WebSphere Message Broker

Configuration, Administration, and Security

Version 6 Release 0

WebSphere Message Broker

Configuration, Administration, and Security

Version 6 Release 0

Note
Before you use this information and the product that it supports, read the information in the Notices appendix.

This edition applies to version 6, release 0, modification 0, fix pack 7 of IBM WebSphere Message Broker, and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

About this topic collection

This PDF has been created from the WebSphere Message Broker Version 6.0 (Fix Pack 7 update, March 2008) information center topics. Always refer to the WebSphere Message Broker online information center to access the most current information. The information center is periodically updated on the document update site and this PDF and others that you can download from that Web site might not contain the most current information.

The topic content included in the PDF does not include the ″Related Links″ sections provided in the online topics. Links within the topic content itself are included, but are active only if they link to another topic in the same PDF collection. Links to topics outside this topic collection are also shown, but these attempt to link to a PDF that is called after the topic identifier (for example, ac12340_.pdf) and therefore fail. Use the online information to navigate freely between topics.

Feedback: do not provide feedback on this PDF. Refer to the online information to ensure that you have access to the most current information, and use the Feedback link that appears at the end of each topic to report any errors or suggestions for improvement. Using the Feedback link provides precise information about the location of your comment.

The content of these topics is created for viewing online; you might find that the formatting and presentation of some figures, tables, examples, and so on are not optimized for the printed page. Text highlighting might also have a different appearance.

Part 1. Security

Security

The topics in this section help you to deal with security in WebSphere® Message Broker:

- "Security overview"
- "Planning for security when you install WebSphere Message Broker" on page 15
- "Setting up broker domain security" on page 16
- "Setting up z/OS security" on page 37
- "Publish/subscribe security" on page 41
- "Securing the publish/subscribe domain" on page 50

Security overview

When you are designing a WebSphere Message Broker application it is important to consider the security measures that are needed to protect the information in the system.

There is some security configuration required to enable WebSphere Message Broker to work correctly and to protect the information in the system. For example, you can set up security measures to protect queues against unauthorized use.

In addition, system administrators need WebSphere Message Broker authorities that allow them to perform customization and configuration tasks, run utilities, perform problem determination, and collect diagnostic materials.

Security is split into several areas:

- "Authorization for configuration tasks"
- "Security for development resources" on page 4
- "Authorization to access runtime resources" on page 4
- "Security exits" on page 8
- "SSL authentication" on page 13 (for the Real Time node only)
- "Tunneling" on page 14
- "Quality of protection" on page 14
- "Domain awareness for Message Brokers Toolkit users on Windows" on page 15.

Authorization for configuration tasks

Authorization is the process of granting or denying access to a system resource. For WebSphere Message Broker, authorization is concerned with controlling who has permission to access WebSphere Message Broker resources, and ensuring that users who attempt to work with those resources have the necessary authorization to do so.

Examples of tasks that require authorization are:

- Configuring a broker using, for example, the "mqsicreatebroker command" on page 374.
- Accessing queues, for example, putting a message to the input queue of a message flow.
- Taking actions within the workbench, for example, deploying a message flow to an execution group.

- Publishing topics and subscribing to topics, as described in "Enabling topic-based security" on page 32

Authorization for existing resources

If you want to use the security facilities of Version 6.0, when you require access to a resource that already exists, the user ID with which you work must be included in the Access Control List (ACL) for that resource.

For authorization to create resources, for example brokers, you must be a member of the **Administrator** local group.

The security architecture of WebSphere Message Broker is platform independent. If you are running in a heterogeneous environment, ensure that you limit all the principals you define for WebSphere Message Broker tasks to eight characters or fewer. If you have a Windows®-only environment, you can create principals of up to twelve characters, but only use these longer names if you are sure that you will not later include a Linux®, UNIX®, or z/OS® system in your WebSphere Message Broker network.

Security for development resources

Security for development resources must be addressed and defined by the application development organization. No special facilities are provided by WebSphere Message Broker to address this environment over and above those available for a production environment.

