to WMQ_RECEIVE_CONVERSION_QMGR.

Data type:
Integer

Value:
Any positive integer.

The default value is 1208.

Specifying a `GMO_CONVERT` value in a message is optional. If a `GMO_CONVERT` value is specified, conversion takes place according to the value specified.

XMSC_WMQ_RECEIVE_CONVERSION

Destination property that determines whether data conversion is going to be performed by the queue manager.

Data type:
Integer

Values:
XMSC_WMQ_RECEIVE_CONVERSION_CLIENT_MSG (DEFAULT): Perform data conversion on the XMS client only. Conversion is always done using codepage 1208.

XMSC_WMQ_RECEIVE_CONVERSION_QMGR: Perform data conversion on the queue manager before sending a message to the XMS client.

XMSC_WMQ_RECEIVE_EXIT

Data type:
String

Property of:
ConnectionFactory

Identifies a channel receive exit to be run.

The value of the property is a string that identifies a channel receive exit and has the following format:

libraryName(entryPointName)

where,

- **libraryName** is the full path of the managed exit .dll
- entryPointName is the class name qualified by the namespace

For example, C:\MyReceiveExit.dll(MyReceiveExitNameSpace.MyReceiveExitClassName)

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in managed client mode. Also, only managed exits are supported.

XMSC_WMQ_RECEIVE_EXIT_INIT

Data type:
String

Property of:
ConnectionFactory

The user data that is passed to a channel receive exit when it is called.

The value of the property is a string. By default, the property is not set.

This property is relevant only when an application connects to a queue manager in managed client mode and the "XMSC_WMQ_RECEIVE_EXIT" on page 2061 property is set.

XMSC_WMQ_RESOLVED_QUEUE_MANAGER

Data type:
String

Property of:
ConnectionFactory

This property is used to obtain the name of the queue manager to which it is connected.

When used with a CCDT (Client Channel Definition Table), this name might be different from the queue manager name specified in the Connection Factory.

XMSC_WMQ_RESOLVED_QUEUE_MANAGER_ID

Data type:
String

Property of:
ConnectionFactory

This property is populated with the ID of the queue manager after the connection.

XMSC_WMQ_SECURITY_EXIT

Data type:
String

Property of:
ConnectionFactory

Identifies a channel security exit.

The value of the property is a string that identifies a channel security exit and has the following format:

libraryName(entryPointName)

where,

- **libraryName** is the full path of the managed exit .dll
- entryPointName is the class name qualified by the namespace

For example, C:\MySecurityExit.dll(MySecurityExitNameSpace.MySecurityExitClassName)

The maximum length of the string is 128 characters.

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in managed client mode. Also, only managed exits are supported.

XMSC_WMQ_SECURITY_EXIT_INIT

Data type:
String

Property of:
ConnectionFactory

The user data that is passed to a channel security exit when it is called.

The maximum length of the string of user data is 32 characters.

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in managed client mode and the "XMSC_WMQ_SECURITY_EXIT" on page 2062 property is set.

XMSC_WMQ_SEND_EXIT

Data type:
String

Property of:
ConnectionFactory

Identifies a channel send exit.

The value of the property is a string. A channel send exit has the following format:

libraryName(entryPointName)

where,

- **libraryName** is the full path of the managed exit .dll
- entryPointName is the class name qualified by the namespace

For example, `C:\MySendExit.dll(MySendExitNameSpace.MySendExitClassName)`

By default, the property is not set.

This property is relevant only when an application connects to a queue manager in managed client mode. Also, only managed exits are supported.

XMSC_WMQ_SEND_EXIT_INIT

Data type:
String

Property of:
ConnectionFactory

The user data that is passed to channel send exits when they are called.

The value of the property is a string of one or more items of user data separated by commas. By default, the property is not set.

The rules for specifying user data that is passed to a sequence of channel send exits, are the same as the rules for specifying user data that is passed to a sequence of channel receive exits. For the rules therefore, see "XMSC_WMQ_RECEIVE_EXIT_INIT" on page 2062.

This property is relevant only when an application connects to a queue manager in managed client mode and the "XMSC_WMQ_SEND_EXIT" on page 2063 property is set.

XMSC_WMQ_SEND_CHECK_COUNT

Data type:
System.Int32

Property of:
ConnectionFactory

The number of send calls to allow between checking for asynchronous put errors, within a single non-transacted XMS session.

By default this property is set to 0.

XMSC_WMQ_SHARE_CONV_ALLOWED

Data type:
System.Int32

Property of:
ConnectionFactory

Applicable objects:
JMS administration tool long name: SHARECONVALLOWED

JMS administration tool short name: SCALD

Whether a client connection can share its socket with other top-level XMS connections from the same process to the same queue manager, if the channel definitions match. This property is provided to allow complete isolation of Connections in separate sockets if required for application development, maintenance, or operational reasons. Setting this property merely indicates to XMS to make the underlying socket shared. It does not indicate how many connections shares a single socket. The number of connections sharing a socket is determined by SHARECNV value which is negotiated between IBM MQ client and IBM MQ server.

An application can set the following named constants to set the property:

- XMSC_WMQ_SHARE_CONV_ALLOWED_FALSE - Connections do not share a socket.
- XMSC_WMQ_SHARE_CONV_ALLOWED_TRUE - Connections share a socket.

By default the property is set to XMSC_WMQ_SHARE_CONV_ALLOWED_ENABLED.

This property is relevant only when an application connects to a queue manager in client mode.

XMSC_WMQ_SSL_CERT_STORES

Data type:
String

Property of:
ConnectionFactory

The locations of the servers that hold the certificate revocation lists (CRLs) to be used on an SSL connection to a queue manager.

The value of the property is a list of one or more URLs separated by commas. Each URL has the following format:

```
[user[/password]@]ldap://[serveraddress][:portnum][,...]
```

This format is compatible with, but extended from, the basic MQJMS format.

It is valid to have an empty `serveraddress`. In this case, XMS assumes that the value is the string "localhost".

An example list is:

```
myuser/mypassword@ldap://server1.mycom.com:389
ldap://server1.mycom.com
ldap://
ldap://:389
```

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

By default, the property is not set.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_CIPHER_SPEC

Data type:
String

Property of:
ConnectionFactory

The name of the CipherSpec to be used on a secure connection to a queue manager.

Cipher specifications that you can use with IBM MQ TLS support are listed in the following table. When you request a personal certificate, you specify a key size for the public and private key pair. The key size that is used during the SSL handshake is the size stored in the certificate unless it is determined by the CipherSpec, as noted in the table. By default, this property is not set.

CipherSpec name	Protocol used	Hash algorithm	Encryption algorithm	Encryption bits	FIPS[1]	Suite B 128 bit	Suite B 192 bit
TLS_RSA_WITH_AES_128_CBC_SHA	TLS 1.0	SHA-1	AES	128	Yes	No	No
TLS_RSA_WITH_AES_256_CBC_SHA[2]	TLS 1.0	SHA-1	AES	256	Yes	No	No
TLS_RSA_WITH_DES_CBC_SHA	TLS 1.0	SHA-1	DES	56	No	No	No
TLS_RSA_WITH_3DES_EDE_CBC_SHA[4]	TLS 1.0	SHA-1	3DES	168	Yes	No	No
TLS_RSA_WITH_AES_128_GCM_SHA256	TLS 1.2	SHA-256	AES	128	Yes	No	No
TLS_RSA_WITH_AES_256_GCM_SHA384	TLS 1.2	SHA-384	AES	256	Yes	No	No
TLS_RSA_WITH_AES_128_CBC_SHA256	TLS 1.2	SHA-256	AES	128	Yes	No	No
TLS_RSA_WITH_AES_256_CBC_SHA256	TLS 1.2	SHA-256	AES	256	Yes	No	No
ECDHE_ECDSA_RC4_128_SHA256	TLS 1.2	SHA-256	RC4	128	No	No	No
ECDHE_ECDSA_3DES_EDE_CBC_SHA256	TLS 1.2	SHA-256	3DES	168	Yes	No	No

CipherSpec name	Protocol used	Hash algorithm	Encryption algorithm	Encryption bits	FIPS[1]	Suite B 128 bit	Suite B 192 bit
ECDHE_RSA_RC4_128_SHA256	TLS 1.2	SHA-256	RC4	128	No	No	No
ECDHE_RSA_3DES_EDE_CBC_SHA256	TLS 1.2	SHA-256	3DES	168	Yes	No	No
ECDHE_ECDSA_AES_128_CBC_SHA256	TLS 1.2	SHA-256	AES	128	Yes	No	No
ECDHE_ECDSA_AES_256_CBC_SHA384	TLS 1.2	SHA-384	AES	256	Yes	No	No
ECDHE_RSA_AES_128_CBC_SHA256	TLS 1.2	SHA-256	AES	128	Yes	No	No
ECDHE_RSA_AES_256_CBC_SHA384	TLS 1.2	SHA-384	AES	256	Yes	No	No
ECDHE_ECDSA_AES_128_GCM_SHA256	TLS 1.2	SHA-256	AES	128	Yes	Yes	No
ECDHE_ECDSA_AES_256_GCM_SHA384	TLS 1.2	SHA-384	AES	256	Yes	No	Yes
ECDHE_RSA_AES_128_GCM_SHA256	TLS 1.2	SHA-256	AES	128	Yes	No	No
ECDHE_RSA_AES_256_GCM_SHA384	TLS 1.2	SHA-384	AES	256	Yes	No	No
TLS_RSA_WITH_NULL_SHA256	TLS 1.2	SHA-256	None	0	No	No	No
ECDHE_RSA_NULL_SHA256	TLS 1.2	SHA-256	None	0	No	No	No
ECDHE_ECDSA_NULL_SHA256	TLS 1.2	SHA-256	None	0	No	No	No
TLS_RSA_WITH_NULL_NULL	TLS 1.2	None	None	0	No	No	No
TLS_RSA_WITH_RC4_128_SHA256	TLS 1.2	SHA-256	RC4	128	No	No	No

Notes:

1. Specifies whether the CipherSpec complies with Federal Information Processing Standards (FIPS) 140-2. For an explanation of FIPS and information about how to configure IBM MQ for FIPS 140-2 compliant operation, see Federal Information Processing Standards (FIPS).
2. This CipherSpec cannot be used to secure a connection from the IBM MQ Explorer to a queue manager unless the appropriate unrestricted policy files are applied to the JRE used by the IBM MQ Explorer.
3. This CipherSpec was FIPS 140-2 certified before 19 May 2007.
4. When IBM MQ is configured for FIPS 140-2 compliant operation, this CipherSpec can be used to transfer up to 32 GB of data before the connection is terminated with error AMQ9288. To avoid this error, either avoid using triple DES (which is deprecated), or enable secret key reset when using this CipherSpec in a FIPS 140-2 configuration.

Related concepts
Data integrity of messages
Related tasks
Securing
Specifying CipherSpecs

XMSC_WMQ_SSL_CIPHER_SUITE

Data type:
String

Property of:
ConnectionFactory

The name of the CipherSuite to be used on a TLS connection to a queue manager. The protocol used in negotiating the secure connection depends on the specified CipherSuite.

This property has the following canonical values:

- SSL_RSA_WITH_DES_CBC_SHA
- SSL_RSA_EXPORT1024_WITH_DES_CBC_SHA
- SSL_RSA_EXPORT1024_WITH_RC4_56_SHA
- SSL_RSA_EXPORT_WITH_RC4_40_MD5
- SSL_RSA_WITH_RC4_128_MD5
- SSL_RSA_WITH_RC4_128_SHA
- SSL_RSA_WITH_3DES_EDE_CBC_SHA
- SSL_RSA_WITH_AES_128_CBC_SHA
- SSL_RSA_WITH_AES_256_CBC_SHA
- SSL_RSA_WITH_DES_CBC_SHA
- SSL_RSA_WITH_3DES_EDE_CBC_SHA

This value can be supplied as an alternative to XMSC_WMQ_SSL_CIPHER_SPEC.

If a non-empty value is specified for XMSC_WMQ_SSL_CIPHER_SPEC, this value overrides the setting for XMSC_WMQ_SSL_CIPHER_SUITE. If XMSC_WMQ_SSL_CIPHER_SPEC does not have a value, the value of XMSC_WMQ_SSL_CIPHER_SUITE is used as the cipher suite to be given to GSKit. In this case, the value is mapped on to the equivalent CipherSpec value, as described in CipherSuite and CipherSpec name mappings for XMS connections to an IBM MQ queue manager.

If both XMSC_WMQ_SSL_CIPHER_SPEC and XMSC_WMQ_SSL_CIPHER_SUITE are empty, the field pChDef->SSLCipherSpec is filled with spaces.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

By default, the property is not set.

Related concepts
SSL and TLS support for the unmanaged .NET client
SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_CRYPTO_HW

Data type:
String

Property of:
ConnectionFactory

Configuration details for the cryptographic hardware connected to the client system.

This property has the following canonical values:

- GSK_ACCELERATOR_RAINBOW_CS_OFF
- GSK_ACCELERATOR_RAINBOW_CS_ON
- GSK_ACCELERATOR_NCIPHER_NF_OFF
- GSK_ACCELERATOR_NCIPHER_NF_ON

There is a special format for PKCS11 cryptographic hardware (where DriverPath, TokenLabel, and TokenPassword are user-specified strings):

```
GSK_PKCS11=PKCS#11 DriverPath; PKCS#11 TokenLabel;PKCS#11 TokenPassword
```

XMS does not interpret or alter the contents of the string. It copies the value supplied, up to a limit of 256 single-byte characters, into the MQSCO.CryptoHardware field.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

By default, the property is not set.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_FIPS_REQUIRED

Data type:
Boolean

Property of:
ConnectionFactory

The value of this property determines whether an application can or cannot use non-FIPS compliant cipher suites. If this property is set to true, only FIPS algorithms are used for the client-server connection.

This property can have the following values, which translate to the two canonical values for MQSCO.FipsRequired:

Table 881. Table of values for MQSCO.FlipsRequired property

Value	Description	Corresponding value of MQSCO.FipsRequired
false	Any CipherSpec can be used.	MQSSL_FIPS_NO (the default)
true	Only FIPS-certified cryptographic algorithms can be used in the CipherSpec applying to this client connection.	MQSSL_FIPS_YES

XMS copies the relevant value into MQSCO.FipsRequired before calling MQCONNX.

The parameter MQSCO.FipsRequired is only available from IBM WebSphere MQ 6.0. For IBM WebSphere MQ 5.3, if this property is set, XMS does not attempt to make the connection to the queue manager, and throws an appropriate exception instead.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_KEY_REPOSITORY

Data type:
String

Property of:
ConnectionFactory

The location of the key database file in which keys and certificates are stored.

XMS copies the string, up to a limit of 256 single-byte characters, into the MQSCO.KeyRepository field. IBM MQ interprets this string as a filename, including the full path.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

By default, the property is not set.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_KEY_RESETCOUNT

Data type:
System.Int32

Property of:
ConnectionFactory

The KeyResetCount represents the total number of unencrypted bytes sent and received within an SSL conversation before the secret key is renegotiated. The number of bytes includes control information sent by the MCA.

XMS copies the value that you supply for this property into MQSCO.KeyResetCount before calling MQCONNX.

The parameter MQSCO.KeyRestCount is only available from IBM WebSphere MQ 6. If you are running IBM WebSphere MQ 5.3 and this property is set, XMS does not attempt to make the connection to the queue manager, and throws an appropriate exception instead.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

The default value of this property is zero, which means that secret keys are never renegotiated.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

XMSC_WMQ_SSL_PEER_NAME

Data type:
String

Property of:
ConnectionFactory

The peer name to be used on an SSL connection to a queue manager.

There is no list of canonical values for this property. Instead, you must build this string according to the rules for SSLPEER.

An example of a peer name is:

```
"CN=John Smith, O=IBM ,OU=Test , C=GB"
```

XMS copies the string into the correct single-byte code page, and places the correct values into MQCD.SSLPeerNamePtr and MQCD.SSLPeerNameLength before calling MQCONNX.

This property is relevant only if the application connects to a queue manager in client mode.

For .NET only: From IBM MQ 8.0, managed connections to IBM MQ (WMQ_CM_CLIENT) and unmanaged connections to IBM MQ (WMQ_CM_CLIENT_UNMANAGED) both support TLS/SSL connections.

By default, the property is not set.

Related concepts

SSL and TLS support for the unmanaged .NET client

SSL and TLS support for the managed .NET client

Related reference

SSLPEERNAME

XMSC_WMQ_SYNCPOINT_ALL_GETS

Data type:
System.Boolean

Property of:
ConnectionFactory

Whether all messages must be retrieved from queues within sync point control.

The valid values of the property are as follows:

Valid value	Meaning
false	When the circumstances are appropriate, the XMS client can retrieve messages from queues outside of sync point control.
true	The XMS client must retrieve all messages from queues within sync point control.

The default value is false.

XMSC_WMQ_TARGET_CLIENT

Data type:
System.Int32

Property of:
Destination

Name used in a URI:
targetClient

Whether messages sent to the destination contain an MQRFH2 header.

If an application sends a message containing an MQRFH2 header, the receiving application must be able to handle the header.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WMQ_TARGET_DEST_JMS	Messages sent to the destination contain an MQRFH2 header. Specify this value if the application is sending the messages to another XMS application, an IBM MQ classes for JMS application, or a native IBM MQ application that is designed to handle an MQRFH2 header.

Valid value	Meaning
XMSC_WMQ_TARGET_DEST_MQ	Messages sent to the destination do not contain an MQRFH2 header. Specify this value if the application is sending the messages to a native IBM MQ application that is not designed to handle an MQRFH2 header.

The default value is XMSC_WMQ_TARGET_DEST_JMS.

XMSC_WMQ_TEMP_Q_PREFIX

Data type:
String

Property of:
ConnectionFactory

The prefix used to form the name of the IBM MQ dynamic queue that is created when the application creates an XMS temporary queue.

The rules for forming the prefix are the same as the rules for forming the contents of the **`DynamicQName`** field in an object descriptor, but the last non-blank character must be an asterisk(*). If the property is not set, the value used is `CSQ.*` on z/OS and `AMQ.*` on the other platforms. By default, the property is not set.

This property is relevant only in the point-to-point domain.

XMSC_WMQ_TEMP_TOPIC_PREFIX

Data type:
String

Property of:
ConnectionFactory, Destination

When creating temporary topics, XMS generates a topic string of the form "`TEMP/TEMPTOPICPREFIX/unique_id`", or if this property contains the default value, then this string, "`TEMP/unique_id`", is generated. Specifying a non-empty value allows specific model queues to be defined for creating the managed queues for subscribers to temporary topics created under this connection.

Any non-null string consisting only of valid characters for an IBM MQ topic string is a valid value for this property.

By default this property is set to "" (empty string).

Note: This property is relevant only in the publish/subscribe domain.

XMSC_WMQ_TEMPORARY_MODEL

Data type:
String

Property of:
ConnectionFactory

The name of the IBM MQ model queue from which a dynamic queue is created when the application creates an XMS temporary queue.

The default value of the property is SYSTEM.DEFAULT.MODEL.QUEUE.

This property is relevant only in the point-to-point domain.

XMSC_WMQ_WILDCARD_FORMAT

Data type:
System.Int32

Property of:
ConnectionFactory, Destination

This property determines which version of wildcard syntax is to be used.

When using publish/subscribe with IBM MQ '*' and '?' are treated as wildcards. Whereas '#' and '+' are treated as wildcards when using publish subscribe with IBM Integration Bus. This property replaces the XMSC_WMQ_BROKER_VERSION property.

The valid values for this property are:

XMSC_WMQ_WILDCARD_TOPIC_ONLY
Recognizes the topic level wildcards only i.e. '#' and '+' are treated as wildcards. This value is same as XMSC_WMQ_BROKER_V2.

XMSC_WMQ_WILDCARD_CHAR_ONLY
Recognizes the character wildcards only i.e. '*' and '?' are treated as wildcards. This value is same as XMSC_WMQ_BROKER_V1.

By default this property is set to XMSC_WMQ_WILDCARD_TOPIC_ONLY.

XMSC_WPM_BUS_NAME

Data type:
String

Property of:
ConnectionFactory and Destination

Name used in a URI:
busName

For a connection factory, the name of the service integration bus that the application connects to or, for a destination, the name of the service integration bus in which the destination exists.

For a destination that is a topic, this property is the name of the service integration bus in which the associated topic space exists. This topic space is specified by the XMSC_WPM_TOPIC_SPACE property.

If the property is not set for a destination, the queue or associated topic space is assumed to exist in the service integration bus to which the application connects.

By default, the property is not set.

XMSC_WPM_CONNECTION_PROTOCOL

Data type:
System.Int32

Property of:
Connection

The communications protocol used for the connection to the messaging engine. This property is read-only.

The possible values of the property are as follows:

Value	Meaning
XMSC_WPM_CP_HTTP	The connection uses HTTP over TCP/IP.
XMSC_WPM_CP_TCP	The connection uses TCP/IP.

XMSC_WPM_CONNECTION_PROXIMITY

Data type:
System.Int32

Property of:
ConnectionFactory

The connection proximity setting for the connection. This property determines how close the messaging engine that the application connects to must be to the bootstrap server.

The valid values of the property are as follows:

Valid value	Connection proximity setting
XMSC_WPM_CONNECTION_PROXIMITY_BUS	Bus
XMSC_WPM_CONNECTION_PROXIMITY_CLUSTER	Cluster
XMSC_WPM_CONNECTION_PROXIMITY_HOST	Host
XMSC_WPM_CONNECTION_PROXIMITY_SERVER	Server

The default value is XMSC_WPM_CONNECTION_PROXIMITY_BUS.

XMSC_WPM_DUR_SUB_HOME

Data type:
String

Property of:
ConnectionFactory

Name used in a URI:
durableSubscriptionHome

The name of the messaging engine where all durable subscriptions for a connection or a destination are managed. Messages to be delivered to the durable subscribers are stored at the publication point of the same messaging engine.

A durable subscription home must be specified for a connection before an application can create a durable subscriber that uses the connection. Any value specified for a destination overrides the value specified for the connection.

By default, the property is not set.

This property is relevant only in the publish/subscribe domain.

XMSC_WPM_HOST_NAME

Data type:
String

Property of:
Connection

The host name or IP address of the system that contains the messaging engine to which the application is connected. This property is read-only.

XMSC_WPM_LOCAL_ADDRESS

Data type:
String

Property of:
ConnectionFactory

For a connection to a service integration bus, this property specifies the local network interface to be used, or the local port or range of local ports to be used, or both.

The value of the property is a string with the following format:

[*host_name*][(*low_port*)[,*high_port*])]

The meanings of the variables are as follows:

host_name
: The host name or IP address of the local network interface to be used for the connection.

  Providing this information is necessary only if the system on which the application is running has two or more network interfaces and you need to be able to specify which interface must be used for the connection. If the system has only one network interface, only that interface can be used. If the system has two or more network interfaces and you do not specify which interface must be used, the interface is selected at random.

low_port
: The number of the local port to be used for the connection.

  If *high_port* is also specified, *low_port* is interpreted the lowest port number in a range of port numbers.

high_port
: The highest port number in a range of port numbers. One of the ports in the specified range must be used for the connection.

Here are some examples of valid values of the property:

```
JUPITER
9.20.4.98
JUPITER(1000)
9.20.4.98(1000,2000)
(1000)
(1000,2000)
```

By default, the property is not set.

XMSC_WPM_ME_NAME

Data type:
String

Property of:
Connection

The name of the messaging engine to which the application is connected. This property is read-only.

XMSC_WPM_NON_PERSISTENT_MAP

Data type:
System.Int32

Property of:
ConnectionFactory

The reliability level of nonpersistent messages that are sent using the connection.

The valid values of the property are as follows:

Valid value	Reliability level
XMSC_WPM_MAPPING_AS_DESTINATION	Determined by the default reliability level specified for the queue or topic space in the service integration bus
XMSC_WPM_MAPPING_BEST_EFFORT_NON_PERSISTENT	Best effort nonpersistent
XMSC_WPM_MAPPING_EXPRESS_NON_PERSISTENT	Express nonpersistent

Valid value	Reliability level
XMSC_WPM_MAPPING_RELIABLE_NON_PERSISTENT	Reliable nonpersistent
XMSC_WPM_MAPPING_RELIABLE_PERSISTENT	Reliable persistent
XMSC_WPM_MAPPING_ASSURED_PERSISTENT	Assured persistent

The default value is XMSC_WPM_MAPPING_EXPRESS_NON_PERSISTENT.

XMSC_WPM_PERSISTENT_MAP

Data type:
System.Int32

Property of:
ConnectionFactory

The reliability level of persistent messages that are sent using the connection.

The valid values of the property are as follows:

Valid value	Reliability level
XMSC_WPM_MAPPING_AS_DESTINATION	Determined by the default reliability level specified for the queue or topic space in the service integration bus
XMSC_WPM_MAPPING_BEST_EFFORT_NON_PERSISTENT	Best effort nonpersistent
XMSC_WPM_MAPPING_EXPRESS_NON_PERSISTENT	Express nonpersistent
XMSC_WPM_MAPPING_RELIABLE_NON_PERSISTENT	Reliable nonpersistent
XMSC_WPM_MAPPING_RELIABLE_PERSISTENT	Reliable persistent
XMSC_WPM_MAPPING_ASSURED_PERSISTENT	Assured persistent

The default value is XMSC_WPM_MAPPING_RELIABLE_PERSISTENT.

XMSC_WPM_PORT

Data type:
System.Int32

Property of:
Connection

The number of the port listened on by the messaging engine to which the application is connected. This property is read-only.

XMSC_WPM_PROVIDER_ENDPOINTS

Data type:
String

Property of:
ConnectionFactory

A sequence of one or more endpoint addresses of bootstrap servers. The endpoint addresses are separated by commas.

A bootstrap server is an application server that is responsible for selecting the messaging engine to which the application connects. The endpoint address of a bootstrap server has the following format:

host_name:*port_number*:*chain_name*

The meanings of the components of an endpoint address are as follows:

host_name
The host name or IP address of the system on which the bootstrap server resides. If no host name or IP address is specified, the default is `localhost`.

port_number
The number of the port on which the bootstrap server listens for incoming requests. If no port number is specified, the default is 7276.

chain_name
The name of a bootstrap transport chain used by the bootstrap server. The valid values are as follows:

Valid value	Name of the bootstrap transport chain
XMSC_WPM_BOOTSTRAP_HTTP	BootstrapTunneledMessaging
XMSC_WPM_BOOTSTRAP_HTTPS	BootstrapTunneledSecureMessaging
XMSC_WPM_BOOTSTRAP_SSL	BootstrapSecureMessaging
XMSC_WPM_BOOTSTRAP_TCP	BootstrapBasicMessaging

If no name is specified, the default value is XMSC_WPM_BOOTSTRAP_TCP.

If no endpoint address is specified, the default is localhost:7276:BootstrapBasicMessaging.

XMSC_WPM_SSL_CIPHER_SUITE

Data type:
String

Property of:
ConnectionFactory

The name of the CipherSuite to be used on a TLS connection to a WebSphere Application Server service integration bus messaging engine. The protocol used in negotiating the secure connection depends on the specified CipherSuite.

Table 882. CipherSuite options for connection to a WebSphere Application Server service integration bus messaging engine

Cipher suite	Protocol used
TLS_RSA_WITH_DES_CBC_SHA	TLSv1
TLS_RSA_WITH_3DES_EDE_CBC_SHA	TLSv1
TLS_RSA_WITH_AES_128_CBC_SHA	TLSv1
TLS_RSA_WITH_AES_256_CBC_SHA	TLSv1

Notes:

1. TLS_RSA_WITH_AES_128_CBC_SHA and TLS_RSA_WITH_AES_256_CBC_SHA CipherSuites are supported on Windows or Solaris only. (This is dictated by GSKit.)
2. TLS_RSA_WITH_3DES_EDE_CBC_SHA is deprecated. However, it can still be used to transfer up to 32 GB of data before the connection is terminated with error AMQ9288. To avoid this error, you need to either avoid using triple DES, or enable secret key reset when using this CipherSpec.

There is no default for this property. If you want to use SSL or TLS, you must specify a value for this property, otherwise your application is not able to connect successfully to the server.

XMSC_WPM_SSL_FIPS_REQUIRED

Note: On UNIX, Linux, and Windows, IBM MQ provides FIPS 140-2 compliance through the "IBM Crypto for C" cryptographic module. The certificate for this module has been moved to the Historical status. Customers should view the IBM Crypto for C certificate and be aware of any advice provided by NIST. A replacement FIPS 140-3 module is currently in progress and its status can be viewed by searching for it in the NIST CMVP modules in process list.

Data type:
Boolean

Property of:
ConnectionFactory

The value of this property determines whether an application can or cannot use non-FIPS compliant cipher suites. If this property is set to true, only FIPS algorithms are used for the client-server connection.Setting the value of this property to TRUE prevents the application from using non-FIPS compliant cipher suites.

By default, the property is set to FALSE (that is, FIPS mode off).

XMSC_WPM_SSL_KEY_REPOSITORY

Data type:
String

Property of:
ConnectionFactory

A path to the file that is the keyring file containing the public or private keys to be used in the secure connection.

Setting the keyring file property to the special value of XMSC_WPM_SSL_MS_CERTIFICATE_STORE specifies the use the Microsoft Windows key database. Using the Microsoft Windows key database, which is found under **Control Panel** > **Internet Options** > **Content** > **Certificates**, removes the need for a separate key file database. Use of this constant on Windows x64 and other platforms is not permitted.

By default, the property is not set.

XMSC_WPM_SSL_KEYRING_LABEL

Data type:
String

Property of:
ConnectionFactory

The certificate to be used when authenticating with the server. If no value is specified, the default certificate is used.

By default, the property is not set.

XMSC_WPM_SSL_KEYRING_PW

Data type:
String

Property of:
ConnectionFactory

The password for the keyring file.

This property can be used as an alternative to using XMSC_WPM_SSL_KEYRING_STASH_FILE to configure the password for the keyring file.

By default, the property is not set.

XMSC_WPM_SSL_KEYRING_STASH_FILE

Data type:
String

Property of:
ConnectionFactory

The name of a binary file containing the password of the key repository file.

This property can be used as an alternative to using XMSC_WPM_SSL_KEYRING_PW to configure the password for the keyring file.

By default, the property is not set.

XMSC_WPM_TARGET_GROUP

Data type:
String

Property of:
ConnectionFactory

The name of a target group of messaging engines. The nature of the target group is determined by the XMSC_WPM_TARGET_TYPE property.

Set this property if you want to restrict the search for a messaging engine to a subgroup of the messaging engines in the service integration bus. If you want your application to be able to connect to any messaging engine in the service integration bus, do not set this property.

By default, the property is not set.

XMSC_WPM_TARGET_SIGNIFICANCE

Data type:
System.Int32

Property of:
ConnectionFactory

The significance of the target group of messaging engines.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WPM_TARGET_SIGNIFICANCE_ PREFERRED	A messaging engine in the target group is selected if one is available. Otherwise, a messaging engine outside the target group is selected, provided it is in the same service integration bus.
XMSC_WPM_TARGET_SIGNIFICANCE_ REQUIRED	The selected messaging engine must be in the target group. If a messaging engine in the target group is not available, the connection process fails.

The default value of the property is XMSC_WPM_TARGET_SIGNIFICANCE_PREFERRED.

XMSC_WPM_TARGET_TRANSPORT_CHAIN

Data type:
String

Property of:
ConnectionFactory

The name of the inbound transport chain that the application must use to connect to a messaging engine.

The value of the property can be the name of any inbound transport chain that is available in the application server that hosts the messaging engine. The following named constant is provided for one of the predefined inbound transport chains:

Named constant	Name of transport chain
XMSC_WPM_TARGET_TRANSPORT_CHAIN_BASIC	InboundBasicMessaging

The default value of the property is XMSC_WPM_TARGET_TRANSPORT_CHAIN_BASIC.

XMSC_WPM_TARGET_TYPE

Data type:
System.Int32

Property of:
ConnectionFactory

The type of the target group of messaging engines. This property determines the nature of the target group identified by the XMSC_WPM_TARGET_GROUP property.

The valid values of the property are as follows:

Valid value	Meaning
XMSC_WPM_TARGET_TYPE_BUSMEMBER	The name of the target group is the name of a bus member. The target group is all the messaging engines in the bus member.
XMSC_WPM_TARGET_TYPE_CUSTOM	The name of the target group is the name of a user-defined group of messaging engines. The target group is all the messaging engines that are registered with the user-defined group.
XMSC_WPM_TARGET_TYPE_ME	The name of the target group is the name of a messaging engine. The target group is the specified messaging engine.

By default, the property is not set.

XMSC_WPM_TEMP_Q_PREFIX

Data type:
String

Property of:
ConnectionFactory

The prefix used to form the name of the temporary queue that is created in the service integration bus when the application creates an XMS temporary queue. The prefix can contain up to 12 characters.

The name of a temporary queue starts with the characters "_Q" followed by the prefix. The remainder of the name consists of system generated characters.

By default, the property is not set, which means that the name of a temporary queue does not have a prefix.

This property is relevant only in the point-to-point domain.

XMSC_WPM_TEMP_TOPIC_PREFIX

Data type:
String

Property of:
ConnectionFactory

The prefix used to form the name of a temporary topic that is created by the application. The prefix can contain up to 12 characters.

The name of a temporary topic starts with the characters "_T" followed by the prefix. The remainder of the name consists of system generated characters.

By default, the property is not set, which means that the name of a temporary topic does not have a prefix.

This property is relevant only in the publish/subscribe domain.

XMSC_WPM_TOPIC_SPACE

Data type:
String

Property of:
Destination

Name used in a URI:
topicSpace

The name of the topic space that contains the topic. Only a destination that is a topic can have this property.

By default, the property is not set, which means that the default topic space is assumed.

This property is relevant only in the publish/subscribe domain.

Managed File Transfer developing applications reference

Reference information to help you develop applications for Managed File Transfer.

Examples of using fteCreateTransfer to start programs

You can use the **fteCreateTransfer** command to specify programs to run before or after a transfer.

In addition to using **fteCreateTransfer**, there are other ways to invoke a program before or after a transfer. For more information, see Specifying programs to run with MFT.

All these examples use the following syntax to specify a program:

```
[type:]commandspec[,[retrycount][,[retrywait][,successrc]]]
```

For more information about this syntax, see **fteCreateTransfer**: start a new file transfer.

Running an executable program

The following example specifies an executable program called mycommand and passes two arguments, a and b, to the program.

```
mycommand(a,b)
```

To run this program at the source agent AGENT1 before the transfer starts, use the following command:

```
fteCreateTransfer -sa AGENT1 -da AGENT2 -presrc mycommand(a,b)
destinationSpecification sourceSpecification
```

Running, and retrying, an executable program

The following example specifies an executable program called `simple`, which does not take any arguments. A value of 1 is specified for `retrycount` and a value of 5 is specified for `retrywait`. These values mean that the program will be retried once if it does not return a successful return code, after a wait of five seconds. No value is specified for `successrc`, so the only successful return code is the default value of 0.

```
executable:simple,1,5
```

To run this program at the source agent AGENT1 after the transfer has completed, use the following command:

```
fteCreateTransfer -sa AGENT1 -da AGENT2 -postsrc executable:simple,1,5
destinationSpecification sourceSpecification
```

Running an Ant script and specifying successful return codes

The following example specifies an Ant script called `myscript` and passes two properties to the script. The script is run using the **`fteAnt`** command. The value for `successrc` is specified as `>2&<7&!5|0|14`, which specifies that return codes of 0, 3, 4, 6, and 14 indicate success.

```
antscript:myscript(prop1=fred,prop2=bob),,,>2&<7&!5|0|14
```

To run this program at the destination agent AGENT2 before the transfer has started, use the following command:

```
fteCreateTransfer -sa AGENT1 -da AGENT2 -predst
"antscript:myscript(prop1=fred,prop2=bob),,,>2&<7&!5|0|14"destinationSpecification sourceSpecification
```

Running an Ant script and specifying targets to call

The following example specifies an Ant script called `script2` and two targets, `target1` and `target2`, to call. The property `prop1` is also passed in, with a value of `recmfm(F,B)`. The comma (,) and parentheses in this value are escaped using a backslash character (\).

```
antscript:script2(target1,target2,prop1=recmfm\(F\,B\)),,,>2&<7&!5|0|14
```

To run this program at the destination agent AGENT2 after the transfer has completed, use the following command:

```
fteCreateTransfer -sa AGENT1 -da AGENT2
-postdst "antscript:script2(target1,target2,prop1=recmfm\(F\,B\)),,,>2&<7&!5|0|14"
destinationSpecification sourceSpecification
```

Using metadata in an Ant script

You can specify an Ant task as any of the following calls for a transfer:

- pre source
- post source
- predestination
- post destination

When the Ant task is run, the user meta data of the transfer is made available using environment variables. You can access this data using, for example, the following code:

```
<property environment="environment" />
<echo>${environment.mymetadata}</echo>
```

where `mymetadata` is the name of some meta data inserted into the transfer.

Running a JCL script

The following example specifies a JCL script called ZOSBATCH. A value of 3 is specified for `retrycount`, a value of 30 is specified for `retrywait` and a value of 0 is specified for `successrc`. These values mean that the script is retried three times if it does not return a successful return code of 0, with a wait of thirty seconds between each attempt.

```
jcl:ZOSBATCH,3,30,0
```

where ZOSBATCH is a member of a PDS called MYSYS.JCL, and the `agent.properties` file contains the line `commandPath=....://'MYSYS.JCL':...`

To run this program at the source agent AGENT1 after the transfer has completed, use the following command:

```
fteCreateTransfer -sa AGENT1 -da AGENT2 -postsrc jcl:ZOSBATCH,3,30,0
destinationSpecification sourceSpecification
```

Related tasks

Specifying programs to run with MFT

Related reference

`fteCreateTransfer`: start a new file transfer

`fteAnt`: run Ant tasks in MFT

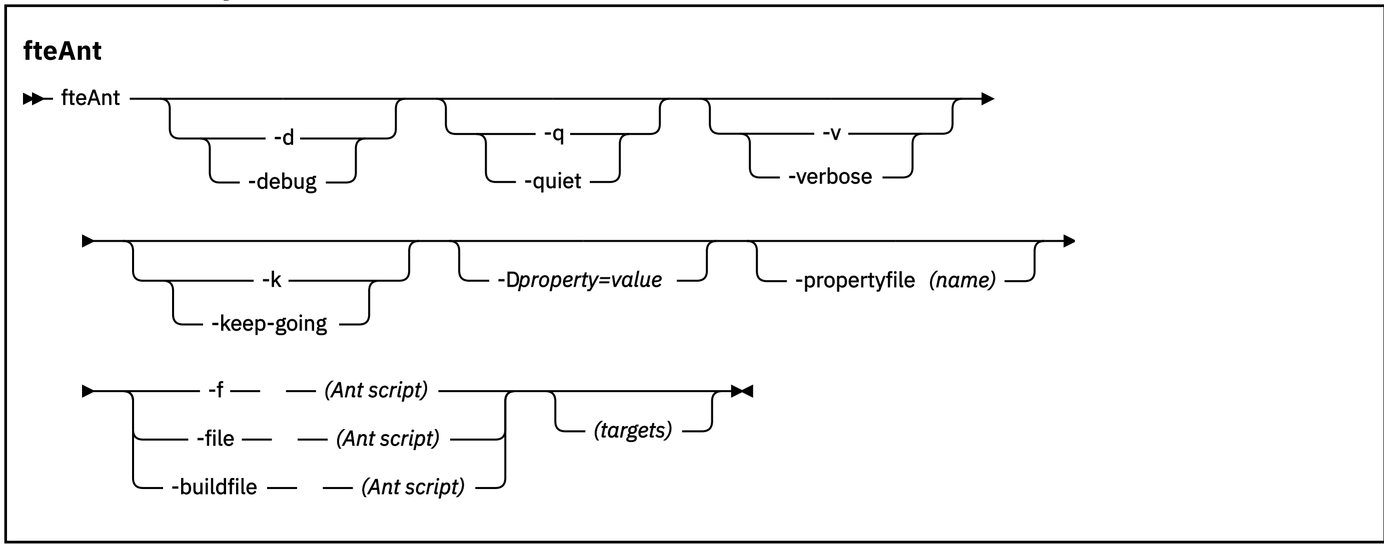
The **`fteAnt`** command runs Ant scripts in an environment that has Managed File Transfer Ant tasks available. Unlike the standard **`ant`** command, **`fteAnt`** requires that you define a script file.

MFT Ant tasks and nested parameters

Managed File Transfer provides a number of Ant tasks that you can use to access file transfer capabilities. There is also a set of nested parameters available; these parameters describe nested sets of elements that are common across several of the supplied Ant tasks.

The **`fteAnt`** command syntax, parameters, usage example and return codes are described in the rest of this topic. For details of the Ant tasks and nested parameters that are provided by MFT, see the subtopics.

fteAnt syntax



Parameters

-debug or -d
Optional. Generate debugging output.

-quiet or -q
Optional. Generate minimal output.

-verbose or -v
Optional. Generate verbose output.

-keep-going or -k
Optional. Execute all targets that do not depend on failed targets.

-D *property=value*
Optional. Use *value* for a given *property*. Properties that are set with **-D** take precedence over those set in a properties file.

Use the property **com.ibm.wmqfte.propertyset** to specify the set of configuration options that are used for Ant tasks. Use the name of a non-default coordination queue manager as the value for this property. Ant tasks then use the set of configuration options that are associated with this non-default coordination queue manager. If you do not specify this property, the default set of configuration options that are based on the default coordination queue manager is used. If you specify the **cmdqm** attribute for an Ant task, this attribute takes precedence over the set of configuration options that are specified for the **fteAnt** command. This behavior applies regardless of whether you are using the default set of configuration options or specifying a set with the **com.ibm.wmqfte.propertyset** property.

-propertyfile (*name*)
Optional. Load all properties from a file with **-D** properties taking precedence.

-f (*Ant script*), -file (*Ant script*), or -buildfile (*Ant script*)
Required. Specifies the name of the Ant script to run.

targets
Optional. The name of one or more targets to run from the Ant script. If you do not specify a value for this parameter, the default target for the script is run.

-version
Optional. Displays the Managed File Transfer command and Ant versions.

-? or -h
Optional. Displays command syntax.

Example

In this example, the target **copy** in Ant script `fte_script.xml` is run and the command writes debugging output to standard out.

```
fteAnt -d -f fte_script.xml copy
```

Return codes

0
Command completed successfully.

1
Command ended unsuccessfully.

Other status return codes can also be specified from Ant scripts, for example by using the Ant fail task.

See Fail for more information.

fte:awaitoutcome Ant task

Waits for a **fte:filecopy**, **fte:filemove**, or **fte:call** operation to complete.

Attributes

id
: Required. Identifies the transfer to await an outcome from. Typically, this is a property set by the idProperty attribute of the fte:filecopy, fte:filemove, or fte:call tasks.

rcproperty
: Required. Names a property to store the return code of the **fte:awaitoutcome** task in.

timeout
: Optional. The maximum amount of time, in seconds, to wait for the operation to complete. The minimum timeout is one second. If you do not specify a timeout value, the **fte:awaitoutcome** task waits forever for the outcome of the operation to be determined.

Example

In this example a file copy is started, and its identifier is stored in the `copy.id` property. While the copy is progressing, other processing can take place. The **fte:awaitoutcome** statement is used to wait until the copy operation completes. The **fte:awaitoutcome** statement identifies which operation to wait for using the identifier stored in the `copy.id` property. The **fte:awaitoutcome** stores a return code indicating the outcome of the copy operation into a property called `copy.result`.

```
<-- issue a file copy request -->
<fte:filecopy
src="AGENT1@QM1"
dst="AGENT2@QM2"
idproperty="copy.id"
outcome="defer">

<fte:filespec
  srcfilespec="/home/fteuser1/file.bin"
  dstdir="/home/fteuser2"/>

</fte:filecopy>

<fte:awaitoutcome id="${copy.id}" rcProperty="copy.rc"/>

<echo>Copy id=${copy.id} rc=${copy.rc}</echo>
```

Related tasks

Using Apache Ant with MFT

fte:call Ant task

You can use the **fte:call** task to remotely call scripts and programs.

This task allows you to send a **fte:call** request to an agent. The agent processes this request by running a script or program and returning the outcome. The commands to call must be accessible to the agent. Ensure the commandPath property value in the `agent.properties` file includes the location of the commands to call. Any path information specified by the command nested element must be relative to the locations specified by the commandPath property. By default commandPath is empty so that the agent cannot call any commands. For more information about this property, see commandPath MFT property.

For more information about the `agent.properties` file, see The MFT `agent.properties` file.

Attributes

agent

Required. Specifies the agent to submit the **fte:call** request to. Specify the agent information in the form: *agentname@qmgrname* where *agentname* is the name of the agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

cmdqm

Optional. The command queue manager to submit the request to. Specify this information in the form *qmgrname@host@port@channel*, where:

- *qmgrname* is the name of the queue manager
- *host* is the optional host name of the system where the queue manager is running
- *port* is the optional port number that the queue manager is listening on
- *channel* is the optional SVRCONN channel to use

If you omit the *host*, *port*, or *channel* information for the command queue manager, the connection information specified in the `command.properties` file is used. For more information, see The MFT command.properties file.

You can use the **com.ibm.wmqfte.propertySet** property to specify which `command.properties` file to use. For more information, see com.ibm.wmqfte.propertySet.

If you do not use the cmdqm attribute, the task defaults to using the `com.ibm.wmqfte.ant.commandQueueManager` property, if this property is set. If the `com.ibm.wmqfte.ant.commandQueueManager` property is not set, a connection to the default queue manager, defined in the `command.properties` file, is attempted. The format of the `com.ibm.wmqfte.ant.commandQueueManager` property is the same as the cmdqm attribute, that is, `qmgrname@host@port@channel`.

idproperty

Optional unless you have specified an `outcome` of `defer`. Specifies the name of a property to assign the transfer identifier to. Transfer identifiers are generated at the point a transfer request is submitted and you can use transfer identifiers to track the progress of a transfer, diagnose problems with a transfer, and cancel a transfer.

You cannot specify this property if you have also specified an `outcome` property of `ignore`. However, you must specify `idproperty` if you have also specified an `outcome` property of `defer`.

jobname

Optional. Assigns a job name to the **fte:call** request. You can use job names to create logical groups of transfers. Use the "fte:uuid Ant task" on page 2096 task to generate pseudo-unique job names. If you do not use the jobname attribute, the task defaults to using the `com.ibm.wmqfte.ant.jobName` property value, if this property is set. If you do not set this property, no job name is associated with the **fte:call** request.

origuser

Optional. Specifies the originating user identifier to associate with the **fte:call** request. If you do not use the origuser attribute, the task defaults to using the user ID that is used to run the Ant script.

outcome

Optional. Determines whether the task waits for the **fte:call** operation to complete before returning control to the Ant script. Specify one of the following options:

await

The task waits for the **fte:call** operation to complete before returning. When an `outcome` of `await` is specified the `idproperty` attribute is optional.

defer

The task returns as soon as the **fte:call** request has been submitted and assumes that the outcome of the call operation is dealt with later using either the awaitoutcome or ignoreoutcome tasks. When an `outcome` of `defer` is specified the `idproperty` attribute is required.

ignore

If the outcome of the **fte:call** operation is not important, you can specify a value of `ignore`. The task then returns as soon as the **fte:call** request has been submitted, without allocating any resources for tracking the outcome of the command. When an `outcome` of `ignore` is specified the `idproperty` attribute cannot be specified.

If you do not specify the outcome attribute, the task defaults to using the value `await`.

rcproperty

Optional. Specifies the name of a property to assign the result code of the **fte:call** request to. The result code reflects the overall outcome of the **fte:call** request.

You cannot specify this property if you have also specified an `outcome` property of `ignore` or `defer`. However, you must specify `rcproperty` if you have specified an outcome of `await`.

Parameters specified as nested elements

fte:command

Specifies the command to be called by the agent. You can only associate a single `fte:command` element with a given**fte:call** operation. The command to be called must be located on the path specified by the commandPath property in the agent's `agent.properties` file.

fte:metadata

You can specify metadata to associate with the call operation. This metadata is recorded in the log messages generated by the call operation. You can only associate a single block of metadata with a given transfer element; however this block can contain many pieces of metadata.

Example

This example shows how to call a command at AGENT1 running on queue manager QM1. The command to call is the script `command.sh`, and the script is called with a single argument of `xyz`. The command `command.sh` is located on the path specified by the commandPath property in the agent's `agent.properties` file.

```
<fte:call cmdqm="QM0@localhost@1414@SYSTEM.DEF.SVRCONN"
            agent="AGENT1@QM1"
            rcproperty="call.rc"
            origuser="bob"
            jobname="${job.id}">

    <fte:command command="command.sh" successrc="1" retrycount="5" retrywait="30">
        <fte:arg value="xyz"/>
    </fte:command>

    <fte:metadata>
        <fte:entry name="org.foo.accountName" value="BDG3R"/>
    </fte:metadata>

</fte:call>
```

Related tasks

Using Apache Ant with MFT

fte:cancel Ant task

Cancels a Managed File Transfer managed transfer or managed call. A managed transfer might have been created using the **fte:filecopy** or **fte:filemove** tasks. A managed call might have been created using the **fte:call** task.

Attributes

agent

Required. Specifies the agent to submit the **fte:cancel** request to. The value is in the form: *agentname@qmgrname* where *agentname* is the name of the agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

cmdqm

Optional. The command queue manager to submit the request to. Specify this information in the form *qmgrname@host@port@channel*, where:

- *qmgrname* is the name of the queue manager
- *host* is the optional host name of the system where the queue manager is running
- *port* is the optional port number that the queue manager is listening on
- *channel* is the optional SVRCONN channel to use

If you omit the *host*, *port*, or *channel* information for the command queue manager, the connection information specified in the `command.properties` file is used. For more information, see The MFT command.properties file.

You can use the **com.ibm.wmqfte.propertySet** property to specify which `command.properties` file to use. For more information, see com.ibm.wmqfte.propertySet.

If you do not use the cmdqm attribute, the task defaults to using the `com.ibm.wmqfte.ant.commandQueueManager` property, if this property is set. If the `com.ibm.wmqfte.ant.commandQueueManager` property is not set, a connection to the default queue manager, defined in the `command.properties` file, is attempted. The format of the `com.ibm.wmqfte.ant.commandQueueManager` property is the same as the cmdqm attribute, that is, `qmgrname@host@port@channel`.

id

Required. Specifies the transfer identifier of the transfer to cancel. Transfer identifiers are generated at the point a transfer request is submitted by both the fte:filecopy and fte:filemove tasks.

origuser

Optional. Specifies the originating user identifier to associate with the **cancel** request. If the origuser attribute is not used, the task defaults to using the user ID that is used to run the Ant script.

Example

The example sends a **fte:cancel** request to the command queue manager `qm0`. The **fte:cancel** request is targeted at `agent1` on queue manager `qm1` for the transfer identifier populated by the `transfer.id` variable. The request is run using the "bob" user ID.

```
<fte:cancel cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
            agent="agent1@qm1"
            id="${transfer.id}"
            origuser="bob"/>
```

Related tasks

Using Apache Ant with MFT

fte:filecopy Ant task

The **fte:filecopy** task copies files between Managed File Transfer agents. The file is not deleted from the source agent.

Attributes

cmdqm

Optional. The command queue manager to submit the request to. Specify this information in the form *qmgrname@host@port@channel*, where:

- *qmgrname* is the name of the queue manager
- *host* is the optional host name of the system where the queue manager is running
- *port* is the optional port number that the queue manager is listening on
- *channel* is the optional SVRCONN channel to use

If you omit the *host*, *port*, or *channel* information for the command queue manager, the connection information specified in the `command.properties` file is used. For more information, see The MFT command.properties file.

You can use the **com.ibm.wmqfte.propertySet** property to specify which `command.properties` file to use. For more information, see com.ibm.wmqfte.propertySet.

If you do not use the cmdqm attribute, the task defaults to using the `com.ibm.wmqfte.ant.commandQueueManager` property, if this property is set. If the `com.ibm.wmqfte.ant.commandQueueManager` property is not set, a connection to the default queue manager, defined in the `command.properties` file, is attempted. The format of the `com.ibm.wmqfte.ant.commandQueueManager` property is the same as the cmdqm attribute, that is, `qmgrname@host@port@channel`.

dst

Required. Specifies the destination agent for the copy operation. Specify this information in the form: `agentname@qmgrname` where `agentname` is the name of the destination agent and `qmgrname` is the name of the queue manager that this agent is directly connected to.

idproperty

Optional unless you have specified an `outcome` of `defer`. Specifies the name of a property to assign the transfer identifier to. Transfer identifiers are generated at the point a transfer request is submitted and you can use transfer identifiers to track the progress of a transfer, diagnose problems with a transfer, and cancel a transfer.

You cannot specify this property if you have also specified an `outcome` property of `ignore`. However, you must specify `idproperty` if you have also specified an `outcome` property of `defer`.

jobname

Optional. Assigns a job name to the copy request. You can use job names to create logical groups of transfers. Use the “fte:uuid Ant task” on page 2096 task to generate pseudo-unique job names. If you do not use the jobname attribute, the task defaults to using the `com.ibm.wmqfte.ant.jobName` property value, if this property is set. If you do not set this property, no job name is associated with the copy request.

origuser

Optional. Specifies the originating user identifier to associate with the copy request. If you do not use the origuser attribute, the task defaults to using the user ID that is used to run the Ant script.

outcome

Optional. Determines whether the task waits for the copy operation to complete before returning control to the Ant script. Specify one of the following options:

await

The task waits for the copy operation to complete before returning. When an `outcome` of `await` is specified the `idproperty` attribute is optional.

defer

The task returns as soon as the copy request has been submitted and assumes that the outcome of the copy operation is dealt with later using either the “fte:awaitoutcome Ant task” on page 2084 or “fte:ignoreoutcome Ant task” on page 2094 tasks. When an `outcome` of `defer` is specified the `idproperty` attribute is required.

ignore

If the outcome of the copy operation is not important, you can specify a value of `ignore`. The task then returns as soon as the copy request has been submitted, without allocating any resources for tracking the outcome of the transfer. When an `outcome` of `ignore` is specified the `idproperty` attribute cannot be specified.

If you do not specify the outcome attribute, the task defaults to using the value `await`.

priority

Optional. Specifies the priority to associate with the copy request. In general, higher priority transfer requests take precedence over lower priority requests. The priority value must be in the range 0 - 9 (inclusive). A priority value of 0 is the lowest priority and a value of 9 is the highest priority. If you do not specify the `priority` attribute, the transfer defaults to a priority of 0.

rcproperty

Optional. Specifies the name of a property to assign the result code of the copy request to. The result code reflects the overall outcome of the copy request.