Authorization to access runtime resources

Runtime resources are WebSphere Message Broker objects that exist at run time in the broker domain. Each runtime object has an Access Control List (ACL) which determines which users and groups can access the object. The ACL entries for an object can permit a user or group to view the object or view and modify the object from the workbench, the command line, or using the Configuration Manager Proxy (CMP).

ACLs allow or deny access for a user to an object but ACL entries do not secure the object; that is, the ACL entry cannot verify the user's identity.

Using ACL entries, you can control users' access to specific objects in the broker domain. For example, user JUNGLE\MPERRY might be given access to modify BROKERA, but have no access rights to BROKERB. In a further example the same user might have access to deploy to execution group EXEGRP1, but not to EXEGRP2, even though they are both members of BROKERA.

When you try to view or modify an object for which you require permission, the following information is passed to the Configuration Manager:
- Object type
- Object name
- Requested action
- Your user ID.

The Configuration Manager checks the ACL table. If your user ID is included in the ACL entry for the named object, you are authorized to perform the operation.

Refer to Related reference information below for descriptions of the tools that system administrators use to control the ACLs.

ACL entries and groups

In previous versions of WebSphere Message Broker, access to runtime objects was controlled by defining a set of groups and assigning users to those groups. ACL entries enable you to control access with more granularity than groups. ACL entries also enable a single Configuration Manager to manage development, test, and production systems separately by configuring users' access to each broker. Using groups, you would have to place the development, test, and production systems in separate broker domains, each controlled by a separate Configuration Manager.

If you migrate a Configuration Manager from a previous version of WebSphere Message Broker, ACL entries are automatically defined for the following groups:

- mqbrkrs
- mqbrops
- mqbrdevt
- mqbrasgn
- mqbrtpic

Without these ACL entries, users that belong to these groups do not have authority to perform actions on the objects in the domain.

When you use single user ACLs, you must define the users on the workstation that is accessing the objects (that is, the machine on which the Toolkit is running), but you do not need to define them on the workstation that is running the Configuration Manager. However, when you are using Group ACLs, you must define the users on both workstations and then define the groups on the workstation that is running the Configuration Manager, before adding the users to the groups. This is necessary because no group information is passed between the workstations.

Access Control Lists

Access Control List (ACL) entries allow or deny a user to access an object. ACL entries do not, however, secure the object because the ACL entry cannot verify the user's identity. An ACL entry contains the user name and can specify a host name or domain name. It is possible, for example, for a user to get access to the objects by creating an account on a computer that has a host name that is the same as an authorized Windows domain name. Use ACL entries to control access to the objects in the broker domain but do not rely on ACL entries to secure your broker domains; use SSL or security exits to secure the channels between components in the broker domain.

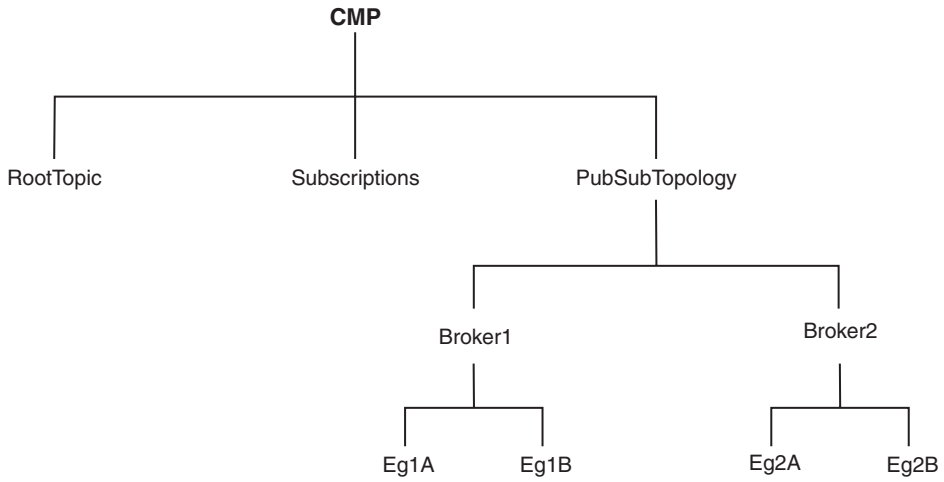
WebSphere Message Broker uses Access Control List (ACL) entries to govern which users and groups can manipulate objects in the broker domain. There are four different access levels that can be granted for a user or group: Full, View, Deploy, and Edit. Not all access levels are valid for all object types; see "ACL permissions" on page 537 for a list of the permissions that can be applied to each object type and a summary of the actions that the user or group can perform.