You cannot specify this property if you have also specified an `outcome` property of `ignore` or `defer`. However, you must specify `rcproperty` if you specify an outcome of `await`.

V 9.1.0 **transferRecoveryTimeout**

Optional. Sets the amount of time, in seconds, during which a source agent keeps trying to recover a stalled file transfer. Specify one of the following options:

-1

The agent continues to attempt to recover the stalled transfer until the transfer is complete. Using this option is the equivalent of the default behavior of the agent when the property is not set.

0

The agent stops the file transfer as soon as it enters recovery.

>0

The agent continues to attempt to recover the stalled transfer for the amount of time in seconds as set by the positive integer value specified. For example,

```
<fte:filecopy cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src="agent1@qm1" dst="agent2@qm2"
              rcproperty="copy.result" transferRecoveryTimeout="21600">

    <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/
file.bin"/>

</fte:filecopy>
```

indicates that the agent keeps trying to recover the transfer for 6 hours from when it enters recovery. Maximum value for this attribute is 999999999.

Specifying the transfer recovery timeout value in this way sets it on a per transfer basis. To set a global value for all transfers in a Managed File Transfer network, you can add a property to the Transfer recovery timeout properties. For more information, see Timeout option for transfers in recovery.

src

Required. Specifies the source agent for the copy operation. Specify this information in the form: *agentname@qmgrname* where *agentname* is the name of the source agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

Parameters specified as nested elements

fte:filespec

Required. You must specify at least one file specification that identifies the files to copy. You can specify more than one file specification if required. See "fte:filespec Ant nested element" on page 2096 for more information.

fte:metadata

You can specify metadata to associate with the copy operation. This metadata is carried with the transfer and is recorded in the log messages generated by the transfer. You can only associate a single block of metadata with a given transfer element; however this block can contain many pieces of metadata. See the fte:metadata topic for more information.

fte:presrc
: Specifies a program invocation to take place at the source agent before the transfer starts. You can only associate a single `fte:presrc` element with a given transfer. See the program invocation topic for more information.

fte:predst
: Specifies a program invocation to take place at the destination agent before the transfer starts. You can only associate a single `fte:predst` element with a given transfer. See the program invocation topic for more information.

fte:postsrc
: Specifies a program invocation to take place at the source agent after the transfer has completed. You can only associate a single `fte:postsrc` element with a given transfer. See the program invocation topic for more information.

fte:postdst
: Specifies a program invocation to take place at the destination agent after the transfer has completed. You can only associate a single `fte:postdst` element with a given transfer. See the program invocation topic for more information.

If fte:presrc, fte:predst, fte:postsrc, fte:postdst, and exits do not return a success status, the rules are as follows in the order specified:

1. Run the source start exits. If source start exits fail the transfer fails and nothing further is run.
2. Run the pre-source call (when present). If the pre-source call fails, the transfer fails and nothing further is run.
3. Run the destination start exits. If the destination start exits fail the transfer fails and nothing further is run.
4. Run the pre-destination call (when present). If the pre-destination call fails, the transfer fails and nothing further is run.
5. Perform the file transfers.
6. Run the destination end exits. There is no failure status for these exits.
7. If the transfer is successful (if some files transfer successfully, it is deemed successful) run the post-destination call (if present). If the post-destination call fails, the transfer fails.
8. Run the source end exits. There is no failure status for these exits.
9. If the transfer is successful run the post-source call (if present). If the post-source call fails, the transfer fails.

Examples

This example shows a basic file transfer between `agent1` and `agent2`. The command to start the file transfer is sent to a queue manager called `qm0,` using a client transport mode connection. The result of the file transfer operation is assigned to the property called `copy.result`.

```
<fte:filecopy cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src="agent1@qm1" dst="agent2@qm2"
              rcproperty="copy.result">

    <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/file.bin"/>

</fte:filecopy>
```

This example shows the same file transfer, but with the addition of metadata and a program start to take place at the source agent after the transfer has completed.

```
<fte:filecopy cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src="agent1@qm"1 dst="agent2@qm2"
              rcproperty="copy.result">


    <fte:metadata>
```

```
            <fte:entry name="org.example.departId" value="ACCOUNTS"/>
            <fte:entry name="org.example.batchGroup" value="A1"/>
    </fte:metadata>

    <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/file.bin"/>

    <fte:postsrc command="/home/fteuser2/scripts/post.sh" successrc="1" >
            <fte:arg value="/home/fteuser2/file.bin"/>
  </fte:postsrc>
</fte:filecopy>
```

Related concepts

V 9.1.0 Timeout option for file transfers in recovery

Related tasks

Using Apache Ant with MFT

fte:filemove Ant task

The **fte:filemove** task moves files between Managed File Transfer agents. When a file has been successfully transferred from the source agent to the destination agent, the file is deleted from the source agent.

Attributes

cmdqm

Optional. The command queue manager to submit the request to. Specify this information in the form *qmgrname@host@port@channel*, where:

- *qmgrname* is the name of the queue manager
- *host* is the optional host name of the system where the queue manager is running
- *port* is the optional port number that the queue manager is listening on
- *channel* is the optional SVRCONN channel to use

If you omit the *host*, *port*, or *channel* information for the command queue manager, the connection information specified in the `command.properties` file is used. For more information, see The MFT command.properties file.

You can use the **com.ibm.wmqfte.propertySet** property to specify which `command.properties` file to use. For more information, see com.ibm.wmqfte.propertySet.

If you do not use the cmdqm attribute, the task defaults to using the `com.ibm.wmqfte.ant.commandQueueManager` property, if this property is set. If the `com.ibm.wmqfte.ant.commandQueueManager` property is not set, a connection to the default queue manager, defined in the `command.properties` file, is attempted. The format of the `com.ibm.wmqfte.ant.commandQueueManager` property is the same as the cmdqm attribute, that is, `qmgrname@host@port@channel`.

dst

Required. Specifies the destination agent for the copy operation. Specify this information in the form: *agentname@qmgrname* where *agentname* is the name of the destination agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

idproperty

Optional unless you have specified an `outcome` of `defer`. Specifies the name of a property to assign the transfer identifier to. Transfer identifiers are generated at the point a transfer request is submitted and you can use transfer identifiers to track the progress of a transfer, diagnose problems with a transfer, and cancel a transfer.

You cannot specify this property if you have also specified an `outcome` property of `ignore`. However, you must specify `idproperty` if you have also specified an `outcome` property of `defer`.

jobname
Optional. Assigns a job name to the move request. You can use job names to create logical groups of transfers. Use the fte:uuid task to generate pseudo-unique job names. If you do not use the jobname attribute, the task defaults to using the `com.ibm.wmqfte.ant.jobName` property value, if this property is set. If you do not set this property, no job name is associated with the move request.

origuser
Optional. Specifies the originating user identifier to associate with the move request. If you do not use the origuser attribute, the task defaults to using the user ID that is used to run the Ant script.

outcome
Optional. Determines whether the task waits for the move operation to complete before returning control to the Ant script. Specify one of the following options:

await
The task waits for the move operation to complete before returning. When an `outcome` of `await` is specified the `idproperty` attribute is optional.

defer
The task returns as soon as the move request has been submitted and assumes that the outcome of the move operation is dealt with later using either the "fte:awaitoutcome Ant task" on page 2084 or "fte:ignoreoutcome Ant task" on page 2094 task. When an `outcome` of `defer` is specified the `idproperty` attribute is required.

ignore
If the outcome of the move operation is not important, you can specify a value of `ignore`. The task then returns as soon as the move request has been submitted, without allocating any resources for tracking the outcome of the transfer. When an `outcome` of `ignore` is specified the `idproperty` attribute cannot be specified.

If you do not specify the outcome attribute, the task defaults to using the value `await`.

priority
Optional. Specifies the priority to associate with the move request. In general, higher priority transfer requests take precedence over lower priority requests. The priority value must be in the range 0 - 9 (inclusive). A priority value of 0 is the lowest priority and a value of 9 is the highest priority. If you do not specify the `priority` attribute, the transfer defaults to a priority of 0.

rcproperty
Optional. Specifies the name of a property to assign the result code of the move request to. The result code reflects the overall outcome of the move request.

You cannot specify this property if you have also specified an `outcome` property of `ignore` or `defer`. However, you must specify `rcproperty` if you have specified an outcome of `await`.

V 9.1.0 **transferRecoveryTimeout**
Optional. Sets the amount of time, in seconds, during which a source agent keeps trying to recover a stalled file transfer. Specify one of the following options:

-1
The agent continues to attempt to recover the stalled transfer until the transfer is complete. Using this option is the equivalent of the default behavior of the agent when the property is not set.

0
The agent stops the file transfer as soon as it enters recovery.

>0
The agent continues to attempt to recover the stalled transfer for the amount of time in seconds as set by the positive integer value specified. For example,

```
<fte:filemove cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src=agent1@qm1 dst="agent2@qm2"
              rcproperty="move.result" transferRecoveryTimeout="21600">
```

```
    <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/
file.bin"/>

</fte:filemove
```

indicates that the agent keeps trying to recover the transfer for 6 hours from when it enters recovery. Maximum value for this attribute is 999999999.

Specifying the transfer recovery timeout value in this way sets it on a per transfer basis. To set a global value for all transfers in a Managed File Transfer network, you can add a property to the Transfer recovery timeout properties. For more information, see Timeout option for transfers in recovery.

src
Required. Specifies the source agent for the move operation. Specify this information in the form: *agentname@qmgrname* where *agentname* is the name of the source agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

Parameters specified as nested elements

fte:filespec
Required. You must specify at least one file specification that identifies the files to move. You can specify more than one file specification if required. See "fte:filespec Ant nested element" on page 2096 for more information.

fte:metadata
Optional. You can specify metadata to associate with the file move operation. This metadata is carried with the transfer and is recorded in the log messages generated by the transfer. You can only associate a single block of metadata with a given transfer element; however this block can contain many pieces of metadata. See the fte:metadata topic for more information.

fte:presrc
Optional. Specifies a program invocation to take place at the source agent before the transfer starts. You can only associate a single `fte:presrc` element with a given transfer. See the program invocation topic for more information.

fte:predst
Optional. Specifies a program invocation to take place at the destination agent before the transfer starts. You can only associate a single `fte:predst` element with a given transfer. See the program invocation topic for more information.

fte:postsrc
Optional. Specifies a program invocation to take place at the source agent after the transfer has completed. You can only associate a single `fte:postsrc` element with a given transfer. See the program invocation topic for more information.

fte:postdst
Optional. Specifies a program invocation to take place at the destination agent after the transfer has completed. You can only associate a single `fte:postdst` element with a given transfer. See the program invocation topic for more information.

If fte:presrc, fte:predst, fte:postsrc, fte:postdst, and exits do not return a success status, the rules are as follows in the order specified:

1. Run the source start exits. If source start exits fail the transfer fails and nothing further is run.
2. Run the pre-source call (when present). If the pre-source call fails, the transfer fails and nothing further is run.
3. Run the destination start exits. If the destination start exits fail the transfer fails and nothing further is run.
4. Run the pre-destination call (when present). If the pre-destination call fails, the transfer fails and nothing further is run.
5. Perform the file transfers.
6. Run the destination end exits. There is no failure status for these exits.

7. If the transfer is successful (if some files transfer successfully, the transfer is considered successful), run the post-destination call (if present). If the post-destination call fails, the transfer fails.
8. Run the source end exits. There is no failure status for these exits.
9. If the transfer is successful, run the post-source call (if present). If the post-source call fails, the transfer fails.

Examples

This example shows a basic file move between `agent1` and `agent2`. The command to start the file move is sent to a queue manager called `qm0`, using a client transport mode connection. The result of the file transfer operation is assigned to the property called `move.result`.

```
<fte:filemove cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src="agent1@qm1" dst="agent2@qm2"
              rcproperty="move.result">

    <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/file.bin"/>

</fte:filemove>
```

Related concepts

V 9.1.0 Timeout option for file transfers in recovery

Related tasks

Using Apache Ant with MFT

fte:ignoreoutcome Ant task

Ignore the outcome of an **fte:filecopy**, **fte:filemove**, or **fte:call** command. When you specify an **fte:filecopy**, **fte:filemove**, or **fte:call** task to have an outcome of `defer`, the Ant task allocates resources to tracking this outcome. If you are no longer interested in the outcome, you can use the **fte:ignoreoutcome** task to free those resources.

Attributes

id

Required. Identifies the outcome that is no longer of interest. Typically you specify this identifier using a property that you set using the `idproperty` attribute of the “fte:filecopy Ant task” on page 2087, “fte:filemove Ant task” on page 2091, or “fte:call Ant task” on page 2084 task.

Example

This example shows how you can use the fte:ignoreoutcome task to free the resources allocated to tracking the outcome of the earlier “fte:filecopy Ant task” on page 2087 task.

```
<!-- issue a file copy request -->
<fte:filecopy cmdqm="qm1@localhost@1414@SYSTEM.DEF.SVRCONN"
                  src="agent1@qm1" dst="agent1@qm1"
                  idproperty="copy.id"
                  outcome="defer"/>

<!-- do some other things -->

<!-- decide that the result of the copy is not interesting -->
<fte:ignoreoutcome id="${copy.id}"/>
```

Related tasks

Using Apache Ant with MFT

fte:ping Ant task

This IBM MQ Managed File Transfer Ant task pings an agent to elicit a response, and so determines if the agent is able to process transfers.

Attributes

agent
: Required. Specifies the agent to submit the **fte:ping** request to. The value is in the form: *agentname@qmgrname* where *agentname* is the name of the agent and *qmgrname* is the name of the queue manager that this agent is directly connected to.

cmdqm
: Optional. The command queue manager to submit the request to. Specify this information in the form *qmgrname@host@port@channel*, where:

- *qmgrname* is the name of the queue manager
- *host* is the optional host name of the system where the queue manager is running
- *port* is the optional port number that the queue manager is listening on
- *channel* is the optional SVRCONN channel to use

If you omit the *host*, *port*, or *channel* information for the command queue manager, the connection information specified in the `command.properties` file is used. For more information, see The MFT command.properties file.

You can use the **com.ibm.wmqfte.propertySet** property to specify which `command.properties` file to use. For more information, see com.ibm.wmqfte.propertySet.

If you do not use the cmdqm attribute, the task defaults to using the `com.ibm.wmqfte.ant.commandQueueManager` property, if this property is set. If the `com.ibm.wmqfte.ant.commandQueueManager` property is not set, a connection to the default queue manager, defined in the `command.properties` file, is attempted. The format of the `com.ibm.wmqfte.ant.commandQueueManager` property is the same as the cmdqm attribute, that is, `qmgrname@host@port@channel`.

rcproperty
: Required. Names a property to store the return code of the **ping** operation in.

timeout
: Optional. The maximum amount of time, in seconds, for the task to wait for the agent to respond. The minimum timeout is zero seconds, however a timeout of minus one can also be specified such that the command waits forever for the agent to respond. If no value is specified for the `timeout` then the default is to wait up to 5 seconds for the agent to respond.

Example

This example sends a **fte:ping** request to `agent1` hosted by qm1. The **fte:ping** request waits 15 seconds for the agent to respond. The outcome of the **fte:ping** request is stored in a property called `ping.rc`.

```
<fte:ping agent="agent1@qm1" rcproperty="ping.rc" timeout="15"/>
```

Return codes

0
: Command completed successfully.

2
: Command timed out.

Related tasks

Using Apache Ant with MFT

fte:uuid Ant task

Generates a pseudo-random unique identifier and assigns it to a given property. For example, you can use this identifier to generate job names for other file transfer operations.

Attributes

length
Required. The numeric length of UUID to generate. This length value does not include the length of any prefix, specified by the **prefix** parameter.

property
Required. The name of the property to assign the generated UUID to.

prefix
Optional. A prefix to add to the generated UUID. This prefix is not counted as part of the length of the UUID, as specified by the **length** parameter.

Example

This example defines a UUID that starts with the letters ABC followed by 16 pseudo-random hex characters. The UUID is assigned to a property named `uuid.property`.

```
<fte:uuid length="16" property="uuid.property" prefix="ABC"/>
```

Related tasks
Using Apache Ant with MFT

fte:filespec Ant nested element

The **fte:filespec** parameter is used as a nested element in other tasks. Use **fte:filespec** to describe a mapping between one or more source files, directories z/OS or data sets, and a destination. Typically this element is used when expressing a set of files or directories z/OS or data sets to move or copy.

Nested by:

- The fte:filecopy task
- The fte:filemove task

Source specification attributes

You must specify one of srcfilespec or srcqueue.

srcfilespec
Specifies the source of the file operation. The value of this attribute can include a wildcard.

srcqueue
Specifies the source of the transfer is a queue. The transfer moves data from messages stored on the queue specified by this attribute. You cannot specify this attribute if the **fte:filespec** task is nested within the **fte:filecopy** task.

The srcqueue attribute is not supported when the source agent is a protocol bridge agent.

Destination specification attributes

You must specify one of dstdir, dstds, dstfilespace, dstfile, dstqueue or dstpds.

dstdir
Specifies a directory as the destination for a file operation.

z/OS **dstds**
Specifies a data set as the destination for a file operation.

This attribute is supported only when the destination agent is running on the z/OS platform.

dstfile
Specifies a file as the destination for a file operation.

dstfilespace
Specifies a file space as the destination for a file operation.

This attribute applies only if the destination agent is an IBM MQ 8.0 web agent that has access to the web gateway file space.

z/OS **dstpds**
Specifies a partitioned data set as the destination for a file operation.

This attribute is supported only when the destination agent is running on the z/OS platform.

dstqueue

Specifies a queue as the destination for a file to message operation. You can optionally include a queue manager name in this specification, using the format QUEUE@QUEUEMANAGER. If you do not specify a queue manager name the destination agent queue manager is used if you have not set the enableClusterQueueInputOutput agent property to true. If the enableClusterQueueInputOuput property is set to true, the destination agent uses standard IBM MQ procedures to determine where the queue is located. You must specify a valid queue name that exists on the queue manager.

If you specify the dstqueue attribute, you cannot specify the srcqueue attributes because these attributes are mutually exclusive.

The dstqueue attribute is not supported when the destination agent is a protocol bridge agent.

Source option attributes

srcencoding
Optional. The character set encoding used by the file to transfer.

You can specify this attribute only when the conversion attribute is set to a value of `text`.

If you do not specify the srcencoding attribute, the character set of the source system is used for text transfers.

srceol
Optional. The end of line delimiter used by the file being transferred. The valid values are as follows:

- CRLF - Use a carriage return character followed by a line-feed character as the end of line delimiter. This convention is typical for Windows systems.
- LF - Use a line-feed character as the end of line delimiter. This convention is typical for UNIX systems.

You can specify this attribute only when the conversion attribute is set to a value of `text`. If you do not specify the srceol attribute, text transfers automatically determine the correct value based on the operating system of the source agent.

z/OS **srckeeptrailingspaces**
Optional. Determines whether trailing spaces are kept on source records read from a fixed-length-format data set as part of a text mode transfer. The valid values are as follows:

- `true` - trailing spaces are kept.

- `false` - trailing spaces are stripped.

If you do not specify the srckeeptrailingspaces attribute, a default value of `false` is specified.

You can specify this attribute only if you also specify the srcfilespec attribute and you set the conversion attribute to a value of `text.`

srcmsgdelimbytes
Optional. Specifies one or more byte values to insert as the delimiter when appending multiple messages to a binary file. Each value must be specified as two hexadecimal digits in the range 00-FF, prefixed by x. Multiple bytes must be comma-separated. For example, `srcmsgdelimbytes="x08,xA4"`. You can specify the srcmsgdelimbytes attribute only if you have also specified the srcqueue attribute. You cannot specify the srcmsgdelimbytes attribute if you have also specified the value `text` for the conversion attribute.

srcmsgdelimtext
Optional. Specifies a sequence of text to insert as the delimiter when appending multiple messages to a text file. You can include Java escape sequences for String literals in the delimiter. For example, `srcmsgdelimtext="\u007d\n"`. The text delimiter is inserted after each message by the source agent. The text delimiter is encoded to binary format using the source encoding of the transfer. Each message is read in binary format, the encoded delimiter is appended in binary format to the message, and the result is transferred in binary format to the destination agent. If the source agent code page includes shift-in and shift-out states, the agent assumes that each message is in the shift-out state at the end of the message. At the destination agent the binary data is converted in the same way as a file to file text transfer. You can only specify the srcmsgdelimtext attribute if you have also specified the srcqueue attribute and a value of `text` for the conversion attribute.

srcmsgdelimposition
Optional. Specifies the position that the text or binary delimiter is inserted into. The valid values are as follows:

- `prefix` - the delimiters are inserted into the destination file before the data from each message.
- `postfix` - the delimiters are inserted into the destination file after the data from each message.

You can specify the srcmsgdelimposition attribute only if you have also specified one of the srcmsgdelimbytes or srcmsgdelimtext attributes.

srcmsggroups
Optional. Specifies that the messages are grouped by IBM MQ group ID. The first complete group is written to the destination file. If this attribute is not specified, all messages on the source queue are written to the destination file. You can specify the srcmsggroups attribute only if you have also specified the srcqueue attribute.

srcqueuetimeout
Optional. Specifies the time, in seconds, to wait for one of the following conditions to be met:

- For a new message to be written to the queue.
- If the srcmsggroups attribute was specified, for a complete group to be written on the queue.

If neither of these conditions are met within the time specified by the value of srcqueuetimeout, the source agent stops reading from the queue and completes the transfer. If the srcqueuetimeout attribute is not specified, the source agent stops reading from the source queue immediately if the source queue is empty or, in the case where the srcmsggroups attribute is specified, if there is no complete group on the queue. You can specify the srcqueuetimeout attribute only if you have also specified the srcqueue attribute.

For information about setting the srcqueuetimeout value, see Guidance for specifying a wait time on a message-to-file transfer.

z/OS **srcrecdelimbytes**

Optional. Specifies one or more byte values to insert as the delimiter when appending multiple records from a record-oriented source file to a binary file. You must specify each value as two hexadecimal digits in the range 00-FF, prefixed by x. Multiple bytes must be comma-separated. For example:

```
srcrecdelimbytes="x08,xA4"
```

You can specify the srcrecdelimbytes attribute only if the transfer source file is record oriented, for example a z/OS data set, and the destination file is a normal, non-record-oriented file. You cannot specify the srcrecdelimbytes attribute if you have also specified the value `text` for the conversion attribute.

srcrecdelimpos

Optional. Specifies the position that the binary delimiter is inserted into. The valid values are as follows:

- prefix - the delimiters are inserted into the destination file before the data from each source record-oriented file record.
- postfix - the delimiters are inserted into the destination file after the data from each source record-oriented file record.

You can specify the srcrecdelimpos attribute only if you have also specified the srcrecdelimbytes attribute.

Destination option attributes

dstencoding

Optional. The character set encoding to use for the transferred file.

You can specify this attribute only when the conversion attribute is set to a value of `text`.

If the dstencoding attribute is not specified, the character set of the destination system is used for text transfers.

dsteol

Optional. The end of line delimiter to use for the transferred file. The valid values are as follows:

- `CRLF` - Use a carriage return character followed by a line-feed character as the end of line delimiter. This convention is typical for Windows systems.
- `LF` - Use a line-feed character as the end of line delimiter. This convention is typical for UNIX systems.

You can specify this attribute only when the conversion attribute is set to a value of `text`.

If you do not specify the dsteol attribute, text transfers automatically determine the correct value based on the operating system of the destination agent.

dstmsgdelimbytes

Optional. Specifies the hexadecimal delimiter to use when splitting a binary file into multiple messages. All the messages have the same IBM MQ group ID; the last message in the group has the IBM MQ LAST_MSG_IN_GROUP flag set. The format for specifying a hexadecimal byte as a delimiter is `xNN`, where N is a character in the range 0-9 or a-f. You can specify a sequence of hexadecimal bytes as a delimiter by specifying a comma-separated list of hexadecimal bytes, for example: `x3e,x20,x20,xbf`.

You can specify the dstmsgdelimbytes attribute only if you have also specified the dstqueue attribute and the transfer is in binary mode. You can specify only one of the dstmsgsize, dstmsgdelimbytes, and dstmsgdelimpattern attributes.

dstmsgdelimpattern

Optional. Specifies the Java regular expression to use when splitting a text file into multiple messages. All the messages have the same IBM MQ group ID; the last message in the group has the IBM MQ LAST_MSG_IN_GROUP flag set. The format for specifying a regular expression as a delimiter is a regular expression enclosed in parentheses, (*regular_expression*), or enclosed in double quotation marks, "*regular_expression*". For more information, see Regular expressions used by MFT.

By default, the length of the string that the regular expression can match is limited by the destination agent to five characters. You can change this behavior using the **maxDelimiterMatchLength** agent property. For more information, see MFT advanced agent properties.

You can specify the dstmsgdelimpattern attribute only if you have also specified the dstqueue attribute and the transfer is in text mode. You can specify only one of the dstmsgsize, dstmsgdelimbytes, and dstmsgdelimpattern attributes.

dstmsgdelimposition

Optional. Specifies the position that the text or binary delimiter is expected to be in. The valid values are as follows:

- prefix - The delimiters are expected at the beginning of each line.
- postfix - The delimiters are expected at the end of each line.

You can specify the dstmsgdelimposition attribute only if you have also specified the dstmsgdelimpattern attribute.

dstmsgincludedelim

Optional. Specifies whether to include the delimiter that is used to split the file into multiple messages in the messages. If the dstmsgincludedelim attribute is specified, the delimiter is included at the end of the message that contains the file data preceding the delimiter. By default the delimiter is not included in the messages. You can specify the dstmsgincludedelim attribute only if you have also specified one of the dstmsgdelimpattern and dstmsgdelimbytes attributes.

dstmsgpersist

Optional. Specifies whether messages written to the destination queue are persistent. The valid values are as follows:

- true - Write persistent messages to the destination queue. This is the default value.
- false - Write non-persistent messages to the destination queue.
- qdef - The persistence value is taken from the DefPersistence attribute of the destination queue.

You can specify this attribute only when the dstqueue attribute is also specified.

dstmsgprops

Optional. Specifies whether the first message written to the destination queue by the transfer has IBM MQ message properties set. Possible values are:

- true - Set message properties on the first message created by the transfer.
- false - Do not set message properties on the first message created by the transfer. This is the default value.

For more information, see MQ message properties set by MFT on messages written to destination queues.

You can specify this attribute only when the dstqueue attribute is also specified.

dstmsgsize

Optional. Specifies whether to split the file into multiple fixed-length messages. All of the messages have the same IBM MQ group ID; the last message in the group has the IBM MQ LAST_MSG_IN_GROUP flag set. The size of the messages is specified by the value of dstmsgsize. The format of dstmsgsize is *lengthunits*, where *length* is a positive integer value and *units* is one of the following values:

- B - Bytes. The minimum value allowed is two times the maximum bytes-per-character value of the code page of the destination messages.
- K - Kibibytes. This is equivalent to 1024 bytes.
- M - Mebibytes. This is equivalent to 1024 kibibytes.

If the file is transferred in text mode, and is in a double-byte character set or multibyte character set, the file is split into messages on the closest character boundary to the specified message size.

You can specify the dstmsgsize attribute only if you have also specified the dstqueue attribute. You can specify only one of the dstmsgsize, dstmsgdelimbytes, and dstmsgdelimpattern attributes.

dstunsupportedcodepage

Optional. Specifies the action to take if the destination queue manager, as specified by the dstqueue attribute, does not support the code page used when transferring file data to a queue as a text transfer. The valid values for this attribute are as follows:

- `binary` - continue the transfer but do not apply code page conversion to the data being transferred. Specifying this value is equivalent to not setting the conversion attribute to `text`.
- `fail` - do not continue with the transfer operation. The file is recorded as having failed to transfer. This is the default.

You can only specify the dstunsupportedcodepage attribute if you have also specified the dstqueue attribute and a value of `text` for the conversion attribute.

dsttruncaterecords

Optional. Specifies that destination records longer than the LRECL data set attribute are truncated. If set to true, the records are truncated. If set to false, the records are wrapped. The default setting is false. This parameter is valid only for text mode transfers where the destination is a data set.

Other attributes

checksum

Optional. Determines the algorithm used to checksum transferred files.

- `MD5` - use the MD5 hashing algorithm.
- `NONE` - do not use a checksum algorithm.

If you do not specify the checksum attribute, a default value of `MD5` is used.

conversion

Optional. Specifies the type of conversion to apply to the file as it is being transferred. Possible values are:

- `binary` - apply no conversion.
- `text` - apply code page conversion between the source and destination systems. Also apply conversion of line delimiters. The `srcencoding`, `dstencoding`, `srceol` and `dsteol` attributes influence the conversion that is applied.

If you do not specify the conversion attribute, a default value of `binary` is specified.

overwrite

Optional. Determines whether an existing destination file z/OS or data set can be overwritten by the operation. When you specify a value of `true`, any existing destination file z/OS or data sets are overwritten. When you specify a value of `false`, the existence of a duplicate file z/OS or data set at the destination results in the operation failing. If the overwrite attribute is not specified, a default value of `false` is specified.

recurse

Optional. Determines whether the file transfer recurses into subdirectories. When you specify a value of `true`, the transfer recurses into subdirectories. When you specify a value of `false`, the transfer

does not recurse into subdirectories. If the recurse attribute is not specified, a default value of `false` is specified.

Example

This example specifies a fte:filespec with a source file of `file1.bin` and a destination file of `file2.bin.`

```
<fte:filespec srcfilespec="/home/fteuser/file1.bin" dstfile="/home/fteuser/file2.bin"/>
```

Related tasks

Using Apache Ant with MFT

fte:metadata Ant nested elements

Metadata is used to carry additional user-defined information with a file transfer operation.

See "Metadata for MFT user exits" on page 2106 for more information about how Managed File Transfer uses metadata.

Nested by:

- The fte:filecopy task
- The fte:filemove task
- The fte:call task

Parameters specified as nested elements

fte:entry

You must specify at least one entry inside the fte:metadata nested element. You can choose to specify more than one entry. Entries associate a key name with a value. Keys must be unique in a block of fte:metadata

Entry attributes

name

Required. The name of the key belonging to this entry. This name must be unique across all **`entry`** parameters nested inside a fte:metadata element.

value

Required. The value to assign to this entry.

Example

This example shows a fte:metadata definition that contains two entries.

```
<fte:metadata>
    <fte:entry name="org.foo.partColor" value="red"/>
    <fte:entry name="org.foo.partSize" value="medium"/>
</fte:metadata>
```

Related tasks

Using Apache Ant with MFT

Program invocation nested elements

Programs can be started using one of five nested elements: `fte:presrc`, `fte:predst`, `fte:postdst`, `fte:postsrc`, and `fte:command`. These nested elements instruct an agent to call an external program as part of its processing. Before you can start a program, you must ensure that the command is in a

location specified by the commandPath property in the `agent.properties` file of the agent that runs the command.

Even though each program invocation element has a different name, they share the same set of attributes and the same set of nested elements. Programs can be started by the **`fte:filecopy`**, **`fte:filemove`**, and **`fte:command`** Ant tasks.

You cannot invoke programs from a Connect:Direct® bridge agent.

Ant tasks that can invoke programs:

- The fte:filecopy task nests program invocation parameters using the `fte:predst`, `fte:postdst`, `fte:presrc`, and `fte:postsrc` nested elements.
- The fte:filemove task nests program invocation parameters using the `fte:predst`, `fte:postdst`, `fte:presrc`, and `fte:postsrc` nested elements.
- The fte:call task nests program invocation parameters using the `fte:command` nested element.

Attributes

command

Required. Names the program to call. For the agent to be able to run a command, the command must be in a location specified by the commandPath property in the agent's `agent.properties` file. For more information, see commandPath MFT property. Any path information specified in the `command` attribute is considered relative to a location specified by the commandPath property. When `type` is `executable`, an executable program is expected otherwise a script appropriate for the call type is expected.

retrycount

Optional. The number of times to retry calling the program if the program does not return a success return code. The program named by the `command` attribute is called up to this number of times. The value assigned to this attribute must be non-negative. If you do not specify the `retrycount` attribute, a default value of zero is used.

retrywait

Optional. The time to wait, in seconds, before trying the program invocation again. If the program named by the `command` attribute does not return a success return code and the `retrycount` attribute specifies a non-zero value, this parameter determines the time to wait between retries. The value assigned to this attribute must be non-negative. If you do not specify the `retrywait` attribute, a default value of zero is used.

successrc

Optional. The value of this attribute is used to determine when the program invocation successfully runs. The process return code for the command is evaluated using this expression. The value can be composed of one or more expressions combined with a vertical bar character (|) to signify Boolean OR, or an ampersand (&) character to signify Boolean AND. Each expression can be one of the following types of expression:

- A number to indicate an equality test between the process return code and the number.
- A number prefixed with a ">" character to indicate a greater-than test between the number and the process return code.
- A number prefixed with a "<" character to indicate a less-than test between the number and the process return code.
- A number prefixed with a "!" character to indicate a not-equal-to test between the number and the process return code.

For example: `>2&<7&!5|0|14` is interpreted as the following return codes being successful: 0, 3, 4, 6, 14. All other return codes are interpreted as being unsuccessful. If you do not specify the

successrc attribute, a default value of zero is used. This means that the command is judged to have successfully run if, and only if, it returns a code of zero.

type

Optional. The value of this attribute specifies what type of program is being called. Specify one of the following options:

executable

The task calls an executable program. Can have additional arguments specified using the arg nested element. The program is expected to be accessible on the commandPath and where applicable have execute permission set. UNIX scripts can be called as long as they specify a shell program (for example, first line of shell script file is: #!/bin/sh). Command output written to stderr or stdout is sent to the Managed File Transfer log for the call. However, the amount of data output is limited by the agent configuration. The default is 10K bytes of data, but you can override this default using the agent property: maxCommandOutput.

antscript

The task runs the specified Ant script, using the **fteAnt** command. Properties can be specified using the property nested element. Ant targets can be specified using the target nested element. The Ant script is expected to be accessible on the commandPath. Ant output written to stderr or stdout is sent to the Managed File Transfer log for the call. However, the amount of data output is limited by the agent configuration. The default is 10K bytes of data but you can override this default using the agent property: maxCommandOutput.

z/OS **jcl**

The value jcl is supported on z/OS only and runs the specified z/OS JCL script. The JCL is submitted as a job and requires the job card to be present. When the job is submitted successfully the JCL command output, written to the Managed File Transfer log, contains the following text: JOB *job_name*(*job_id*) where:

- *job_name* is the name of the job identified by the job card in the JCL.
- *job_id* is the z/OS system generated job ID.

If the job cannot be submitted successfully, the JCL script command fails and writes a message to the log indicating the reason for the failure (for example no job card is present). To understand whether the job has been run or completed successfully, use a system service such as SDSF. Managed File Transfer does not provide the information because it only submits the job; the system then determines when to run the job and how the job output is presented. Because a JCL script is submitted as a batch job it is not advisable to specify jcl for a presrc or predst nested element because you only know that the job has been submitted successfully and not whether it ran to completion successfully before the transfer starts. There are no nested elements that are valid with a type of jcl.

The following example shows a JCL job:

```
//MYJOB JOB
//*
//MYJOB EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=H
//SYSUT1 DD DSN=FRED.DEMO.TXT,DISP=SHR
//SYSUT2 DD DSN=BOB.DEMO.TXT,DISP=(NEW,CATLG),
// RECFM=VB,LRECL=133,BLKSIZE=2048,
// SPACE=(TRK,(30,5),RLSE)
//SYSIN DD DUMMY
```

Parameters specified as nested elements

fte:arg

Only valid where the value of the type attribute is executable. Use nested fte:arg elements to specify arguments to the program that is being called as part of the program invocation. The program arguments are built from the values specified by the fte:arg elements in the order that the fte:arg

elements are encountered. You can choose to specify zero or more `fte:arg` elements as nested elements of a program invocation.

fte:property
: Only valid where the value of the `type` attribute is antscript. Use the `name` and `value` attributes of the nested `fte:property` elements to pass in name-value pairs to the Ant script. You can choose to specify zero or more `fte:property` elements as nested elements of a program invocation.

fte:target
: Only valid where the value of the `type` attribute is antscript. Specify a target in the Ant script to call. You can choose to specify zero or more `fte:target` elements as nested elements of a program invocation.

Arg attributes

value
: Required. The value of the argument to pass to the program being called.

Property attributes

name
: Required. The name of a property to pass to the Ant script.

value
: Required. The value to associate with the property name being passed to the Ant script.

Examples

This example shows an `fte:postsrc` program invocation being specified as part of an fte:filecopy task. The program invocation is for a program called `post.sh` and is supplied a single argument of `/home/fteuser2/file.bin`.

```
<fte:filecopy cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
              src="agent1@qm1" dst="agent2@qm2"
              rcproperty="copy.result">
        <fte:filespec srcfilespec="/home/fteuser1/file.bin" dstfile="/home/fteuser2/file.bin"/>

        <fte:postsrc command="post.sh" successrc="1" >
                <fte:arg value="/home/fteuser2/file.bin"/>
        </fte:postsrc>

</fte:filecopy>
```

This example shows an `fte:command` program invocation being specified as part of a fte:call task. The program invocation is for an executable called `command.sh`, which is not passed any command-line arguments. If `command.sh` does not return a success return code of 1, the command is tried again after 30 seconds.

```
<fte:call cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
            agent="agent1@qm1"
            rcproperty="call.rc"
            origuser="bob"
            jobname="${job.id}">
        <fte:command command="command.sh" successrc="1" retrycount="5" retrywait="30"/>
</fte:call>
```

This example shows an `fte:command` program invocation being specified as part of a fte:call task. The program invocation is for the copy and compress targets in an Ant script called `script.xml`, which is passed two properties.

```
<fte:call cmdqm="qm0@localhost@1414@SYSTEM.DEF.SVRCONN"
            agent="agent1@qm1"
            rcproperty="call.rc"
            origuser="bob"
            jobname="${job.id}">
```

```
        <fte:command command="script.xml" type="antscript">
          <property name="src" value="AGENT5@QM5"/>
          <property name="dst" value="AGENT3@QM3"/>
          <target name="copy"/>
          <target name="compress"/>
      </fte:command>
</fte:call>
```

Related tasks

Specifying programs to run with MFT

Using Apache Ant with MFT

MFT user exits for customization reference

Reference information to help you configure user exits for Managed File Transfer.

Related concepts

MFT source and destination user exits

Metadata for MFT user exits

There are three different types of metadata that can be supplied to user exit routines for Managed File Transfer: environment, transfer, and file metadata. This metadata is presented as maps of Java key-value pairs.

Environment metadata

Environment metadata is passed to all user exit routines and describes the agent runtime environment that the user exit routine is being called from. This metadata is read-only and cannot be updated by any user exit routine.

Table 883. Environment metadata

Key	Description
AGENT_CONFIGURATION_DIRECTORY_KEY	The name of the directory that contains the agent's configuration information.
AGENT_PRODUCT_DIRECTORY_KEY	The name of the directory that the agent code has been installed in.
AGENT_VERSION_KEY	Version number for the agent runtime that calls the exit routine.

The key names and value names given in Table 1 are constants that are defined in the EnvironmentMetaDataConstants interface.

Transfer metadata

Transfer metadata is passed to all user exit routines. The metadata consists of system-supplied values and user-supplied values. If you change any system-supplied values, these changes are ignored. The initial user-supplied values for the source transfer start user exit are based on those values you supply when you define the transfer. The source agent can change user-supplied values as part of the processing of the source transfer start user exit. This user exit is called before the entire file transfer starts. These changes are used in subsequent calls to other exit routines that relate to that transfer. Transfer metadata is applied to an entire transfer.

Although all user exits can read values from the transfer metadata, only the source transfer start user exit can change transfer metadata

You cannot use transfer metadata to propagate information between different file transfers.

The system-supplied transfer metadata is detailed in Table 2:

Table 884. Transfer metadata	
Key	**Description**
DESTINATION_AGENT_KEY	The name of the agent that is the destination for the transfer.
JOB_NAME_KEY	The job name associated with the transfer request
MQMD_USER_KEY	The MQMD user field from the message used to submit the transfer request
ORIGINATING_HOST_KEY	The host name specified as the originating host name in the transfer request
ORIGINATING_USER_KEY	The user name specified as the originating user ID in the transfer request
SOURCE_AGENT_KEY	The name of the agent that is the source of the transfer
TRANSFER_ID_KEY	The identifier of the transfer

The key names and value names given in Table 2 are constants that are defined in the TransferMetaDataConstants interface.

File metadata

The file metadata is passed to the source transfer start exit as part of the file specification. There is separate file metadata for the source and destination files.

You cannot use file metadata to propagate information between different file transfers.

Table 885. File metadata		
Key	**Permitted values**	**Description**
CONVERT_LINE_SEPARATORS		Key value used for text transfers to indicate whether CRLF (carriage return-line feed) or LF (line feed) line separator sequences in source data are converted to the line separator sequence at the destination.
DELIMITER_KEY		Key value used to define a delimiter to separate record data when transferring record-oriented data to normal files. Also used for message-to-file and file-to-message transfers.
DELIMITER_POSITION_KEY	DELIMITER_POSITION_PREFIX_VALUE DELIMITER_POSITION_POSTFIX_VALUE	Use with the DELIMITER_KEY to define the position of the delimiter; either prefix or postfix.
DELIMITER_TYPE_KEY	DELIMITER_TYPE_BINARY_VALUE DELIMITER_TYPE_TEXT_VALUE DELIMITER_TYPE_SIZE_VALUE	Use with the DELIMITER_KEY to define the type of delimiter.
DESTINATION_EXIST_KEY	DESTINATION_EXIST_KEY_ERROR_VALUE DESTINATION_EXIST_KEY_OVERWRITE_VALUE	Determines the file transfer behavior if the destination file exists.
FILE_ALIAS_KEY		Key value used to define an alias for the file being transferred.
FILE_CHECKSUM_METHOD_KEY	FILE_CHECKSUM_METHOD_NONE_VALUE FILE_CHECKSUM_METHOD_MD5_VALUE	Determines the checksum method to use when transferring the file.
FILE_CONVERSION_KEY	FILE_CONVERSION_TEXT_VALUE FILE_CONVERSION_BINARY_VALUE	Determines the type of conversion applied to the file contents.

Key	Permitted values	Description
FILE_ENCODING_KEY		Determines the encoding used for a text file.
FILE_END_OF_LINE_KEY	FILE_END_OF_LINE_LF_VALUE FILE_END_OF_LINE_CRLF_VALUE	Determines the character sequence that denotes the end of a line: <LF> or <CR><LF>.
FILE_SPACE_ALIAS		Determines the alias of a file in the file space. **Note:** This metadata can be used only if the FILE_TYPE_KEY is FILE_TYPE_FILE_SPACE_VALUE
FILE_SPACE_NAME		Determines the name of the file space. **Note:** This metadata can be used only if the FILE_TYPE_KEY is FILE_TYPE_FILE_SPACE_VALUE
FILE_TYPE_KEY	FILE_TYPE_FILE_VALUE FILE_TYPE_DIRECTORY_VALUE FILE_TYPE_DATASET_VALUE FILE_TYPE_PDS_VALUE FILE_TYPE_QUEUE_VALUE FILE_TYPE_FILE_SPACE_VALUE	Determines the destination file, queue, or file space specification.
GROUP_ID_KEY		Key value used for message-to-file transfers to determine the group of messages to read from the source queue. This attribute is valid only when the value of USE_GROUPS_KEY is USE_GROUPS_TRUE_VALUE.
INCLUDE_DELIMITER_IN_MESSAGE_ KEY	INCLUDE_DELIMITER_IN_MESSAGE_TRUE_VALUE INCLUDE_DELIMITER_IN_MESSAGE_FALSE_VALUE	Key value used for file-to-message transfers to determine whether to include the delimiters that were used to split the file into multiple messages at the end of the messages. This attribute is valid only when the value of DELIMITER_TYPE_KEY is DELIMITER_TYPE_BINARY_VALUE DELIMITER_TYPE_TEXT_VALUE.
INSERT_RECORD_LINE_SEPARATOR_ KEY		Key value used for text transfers from record-oriented files to specify whether line separators are inserted into the data after each record.
KEEP_TRAILING_SPACES_KEY	KEEP_TRAILING_SPACES_TRUE_VALUE KEEP_TRAILING_SPACES_FALSE_VALUE	Key value used to determine whether trailing spaces are removed from records read from fixed-length-format data sets.
NEW_RECORD_ON_LINE_SEPARATOR _KEY		Key value used for text transfers to record- oriented files to specify whether line separators in the data are included with the record data or cause a new record (and are not written).
PERSISTENT_KEY	PERSISTENT_TRUE_VALUE PERSISTENT_FALSE_VALUE PERSISTENT_QDEF_VALUE	Key value used for file-to-message transfers to determine whether the messages are persistent.

Table 885. File metadata (continued)

Key	Permitted values	Description
SET_MQ_PROPS_KEY	SET_MQ_PROPS_TRUE_VALUE SET_MQ_PROPS_FALSE_VALUE	Key value used for file-to-message transfers to determine whether IBM MQ message properties are set on the first message in a file, and any messages written to the queue when an error occurs.
UNRECOGNISED_CODE_PAGE_KEY	UNRECOGNISED_CODE_PAGE_FAIL_VALUE UNRECOGNISED_CODE_PAGE_BINARY_VALUE	Key value used for file-to-message transfers to determine whether a text mode transfer fails or conversion is performed, if the code page of the data is not recognized by the destination queue manager.
USE_GROUPS_KEY	USE_GROUPS_TRUE_VALUE USE_GROUPS_FALSE_VALUE	Key value used for message-to-file transfers to determine whether to transfer only a complete group of messages from the source queue.
WAIT_TIME_KEY		Key value used for message-to-file transfers to determine the time, in seconds, for the source agent to wait for one of the following cases: • A message to appear on the source queue, if the queue is empty or has become empty, if the value of USE_GROUPS_KEY is FALSE. • A complete group to appear on the source queue, if the value of USE_GROUPS_KEY is TRUE.

Table 885. File metadata (continued)

The key names and value names given in Table 3 are constants that are defined in the FileMetaDataConstants interface.

MFT resource monitor user exits

Resource monitor user exits allow you to configure custom code to run when a monitor's trigger condition is satisfied, before the associated task is started.

It is not recommended to invoke new transfers directly from user exit code. In some circumstances this causes files to be transferred multiple times as user exits are not resilient to agent restarts.

Resource monitor user exits use the existing infrastructure for user exits. The monitor user exits are called after a monitor has triggered but before the corresponding task has been run by the monitor's task. This allows the user exit to modify the task to be run and decide whether a task should proceed or not. You can modify the monitor task by updating the monitor metadata, which is then used for variable substitution in the task document created by the creation of the original monitor. Alternatively, the monitor exit can replace or update the task definition XML string passed as a parameter. The monitor exit can return a result code of either 'proceed' or 'cancel' for the task. If cancel is returned, the task will not be started and the monitor will not start again until the monitored resource matches the trigger conditions. If the resource has not changed, the trigger will not start. As with the other user exits, you can chain monitor exits together. If one of the exits returns a cancel result code, the overall result is cancel and the task is not started.

- A map of environment metadata (same as other user exits)
- A map of monitor metadata including immutable system metadata and mutable user metadata. The immutable system metadata is as follows:
  - FILENAME - name of the file that satisfied the trigger condition

– FILEPATH - path to the file that satisfied the trigger condition
– FILESIZE (in bytes - this metadata might not be present) - size of the file that satisfied the trigger condition
– LASTMODIFIEDDATE (Local) - date that the file that satisfied the trigger condition was last changed. This date is expressed as the local date of the time zone the agent is running in and is formatted as an ISO 8601 date.
– LASTMODIFIEDTIME (Local) - time in local format that the file that satisfied the trigger condition was last changed. This time is expressed as the local time of the time zone the agent is running in and is formatted as an ISO 8601 time.
– LASTMODIFIEDDATEUTC - date in universal format that the file that satisfied the trigger condition was last changed. This date is expressed as the local date converted to the UTC time zone and is formatted as an ISO 8601 date.
– LASTMODIFIEDTIMEUTC - time in universal format that the file that satisfied the trigger condition was last changed. This time is expressed the local time converted to the UTC time zone and is formatted as an ISO 8601 time.
– AGENTNAME - the monitor agent name

- An XML string representing the task to be run as a result of the monitor trigger.

Monitor exits return the following data:

- An indicator that specifies whether to progress further (proceed or cancel)
- A string to insert into the trigger-satisfied log message

As a result of running the monitor exit code, the monitor metadata and task definition XML string that were originally passed as parameters might also have been updated.

The value of the agent property monitorExitClasses (in the `agent.properties` file) specifies which monitor exit classes to load, with each exit class separated by a comma. For example:

```
monitorExitClasses=testExits.TestExit1,testExits.testExit2
```

The interface to the monitor user exit is:

```
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately prior to starting a task as the result of a monitor trigger
 */
public interface MonitorExit {

    /**
     * Invoked immediately prior to starting a task as the result of a monitor
     * trigger.
     *
     * @param environmentMetaData
     *            meta data about the environment in which the implementation
     *            of this method is running.  This information can only be read,
     *            it cannot be updated by the implementation.  The constant
     *            defined in <code>EnvironmentMetaDataConstants</code> class can
     *            be used to access the data held by this map.
     *
     * @param monitorMetaData
     *            meta data to associate with the monitor. The meta data passed
     *            to this method can be altered, and the changes will be
     *            reflected in subsequent exit routine invocations. This map
     *            also contains keys with IBM reserved names.  These entries are
     *            defined in the <code>MonitorMetaDataConstants</code> class and
     *            have special semantics. The the values of the IBM reserved names
```

```
     *            cannot be modified by the exit
     *
     * @param taskDetails
     *            An XML String representing the task to be executed as a result of
     *            the monitor triggering. This XML string may be modified by the
     *            exit
     *
     * @return    a monitor exit result object which is used to determine if the
     *            task should proceed, or be cancelled.
     */
    MonitorExitResult onMonitor(Map<String, String> environmentMetaData,
                                Map<String, String> monitorMetaData,
                                Reference<String> taskDetails);
}
```

The constants for the IBM-reserved values in the monitor metadata are as follows:

```
package com.ibm.wmqfte.exitroutine.api;

/**
* Constants for IBM reserved values placed into the monitor meta data
* maps used by the monitor exit routines.
*/
public interface MonitorMetaDataConstants {

/**
* The value associated with this key is the name of the trigger
* file associated with the monitor. Any modification performed
* to this property by user exit routines will be ignored.
*/
final String FILE_NAME_KEY = "FILENAME";

/**
* The value associated with this key is the path to the trigger
* file associated with the monitor. Any modification performed
* to this property by user exit routines will be ignored.
*/
final String FILE_PATH_KEY = "FILEPATH";

/**
* The value associated with this key is the size of the trigger
* file associated with the monitor. This will not be present in
* the cases where the size cannot be determined. Any modification
* performed to this property by user exit routines will be ignored.
*/
final String FILE_SIZE_KEY = "FILESIZE";

/**
* The value associated with this key is the local date on which
* the trigger file associated with the monitor was last modified.
* Any modification performed to this property by user exit routines
* will be ignored.
*/
final String LAST_MODIFIED_DATE_KEY = "LASTMODIFIEDDATE";

/**
* The value associated with this key is the local time at which
* the trigger file associated with the monitor was last modified.
* Any modification performed to this property by user exit routines
* will be ignored.
*/
final String LAST_MODIFIED_TIME_KEY = "LASTMODIFIEDTIME";

/**
* The value associated with this key is the UTC date on which
* the trigger file associated with the monitor was last modified.
* Any modification performed to this property by user exit routines
* will be ignored.
*/
final String LAST_MODIFIED_DATE_KEY_UTC = "LASTMODIFIEDDATEUTC";

/**
* The value associated with this key is the UTC time at which
* the trigger file associated with the monitor was last modified.
* Any modification performed to this property by user exit routines
* will be ignored.
*/
final String LAST_MODIFIED_TIME_KEY_UTC = "LASTMODIFIEDTIMEUTC";
```

```
/**
* The value associated with this key is the name of the agent on which
* the monitor is running. Any modification performed to this property by
* user exit routines will be ignored.
*/
final String MONITOR_AGENT_KEY = "AGENTNAME";

}
```

Example monitor user exit

This example class implements the MonitorExit interface. This example adds a custom substitution variable into the monitor metadata called *REDIRECTEDAGENT* that will be populated with a value of `LONDON` if the hour of the day is odd, and a value of `PARIS` for even hours. The monitor exit result code is set to always return `proceed`.

```
package com.ibm.wmqfte.monitor;

import java.util.Calendar;
import java.util.Map;

import com.ibm.wmqfte.exitroutine.api.MonitorExit;
import com.ibm.wmqfte.exitroutine.api.MonitorExitResult;
import com.ibm.wmqfte.exitroutine.api.Reference;

/**
 * Example resource monitor user exit that changes the monitor mutable
 * metadata value between 'LONDON' and 'PARIS' depending on the hour of the day.
 *
 */
public class TestMonitorExit implements MonitorExit {

    // custom variable that will substitute destination agent
    final static String REDIRECTED_AGENT = "REDIRECTEDAGENT";

    public MonitorExitResult onMonitor(
Map<String, String> environmentMetaData,
            Map<String, String> monitorMetaData,
Reference<String> taskDetails) {

        // always succeed
        final MonitorExitResult result = MonitorExitResult.PROCEED_RESULT;

        final int hour = Calendar.getInstance().get(Calendar.HOUR_OF_DAY);

        if (hour%2 == 1) {
            monitorMetaData.put(REDIRECTED_AGENT, "LONDON");
        } else {
            monitorMetaData.put(REDIRECTED_AGENT, "PARIS");
        }

        return result;
    }
}
```

The corresponding task for a monitor that makes use of the *REDIRECTEDAGENT* substitution variable could look similar to the following:

```
<?xml version="1.0" encoding="UTF-8"?>
<request version="4.00"
         xmlns:xsi="https://www.w3.org/2001/XMLSchema-instance"
         xsi:noNamespaceSchemaLocation="FileTransfer.xsd">
  <managedTransfer>
    <originator>
        <hostName>reportserver.com</hostName>
        <userID>USER1</userID>
    </originator>
    <sourceAgent agent="AGENT1"
                 QMgr="QM1"/>
    <destinationAgent agent="${REDIRECTEDAGENT}"
                      QMgr="QM2"/>
    <transferSet>
      <item mode="binary" checksumMethod="MD5">
        <source recursive="false" disposition="delete">
```

```
            <file>c:\sourcefiles\reports.doc</file>
          </source>
          <destination type="file" exist="overwrite">
            <file>c:\destinationfiles\reports.doc</file>
          </destination>
        </item>
      </transferSet>
    </managedTransfer>
  </request>
```

Before this transfer is started, the value of the <destinationAgent> element's `agent` attribute is replaced with either `LONDON` or `PARIS`.