To reduce the number of access control entries that a broker administrator must create, the ACL permissions behave in a hierarchical manner. The root of the tree is the ConfigManangerProxy object, which has three children: RootTopic, Subscriptions, and PubSubTopology. The PubSubTopology object has zero or more brokers as children, and each broker can have zero or more execution groups as

children. When an ACL entry is added to a given object, permission is granted to that object and to all objects beneath it in the hierarchy, unless it is overridden by another ACL entry.

On z/OS, you must define an OMVS segment for user IDs and groups, so that a Configuration Manager can obtain user ID and group information from the External Security Manager (ESM) database.

The following diagram shows an example hierarchy:



The following examples show how this hierarchical behavior works in practice.

Example 1

UserA has no access control entries. Therefore, UserA cannot manipulate any objects in the hierarchy, or see any of the objects defined in the hierarchy.

Example 2

UserB has an ACL entry that gives Deploy authority to the execution group Eg1A. This gives UserB implied View authority to PubSubTopology and Broker1. UserB must be able to view PubSubTopology and Broker1 (for example, in the Message Brokers Toolkit) to be able to deploy to Eg1A.

Because UserB does not have any ACL entries for PubSubTopology or Broker1, UserB does not inherit access to the other broker or execution groups in the hierarchy. In practice, this means that UserB can see that there is another execution group defined on the broker Broker1 but cannot see any details (including the execution group's name). Similarly, UserB can see that another broker exists within the topology, but cannot see any details. UserB has no access to RootTopic or to Subscriptions (the subscriptions table).

The following command creates the ACL entry for UserB:

```
mqsicreateaclentry testcm -u UserB -a -x D -b Broker1 -e Eg1A
```

The `mqsilistaclentry` command then displays the following information:

```
BIP1778I: userb -USER  -  D  -  Broker1/Eg1A      -  ExecutionGroup
```

Example 3

UserC has an ACL entry that gives View authority for the Configuration Manager Proxy (CMP), and an ACL entry that gives Full authority for Broker1. This gives UserC the following authorities:

CMP View
RootTopic View
Subs View
Topology View
Broker1 Full
Eg1A Full
Eg1B Full
Broker2 View
Eg2A View
Eg2B View

The following commands create the ACL entries for UserC:

```
mqsicreateaclentry testcm -u UserC -a -x V -p
mqsicreateaclentry testcm -u UserC -a -x F -b Broker1
```

The `mqsilistaclentry` command then displays the following information:

```
BIP1778I: userc               -  USER  -  V  -  ConfigManagerProxy  -  ConfigManagerProxy
BIP1778I: userc               -  USER  -  F  -  Broker1             -  Broker
```

Example 4

UserD has an ACL entry that gives Full authority for the CMP, and an ACL entry that gives View authority for Broker1. The View authority to access Broker1 means that UserD does not inherit Full authority for Broker1. This use of View ACL entries is useful because it allows users who usually have full control over a given object to reduce their access temporarily, to prevent accidental deletion or deployment. If users need full control of the object, removing the View entry restores Full authority, so that they can perform the operations that they need, and then restore the View entry. UserD has the following authorities:

CMP Full
RootTopic Full
Subs Full
Topology Full
Broker1 View
Eg1A View
Eg1B View
Broker2 Full
Eg2A Full
Eg2B Full

The following commands create the ACL entries for UserD:

```
mqsicreateaclentry testcm -u UserD -a -x F -p
mqsicreateaclentry testcm -u UserD -a -x V -b Broker1
```

The `mqsilistaclentry` command then displays the following information:

```
BIP1778I: userd               -  USER  -  F  -  ConfigManagerProxy  -  ConfigManagerProxy
BIP1778I: userd               -  USER  -  V  -  Broker1             -  Broker
```

The following command can then delete the ACL entries for UserD:

```
mqsideleteaclentry testcm -u UserD -a -b Broker1
```

To change the access control entries for an object, a user must have Full authority for that object or any parent in the hierarchy. This means that the permission to change the ACLs themselves works in the same way as described above, with the exception that access to the ACLs cannot be removed by granting a lower permission further down the tree; this is necessary because otherwise a user would be able to give themselves a View entry and would not then be able to remove it.