You must specify the substitution variable in the monitor exit class and the task definition XML in uppercase.

Related concepts

"Metadata for MFT user exits" on page 2106
There are three different types of metadata that can be supplied to user exit routines for Managed File Transfer: environment, transfer, and file metadata. This metadata is presented as maps of Java key-value pairs.

"Java interfaces for MFT user exits" on page 2115
Use the topics in this section for reference information about Java interfaces for user exit routines.

MFT source and destination user exits

Related tasks

Customizing MFT with user exits

Related reference

"MFT Agent properties for user exits" on page 2113
In addition to the standard properties in the `agent.properties` file, there are several advanced properties specifically for user exit routines. These properties are not included by default so if you want to use any of them, you must manually edit the `agent.properties` file. If you make a change to `agent.properties` file while that agent is running, stop and restart the agent to pick up the changes.

MFT Agent properties for user exits

In addition to the standard properties in the `agent.properties` file, there are several advanced properties specifically for user exit routines. These properties are not included by default so if you want to use any of them, you must manually edit the `agent.properties` file. If you make a change to `agent.properties` file while that agent is running, stop and restart the agent to pick up the changes.

For IBM WebSphere MQ 7.5 or later, environment variables can be used in some Managed File Transfer properties that represent file or directory locations. This allows the locations of files or directories used when running parts of the product, to vary depending on environment changes, such as which user is running the process. For more information, see Environment variables in MFT properties.

User exit routine properties

The user exit routines are called in the order listed in the following table. For more information about the `agent.properties` file, see Advanced agent properties: User exit routine.

Table 886. Agent properties for user exits

Property name	Description
sourceTransferEndExitClasses	Specifies a comma-separated list of classes that implement a source transfer end exit routine.
sourceTransferStartExitClasses	Specifies a comma-separated list of classes that implement a source transfer start exit routine.
destinationTransferStartExitClasses	Specifies a comma-separated list of classes that implement a destination transfer start user exit routine.

Table 886. Agent properties for user exits (continued)	
Property name	**Description**
destinationTransferEndExitClasses	Specifies a comma-separated list of classes that implement a destination transfer user exit routine.
exitClassPath	Specifies a platform-specific, character-delimited list of directories that act as the class path for user exit routines. The agent exits directory is searched before any entries in this class path. If you are using this property on Windows, use a forward slash character (/) as a path delimiter, not the backslash character (\). For example: `exitClassPath=C:/mycomp/mqft/exits/encryptFileExit.jar; C:/mycomp/mqft/exits/fileFilter.jar.` For IBM WebSphere MQ 7.5 or later, the value of this property can contain environment variables.
exitNativeLibraryPath	Specifies a platform-specific, character-delimited list of directories that act as the native library path for user exit routines. For IBM WebSphere MQ 7.5 or later, the value of this property can contain environment variables.
monitorExitClasses	Specifies a comma-separated list of classes that implement a monitor exit routine. For more information, see MFT resource monitor user exits.
protocolBridgeCredentialExitClasses	Specifies a comma-separated list of classes that implement a protocol bridge credential user exit routine. For more information, see Mapping credentials for a file server by using exit classes.
protocolBridgePropertiesExitClasses	Specifies a comma-separated list of classes that implement a protocol bridge server properties user exit routine. For more information, see ProtocolBridgePropertiesExit2: Looking up protocol file server properties.
IOExitClasses	Specifies a comma-separated list of classes that implement an I/O user exit routine. List only the classes that implement the IOExit interface, that is, do not list classes that implement the other I/O user exit interfaces, for example IOExitResourcePath and IOExitChannel. For more information, see Using MFT transfer I/O user exits.

Order of exit invocation

The source and destination exits are invoked in the following order:

1. SourceTransferStartExit
2. DestinationTransferStartExit
3. DestinationTransferEndExit
4. SourceTransferEndExit

Chaining source and destination exits

If you specify multiple exits, the first exit in the list is invoked first, followed by the second exit, and so on. Any changes made by the first exit are passed as input to the exit that is subsequently invoked and so on. For example, if the there are two source transfer start exits any changes made to the transfer metadata by the first exit are input to the second exit. Each exit returns its own result. If all the exits of a given type return PROCEED as a transfer result code, the overall result is PROCEED. If one or more exits return CANCEL_TRANSFER, the overall result is CANCEL_TRANSFER. All of the result codes and strings returned by the exits are output in the transfer log.

If the overall result from the source transfer start exit is PROCEED, the transfer proceeds using any changes made by the exits. If the overall result is CANCEL_TRANSFER, the source transfer end exits are invoked and then the transfer is canceled. The completion status in the transfer log is "cancelled".

If the overall result from the destination transfer start exits is PROCEED, the transfer proceeds using any changes made by the exits. If the overall result is CANCEL_TRANSFER, the destination transfer end

exits are invoked, then the source transfer end exits are invoked. Finally the transfer is canceled. The completion status in the transfer log is "cancelled".

If a source or destination exit needs to pass information to following exits either in the chain or in the order of execution it must be done by updating the transfer metadata. The usage of the transfer metadata is exit implementation specific. For instance, if an exit sets the return result to CANCEL_TRANSFER and needs to communicate to the following exits that the transfer has been canceled it must done by setting a transfer metadata value in a way understood by the other exits.

Example

```
sourceTransferStartExitClasses=com.ibm.wmqfte.test.MFTTestSourceTransferStartExit
sourceTransferEndExitClasses=com.ibm.wmqfte.test.MFTTestSourceTransferEndExit
destinationTransferStartExitClasses=com.ibm.wmqfte.test.MFTTestDestinationTransferStartExit
destinationTransferEndExitClasses=com.ibm.wmqfte.test.MFTTestDestinationTransferEndExit
exitClassPath=C:/mycomp/mqft/exits/encryptFileExit.jar;C:/mycomp/mqft/exits/fileFilter.jar
```

Related concepts

Customizing MFT with user exits

“Metadata for MFT user exits” on page 2106
There are three different types of metadata that can be supplied to user exit routines for Managed File Transfer: environment, transfer, and file metadata. This metadata is presented as maps of Java key-value pairs.

“Java interfaces for MFT user exits” on page 2115
Use the topics in this section for reference information about Java interfaces for user exit routines.

Related reference

“MFT resource monitor user exits” on page 2109
Resource monitor user exits allow you to configure custom code to run when a monitor's trigger condition is satisfied, before the associated task is started.

Environment variables in MFT properties

The MFT `agent.properties` file

Java interfaces for MFT user exits

Use the topics in this section for reference information about Java interfaces for user exit routines.

CDCredentialExit.java interface

CDCredentialExit.java

```
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 */
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;

/**
 * An interface that is implemented by classes that are invoked as part of
 * user exit routine processing.  This interface defines methods that are
 * invoked by a Connect:Direct bridge agent to map the IBM MQ user ID of the transfer to credentials
 * that are used to access the Connect:Direct node.
 * There will be one instance of each implementation class per Connect:Direct bridge agent. The methods
```

```
 * can be called from different threads so the methods must be synchronized.
 */
public interface CDCredentialExit {

    /**
     * Invoked once when a Connect:Direct bridge agent is started. It is intended to initialize
     * any resources that are required by the exit
     *
     * @param bridgeProperties
     *            The values of properties defined for the Connect:Direct bridge.
     *            These values can only be read, they cannot be updated by
     *            the implementation.
     *
     * @return    true if the initialisation is successful and false if unsuccessful
     *            If false is returned from an exit the Connect:Direct bridge agent does not
     *            start.
     */
     public boolean initialize(final Map<String, String> bridgeProperties);

     /**
      * Invoked once per transfer to map the IBM MQ user ID in the transfer message to the
      * credentials to be used to access the Connect:Direct node.
       *
       * @param mqUserId The IBM MQ user ID from which to map to the credentials to be used
      *                  to access the Connect:Direct node
     * @param snode    The name of the Connect:Direct SNODE specified as the cdNode in the
     *                 file path. This is used to map the correct user ID and password for the
      *                  SNODE.
     * @return         A credential exit result object that contains the result of the map and
      *                  the credentials to use to access the Connect:Direct node
      */

     public CDCredentialExitResult mapMQUserId(final String mqUserId, final String snode);

      /**
      * Invoked once when a Connect:Direct bridge agent is shutdown. This method releases
      * any resources that were allocated by the exit
      *
       * @param bridgeProperties
      *            The values of properties defined for the Connect:Direct bridge.
      *            These values can only be read, they cannot be updated by
       *            the implementation.
       *
       * @return
     */
     public void shutdown(final Map<String, String> bridgeProperties);      }
```

CredentialExitResult.java interface

CredentialExitResult.java

```
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 */

package com.ibm.wmqfte.exitroutine.api;

/**
 * The result of invoking a Credential mapMQUserId exit method.  It is composed of a result
 * code, which determines whether the mapping of the user id was successful, and an optional
 * Credentials object if the mapping is successful.
 */
public class CredentialExitResult {

    private final CredentialExitResultCode resultCode;
    private final Credentials credentials;

    /**
```

```
     * Constructor.  Creates a credential exit result object with a specified result
     * code and optionally credentials.
     *
     * @param resultCode
     *            The result code to associate with the exit result being created.
     *
     * @param credentials
     *            The credentials to associate with the exit result being created.
     *            A value of <code>null</code> can be specified to indicate no
     *            credentials. If the resultCode is USER_SUCCESSFULLY_MAPPED the
     *            credentials must be set to a non-null value,
     */
    public CredentialExitResult(CredentialExitResultCode resultCode, Credentials credentials) {
        this.resultCode = resultCode;
        this.credentials = credentials;
    }


    /**
     * Returns the result code associated with this credential exit result
     *
     * @return    the result code associated with this exit result.
     */
    public CredentialExitResultCode getResultCode() {
        return resultCode;
    }

    /**
     * Returns the credentials associated with this credential exit result
     *
     * @return    the explanation associated with this credential exit result.
     */
    public Credentials getCredentials() {
        return credentials;
    }
}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

DestinationTransferEndExit.java interface

DestinationTransferEndExit.java

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 */
package com.ibm.wmqfte.exitpoint.api;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately after completing a transfer on the agent acting as the
 * destination of the transfer.
 */
public interface DestinationTransferEndExit {
```

```
    /**
     * Invoked immediately after the completion of a transfer on the agent acting as
     * the destination of the transfer.
     *
     * @param transferExitResult
     *            a result object reflecting whether or not the transfer completed
     *            successfully.
     *
     * @param sourceAgentName
     *            the name of the agent acting as the source of the transfer.
     *
     * @param destinationAgentName
     *            the name of the agent acting as the destination of the
     *            transfer.     This is the name of the agent that the
     *            implementation of this method will be invoked from.
     *
     * @param environmentMetaData
     *            meta data about the environment in which the implementation
     *            of this method is running.  This information can only be read,
     *            it cannot be updated by the implementation.  The constants
     *            defined in <code>EnvironmentMetaDataConstants</code> class can
     *            be used to access the data held by this map.
     *
     * @param transferMetaData
     *            meta data to associate with the transfer.  The information can
     *            only be read, it cannot be updated by the implementation.  This
     *            map may also contain keys with IBM reserved names.  These
     *            entries are defined in the <code>TransferMetaDataConstants</code>
     *            class and have special semantics.
     *
     * @param fileResults
     *            a list of file transfer result objects that describe the source
     *            file name, destination file name and result of each file transfer
     *            operation attempted.
     *
     * @return    an optional description to enter into the log message describing
     *            transfer completion.  A value of <code>null</code> can be used
     *            when no description is required.
     */
    String onDestinationTransferEnd(TransferExitResult transferExitResult,
                    String sourceAgentName,
                    String destinationAgentName,
                    Map<String, String>environmentMetaData,
                    Map<String, String>transferMetaData,
                    List<FileTransferResult>fileResults);
}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"SourceTransferEndExit.java interface" on page 2142

"DestinationTransferStartExit.java interface" on page 2118

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

DestinationTransferStartExit.java interface

DestinationTransferStartExit.java

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```

```
 *   IBM Corp.
 */
package com.ibm.wmqfte.exitpoint.api;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately prior to starting a transfer on the agent acting as the
 * destination of the transfer.
 */
public interface DestinationTransferStartExit {

    /**
     * Invoked immediately prior to starting a transfer on the agent acting as
     * the destination of the transfer.
     *
     * @param sourceAgentName
     *             the name of the agent acting as the source of the transfer.
     *
     * @param destinationAgentName
     *             the name of the agent acting as the destination of the
     *             transfer.     This is the name of the agent that the
     *             implementation of this method will be invoked from.
     *
     * @param environmentMetaData
     *             meta data about the environment in which the implementation
     *             of this method is running.  This information can only be read,
     *             it cannot be updated by the implementation.  The constants
     *             defined in <code>EnvironmentMetaDataConstants</code> class can
     *             be used to access the data held by this map.
     *
     * @param transferMetaData
     *             meta data to associate with the transfer.  The information can
     *             only be read, it cannot be updated by the implementation.  This
     *             map may also contain keys with IBM reserved names.  These
     *             entries are defined in the <code>TransferMetaDataConstants</code>
     *             class and have special semantics.
     *
     * @param fileSpecs
     *             a list of file specifications that govern the file data to
     *             transfer.  The implementation of this method can modify the
     *             entries in this list and the changes will be reflected in the
     *             files transferred. However, new entries may not be added and
     *             existing entries may not be removed.
     *
     * @return    a transfer exit result object which is used to determine if the
     *             transfer should proceed, or be cancelled.
     */
    TransferExitResult onDestinationTransferStart(String sourceAgentName,
                                                  String destinationAgentName,
                                              Map<String, String> environmentMetaData,
                                              Map<String, String> transferMetaData,
                                              List<Reference<String>> fileSpecs);
```

Related tasks

Customizing MFT with user exits

Related reference

“SourceTransferStartExit.java interface” on page 2143

“SourceTransferEndExit.java interface” on page 2142

“DestinationTransferEndExit.java interface” on page 2117

“MonitorExit.java interface” on page 2137

“ProtocolBridgeCredentialExit.java interface” on page 2138

FileTransferResult.java interface

FileTransferResult.java

```
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 */

package com.ibm.wmqfte.exitroutine.api;

/**
 * Result information about a file transfer.
 */
public interface FileTransferResult {

    /** An enumeration for the <code>getCorrelatorType()</code> method. */
    public enum CorrelationInformationType {
        /** No correlation information is available for this result */
        NONE,
        /**
         * The correlation information relates to work done in
         * IBM Sterling File Gateway.
         */
        SFG
    }

    /**
     * Returns the source file specification, from which the file was transferred.
     *
     * @return    the source file specification, from which the file was
     *            transferred.
     */
    String getSourceFileSpecification();

    /**
     * Returns the destination file specification, to which the file was transferred.
     *
     * @return    the destination file specification, to which the file was
     *            transferred.  A value of <code>null</code> may be returned
     *            if the transfer did not complete successfully.
     */
    String getDestinationFileSpecification();

    /**
     * Returns the result of the file transfer operation.
     *
     * @return    the result of the file transfer operation.
     */
    FileExitResult getExitResult();

    /**
     * @return an enumerated value that identifies the product to which this correlating
     *         information relates.
     */
    CorrelationInformationType getCorrelatorType();

    /**
     * @return the first string component of the correlating identifier that relates
     *         this transfer result to work done in another product.  A value of null
     *         may be returned either because the other product does not utilize a
     *         string based correlation information or because there is no correlation
     *         information.
     */
    String getString1Correlator();

    /**
     * @return the first long component of the correlating identifier that relates
     *         this transfer result to work done in another product.  A value of zero
     *         is returned when there is no correlation information or the other
     *         product does not utilize long based correlation information or because
     *         the value really is zero!
     */
    long getLong1Correlator();
}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

IOExit.java interface

IOExit.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;
import java.util.Map;

import com.ibm.wmqfte.exitroutine.api.IOExitRecordResourcePath.RecordFormat;

/**
 * An interface that is implemented by classes that you want to be invoked as
 * part of user exit routine processing. This interface defines methods that
 * will be invoked during transfers to perform the underlying file system I/O
 * work for WMQFTE transfers.
 * <p>
 * The {@link #initialize(Map)} method will be called once when the exit is
 * first installed. The WMQFTE agent properties are passed to this method, thus
 * enabling the exit to understand its environment.
 * <p>
 * The {@link #isSupported(String)} method will be invoked during WMQFTE
 * transfers to determine whether the user exit should be used. If the
 * {@link #isSupported(String)} method returns a value of {@code true}, the
 * {@link #newPath(String)} method will be invoked for the paths specified for
 * the transfer request. The returned {@link IOExitPath} instance from a
 * {@link #newPath(String)} method invocation will then be used by the WMQFTE
 * transfer to obtain information about the resource and to transfer data to or
 * from the resource.
 * <p>
 * To obtain transfer context for an I/O exit, a {@link SourceTransferStartExit}
 * or {@link DestinationTransferStartExit} as appropriate, should be installed
 * to enable information to be seen by this exit. The
 * {@link SourceTransferStartExit} or {@link DestinationTransferStartExit} are
 * passed the transfer's environment, metadata, and a list of file
 * specifications for the transfer. The paths for the file specifications are
 * the paths passed to the I/O exit's {@link #newPath(String)} method.
 * <p>
 * Note also that the {@link #isSupported(String)} and {@link #newPath(String)}
 * methods might be called at other times by a WMQFTE agent and not just during
 * transfers. For example, at transfer setup time the I/O system is queried to
 * resolve the full resource paths for transfer.
 */
public interface IOExit {

    /**
     * Invoked once when the I/O exit is first required for use. It is intended
     * to initialize any resources that are required by the exit.
     *
     * @param agentProperties
     *            The values of properties defined for the WMQFTE agent. These
     *            values can only be read, they cannot be updated by the
     *            implementation.
```

```
     * @return {@code true} if the initialization is successful and {@code
     *         false} if unsuccessful. If {@code false} is returned from an
     *         exit, the exit will not be used.
     */
    boolean initialize(final Map<String, String> agentProperties);

    /**
     * Indicates whether this I/O user exit supports the specified path.
     * <p>
     * This method is used by WMQFTE to determine whether the I/O user exit
     * should be used within a transfer. If no I/O user exit returns true for
     * this method, the default WMQFTE file I/O function will be used.
     *
     * @param path
     *            The path to the required I/O resource.
     * @return {@code true} if the specified path is supported by the I/O exit,
     *         {@code false} otherwise
     */
    boolean isSupported(String path);

    /**
     * Obtains a new {@link IOExitPath} instance for the specified I/O resource
     * path.
     * <p>
     * This method will be invoked by WMQFTE only if the
     * {@link #isSupported(String)} method has been called for the path and
     * returned {@code true}.
     *
     * @param path
     *            The path to the required I/O resource.
     * @return A {@link IOExitPath} instance for the specified path.
     * @throws IOException
     *             If the path cannot be created for any reason.
     */
    IOExitPath newPath(String path) throws IOException;

    /**
     * Obtains a new {@link IOExitPath} instance for the specified I/O resource
     * path and passes record format and length information required by the
     * WMQFTE transfer.
     * <p>
     * Typically this method will be called for the following cases:
     * <ul>
     * <li>A path where a call to {@link #newPath(String)} has previously
     * returned a {@link IOExitRecordResourcePath} instance and WMQFTE is
     * re-establishing a new {@link IOExitPath} instance for the path, from an
     * internally-serialized state. The passed recordFormat and recordLength
     * will be the same as those for the original
     * {@link IOExitRecordResourcePath} instance.</li>
     * <li>A transfer destination path where the source of the transfer is
     * record oriented. The passed recordFormat and recordLength will be the
     * same as those for the source.</li>
     * </ul>
     * The implementation can act on the record format and length information as
     * deemed appropriate. For example, for a destination agent if the
     * destination does not already exist and the source of the transfer is
     * record oriented, the passed recordFormat and recordLength information
     * could be used to create an appropriate record-oriented destination path.
     * If the destination path already exists, the passed recordFormat and
     * recordLength information could be used to perform a compatibility check
     * and throw an {@link IOException} if the path is not compatible. A
     * compatibility check could ensure that a record oriented path's record
     * format is the same as the passed record format or that the record length
     * is greater or equal to the passed record length.
     * <p>
     * This method will be invoked by WMQFTE only if the
     * {@link #isSupported(String)} method has been called for the path and
     * returned {@code true}.
     *
     * @param path
     *            The path to the required I/O resource.
     * @param recordFormat
     *            The advised record format.
     * @param recordLength
     *            The advised record length.
     * @return A {@link IOExitPath} instance for the specified path.
     * @throws IOException
     *             If the path cannot be created for any reason. For example,
     *             the passed record format or length is incompatible with the
     *             path's actual record format or length.
     */
```

```
    IOExitPath newPath(String path, RecordFormat recordFormat, int recordLength)
            throws IOException;
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitChannel.java interface

IOExitChannel.java

```
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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;
import java.nio.ByteBuffer;

/**
 * Represents a channel that enables data to be read from or written to an
 * {@link IOExitResourcePath} resource.
 */
public interface IOExitChannel {

    /**
     * Obtains the data size for the associated {@link IOExitResourcePath} in
     * bytes.
     *
     * @return The data size in bytes.
     * @throws IOException
     *             If a problem occurs while attempting obtain the size.
     */
    long size() throws IOException;

    /**
     * Closes the channel, flushing any buffered write data to the resource and
     * releasing any locks.
     *
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while closing the resource.
     *             This means that WMQFTE can attempt to recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs. For example, the channel might
     *             already be closed.
     */
    void close() throws RecoverableIOException, IOException;

    /**
     * Reads data from this channel into the given buffer, starting at this
     * channel's current position, and updates the current position by the
     * amount of data read.
     * <p>
     * Data is copied into the buffer starting at its current position and up to
     * its limit. On return, the buffer's position is updated to reflect the
     * number of bytes read.
     *
     * @param buffer
     *            The buffer that the data is to be copied into.
     * @return The number of bytes read, which might be zero, or -1 if the end of
     *         data has been reached.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while reading the data. For a
     *             WMQFTE transfer this means that it will attempt to recover.
     * @throws IOException
     *             If some other I/O problem occurs. For a WMQFTE transfer this
```

```
     *             means that it will be failed.
     */
    int read(ByteBuffer buffer) throws RecoverableIOException, IOException;

    /**
     * Writes data to this channel from the given buffer, starting at this
     * channel's current position, and updates the current position by the
     * amount of data written. The channel's resource is grown to accommodate
     * the data, if necessary.
     * <p>
     * Data is copied from the buffer starting at its current position and up to
     * its limit. On return, the buffer's position is updated to reflect the
     * number of bytes written.
     *
     * @param buffer
     *            The buffer containing the data to be written.
     * @return The number of bytes written, which might be zero.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while writing the data. For a
     *             WMQFTE transfer this means that it will attempt to recover.
     * @throws IOException
     *             If some other I/O problem occurs. For a WMQFTE transfer this
     *             means that it will be failed.
     */
    int write(ByteBuffer buffer) throws RecoverableIOException, IOException;

    /**
     * Forces any updates to this channel's resource to be written to its
     * storage device.
     * <p>
     * This method is required to force changes to both the resource's content
     * and any associated metadata to be written to storage.
     *
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while performing the force.
     *             For a WMQFTE transfer this means that it will attempt to
     *             recover.
     * @throws IOException
     *             If some other I/O problem occurs. For a WMQFTE transfer this
     *             means that it will be failed.
     */
    void force() throws RecoverableIOException, IOException;

    /**
     * Attempts to lock the entire resource associated with the channel for
     * shared or exclusive access.
     * <p>
     * The intention is for this method not to block if the lock is currently
     * unavailable.
     *
     * @param shared
     *            {@code true} if a shared lock is required, {@code false} if an
     *            exclusive lock is required.
     * @return A {@link IOExitLock} instance representing the newly acquired
     *         lock or null if the lock cannot be obtained.
     * @throws IOException
     *             If a problem occurs while attempting to acquire the lock.
     */
    IOExitLock tryLock(boolean shared) throws IOException;
}
```

Related tasks

Using MFT transfer I/O user exits
Customizing MFT with user exits

IOExitLock.java interface

IOExitLock.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;

/**
 * Represents a lock on a resource for either shared or exclusive access.
 * {@link IOExitLock} instances are returned from
 * {@link IOExitChannel#tryLock(boolean)} calls and WMQFTE will request the
 * release of the lock at the appropriate time during a transfer. Additionally, when
 * a {@link IOExitChannel#close()} method is called it will be the
 * responsibility of the channel to release any associated locks.
 */
public interface IOExitLock {

    /**
     * Releases the lock.
     * <p>
     * After this method has been successfully called the lock is to be deemed as invalid.
     *
     * @throws IOException
     *             If the channel associated with the lock is not open or
     *             another problem occurs while attempting to release the lock.
     */
    void release() throws IOException;

    /**
     * Indicates whether this lock is valid.
     * <p>
     * A lock is considered valid until its @ {@link #release()} method is
     * called or the associated {@link IOExitChannel} is closed.
     *
     * @return {@code true} if this lock is valid, {@code false} otherwise.
     */
    boolean isValid();

    /**
     * @return {@code true} if this lock is for shared access, {@code false} if
     *         this lock is for exclusive access.
     */
    boolean isShared();
}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitPath.java interface

IOExitPath.java

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 */
package com.ibm.wmqfte.exitroutine.api;

/**
 * Represents an abstract path that can be inspected and queried by WMQFTE for
 * transfer purposes.
 * <p>
 * There are two types of path supported:
```

```
 * <ul>
 * <li>{@link IOExitResourcePath} - Represents a path that denotes a data
 * resource. For example, a file, directory, or group of database records.</li>
 * <li>{@link IOExitWildcardPath} - Represents a wildcard path that can be
 * expanded to multiple {@link IOExitResourcePath} instances.</li>
 * </ul>
 */
public abstract interface IOExitPath {

    /**
     * Obtains the abstract path as a {@link String}.
     *
     * @return The abstract path as a {@link String}.
     */
    String getPath();

    /**
     * Obtains the name portion of this abstract path as a {@link String}.
     * <p>
     * For example, a UNIX-style file system implementation evaluates the
     * path {@code /home/fteuser/file1.txt} as having a name of {@code
     * file1.txt}.
     *
     * @return the name portion of this abstract path as a {@link String}.
     */
    String getName();

    /**
     * Obtains the parent path for this abstract path as a {@link String}.
     * <p>
     * For example, a UNIX-style file system implementation evaluates the
     * path {@code /home/fteuser/file1.txt} as having a parent path of {@code
     * /home/fteuser}.
     *
     * @return The parent portion of the path as a {@link String}.
     */
    String getParent();

    /**
     * Obtains the abstract paths that match this abstract path.
     * <p>
     * If this abstract path denotes a directory resource, a list of paths
     * for all resources within the directory are returned.
     * <p>
     * If this abstract path denotes a wildcard, a list of all paths
     * matching the wildcard are returned.
     * <p>
     * Otherwise null is returned, because this abstract path probably denotes a
     * single file resource.
     *
     * @return An array of {@IOExitResourcePath}s that
     *         match this path, or null if this method is not applicable.
     */
    IOExitResourcePath[] listPaths();
}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitProperties.java interface

IOExitProperties.java

```
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```

```
 */
package com.ibm.wmqfte.exitroutine.api;

/**
 * Properties that determine how WMQFTE treats an {@link IOExitPath} for certain
 * aspects of I/O. For example, whether to use intermediate files.
 */
public class IOExitProperties {

    private boolean rereadSourceOnRestart = true;
    private boolean rechecksumSourceOnRestart = true;
    private boolean rechecksumDestinationOnRestart = true;
    private boolean useIntermediateFileAtDestination = true;
    private boolean requiresSingleThreadedChannelIO = false;

    /**
     * Determines whether the I/O exit implementation expects the resource to be
     * re-read from the start if a transfer is restarted.
     *
     * @return {@code true} if, on restart, the I/O exit expects the source
     *         resource to be opened at the beginning and re-read from the
     *         beginning (the {@link IOExitPath#openForRead(long)} method is
     *         always invoked with 0L as an argument). {@code false} if, on
     *         restart, the I/O exit expects the source to be opened at the
     *         offset that the source agent intends to start reading from (the
     *         {@link IOExitPath#openForRead(long)} method can be invoked with a
     *         non-zero value as its argument).
     */
    public boolean getRereadSourceOnRestart() {
        return rereadSourceOnRestart;
    }

    /**
     * Sets the value to determine whether the I/O exit implementation expects
     * the resource to be re-read from the beginning if a transfer is restarted.
     * <p>
     * The default is {@code true}. The I/O exit should call this method when
     * required to change this value.
     *
     * @param rereadSourceOnRestart
     *            {@code true} if, on restart, the I/O exit expects the source
     *            resource to be opened at the beginning and re-read from the
     *            beginning (the {@link IOExitPath#openForRead(long)} method
     *            is always invoked with 0L as an argument). {@code false}
     *            if, on restart, the I/O exit expects the source to be opened
     *            at the offset that the source agent intends to start reading
     *            from (the {@link IOExitPath#openForRead(long)} method can be
     *            invoked with a non-zero value as its argument).
     */
    public void setRereadSourceOnRestart(boolean rereadSourceOnRestart) {
        this.rereadSourceOnRestart = rereadSourceOnRestart;
    }

    /**
     * Determines whether the I/O exit implementation requires the source
     * resource to be re-checksummed if the transfer is restarted.
     * Re-checksumming takes place only if the
     * {@link #getRereadSourceOnRestart()} method returns {@code true}.
     *
     * @return {@code true} if, on restart, the I/O exit expects the already-
     *         transferred portion of the source to be re-checksummed for
     *         inconsistencies. Use this option in environments
     *         where the source could be changed during a restart. {@code
     *         false} if, on restart, the I/O exit does not require the
     *         already-transferred portion of the source to be re-checksummed.
     */
    public boolean getRechecksumSourceOnRestart() {
        return rechecksumSourceOnRestart;
    }

    /**
     * Sets the value to determine whether the I/O exit implementation requires
     * the source resource to be re-checksummed if the transfer is restarted.
     * Re-checksumming takes place only if the
     * {@link #getRereadSourceOnRestart()} method returns {@code true}.
     * <p>
     * The default is {@code true}. The I/O exit should call this method when
     * required to change this value.
     *
     * @param rechecksumSourceOnRestart
     *            {@code true} if, on restart, the I/O exit expects the already
     *            transferred portion of the source to be re-checksummed
```

```
     *            for inconsistencies. Use this option in environments
     *            where the source could be changed during a restart.
     *            {@code false} if, on restart, the I/O exit does not
     *            require the already-transferred portion of the source to be
     *            re-checksummed.
     */
    public void setRechecksumSourceOnRestart(boolean rechecksumSourceOnRestart) {
        this.rechecksumSourceOnRestart = rechecksumSourceOnRestart;
    }

    /**
     * Determines whether the I/O exit implementation requires the destination
     * resource to be re-checksummed if the transfer is restarted.
     *
     * @return {@code true} if, on restart, the I/O exit expects the already
     *         transferred portion of the destination to be re-checksummed to
     *         check for inconsistencies. This option should be used in
     *         environments where the destination could have been changed while
     *         a restart is occurring. {@code false} if, on restart, the I/O exit
     *         does not require the already transferred portion of the
     *         destination to be re-checksummed.
     */
    public boolean getRechecksumDestinationOnRestart() {
        return rechecksumDestinationOnRestart;
    }

    /**
     * Sets the value to determine whether the I/O exit implementation requires
     * the destination resource to be re-checksummed if the transfer is
     * restarted.
     * <p>
     * The default is {@code true}. The I/O exit should call this method when
     * required to change this value.
     *
     * @param rechecksumDestinationOnRestart
     *            {@code true} if, on restart, the I/O exit expects the already-
     *            transferred portion of the destination to be re-checksummed
     *            for inconsistencies. Use this option in environments
     *            where the destination could have been changed during a
     *            restart. {@code false} if, on restart, the I/O exit does not
     *            require the already-transferred portion of the destination
     *            to be re-checksummed.
     */
    public void setRechecksumDestinationOnRestart(
            boolean rechecksumDestinationOnRestart) {
        this.rechecksumDestinationOnRestart = rechecksumDestinationOnRestart;
    }

    /**
     * Determines whether the I/O exit implementation requires the use of an
     * intermediate file when writing the data at the destination. The
     * intermediate file mechanism is typically used to prevent an incomplete
     * destination resource from being processed.
     *
     * @return {@code true} if data should be written to an intermediate file at
     *         the destination and then renamed (to the requested destination
     *         path name as specified in the transfer request) after the transfer is
     *         complete. {@code false} if data should be written directly to the
     *         requested destination path name without the use of an
     *         intermediate file.
     */
    public boolean getUseIntermediateFileAtDestination() {
        return useIntermediateFileAtDestination;
    }

    /**
     * Sets the value to determine whether the I/O exit implementation requires
     * the use of an intermediate file when writing the data at the destination.
     * The intermediate file mechanism is typically used to prevent an
     * incomplete destination resource from being processed.
     *
     * <p>
     * The default is {@code true}. The I/O exit should call this method when
     * required to change this value.
     *
     * @param useIntermediateFileAtDestination
     *            {@code true} if data should be written to an intermediate file
     *            at the destination and then renamed (to the requested
     *            destination path name as specified in the transfer request) after
     *            the transfer is complete. {@code false} if data should be written
     *            directly to the requested destination path name without the
     *            use of an intermediate file
```

```
     */
    public void setUseIntermediateFileAtDestination(
            boolean useIntermediateFileAtDestination) {
        this.useIntermediateFileAtDestination = useIntermediateFileAtDestination;
    }

    /**
     * Determines whether the I/O exit implementation requires
     * {@link IOExitChannel} instances to be accessed by a single thread only.
     *
     * @return {@code true} if {@link IOExitChannel} instances are to be
     *         accessed by a single thread only.
     */
    public boolean requiresSingleThreadedChannelIO() {
        return requiresSingleThreadedChannelIO;
    }

    /**
     * Sets the value to determine whether the I/O exit implementation requires
     * channel operations for a particular instance to be accessed by a
     * single thread only.
     * <p>
     * For certain I/O implementations it is necessary that resource path
     * operations such as open, read, write, and close are invoked only from a
     * single execution {@link Thread}. When set {@code true}, WMQFTE ensures
     * that the following are invoked on a single thread:
     * <ul>
     * <li>{@link IOExitResourcePath#openForRead(long) method and all methods of
     * the returned {@link IOExitChannel} instance.</li>
     * <li>{@link IOExitResourcePath#openForWrite(boolean)) method and all
     * methods of the returned {@link IOExitChannel} instance.</li>
     * </ul>
     * <p>
     * This has a slight performance impact, hence enable single-threaded channel
     * I/O only when absolutely necessary.
     * <p>
     * The default is {@code false}. The I/O exit should call this method when
     * required to change this value.
     *
     * @param requiresSingleThreadedChannelIO
     *            {@code true} if {@link IOExitChannel} instances are to be
     *            accessed by a single thread only.
     */
    public void setRequiresSingleThreadedChannelIO(boolean requiresSingleThreadedChannelIO) {
        this.requiresSingleThreadedChannelIO = requiresSingleThreadedChannelIO;
    }
}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitRecordChannel.java interface

IOExitRecordChannel.java

```
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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;
import java.nio.ByteBuffer;

/**
 * Represents a channel that enables records of data to be read from or written
```

```
 * to an {@link IOExitRecordResourcePath} resource.
 * <p>
 * This is an extension of the {@link IOExitChannel} interface such that the
 * {@link #read(java.nio.ByteBuffer)} and {@link #write(java.nio.ByteBuffer)}
 * methods are expected to deal in whole records of data only. That is, the
 * {@link java.nio.ByteBuffer} returned from the read method and passed to the
 * write method is assumed to contain one or more complete records.
 */
public interface IOExitRecordChannel extends IOExitChannel {

    /**
     * Reads records from this channel into the given buffer, starting at this
     * channel's current position, and updates the current position by the
     * amount of data read.
     * <p>
     * Record data is copied into the buffer starting at its current position
     * and up to its limit. On return, the buffer's position is updated to
     * reflect the number of bytes read.
     * <p>
     * Only whole records are copied into the buffer.
     * <p>
     * For a fixed-record-format resource, this might be multiple records. The
     * amount of data in the return buffer does not necessarily need to be a
     * multiple of the record length, but the last record is still to be treated
     * as a complete record and padded as required by the caller.
     * <p>
     * For a variable-format resource, this is a single whole record of a size
     * corresponding to the amount of return data or multiple whole records with
     * all except the last being treated as records of maximum size.
     *
     * @param buffer
     *            The buffer that the record data is to be copied into.
     * @return The number of bytes read, which might be zero, or -1 if the end of
     *         data has been reached.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while reading the data. For a
     *             WMQFTE transfer this means that it will attempt to recover.
     * @throws IOException
     *             If some other I/O problem occurs, for example, if the passed
     *             buffer is insufficient to contain at least one complete
     *             record). For a WMQFTE transfer this means that it will be
     *             failed.
     */
    int read(ByteBuffer buffer) throws RecoverableIOException, IOException;

    /**
     * Writes records to this channel from the given buffer, starting at this
     * channel's current position, and updates the current position by the
     * amount of data written. The channel's resource is grown to accommodate
     * the data, if necessary.
     * <p>
     * Record data is copied from the buffer starting at its current position
     * and up to its limit. On return, the buffer's position is updated to
     * reflect the number of bytes written.
     * <p>
     * The buffer is expected to contain only whole records.
     * <p>
     * For a fixed-record-format resource, this might be multiple records and if
     * there is insufficient data in the buffer for a complete record, the
     * record is to be padded as required to complete the record.
     * <p>
     * For a variable-record format resource the buffer is normally expected to
     * contain a single record of length corresponding to the amount of data
     * within the buffer. However, if the amount of data within the buffer
     * exceeds the maximum record length, the implementation can either:
     * <ol>
     * <li>throw an {@link IOException} indicating that it cannot handle the
     * situation.</li>
     * <li>Consume a record's worth of data from the buffer, leaving the remaining
     * data within the buffer.</li>
     * <li>Consume all the buffer data and just write what it can to the current
     * record. This effectively truncates the data.</li>
     * <li>Consume all the buffer data and write to multiple records.</li>
     * </ol>
     *
     * @param buffer
     *            The buffer containing the data to be written.
     * @return The number of bytes written, which might be zero.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while writing the data. For a
     *             WMQFTE transfer this means that it will attempt to recover.
     * @throws IOException
```

```
     *              If some other I/O problem occurs. For a WMQFTE transfer this
     *              means that it will be failed.
     */
    int write(ByteBuffer buffer) throws RecoverableIOException, IOException;

}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

z/OS *IOExitRecordResourcePath.java interface*

IOExitRecordResourcePath.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;

/**
 * Represents a path that denotes a record-oriented data resource (for example,
 * a z/OS data set). It allows the data to be located, the record format to be
 * understood, and {@link IOExitRecordChannel} instances to be created for read
 * or write operations.
 */
public interface IOExitRecordResourcePath extends IOExitResourcePath {

    /**
     * Record formats for record-oriented resources.
     */
    public enum RecordFormat {
        FIXED, VARIABLE
    }

    /**
     * Obtains the record length for records that are maintained by the resource
     * denoted by this abstract path.
     * <p>
     * For a resource with fixed-length records, the data for each record read
     * and written is assumed to be this length.
     * <p>
     * For a resource with variable-length records, this is the maximum length
     * for a record's data.
     * <p>
     * This method should return a value greater than zero, otherwise it can
     * result in the failure of a WMQFTE transfer that involves this abstract
     * path.
     *
     * @return The record length, in bytes, for records maintained by the
     *         resource.
     */
    int getRecordLength();

    /**
     * Obtains record format, as a {@link RecordFormat} instance, for records
     * that are maintained by the resource denoted by this abstract path.
     *
     * @return A {@link RecordFormat} instance for the record format for records
     *         that are maintained by the resource denoted by this abstract
     *         path.
     */
    RecordFormat getRecordFormat();
```

```
    /**
     * Opens a {@link IOExitRecordChannel} instance for reading data from the
     * resource denoted by this abstract path. The current data byte position
     * for the resource is expected to be the passed position value, such that
     * when {@link IOExitRecordChannel#read(java.nio.ByteBuffer)} is called,
     * data starting from that position is read.
     * <p>
     * Note that the data byte read position will be on a record boundary.
     *
     * @param position
     *            The required data byte read position.
     * @return A new {@link IOExitRecordChannel} instance allowing data to be
     *         read from the resource denoted by this abstract path.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while attempting to open the
     *             resource for reading. This means that WMQFTE can attempt to
     *             recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    IOExitRecordChannel openForRead(long position)
            throws RecoverableIOException, IOException;

    /**
     * Opens a {@link IOExitRecordChannel} instance for writing data to the
     * resource denoted by this abstract path. Writing of data, using the
     * {@link IOExitRecordChannel#write(java.nio.ByteBuffer)} method, starts at
     * either the beginning of the resource or end of the current data for the
     * resource, depending on the specified append parameter.
     *
     * @param append
     *            When {@code true} indicates that data written to the resource
     *            should be appended to the end of the current data. When
     *            {@code false} indicates that writing of data is to start at
     *            the beginning of the resource; any existing data is lost.
     * @return A new {@link IOExitRecordChannel} instance allowing data to be
     *         written to the resource denoted by this abstract path.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while attempting to open the
     *             resource for writing. This means that WMQFTE can attempt to
     *             recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    IOExitRecordChannel openForWrite(boolean append)
            throws RecoverableIOException, IOException;
}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitResourcePath.java interface

IOExitResourcePath.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.io.IOException;

/**
 * Represents a path that denotes a data resource (for example, a file,
 * directory, or group of database records). It allows the data to be located
```

```
 * and {@link IOExitChannel} instances to be created for read or write
 * operations.
 * <p>
 * There are two types of data resources as follows:
 * <ul>
 * <li>Directory - a container for other data resources. The
 * {@link #isDirectory()} method returns {@code true} for these.</li>
 * <li>File - a data container. This allows data to be read from or written to
 * it. The {@link #isFile()} method returns {@code true} for these.</li>
 * </ul>
 */
public interface IOExitResourcePath extends IOExitPath {

    /**
     * Creates a new {@link IOExitResourcePath} instance for a child path of the
     * resource denoted by this abstract path.
     * <p>
     * For example, with a UNIX-style path, {@code
     * IOExitResourcePath("/home/fteuser/test").newPath("subtest")} could be
     * equivalent to: {@code IOExitResourcePath("/home/fteuser/test/subtest")}
     *
     * @param child
     *            The child path name.
     * @return A new {@link IOExitResourcePath} instance that represents a child
     *         of this path.
     */
    IOExitResourcePath newPath(final String child);

    /**
     * Creates the directory path for the resource denoted by this abstract
     * path, including any necessary but nonexistent parent directories. If the
     * directory path already exists, this method has no effect.
     * <p>
     * If this operation fails, it might have succeeded in creating some of the
     * necessary parent directories.
     *
     * @throws IOException
     *             If the directory path cannot be fully created, when it does
     *             not already exist.
     */
    void makePath() throws IOException;

    /**
     * Obtains the canonical path of the abstract path as a {@link String}.
     * <p>
     * A canonical path is defined as being absolute and unique. For example,
     * the path can be represented as UNIX-style relative path: {@code
     * test/file.txt} but the absolute and unique canonical path representation
     * is: {@code /home/fteuser/test/file.txt}
     *
     * @return The canonical path as a {@link String}.
     * @throws IOException
     *             If the canonical path cannot be determined for any reason.
     */
    String getCanonicalPath() throws IOException;

    /**
     * Tests if this abstract path is an absolute path.
     * <p>
     * For example, a UNIX-style path, {@code /home/fteuser/test} is an absolute
     * path, whereas {@code fteuser/test} is not.
     *
     * @return {@code true} if this abstract path is an absolute path, {@code
     *         false} otherwise.
     */
    boolean isAbsolute();

    /**
     * Tests if the resource denoted by this abstract path exists.
     *
     * @return {@code true} if the resource denoted by this abstract path
     *         exists, {@code false} otherwise.
     * @throws IOException
     *             If the existence of the resource cannot be determined for any
     *             reason.
     */
    boolean exists() throws IOException;

    /**
     * Tests whether the calling application can read the resource denoted by
     * this abstract path.
     *
```

```
     * @return {@code true} if the resource for this path exists and can be
     *         read, {@code false} otherwise.
     * @throws IOException
     *             If a problem occurs while attempting to determine if the
     *             resource can be read.
     */
    boolean canRead() throws IOException;

    /**
     * Tests whether the calling application can modify the resource denoted by
     * this abstract path.
     *
     * @return {@code true} if the resource for this path exists and can be
     *         modified, {@code false} otherwise.
     * @throws IOException
     *             If a problem occurs while attempting to determine if the
     *             resource can be modified.
     */
    boolean canWrite() throws IOException;

    /**
     * Tests whether the specified user is permitted to read the resource
     * denoted by this abstract path.
     * <p>
     * When WMQFTE invokes this method, the user identifier is the MQMD user
     * identifier for the requesting transfer.
     *
     * @param userId
     *            User identifier to test for access.
     * @return {@code true} if the resource for this abstract path exists and is
     *         permitted to be read by the specified user, {@code false}
     *         otherwise.
     * @throws IOException
     *             If a problem occurs while attempting to determine if the user
     *             is permitted to read the resource.
     */
    boolean readPermitted(String userId) throws IOException;

    /**
     * Tests whether the specified user is permitted to modify the resource
     * denoted by this abstract path.
     * <p>
     * When WMQFTE invokes this method, the user identifier is the MQMD user
     * identifier for the requesting transfer.
     *
     * @param userId
     *            User identifier to test for access.
     * @return {@code true} if the resource for this abstract path exists and is
     *         permitted to be modified by the specified user, {@code false}
     *         otherwise.
     * @throws IOException
     *             If a problem occurs while attempting to determine if the user
     *             is permitted to modify the resource.
     */
    boolean writePermitted(String userId) throws IOException;

    /**
     * Tests if the resource denoted by this abstract path is a directory-type
     * resource.
     *
     * @return {@code true} if the resource denoted by this abstract path is a
     *         directory type resource, {@code false} otherwise.
     */
    boolean isDirectory();

    /**
     * Creates the resource denoted by this abstract path, if it does not
     * already exist.
     *
     * @return {@code true} if the resource does not exist and was successfully
     *         created, {@code false} if the resource already existed.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while attempting to create
     *             the resource. This means that WMQFTE can attempt to recover
     *             the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    boolean createNewPath() throws RecoverableIOException, IOException;

    /**
     * Tests if the resource denoted by this abstract path is a file-type
```

```
     * resource.
     *
     * @return {@code true} if the resource denoted by this abstract path is a
     *         file type resource, {@code false} otherwise.
     */
    boolean isFile();

    /**
     * Obtains the last modified time for the resource denoted by this abstract
     * path.
     * <p>
     * This time is measured in milliseconds since the epoch (00:00:00 GMT,
     * January 1, 1970).
     *
     * @return The last modified time for the resource denoted by this abstract
     *         path, or a value of 0L if the resource does not exist or a
     *         problem occurs.
     */
    long lastModified();

    /**
     * Deletes the resource denoted by this abstract path.
     * <p>
     * If the resource is a directory, it must be empty for the delete to work.
     *
     * @throws IOException
     *             If the delete of the resource fails for any reason.
     */
    void delete() throws IOException;

    /**
     * Renames the resource denoted by this abstract path to the specified
     * destination abstract path.
     * <p>
     * The rename should still be successful if the resource for the specified
     * destination abstract path already exists and it is possible to replace
     * it.
     *
     * @param destination
     *            The new abstract path for the resource denoted by this
     *            abstract path.
     * @throws IOException
     *             If the rename of the resource fails for any reason.
     */
    void renameTo(IOExitResourcePath destination) throws IOException;

    /**
     * Creates a new path to use for writing to a temporary resource that did
     * not previously exist.
     * <p>
     * The implementation can choose the abstract path name for the temporary
     * resource. However, for clarity and problem diagnosis, the abstract path
     * name for the temporary resource should be based on this abstract path
     * name with the specified suffix appended and additional characters to make
     * the path unique (for example, sequence numbers), as required.
     * <p>
     * When WMQFTE transfers data to a destination it normally attempts to first
     * write to a temporary resource then on transfer completion renames the
     * temporary resource to the required destination. This method is called by
     * WMQFTE to create a new temporary resource path. The returned path should
     * be new and the resource should not previously exist.
     *
     * @param suffix
     *            Recommended suffix to use for the generated temporary path.
     *
     * @return A new {@link IOExitResourcePath} instance for the temporary
     *         resource path, that did not previously exist.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs whilst attempting to create
     *             the temporary resource. This means that WMQFTE can attempt to
     *             recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    IOExitResourcePath createTempPath(String suffix)
            throws RecoverableIOException, IOException;

    /**
     * Opens a {@link IOExitChannel} instance for reading data from the resource
     * denoted by this abstract path. The current data byte position for the
     * resource is expected to be the passed position value, such that when
     * {@link IOExitChannel#read(java.nio.ByteBuffer)} is called, data starting
```

```
     * from that position is read.
     *
     * @param position
     *            The required data byte read position.
     * @return A new {@link IOExitChannel} instance allowing data to be read
     *         from the resource denoted by this abstract path.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs while attempting to open the
     *             resource for reading. This means that WMQFTE can attempt to
     *             recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    IOExitChannel openForRead(long position) throws RecoverableIOException,
            IOException;

    /**
     * Opens a {@link IOExitChannel} instance for writing data to the resource
     * denoted by this abstract path. Writing of data, using the
     * {@link IOExitChannel#write(java.nio.ByteBuffer)} method, starts at either
     * the beginning of the resource or end of the current data for the
     * resource, depending on the specified append parameter.
     *
     * @param append
     *            When {@code true} indicates that data written to the resource
     *            should be appended to the end of the current data. When
     *            {@code false} indicates that writing of data is to start at
     *            the beginning of the resource; any existing data is lost.
     * @return A new {@link IOExitChannel} instance allowing data to be written
     *         to the resource denoted by this abstract path.
     * @throws RecoverableIOException
     *             If a recoverable problem occurs whilst attempting to open the
     *             resource for writing. This means that WMQFTE can attempt to
     *             recover the transfer.
     * @throws IOException
     *             If some other I/O problem occurs.
     */
    IOExitChannel openForWrite(boolean append) throws RecoverableIOException,
            IOException;

    /**
     * Tests if the resource denoted by this abstract path is in use by another
     * application. Typically, this is because another application has a lock on
     * the resource either for shared or exclusive access.
     *
     * @return {code true} if resource denoted by this abstract path is in use
     *         by another application, {@code false} otherwise.
     */
    boolean inUse();

    /**
     * Obtains a {@link IOExitProperties} instance for properties associated
     * with the resource denoted by this abstract path.
     * <p>
     * WMQFTE will read these properties to govern how a transfer behaves when
     * interacting with the resource.
     *
     * @return A {@link IOExitProperties} instance for properties associated
     *         with the resource denoted by this abstract path.
     */
    IOExitProperties getProperties();

}
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

IOExitWildcardPath.java interface

IOExitWildcardPath.java

```
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 */
package com.ibm.wmqfte.exitroutine.api;

/**
 * Represents a path that denotes a wildcard. This can be used to match multiple
 * resource paths.
 */
public interface IOExitWildcardPath extends IOExitPath {
```

Related tasks

Using MFT transfer I/O user exits

Customizing MFT with user exits

MonitorExit.java interface

MonitorExit.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately prior to starting a task as the result of a monitor trigger
 */
public interface MonitorExit {

    /**
     * Invoked immediately prior to starting a task as the result of a monitor
     * trigger.
     *
     * @param environmentMetaData
     *            meta data about the environment in which the implementation
     *            of this method is running.  This information can only be read,
     *            it cannot be updated by the implementation.  The constant
     *            defined in <code>EnvironmentMetaDataConstants</code> class can
     *            be used to access the data held by this map.
     *
     * @param monitorMetaData
     *            meta data to associate with the monitor. The meta data passed
     *            to this method can be altered, and the changes will be
     *            reflected in subsequent exit routine invocations. This map
     *            also contains keys with IBM reserved names.  These entries are
     *            defined in the <code>MonitorMetaDataConstants</code> class and
     *            have special semantics. The the values of the IBM reserved names
     *            cannot be modified by the exit
     *
     * @param taskDetails
     *            An XML String representing the task to be executed as a result of
     *            the monitor triggering. This XML string may be modified by the
     *            exit
     *
     * @return    a monitor exit result object which is used to determine if the
     *            task should proceed, or be cancelled.
```

```
     */
    MonitorExitResult onMonitor(Map<String, String> environmentMetaData,
                                Map<String, String> monitorMetaData,
                                Reference<String> taskDetails);
}
```

Related tasks

Monitoring MFT resources

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"SourceTransferEndExit.java interface" on page 2142

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"ProtocolBridgeCredentialExit.java interface" on page 2138

ProtocolBridgeCredentialExit.java interface

ProtocolBridgeCredentialExit.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;

/**
 * An interface that is implemented by classes that are to be invoked as part of
 * user exit routine processing.  This interface defines methods that will
 * be invoked by a protocol bridge agent to map the MQ user ID of the transfer to credentials
 * that are to be used to access the protocol server.
 * There will be one instance of each implementation class per protocol bridge agent. The methods
 * can be called from different threads so the methods must be synchronized.
 */
public interface ProtocolBridgeCredentialExit {

    /**
     * Invoked once when a protocol bridge agent is started. It is intended to initialize
     * any resources that are required by the exit
     *
     * @param bridgeProperties
     *            The values of properties defined for the protocol bridge.
     *            These values can only be read, they cannot be updated by
     *            the implementation.
     *
     *
     * @return    true if the initialization is successful and false if unsuccessful
     *            If false is returned from an exit the protocol bridge agent will not
     *            start
     */

   public boolean initialize(final Map<String>  bridgeProperties);

      /**
      * Invoked once for each transfer to map the MQ user ID in the transfer message to the
      * credentials to be used to access the protocol server
       *
       * @param mqUserId The MQ user ID from which to map to the credentials to be used
      *                  access the protocol server
      * @return          A credential exit result object that contains the result of the map and
```

```
     *                  the credentials to use to access the protocol server
    */

   public CredentialExitResult mapMQUserId(final String mqUserId);

   /**
     * Invoked once when a protocol bridge agent is shutdown. It is intended to release
     * any resources that were allocated by the exit
     *
      * @param bridgeProperties
     *            The values of properties defined for the protocol bridge.
     *            These values can only be read, they cannot be updated by
      *            the implementation.
    *
      * @return
   */

   public void shutdown(final Map<String> bridgeProperties);