ACL entries can be manipulated using the Java Configuration Manager Proxy API or using the **mqsicreateaclentry**, **mqsideleteaclentry**, and **mqsilistaclentry** commands.

Security exits

You can use security exit programs to verify that the partner at the other end of a connection is genuine.

When you start the Message Brokers Toolkit a security exit to monitor the connection to the Configuration Manager is not started by default. If you want to protect access to the Configuration Manager from client programs, you can use the WebSphere MQ security exit facility.

If you want to use a security exit to provide connection security, you must define one when you create a new domain connection in the Domains view of the Message Brokers Toolkit. You can enable security exits on the connection from the Message Brokers Toolkit to the Configuration Manager.

- Set up a security exit on the channel at the Configuration Manager end. This security exit does not have any special requirements; you can provide a standard security exit.
- Set up a security exit in the Message Brokers Toolkit. Identify the security exit properties when you create the domain connection.

The security exit is a standard WebSphere MQ security exit, written in Java™.

For an overview of security exits and details in their implementation, refer to the topic ″Channel security exit programs″ in ″Channel-exit programs″ in *WebSphere MQ Intercommunication*. If you have v5.3 then look on the on the **V5.3** tab in the Multiplatforms section of the WebSphere MQ library Web page. If you have v6 then locate ″Channel-exit programs″ within the Intercommunication section of the WebSphere MQ Version 6 information center online.

Public key cryptography

All encryption systems rely on the concept of a key. A key is the basis for a transformation, usually mathematical, of an ordinary message into an unreadable message. For centuries, most encryption systems have relied on what is called private key encryption. Public key encryption is the only challenge to private key encryption that has appeared within the last 30 years.

Private key encryption

Private-key encryption systems use a single key that is shared between the sender and the receiver. Both must have the key; the sender encrypts the message by using the key, and the receiver decrypts the message with the same key. Both must

keep the key private to keep their communication private. This kind of encryption has characteristics that make it unsuitable for widespread, general use:

- Private key encryption requires a key for every pair of individuals who need to communicate privately. The necessary number of keys rises dramatically as the number of participants increases.
- The fact that keys must be shared between pairs of communicators means the keys must somehow be distributed to the participants. The need to transmit secret keys makes them vulnerable to theft.
- Participants can communicate only by prior arrangement. No way exists to send a usable encrypted message to someone spontaneously. You and the other participant must make arrangements to communicate by sharing keys.

Private-key encryption is also called symmetric encryption, because the same key is used to encrypt and decrypt the message.

Public key encryption

Public key encryption uses a pair of mathematically related keys. A message that is encrypted with the first key must be decrypted with the second key, and a message that is encrypted with the second key must be decrypted with the first key.

Each participant in a public-key system has a pair of keys. The symmetric (private) key is kept secret. The other key is distributed to anyone who wants it; this key is the public key.

To send an encrypted message to you, the sender encrypts the message by using your public key. When you receive the message, you decrypt it by using your symmetric key. To send a message to someone, you encrypt the message by using the recipient's public key. The message can be decrypted with the recipient's symmetric key only. This kind of encryption has characteristics that make it very suitable for general use:

- Public-key encryption requires only two keys per participant. The increase in the total number of keys is less dramatic as the number of participants increases, compared to symmetric key encryption.
- The need for secrecy is more easily met. Only the symmetric key needs to be kept secret and because it does not need to be shared, the symmetric key is less vulnerable to theft in transmission than the shared key in a symmetric key system.
- Public keys can be published, which eliminates the need for prior sharing of a secret key before communication. Anyone who knows your public key can use it to send you a message that only you can read.

Public-key encryption is also called asymmetric encryption, because the same key cannot be used to encrypt and decrypt the message. Instead, one key of a pair is used to undo the work of the other.