}
```

Related tasks

Customizing MFT with user exits

Mapping credentials for a file server by using exit classes

ProtocolBridgeCredentialExit2.java interface

ProtocolBridgeCredentialExit2.java

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 */
package com.ibm.wmqfte.exitroutine.api;

/**
 * An interface that is implemented by classes that are invoked as part of user
 * exit routine processing. This interface defines methods that are invoked by a
 * protocol bridge agent to map the MQ user ID of the transfer to credentials
 * used to access a specified protocol bridge server. There will be one instance
 * of each implementation class for each protocol bridge agent. The methods can
 * be called from different threads so the methods must be synchronized.
 */
public interface ProtocolBridgeCredentialExit2 extends
        ProtocolBridgeCredentialExit {

    /**
     * Invoked once for each transfer to map the MQ user ID in the transfer
     * message to the credentials used to access a specified protocol server.
     *
     * @param endPoint
     *            Information that describes the protocol server to be accessed.
     * @param mqUserId
     *            The MQ user ID from which to map the credentials used to
     *            access the protocol server.
     * @return A {@link CredentialExitResult) instance that contains the result
     *         of the map and the credentials to use to access the protocol
     *         server.
     */
    public CredentialExitResult mapMQUserId(
            final ProtocolServerEndPoint endPoint, final String mqUserId);
}
```

Related tasks

Customizing MFT with user exits

Mapping credentials for a file server by using exit classes

ProtocolBridgePropertiesExit2.java interface

ProtocolBridgePropertiesExit2.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;
import java.util.Properties;

/**
 * An interface that is implemented by classes that are to be invoked as part of
 * user exit routine processing. This interface defines methods that will be
 * invoked by a protocol bridge agent to look up properties for protocol servers
 * that are referenced in transfers.
 * <p>
 * There will be one instance of each implementation class for each protocol
 * bridge agent. The methods can be called from different threads so the methods
 * must be synchronised.
 */
public interface ProtocolBridgePropertiesExit2 {

    /**
     * Invoked once when a protocol bridge agent is started. It is intended to
     * initialize any resources that are required by the exit.
     *
     * @param bridgeProperties
     *            The values of properties defined for the protocol bridge.
     *            These values can only be read, they cannot be updated by the
     *            implementation.
     * @return {@code true} if the initialization is successful and {@code
     *         false} if unsuccessful. If {@code false} is returned from an exit
     *         the protocol bridge agent will not start.
     */
    public boolean initialize(final Map<String, String> bridgeProperties);

          /**
     * Invoked when the Protocol Bridge needs to access the protocol bridge credentials XML file.
     *
     * @return a {@link String} object giving the location of the ProtocolBridgeCredentials.xml
     */
    public String getCredentialLocation ();

    /**
     * Obtains a set of properties for the specified protocol server name.
     * <p>
     * The returned {@link Properties} must contain entries with key names
     * corresponding to the constants defined in
     * {@link ProtocolServerPropertyConstants} and in particular must include an
     * entry for all appropriate constants described as required.
     *
     * @param protocolServerName
     *            The name of the protocol server whose properties are to be
     *            returned. If a null or a blank value is specified, properties
     *            for the default protocol server are to be returned.
     * @return The {@link Properties} for the specified protocol server, or null
     *         if the server cannot be found.
     */
    public Properties getProtocolServerProperties(
            final String protocolServerName);

    /**
     * Invoked once when a protocol bridge agent is shut down. It is intended to
     * release any resources that were allocated by the exit.
```

```
     *
     * @param bridgeProperties
     *            The values of properties defined for the protocol bridge.
     *            These values can only be read, they cannot be updated by the
     *            implementation.
     */
    public void shutdown(final Map<String, String> bridgeProperties);

}
```

Related tasks

ProtocolBridgePropertiesExit: Looking up protocol file server properties

Customizing MFT with user exits

Mapping credentials for a file server by using exit classes

SourceFileExitFileSpecification.java class

SourceFileExitFileSpecification.java

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 */
package com.ibm.wmqfte.exitroutine.api;

import java.util.Map;

/**
 * A specification of the file names to use for a file transfer, as evaluated by the
 * agent acting as the source of the transfer.
 */
public final class SourceFileExitFileSpecification {

    private final String sourceFileSpecification;
    private final String destinationFileSpecification;
    private final Map<String, String> sourceFileMetaData;
    private final Map<String, String> destinationFileMetaData;

    /**
     * Constructor.  Creates a source file exit file specification.
     *
     * @param sourceFileSpecification
     *            the source file specification to associate with the source file
     *            exit file specification.
     *
     * @param destinationFileSpecification
     *            the destination file specification to associate with the
     *            source file exit file specification.
     *
     * @param sourceFileMetaData
     *            the source file meta data.
     *
     * @param destinationFileMetaData
     *            the destination file meta data   .
     */
    public SourceFileExitFileSpecification(final String sourceFileSpecification,
                                           final String destinationFileSpecification,
                                           final Map<String, String> sourceFileMetaData,
                                           final Map<String, String> destinationFileMetaData) {
        this.sourceFileSpecification = sourceFileSpecification;
        this.destinationFileSpecification = destinationFileSpecification;
        this.sourceFileMetaData = sourceFileMetaData;
        this.destinationFileMetaData = destinationFileMetaData;
    }

    /**
     * Returns the destination file specification.
```

```
     *
     * @return    the destination file specification.  This represents the location,
     *            on the agent acting as the destination for the transfer, where the
     *            file should be written.  Exit routines installed into the agent
     *            acting as the destination for the transfer may override this value.
     */
    public String getDestination() {
        return destinationFileSpecification;
    }

    /**
     * Returns the source file specification.
     *
     * @return    the source file specification.  This represents the location where
     *            the file data will be read from.
     */
    public String getSource() {
        return sourceFileSpecification;
    }

    /**
     * Returns the file meta data that relates to the source file specification.
     *
     * @return the file meta data that relates to the source file specification.
     */
    public Map<String, String> getSourceFileMetaData() {
        return sourceFileMetaData;
    }

    /**
     * Returns the file meta data that relates to the destination file specification.
     *
     * @return the file meta data that relates to the destination file specification.
     */
    public Map<String, String> getDestinationFileMetaData() {
        return destinationFileMetaData;
    }
}
```

Related concepts

"Metadata for MFT user exits" on page 2106

There are three different types of metadata that can be supplied to user exit routines for Managed File Transfer: environment, transfer, and file metadata. This metadata is presented as maps of Java key-value pairs.

SourceTransferEndExit.java interface

SourceTransferEndExit.java

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 */
package com.ibm.wmqfte.exitpoint.api;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately after completing a transfer on the agent acting as the
 * source of the transfer.
 */
public interface SourceTransferEndExit {

    /**
     * Invoked immediately after the completion of a transfer on the agent acting as
     * the source of the transfer.
     *
```

```
     * @param transferExitResult
     *            a result object reflecting whether or not the transfer completed
     *            successfully.
     *
     * @param sourceAgentName
     *            the name of the agent acting as the source of the transfer.
     *            This is the name of the agent that the implementation of this
     *            method will be invoked from.
     *
     * @param destinationAgentName
     *            the name of the agent acting as the destination of the
     *            transfer.
     *
     * @param environmentMetaData
     *            meta data about the environment in which the implementation
     *            of this method is running.  This information can only be read,
     *            it cannot be updated by the implementation.  The constants
     *            defined in <code>EnvironmentMetaDataConstants</code> class can
     *            be used to access the data held by this map.
     *
     * @param transferMetaData
     *            meta data to associate with the transfer.  The information can
     *            only be read, it cannot be updated by the implementation.  This
     *            map may also contain keys with IBM reserved names.  These
     *            entries are defined in the <code>TransferMetaDataConstants</code>
     *            class and have special semantics.
     *
     * @param fileResults
     *            a list of file transfer result objects that describe the source
     *            file name, destination file name and result of each file transfer
     *            operation attempted.
     *
     * @return    an optional description to enter into the log message describing
     *            transfer completion.  A value of <code>null</code> can be used
     *            when no description is required.
     */
    String onSourceTransferEnd(TransferExitResult transferExitResult,
                   String sourceAgentName,
                   String destinationAgentName,
                   Map<String, String>environmentMetaData,
                   Map<String, String>transferMetaData,
                   List<FileTransferResult>fileResults);


}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

SourceTransferStartExit.java interface

SourceTransferStartExit.java

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 */
```

```
package com.ibm.wmqfte.exitpoint.api;

import java.util.List;
import java.util.Map;

/**
 * An interface that is implemented by classes that want to be invoked as part of
 * user exit routine processing.  This interface defines a method that will be
 * invoked immediately prior to starting a transfer on the agent acting as the
 * source of the transfer.
 */
public interface SourceTransferStartExit {

    /**
     * Invoked immediately prior to starting a transfer on the agent acting as
     * the source of the transfer.
     *
     * @param sourceAgentName
     *           the name of the agent acting as the source of the transfer.
     *           This is the name of the agent that the implementation of this
     *           method will be invoked from.
     *
     * @param destinationAgentName
     *           the name of the agent acting as the destination of the
     *           transfer.
     *
     * @param environmentMetaData
     *           meta data about the environment in which the implementation
     *           of this method is running.  This information can only be read,
     *           it cannot be updated by the implementation.  The constants
     *           defined in <code>EnvironmentMetaDataConstants</code> class can
     *           be used to access the data held by this map.
     *
     * @param transferMetaData
     *           meta data to associate with the transfer.  The meta data passed
     *           to this method can be altered, and the changes to will be
     *           reflected in subsequent exit routine invocations.  This map may
     *           also contain keys with IBM reserved names.  These entries are
     *           defined in the <code>TransferMetaDataConstants</code> class and
     *           have special semantics.
     *
     * @param fileSpecs
     *           a list of file specifications that govern the file data to
     *           transfer.  The implementation of this method can add entries,
     *           remove entries, or modify entries in this list and the changes
     *           will be reflected in the files transferred.
     *
     * @return    a transfer exit result object which is used to determine if the
     *           transfer should proceed, or be cancelled.
     */
    TransferExitResult onSourceTransferStart(String sourceAgentName,
                     String destinationAgentName,
                     Map<String, String> environmentMetaData,
                     Map<String, String>transferMetaData,
                     List<SourceFileExitFileSpecification>fileSpecs);
}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceFileExitFileSpecification.java class" on page 2141

"SourceTransferEndExit.java interface" on page 2142

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

TransferExitResult.java interface

TransferExitResult.java

```
/*
 *   Licensed Materials - Property of IBM
 *
 *   "Restricted Materials of IBM"
 *
 *   5724-H72
 *
 *   © Copyright IBM Corp. 2008, 2024. All Rights Reserved.
 *
 *   US Government Users Restricted Rights - Use, duplication or
 *   disclosure restricted by GSA ADP Schedule Contract with
 *   IBM Corp.
 */

package com.ibm.wmqfte.exitroutine.api;

/**
 * The result of invoking a transfer exit routine.  It is composed of a result
 * code, which determines if the transfer should proceed, and an optional explanatory
 * message.  The explanation, if present, is entered into the log message.
 */
public class TransferExitResult {

    private final TransferExitResultCode resultCode;
    private final String explanation;

    /**
     * For convenience, a static "proceed" result with no associated explanation
     * message.
     */
    public static final TransferExitResult PROCEED_RESULT =
        new TransferExitResult(TransferExitResultCode.PROCEED, null);

    /**
     * Constructor.  Creates a transfer exit result object with a specified result
     * code and explanation.
     *
     * @param resultCode
     *            The result code to associate with the exit result being created.
     *
     * @param explanation
     *            The explanation to associate with the exit result being created.
     *            A value of <code>null</code> can be specified to indicate no
     *            explanation.
     */
    public TransferExitResult(TransferExitResultCode resultCode, String explanation) {
        this.resultCode = resultCode;
        this.explanation = explanation;
    }

    /**
     * Returns the explanation associated with this transfer exit result.
     *
     * @return    the explanation associated with this exit result.
     */
    public String getExplanation() {
        return explanation;
    }

    /**
     * Returns the result code associated with this transfer exit result.
     *
     * @return    the result code associated with this exit result.
     */
    public TransferExitResultCode getResultCode() {
        return resultCode;
    }
}
```

Related tasks

Customizing MFT with user exits

Related reference

"SourceTransferStartExit.java interface" on page 2143

"DestinationTransferStartExit.java interface" on page 2118

"DestinationTransferEndExit.java interface" on page 2117

"MonitorExit.java interface" on page 2137

"ProtocolBridgeCredentialExit.java interface" on page 2138

Message formats for messages you can put on the MFT Agent command queue

These XML schemas define the formats for messages that can be put on the agent command queue to request that the agent perform an action. The XML message can be placed on the agent command queue by using the command-line commands or by an application.

- File transfer request message format
- MFT monitor request message formats
- Ping MFT agent request message format
- MFT agent reply message format

V 9.1.0 Messaging REST API reference

Reference information about the messaging REST API.

For more information about using the messaging REST API, see Messaging using the REST API.

V 9.1.0 REST API resources

This collection of topics provides reference information for each of the messaging REST API resources.

For more information about using the messaging REST API, see Messaging using the REST API.

V 9.1.0 /messaging/qmgr/{qmgrName}/queue/{queueName}/message

The messaging REST API allows messages to be put to a queue, V 9.1.3 or messages to be browsed or destructively got from a queue, using the `/messaging/qmgr/{qmgrName}/queue/{queueName}/message` resource.

V 9.1.0 *POST*

You can use the HTTP POST method with the `/messaging/qmgr/`*`{qmgrName}`*`/queue/`*`{queueName}`*`/message` resource to put messages to the specified queue on the specified queue manager.

Puts an IBM MQ message containing the HTTP request body to the specified queue manager and queue. The queue manager must be on the same machine as the mqweb server. The method only supports text based HTTP request bodies. Messages are sent as `MQSTR` formatted messages, and are put using the current user context.

- "Resource URL" on page 2147
- "Request headers" on page 2147
- "Request body format" on page 2148
- "Security requirements" on page 2148
- "Response status codes" on page 2149

- "Response headers" on page 2149
- "Response body format" on page 2150
- "Examples" on page 2150

Resource URL

`https://`*host*`:`*port*`/ibmmq/rest/v2/messaging/qmgr/`*{qmgrName}*`/queue/`*{queueName}*`/message`

Note: If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, you must substitute v1 where the URL uses v2. For example, the first part of the URL is as follows: `https://`*host*`:`*port*`/ibmmq/rest/v1/`

qmgrName

Specifies the name of the queue manager to connect to for messaging. The queue manager must be on the same machine as the mqweb server.

The queue manager name is case-sensitive.

If the queue manager name includes a forward slash, a period, or a percent sign, these characters must be URL encoded:

- A forward slash must be encoded as %2F.
- A period must be encoded as %2E.
- A percent sign must be encoded as %25.

queueName

Specifies the name of the queue on which to put the message.

The queue must be defined as being local, remote, or an alias to the specified queue manager - it may also reference a clustered queue.

The queue name is case sensitive.

If the queue name includes a forward slash or a percent sign, these characters must be URL encoded:

- A forward slash, /, must be encoded as %2F.
- A percent sign, %, must be encoded as %25.

You can use HTTP instead of HTTPS if you enable HTTP connections. For more information about enabling HTTP, see Configuring HTTP and HTTPS ports.

Request headers

The following headers must be sent with the request:

Authorization

This header must be sent if you are using basic authentication. For more information, see Using HTTP basic authentication with the REST API.

Content-Type

This header must be sent with one of the following values:

- `text/plain;charset=utf-8`
- `text/html;charset=utf-8`
- `text/xml;charset=utf-8`
- `application/json;charset=utf-8`
- `application/xml;charset=utf-8`

Note: If *charset* is omitted from the `Context-Type` header, `UTF-8` is assumed.

ibm-mq-rest-csrf-token

This header must be set, but the value can be anything, including being blank.

The following headers can optionally be sent with the request:

Accept-Language
This header specifies the required language for any exceptions or error messages returned in the response message body.

ibm-mq-md-correlationId
This header sets the correlation ID of the created message. The header must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-correlationId: 414d5120514d41444556202020202020202067d8bf5923582e02
```

ibm-mq-md-expiry
This header sets the expiry duration for the created message. The expiry of a message starts from the time the message arrives on the queue. As a result network latency is ignored. The header must be specified as one of the following values:

unlimited
The message does not expire.

This value is the default value.

Integer value
Milliseconds before message expiry.

Limited to the range 0 - 99999999900.

ibm-mq-md-persistence
This header sets the persistence for the created message. The header must be specified as one of the following values:

nonPersistent
The message does not survive system failures or queue manager restarts.

This value is the default value.

persistent
The message survives system failures or queue manager restarts.

ibm-mq-md-replyTo
This header sets the reply-to destination for the created message. The format of the header uses the standard notation of supplying the reply-to queue and an optional queue manager: `replyQueue[@replyQmgr]`

For example:

```
ibm-mq-md-replyTo: myReplyQueue@myReplyQMgr
```

Request body format

The request body must be text and use UTF-8 encoding. No specific text structure is required. An `MQSTR` formatted message containing the request body text is created and put to the specified queue.

For more information, see examples.

Security requirements

The caller must be authenticated to the mqweb server. The `MQWebAdmin` and `MQWebAdminRO` roles are not applicable for the messaging REST API. For more information about security for the REST API, see IBM MQ Console and REST API security.

Once authenticated to the mqweb server the user is capable of using both the messaging REST API and the administrative REST API.

The security principal of the caller must be granted the ability to put messages to the specified queue:

- The queue that is specified by the *{queueName}* portion of the resource URL, must be PUT enabled.
- ULW MQ Appliance For the queue that is specified by the *{queueName}* portion of the resource URL, +PUT authority must be granted to the security principal of the caller.
- z/OS For the queue that is specified by the *{queueName}* portion of the resource URL, UPDATE access must be granted to the security principal of the caller.

ULW On UNIX, Linux, and Windows, you can grant authority to security principals to use IBM MQ resources by using the **setmqaut** command. For more information, see **setmqaut** (grant or revoke authority).

z/OS On z/OS, see Setting up security on z/OS.

If you use Advanced Message Security (AMS) with the messaging REST API, note that all messages are encrypted by using the context of the mqweb server, not the context of the user that posts the message.

Response status codes

201
: Message created and sent successfully.

400
: Invalid data provided.

  For example, an invalid request header value was specified.

401
: Not authenticated.

  The caller must be authenticated to the mqweb server and must be a member of one or more of the `MQWebAdmin`, `MQWebAdminRO`, or `MQWebUser` roles. The `ibm-mq-rest-csrf-token` header must also be specified. For more information, see "Security requirements" on page 2148.

403
: Not authorized.

  The caller is authenticated to the mqweb server and is associated with a valid principal. However, the principal does not have access to all, or a subset of the required IBM MQ resources, or is not in the `MQWebUser` role. For more information about the access that is required, see "Security requirements" on page 2148.

404
: Queue does not exist.

405
: Queue is PUT inhibited.

415
: A message header or body is an unsupported media type.

  For example, the `Content-Type` header is set to an unsupported media type.

500
: Server issue or error code from IBM MQ.

502
: The current security principal cannot send the message as the messaging provider does not support the required function. For example, if the mqweb server class path is invalid.

503
: Queue manager not running.

Response headers

The following headers are returned with the response:

Content-Language
Specifies the language identifier of the response message in the event of any errors or exceptions. Used in conjunction with `Accept-Language` request header to indicate the required language for any error or exception conditions. The mqweb server default is used if the requested language is unsupported.

Content-Length
Specifies the length of the HTTP response body, even when there is no content. Upon success the value is zero.

Content-Type
Specifies the type of response body. Upon success the value is `text/plain;charset=utf-8`. In the event of any errors or exceptions, the value is `application/json;charset=utf-8`.

ibm-mq-md-messageId
Specifies the message ID that is allocated by IBM MQ to this message. Like the `ibm-mq-md-correlationId` request header, it is represented as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-messageId: 414d5120514d414445562020202020202067d8ce5923582f07
```

Note: The default message priority for POST is 4.

Response body format

The response body is empty if the message is sent successfully. If an error occurs, the response body contains an error message. For more information, see REST API error handling.

Examples

The following examples use the v2 resource URL. If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, in the resource URL, substitute v1 where the example URL uses v2.

The following example logs in a user called `mquser` with the password `mquser`. In cURL, the log in request might look like the following Windows example. The LTPA token is stored in the `cookiejar.txt` file by using the `-c` flag:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/login" -X POST
-H "Content-Type: application/json" --data "{\"username\":\"mquser\",\"password\":\"mquser\"}"
-c c:\cookiejar.txt
```

After the user is logged in, the LTPA token and `ibm-mq-rest-csrf-token` HTTP header are used to authenticate further requests. The `ibm-mq-rest-csrf-token` `token_value` can be any value, including blank.

- The following Windows cURL example sends a message to queue `Q1` on queue manager `QM1`, using default options. The message contains the text *"Hello World!"*:

  ```
  curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message"
  -X POST -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token_value"
  -H "Content-Type: text/plain;charset=utf-8" --data "Hello World!"
  ```

- The following Windows cURL example sends a persistent message to queue `Q1` on queue manager `QM1`, with an expiry of 2 minutes. The message contains the text *"Hello World!"*:

  ```
  curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message"
  -X POST -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token_value"
  -H "Content-Type: text/plain;charset=utf-8" -H "ibm-mq-md-persistence: persistent"
  -H "ibm-mq-md-expiry: 120000" --data "Hello World!"
  ```

- The following Windows cURL example sends a non-persistent message to queue Q1 on queue manager QM1, with no expiry and defined correlation ID. The message contains the text *"Hello World!"*:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message"
-X POST -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Content-Type: text/plain;charset=utf-8" -H "ibm-mq-md-persistence: nonPersistent"
-H "ibm-mq-md-expiry: unlimited" -H "ibm-mq-md-correlationId:
414d5120514d41444556202020202020067d8b
f5923582e02" --data "Hello World!"
```

V 9.1.3 GET

V 9.1.3 You can use the HTTP GET method with the `/messaging/qmgr/{qmgrName}/queue/{queueName}/message` resource to browse messages from the associated queue manager and queue.

Browses the first available message from the specified queue manager and queue. The queue manager must be on the same machine as the mqweb server. The message body is returned in the HTTP response body. The message must have a format of MQSTR and is received using the current user context.

All messages are left on the queue and an appropriate status code is returned to the caller for any inappropriate messages. For example, a message which does not have a MQSTR format.

- “Resource URL” on page 2151
- “Optional query parameters” on page 2152
- “Request headers” on page 2152
- “Request body format” on page 2152
- “Security requirements” on page 2152
- “Response status codes” on page 2153
- “Response headers” on page 2153
- “Response body format” on page 2154
- “Examples” on page 2155

Resource URL

`https://`*`host`*`:`*`port`*`/ibmmq/rest/v2/messaging/qmgr/`*`{qmgrName}`*`/queue/`*`{queueName}`*`/message`

Note: If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, you must substitute v1 where the URL uses v2. For example, the first part of the URL is as follows: `https://`*`host`*`:`*`port`*`/ibmmq/rest/v1/`

qmgrName

Specifies the name of the queue manager to connect to for messaging. The queue manager must be on the same machine as the mqweb server.

The queue manager name is case-sensitive.

If the queue manager name includes a forward slash, a period, or a percent sign, these characters must be URL encoded:

- A forward slash (/) must be encoded as %2F.
- A percent sign (%) must be encoded as %25.

queueName

Specifies the name of the queue from which to browse the message.

The queue must be defined as being local or an alias that points to a local queue.

The queue name is case sensitive.

If the queue name includes a forward slash or a percent sign, these characters must be URL encoded:

- A forward slash, /, must be encoded as %2F.

- A percent sign, %, must be encoded as %25.

You can use HTTP instead of HTTPS if you enable HTTP connections. For more information about enabling HTTP, see Configuring HTTP and HTTPS ports.

Optional query parameters

correlationId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding correlation ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../message?correlationId=414d5120514d414445562020202020202067d8bf5923582e02
```

messageId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding message ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../message?messageId=414d5120514d414445562020202020202067d8ce5923582f07
```

Request headers

The following headers must be sent with the request:

Authorization
This header must be sent if you are using basic authentication. For more information, see Using HTTP basic authentication with the REST API.

ibm-mq-rest-csrf-token
This header must be set, but the value can be anything, including being blank.

The following headers can optionally be sent with the request:

Accept-Charset
This header can be used to indicate what character set is acceptable for the response. If specified, this header must be set as `UTF-8`.

Accept-Language
This header specifies the required language for any exceptions or error messages returned in the response message body.

Request body format

None.

Security requirements

The caller must be authenticated to the mqweb server. The `MQWebAdmin` and `MQWebAdminRO` roles are not applicable for the messaging REST API. For more information about security for the REST API, see IBM MQ Console and REST API security.

Once authenticated to the mqweb server the user is capable of using both the messaging REST API and the administrative REST API.

The security principal of the caller must be granted the ability to browse messages from the specified queue:

- The queue that is specified by the *{queueName}* portion of the resource URL, must be BROWSE enabled.
- ULW MQ Appliance For the queue that is specified by the *{queueName}* portion of the resource URL, +GET, +INQ, and +BROWSE authority must be granted to the security principal of the caller.
- z/OS For the queue that is specified by the *{queueName}* portion of the resource URL, UPDATE, access must be granted to the security principal of the caller.

ULW On UNIX, Linux, and Windows, you can grant authority to security principals to use IBM MQ resources by using the **setmqaut** command. For more information, see **setmqaut** (grant or revoke authority).

z/OS On z/OS, see Setting up security on z/OS.

Response status codes

200
: Message received successfully.

204
: No message available.

400
: Invalid data provided.

  For example, an invalid query parameter value was specified.

401
: Not authenticated.

  The caller must be authenticated to the mqweb server and must be a member of one or more of the MQWebAdmin, MQWebAdminRO, or MQWebUser roles. The ibm-mq-rest-csrf-token header must also be specified. For more information, see "Security requirements" on page 2152.

403
: Not authorized.

  The caller is authenticated to the mqweb server and is associated with a valid principal. However, the principal does not have access to all, or a subset of the required IBM MQ resources, or is not in the MQWebUser role. For more information about the access that is required, see "Security requirements" on page 2152.

404
: Queue does not exist.

500
: Server issue or error code from IBM MQ.

501
: The HTTP response could not be constructed.

  For example, the received message has an incorrect type, or has the correct type but the body could not be processed.

502
: The current security principal cannot receive the message as the messaging provider does not support the required function. For example, if the mqweb server class path is invalid.

503
: Queue manager not running.

Response headers

The following headers are returned with the response:

Content-Language
: Specifies the language identifier of the response message in the event of any errors or exceptions. Used in conjunction with `Accept-Language` request header to indicate the required language for any error or exception conditions. The mqweb server default is used if the requested language is unsupported.

Content-Length
: Specifies the length of the HTTP response body, even when there is no content. The value contains the length (bytes) of the message data.

Content-Type
: Specifies the type of content returned in the response body of the received message. Upon success the value is `text/plain;charset=utf-8`. In the event of any errors or exceptions, the value is `application/json;charset=utf-8`.

ibm-mq-md-correlationId
: Specifies the correlation ID of the received message. The header is returned if the received message contains a valid correlation ID. It is represented as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-correlationId: 414d5120514d414445562020202020202067d8bf5923582e02
```

ibm-mq-md-expiry
: Specifies the remaining expiry duration of the received message. The header can be one of the following values:

unlimited
: The message does not expire.

Integer value
: Remaining milliseconds before message expiry.

ibm-mq-md-messageId
: Specifies the message ID that is allocated by IBM MQ to this message. Like the `ibm-mq-md-correlationId` header, it is represented as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-messageId: 414d5120514d414445562020202020202067d8ce5923582f07
```

ibm-mq-md-persistence
: Specifies the persistence of the received message. The header can be one of the following values:

nonPersistent
: The message does not survive system failures or queue manager restarts.

persistent
: The message survives system failures or queue manager restarts.

ibm-mq-md-replyTo
: Specifies the reply-to destination for the received message. The format of the header uses the standard notation of the reply-to queue and queue manager, `replyQueue@replyQmgr`.

For example:

```
ibm-mq-md-replyTo: myReplyQueue@myReplyQMgr
```

Response body format

Upon success, the response body contains the message body from the received message. If an error occurs, the response body contains a JSON formatted error message. Both responses are UTF-8 encoded. For more information, see REST API error handling.

Be aware that when receiving a message only IBM MQ MQSTR formatted messages are supported.

Browsing a queue that has been marked as GET inhibited returns no content.

If the queue that is being browsed contains messages with duplicate message identifiers, the first message is returned when filtering on the message identifier.

Examples

The following examples use the v2 resource URL. If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, in the resource URL, substitute v1 where the example URL uses v2.

The following example logs in a user called mquser with the password mquser. In cURL, the log in request might look like the following Windows example. The LTPA token is stored in the cookiejar.txt file by using the -c flag:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/login" -X POST
-H "Content-Type: application/json" --data "{\"username\":\"mquser\",\"password\":\"mquser\"}"
-c c:\cookiejar.txt
```

After the user is logged in, the LTPA token and ibm-mq-rest-csrf-token HTTP header are used to authenticate further requests. The ibm-mq-rest-csrf-token token_value can be any value, including blank.

- The following Windows cURL example browses the next available message from queue Q1 on queue manager QM1, using default options:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message"
-X GET -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: text/plain"
```

- The following Windows cURL example browses a message with a specific correlation ID, 0000000000000000000000000000000000000000abcdabcd, from queue Q1 on queue manager QM1:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message?
correlationId=0000000000000000000000000000000000000000abcdabcd"
-X GET -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: text/plain"
```

V 9.1.0 *DELETE*

You can use the HTTP DELETE method with the /messaging/qmgr/{qmgrName}/queue/{queueName}/message resource to get messages from the associated queue manager and queue.

Destructively gets the next available message from the specified queue manager and queue, returning the message body in the HTTP response body. The queue manager must be on the same machine as the mqweb server. The message must have a format of MQSTR, and is received using the current user context.

Incompatible messages are left on the queue and an appropriate status code returned to the caller. For example, a message which does not have a MQSTR format.

- "Resource URL" on page 2156
- "Optional query parameters" on page 2156
- "Request headers" on page 2157
- "Request body format" on page 2157
- "Security requirements" on page 2157
- "Response status codes" on page 2157
- "Response headers" on page 2158
- "Response body format" on page 2159
- "Examples" on page 2159

Resource URL

`https://host:port/ibmmq/rest/v2/messaging/qmgr/{qmgrName}/queue/{queueName}/message`

Note: If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, you must substitute v1 where the URL uses v2. For example, the first part of the URL is as follows: `https://host:port/ibmmq/rest/v1/`

qmgrName
Specifies the name of the queue manager to connect to for messaging. The queue manager must be on the same machine as the mqweb server.

The queue manager name is case-sensitive.

If the queue manager name includes a forward slash, a period, or a percent sign, these characters must be URL encoded:

- A forward slash (/) must be encoded as %2F.
- A percent sign (%) must be encoded as %25.

queueName
Specifies the name of the queue from which to get the next message.

The queue must be defined as being local or an alias pointing to a local queue.

The queue name is case sensitive.

If the queue name includes a forward slash or a percent sign, these characters must be URL encoded:

- A forward slash, /, must be encoded as %2F.
- A percent sign, %, must be encoded as %25.

You can use HTTP instead of HTTPS if you enable HTTP connections. For more information about enabling HTTP, see Configuring HTTP and HTTPS ports.

Optional query parameters

correlationId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding correlation ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../message?correlationId=414d5120514d414445562020202020202067d8bf5923582e02
```

messageId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding message ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../message?messageId=414d5120514d414445562020202020202067d8ce5923582f07
```

wait=*integerValue*
Specifies that the HTTP method will wait *integerValue* milliseconds for the next message to become available.

integerValue
The query parameter must be specified as an integer value representing the millisecond duration. The maximum value is 2147483647.

For example:

```
../message?wait=120000
```

Request headers

The following headers must be sent with the request:

Authorization
This header must be sent if you are using basic authentication. For more information, see Using HTTP basic authentication with the REST API.

ibm-mq-rest-csrf-token
This header must be set, but the value can be anything, including being blank.

The following headers can optionally be sent with the request:

Accept-Charset
This header can be used to indicate what character set is acceptable for the response. If specified, this header must be set as `UTF-8`.

Accept-Language
This header specifies the required language for any exceptions or error messages returned in the response message body.

Request body format

None.

Security requirements

The caller must be authenticated to the mqweb server. The `MQWebAdmin` and `MQWebAdminRO` roles are not applicable for the messaging REST API. For more information about security for the REST API, see IBM MQ Console and REST API security.

Once authenticated to the mqweb server the user is capable of using both the messaging REST API and the administrative REST API.

The security principal of the caller must be granted the ability to get messages from the specified queue:

- The queue that is specified by the *{queueName}* portion of the resource URL, must be `GET` enabled.
- ULW MQ Appliance For the queue that is specified by the *{queueName}* portion of the resource URL, `+GET`, `+INQ`, and `+BROWSE` authority must be granted to the security principal of the caller.
- z/OS For the queue that is specified by the *{queueName}* portion of the resource URL, `UPDATE`, access must be granted to the security principal of the caller.

ULW On UNIX, Linux, and Windows, you can grant authority to security principals to use IBM MQ resources by using the **setmqaut** command. For more information, see **setmqaut** (grant or revoke authority).

z/OS On z/OS, see Setting up security on z/OS.

Response status codes

200
Message received successfully.

204
: No message available.

400
: Invalid data provided.

  For example, an invalid query parameter value was specified.

401
: Not authenticated.

  The caller must be authenticated to the mqweb server and must be a member of one or more of the `MQWebAdmin`, `MQWebAdminRO`, or `MQWebUser` roles. The `ibm-mq-rest-csrf-token` header must also be specified. For more information, see "Security requirements" on page 2157.

403
: Not authorized.

  The caller is authenticated to the mqweb server and is associated with a valid principal. However, the principal does not have access to all, or a subset of the required IBM MQ resources, or is not in the `MQWebUser` role. For more information about the access that is required, see "Security requirements" on page 2157.

404
: Queue does not exist.

405
: Queue is GET inhibited.

500
: Server issue or error code from IBM MQ.

501
: The HTTP response could not be constructed.

  For example, the received message has an incorrect type, or has the correct type but the body could not be processed.

502
: The current security principal cannot receive the message as the messaging provider does not support the required function. For example, if the mqweb server class path is invalid.

503
: Queue manager not running.

Response headers

The following headers are returned with the response:

Content-Language
: Specifies the language identifier of the response message in the event of any errors or exceptions. Used in conjunction with `Accept-Language` request header to indicate the required language for any error or exception conditions. The mqweb server default is used if the requested language is unsupported.

Content-Length
: Specifies the length of the HTTP response body, even when there is no content. The value contains the length (bytes) of the message data.

Content-Type
: Specifies the type of content returned in the response body of the received message. Upon success the value is `text/plain;charset=utf-8`. In the event of any errors or exceptions, the value is `application/json;charset=utf-8`.

ibm-mq-md-correlationId
: Specifies the correlation ID of the received message. The header is returned if the received message contains a valid correlation ID. It is represented as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-correlationId: 414d5120514d41444556202020202020202067d8bf5923582e02
```

ibm-mq-md-expiry
Specifies the remaining expiry duration of the received message. The header can be one of the following values:

unlimited
The message does not expire.

Integer value
Remaining milliseconds before message expiry.

ibm-mq-md-messageId
Specifies the message ID that is allocated by IBM MQ to this message. Like the `ibm-mq-md-correlationId` header, it is represented as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
ibm-mq-md-messageId: 414d5120514d41444556202020202020202067d8ce5923582f07
```

ibm-mq-md-persistence
Specifies the persistence of the received message. The header can be one of the following values:

nonPersistent
The message does not survive system failures or queue manager restarts.

persistent
The message survives system failures or queue manager restarts.

ibm-mq-md-replyTo
Specifies the reply-to destination for the received message. The format of the header uses the standard notation of the reply-to queue and queue manager, `replyQueue@replyQmgr`.

For example:

```
ibm-mq-md-replyTo: myReplyQueue@myReplyQMgr
```

Response body format

Upon success, the response body contains the message body from the received message. If an error occurs, the response body contains a JSON formatted error message. Both responses are UTF-8 encoded. For more information, see REST API error handling.

Be aware that when receiving a message only IBM MQ MQSTR formatted messages are supported. Subsequently, all messages are received under sync-point and any unhandled messages are left on the queue. The IBM MQ queue can be configured to move these poison messages to an alternate destination. For further information, see Handling poison messages in IBM MQ classes for JMS.

Examples

The following examples use the v2 resource URL. If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, in the resource URL, substitute v1 where the example URL uses v2.

The following example logs in a user called `mquser` with the password `mquser`. In cURL, the log in request might look like the following Windows example. The LTPA token is stored in the `cookiejar.txt` file by using the `-c` flag:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/login" -X POST
-H "Content-Type: application/json" --data "{\"username\":\"mquser\",\"password\":\"mquser\"}"
-c c:\cookiejar.txt
```

After the user is logged in, the LTPA token and `ibm-mq-rest-csrf-token` HTTP header are used to authenticate further requests. The `ibm-mq-rest-csrf-token` `token_value` can be any value, including blank.

- The following Windows cURL example removes the next available message from queue Q1 on queue manager QM1, using default options:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message"
-X DELETE -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: text/plain"
```

- The following Windows cURL example removes a message with a specific correlation ID, `0000000000000000000000000000000000000000abcdabcd`, from queue Q1 on queue manager QM1:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message?
correlationId=0000000000000000000000000000000000000000abcdabcd"
-X DELETE -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: text/plain"
```

- The following Windows cURL example removes a message with a specific correlation ID, `0000000000000000000000000000000000000000abcdabcd`, from queue Q1 on queue manager QM1, waiting for up to 30 seconds for the message to become available. If 30 seconds passes without the specified message being put to the queue, the DELETE call returns without a message:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/message?
correlationId=0000000000000000000000000000000000000000abcdabcd&wait=30000"
-X DELETE -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: text/plain"
```

V 9.1.3 /messaging/qmgr/{qmgrName}/queue/{queueName}/messagelist

V 9.1.3 You can use the HTTP GET method with the `/messaging/qmgr/{qmgrName}/queue/{queueName}/messagelist` resource to get a list of available messages from the specified queue on the specified queue manager.

V 9.1.3 *GET*

V 9.1.3 You can use the HTTP GET method with the `/messaging/qmgr/{qmgrName}/queue/{queueName}/messagelist` resource to get a list of available messages from the specified queue on the specified queue manager.

Browses a summary list of messages from the specified queue manager and queue. The queue manager must be on the same machine as the mqweb server. The summary data is returned in the HTTP response body as a JSON formatted array. The data does not contain the payload of the messages and is received using the current user context. No messages are removed from the associated queue.

If a request is made to get a list of available messages from a queue that is GET inhibited, an empty JSON array is returned.

- "Resource URL" on page 2161
- "Optional query parameters" on page 2161
- "Request headers" on page 2162
- "Request body format" on page 2162
- "Security requirements" on page 2162
- "Response status codes" on page 2162
- "Response headers" on page 2163
- "Response body format" on page 2163
- "Examples" on page 2164

Resource URL

`https://host:port/ibmmq/rest/v2/messaging/qmgr/{qmgrName}/queue/{queueName}/messagelist`

Note: If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, you must substitute v1 where the URL uses v2. For example, the first part of the URL is as follows: `https://host:port/ibmmq/rest/v1/`

qmgrName
Specifies the name of the queue manager to connect to for messaging. The queue manager must be on the same machine as the mqweb server.

The queue manager name is case-sensitive.

If the queue manager name includes a forward slash, a period, or a percent sign, these characters must be URL encoded:

- A forward slash (/) must be encoded as %2F.
- A percent sign (%) must be encoded as %25.

queueName
Specifies the name of the queue from which to browse the messages.

The queue must be defined as being local or an alias that points to a local queue.

The queue name is case sensitive.

If the queue name includes a forward slash or a percent sign, these characters must be URL encoded:

- A forward slash, /, must be encoded as %2F.
- A percent sign, %, must be encoded as %25.

You can use HTTP instead of HTTPS if you enable HTTP connections. For more information about enabling HTTP, see Configuring HTTP and HTTPS ports.

Optional query parameters

correlationId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding correlation ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../messagelist?correlationId=414d5120514d414445562020202020202067d8bf5923582e02
```

messageId=*hexValue*
Specifies that the HTTP method returns the next message with the corresponding message ID.

hexValue
The query parameter must be specified as a 48 character hexadecimal encoded string, representing 24 bytes.

For example:

```
../messagelist?messageId=414d5120514d414445562020202020202067d8ce5923582f07
```

limit=*integerValue*
Specifies that the HTTP method response body is limited to *integerValue* JSON elements.

integerValue
The query parameter must be specified as an integer value that represents the maximum number of elements that are contained in the JSON response body.

The default value is 10, and the maximum value is 2147483647.

For example:

```
../messagelist?limit=250
```

Request headers

The following headers must be sent with the request:

Authorization
: This header must be sent if you are using basic authentication. For more information, see Using HTTP basic authentication with the REST API.

ibm-mq-rest-csrf-token
: This header must be set, but the value can be anything, including being blank.

The following headers can optionally be sent with the request:

Accept-Charset
: This header can be used to indicate what character set is acceptable for the response. If specified, this header must be set as UTF-8.

Accept-Language
: This header specifies the required language for any exceptions or error messages returned in the response message body.

Request body format

None.

Security requirements

The caller must be authenticated to the mqweb server. The MQWebAdmin and MQWebAdminRO roles are not applicable for the messaging REST API. For more information about security for the REST API, see IBM MQ Console and REST API security.

Once authenticated to the mqweb server the user is capable of using both the messaging REST API and the administrative REST API.

The security principal of the caller must be granted the ability to browse messages from the specified queue:

- The queue that is specified by the *{queueName}* portion of the resource URL, must be BROWSE enabled.
- ULW MQ Appliance For the queue that is specified by the *{queueName}* portion of the resource URL, +GET, +INQ, and +BROWSE authority must be granted to the security principal of the caller.
- z/OS For the queue that is specified by the *{queueName}* portion of the resource URL, UPDATE, access must be granted to the security principal of the caller.

ULW On UNIX, Linux, and Windows, you can grant authority to security principals to use IBM MQ resources by using the **setmqaut** command. For more information, see **setmqaut** (grant or revoke authority).

z/OS On z/OS, see Setting up security on z/OS.

Response status codes

200
: Message list received successfully.

400
Invalid data provided.

For example, an invalid query parameter value was specified.

401
Not authenticated.

The caller must be authenticated to the mqweb server and must be a member of one or more of the `MQWebAdmin`, `MQWebAdminRO`, or `MQWebUser` roles. The `ibm-mq-rest-csrf-token` header must also be specified. For more information, see “Security requirements” on page 2162.

403
Not authorized.

The caller is authenticated to the mqweb server and is associated with a valid principal. However, the principal does not have access to all, or a subset of the required IBM MQ resources, or is not in the `MQWebUser` role. For more information about the access that is required, see “Security requirements” on page 2162.

404
Queue does not exist.

500
Server issue or error code from IBM MQ.

501
The HTTP response could not be constructed.

For example, the received message has an incorrect type, or has the correct type but the body could not be processed.

502
The current security principal cannot receive the message as the messaging provider does not support the required function. For example, if the mqweb server class path is invalid.

503
Queue manager not running.

Response headers

Content-Language
Specifies the language identifier of the response message in the event of any errors or exceptions. Used in conjunction with `Accept-Language` request header to indicate the required language for any error or exception conditions. The mqweb server default is used if the requested language is unsupported.

Content-Length
Specifies the length of the HTTP response body, even when there is no content. The value contains the length of the message data, in bytes.

Content-Type
Specifies the type of response body. The value is `application/json;charset=utf-8`.

ibm-mq-total-browse-size
V 9.1.5 From IBM MQ 9.1.5, this response header is no longer returned.

Specifies the total number of messages that are available on the queue. If filtering criteria are specified, the total number of messages is the number of messages on the queue that match the filtering criteria. The header value can be equal to or greater than the number of JSON elements that are returned in the response body.

Response body format

Upon success, the response body is a `UTF-8` encoded response. The response contains an outer JSON object that contains a single JSON array called `messages`. Each element in the array is a JSON object that contains information about a message on the queue. Each element contains the following attributes:

correlationId
: Specifies the correlation ID of the message. The value is returned if the message contains a valid correlation ID. It is represented as a 48-character hexadecimal encoded string, representing 24 bytes.

messageId
: Specifies the message ID that is allocated by IBM MQ to this message. It is represented as a 48-character hexadecimal encoded string, representing 24 bytes.

format
: Specifies the MQMD format field. Under normal circumstances text messages will contain the IBM MQ `MQSTR` value.

If a request is made to get a list of messages on a queue that is GET inhibited, an empty JSON array is returned.

If an error occurs, the response body contains a JSON formatted error message. For more information, see REST API error handling.

Examples

The following examples use the v2 resource URL. If you are using a version of IBM MQ earlier than IBM MQ 9.1.5 you must use the v1 resource URL instead. That is, in the resource URL, substitute v1 where the example URL uses v2.

The following example logs in a user called `mquser` with the password `mquser`. In cURL, the log in request might look like the following Windows example. The LTPA token is stored in the `cookiejar.txt` file by using the `-c` flag:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/login" -X POST
-H "Content-Type: application/json" --data "{\"username\":\"mquser\",\"password\":\"mquser\"}"
-c c:\cookiejar.txt
```

After the user is logged in, the LTPA token and `ibm-mq-rest-csrf-token` HTTP header are used to authenticate further requests. The `ibm-mq-rest-csrf-token` `token_value` can be any value, including blank.

- The following Windows cURL example lists the next ten available messages from queue Q1 on queue manager QM1, using default options:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/messagelist"
-X GET -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: application/json"
```

- The following Windows cURL example lists the next two hundred available messages from queue Q1 on queue manager QM1, using default options:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/messagelist?
limit=200"
-X GET -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: application/json"
```

- The following Windows cURL example lists only those messages with the corresponding correlation ID, `0000000000000000000000000000000000000000abcdabcd`, from queue Q1 on queue manager `QM1`:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/queue/Q1/messagelist?
correlationId=0000000000000000000000000000000000000000abcdabcd"
-X GET -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token-value"
-H "Accept: application/json"
```

V 9.1.5 /messaging/qmgr/{qmgrName}/topic/{topicString}/message

You can use the HTTP POST method with the `/messaging/qmgr/{qmgrName}/topic/{topicString}/message` resource to publish messages to the specified topic on the specified queue manager.

V 9.1.5 *POST*

You can use the HTTP POST method with the `/messaging/qmgr/{qmgrName}/topic/{topicString}/message` resource to publish messages to the specified topic on the specified queue manager.

Publishes a text-based message in the HTTP request body to the specified queue manager and topic. The queue manager must be on the same machine as the mqweb server, and only text-based messages are supported. Messages are published as `MQSTR` formatted messages using the current user context, and have a default message priority of 4.

- "Resource URL" on page 2165
- "Request headers" on page 2166
- "Request body format" on page 2167
- "Security requirements" on page 2167
- "Response status codes" on page 2167
- "Response headers" on page 2168
- "Response body format" on page 2168
- "Examples" on page 2168

Resource URL

`https://`*`host`*`:`*`port`*`/ibmmq/rest/v2/messaging/qmgr/`*`{qmgrName}`*`/topic/`*`{topicString}`*`/message`

qmgrName

Specifies the name of the queue manager to connect to for messaging. The queue manager must be on the same machine as the mqweb server.

The queue manager name is case-sensitive.

If the queue manager name includes a forward slash, a period, or a percent sign, these characters must be URL encoded:

- A forward slash must be encoded as %2F.
- A period must be encoded as %2E.
- A percent sign must be encoded as %25.

topicString

Specifies the topic string on which to publish the message.

The topic string is case sensitive. The topic string can contain multiple topic levels, separated by the forward slash delimiter.

If the topic string contains a percent sign, a period, or a question mark, these characters must be URL encoded:

- A percent sign must be encoded as %25.
- A period must be encoded as %2E.
- A question mark must be encoded as %3F.

If the topic string starts or ends with a forwards slash, it must be encoded with a %2F.

For example, to publish to the topic string:

- `sport/football` on queue manager `MY.QMGR`, you use the following URL:

```
https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/MY%2EQMGR/topic/sport/football/message
```

- `/sport/football` on queue manager `MY.QMGR`, you use the following URL:

```
https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/MY%2EQMGR/topic/%2Fsport/football/
message
```

You can use HTTP instead of HTTPS if you enable HTTP connections. For more information about enabling HTTP, see Configuring HTTP and HTTPS ports.

Request headers

The following headers must be sent with the request:

Authorization
This header must be sent if you are using basic authentication. For more information, see Using HTTP basic authentication with the REST API.

Content-Type
This header must be sent with one of the following values:

- `text/plain;charset=utf-8`
- `text/html;charset=utf-8`
- `text/xml;charset=utf-8`
- `application/json;charset=utf-8`
- `application/xml;charset=utf-8`

Note: If *charset* is omitted from the `Context-Type` header, `UTF-8` is assumed.

ibm-mq-rest-csrf-token
This header must be set, but the value can be anything, including being blank.

The following headers can optionally be sent with the request:

Accept-Language
This header specifies the required language for any exceptions or error messages returned in the response message body.

ibm-mq-md-expiry
This header sets the expiry duration for the created message. The expiry of a message starts from the time the message arrives at the queue manager. As a result network latency is ignored. The header must be specified as one of the following values:

unlimited
The message does not expire.

This value is the default value.

Integer value
Milliseconds before message expiry.

Limited to the range 0 - 99999999900.

ibm-mq-md-persistence
This header sets the persistence for the created message. The header must be specified as one of the following values:

nonPersistent
The message does not survive system failures or queue manager restarts.

This value is the default value.

persistent
The message survives system failures or queue manager restarts.

ibm-mq-md-replyTo
This header sets the reply-to destination for the created message. The format of the header uses the standard notation of supplying the reply-to queue and an optional queue manager: `replyQueue[@replyQmgr]`

For example:

```
ibm-mq-md-replyTo: myReplyQueue@myReplyQMgr
```

Request body format

The request body must be text and use UTF-8 encoding. No specific text structure is required. An MQSTR formatted message containing the request body text is created and published to the specified topic.

For more information, see examples.

Security requirements

The caller must be authenticated to the mqweb server. The MQWebAdmin and MQWebAdminRO roles are not applicable for the messaging REST API. For more information about security for the REST API, see IBM MQ Console and REST API security.

Once authenticated to the mqweb server the user is capable of using both the messaging REST API and the administrative REST API.

The security principal of the caller must be granted the ability to publish messages to the specified topic:

- The topic that is specified by the *{topicString}* portion of the resource URL must be PUBLISH enabled.
- ULW MQ Appliance For the topic that is specified by the *{topicString}* portion of the resource URL, +PUB authority must be granted to the security principal of the caller.
- z/OS For the topic that is specified by the *{topicString}* portion of the resource URL, UPDATE access must be granted to the security principal of the caller.

ULW On UNIX, Linux, and Windows, you can grant authority to security principals to use IBM MQ resources by using the **setmqaut** command. For more information, see **setmqaut** (grant or revoke authority).

z/OS On z/OS, see Setting up security on z/OS.

If you use Advanced Message Security (AMS) with the messaging REST API, note that all messages are encrypted by using the context of the mqweb server, not the context of the user that posts the message.

Response status codes

201
Message created and published successfully.

400
Invalid data provided.

For example, an invalid request header value was specified.

401
Not authenticated.

The caller must be authenticated to the mqweb server and must be a member of one or more of the MQWebAdmin, MQWebAdminRO, or MQWebUser roles. The ibm-mq-rest-csrf-token header must also be specified. For more information, see “Security requirements” on page 2167.

403
Not authorized.

The caller is authenticated to the mqweb server and is associated with a valid principal. However, the principal does not have access to all, or a subset of the required IBM MQ resources, or is not in the MQWebUser role. For more information about the access that is required, see “Security requirements” on page 2167.

404
Queue manager does not exist.

405
Topic is PUBLISH inhibited.

415
A message header or body is an unsupported media type.

For example, the `Content-Type` header is set to an unsupported media type.

500
Server issue or error code from IBM MQ.

502
The current security principal cannot publish the message as the messaging provider does not support the required function. For example, if the mqweb server class path is invalid.

503
Queue manager not running.

Response headers

The following headers are returned with the response:

Content-Language
Specifies the language identifier of the response message in the event of any errors or exceptions. Used in conjunction with `Accept-Language` request header to indicate the required language for any error or exception conditions. The mqweb server default is used if the requested language is unsupported.

Content-Length
Specifies the length of the HTTP response body, even when there is no content. Upon success the value is zero.

Content-Type
Specifies the type of response body. Upon success the value is `text/plain;charset=utf-8`. In the event of any errors or exceptions, the value is `application/json;charset=utf-8`.

Response body format

The response body is empty if the message is published successfully. If an error occurs, the response body contains an error message. For more information, see REST API error handling.

Examples

The following example logs in a user called `mquser` with the password `mquser`. In cURL, the log in request might look like the following Windows example. The LTPA token is stored in the `cookiejar.txt` file by using the `-c` flag:

```
curl -k "https://localhost:9443/ibmmq/rest/v1/login" -X POST
-H "Content-Type: application/json" --data "{\"username\":\"mquser\",\"password\":\"mquser\"}"
-c c:\cookiejar.txt
```

After the user is logged in, the LTPA token and `ibm-mq-rest-csrf-token` HTTP header are used to authenticate further requests. The `ibm-mq-rest-csrf-token` `token_value` can be any value, including blank.

- The following Windows cURL example publishes a message to the topic string `myTopic` on queue manager `QM1`, using default options. The message contains the text *"Hello World!"*:

  ```
  curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/topic/myTopic/message"
  -X POST -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token_value"
  -H "Content-Type: text/plain;charset=utf-8" --data "Hello World!"
  ```

- The following Windows cURL example publishes a persistent message to the topic string `myTopic/thisTopic` on queue manager `QM1`, with an expiry of 2 minutes. The message contains the text *"Hello World!"*:

```
curl -k "https://localhost:9443/ibmmq/rest/v2/messaging/qmgr/QM1/topic/myTopic%2FthisTopic/
message"
-X POST -b c:\cookiejar.txt -H "ibm-mq-rest-csrf-token: token_value"
-H "Content-Type: text/plain;charset=utf-8" -H "ibm-mq-md-persistence: persistent"
-H "ibm-mq-md-expiry: 120000" --data "Hello World!"
```

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