With symmetric key encryption, you have to be careful of stolen or intercepted keys. In public-key encryption, where anyone can create a key pair and publish the public key, the challenge is in verifying that the owner of the public key is really the person you think it is. Nothing prevents a user from creating a key pair and publishing the public key under a false name. The listed owner of the public key cannot read messages that are encrypted with that key because the owner does not have the symmetric key. If the creator of the false public key can intercept these

messages, that person can decrypt and read messages that are intended for someone else. To counteract the potential for forged keys, public-key systems provide mechanisms for validating public keys and other information with digital certificates and digital signatures.

Digital certificates

Certificates provide a way of authenticating users. Instead of requiring each participant in an application to authenticate every user, third-party authentication relies on the use of digital certificates.

A digital certificate is equivalent to an electronic ID card. The certificate serves two purposes:

- Establishes the identity of the owner of the certificate.
- Distributes the owner's public key.

Certificates are issued by trusted parties, called certificate authorities (CAs). These authorities can be commercial ventures or they can be local entities, depending on the requirements of your application. Regardless, the CA is trusted to adequately authenticate users before issuing certificates. A CA issues certificates with digital signatures. When a user presents a certificate, the recipient of the certificate validates it by using the digital signature. If the digital signature validates the certificate, the certificate is recognized as intact and authentic. Participants in an application need to validate certificates only; they do not need to authenticate users. The fact that a user can present a valid certificate proves that the CA has authenticated the user. The descriptor, trusted third-party, indicates that the system relies on the trustworthiness of the CAs.

Contents of a digital certificate

A certificate contains several pieces of information, including information about the owner of the certificate and the issuing CA. Specifically, a certificate includes:

- The distinguished name (DN) of the owner. A DN is a unique identifier, a fully qualified name including not only the common name (CN) of the owner but the owner's organization and other distinguishing information.
- The public key of the owner.
- The date on which the certificate is issued.
- The date on which the certificate expires.
- The distinguished name of the issuing CA.
- The digital signature of the issuing CA. The message-digest function creates a signature based upon all the previously listed fields.

The core idea of a certificate is that a CA takes the public key of the owner, signs the public key with its own private key, and returns the information to the owner as a certificate. When the owner distributes the certificate to another party, it signs the certificate with its private key. The receiver can extract the certificate that contains the CA signature with the public key of the owner. By using the CA public key and the CA signature on the extracted certificate, the receiver can validate the CA signature. If valid, the public key that is used to extract the certificate is considered good. The owner signature is validated, and if the validation succeeds, the owner is successfully authenticated to the receiver.

The additional information in a certificate helps an application decide whether to honor the certificate. With the expiration date, the application can determine if the

certificate is still valid. With the name of the issuing CA, the application can check that the CA is considered trustworthy by the site.

A process that uses certificates must provide its personal certificate, the one containing its public key, and the certificate of the CA that signed its certificate, called a signer certificate. In cases where chains of trust are established, several signer certificates can be involved.

Requesting certificates

To get a certificate, send a certificate request to the CA. The certificate request includes:

- The distinguished name of the owner or the user for whom the certificate is requested.
- The public key of the owner.
- The digital signature of the owner.

The message-digest function creates a signature based upon all the previously listed fields.

The CA verifies the signature with the public key in the request to ensure that the request is intact and authentic. The CA then authenticates the owner. Exactly what the authentication consists of depends on a prior agreement between the CA and the requesting organization. If the owner in the request is successfully authenticated, the CA issues a certificate for that owner.

Using certificates: Chain of trust and self-signed certificate

To verify the digital signature on a certificate, you must have the public key of the issuing CA. Because public keys are distributed in certificates, you must have a certificate for the issuing CA that is signed by the issuer. One CA can certify other CAs, so a chain of CAs can issue certificates for other CAs, all of whose public keys you need. Eventually, you reach a root CA that issues itself a self-signed certificate. To validate a user certificate, you need certificates for all of the intervening participants back to the root CA. You then have the public keys that you need to validate each certificate, including the user certificate.

A self-signed certificate contains the public key of the issuer and is signed with the private key. The digital signature is validated like any other, and if the certificate is valid, the public key it contains is used to check the validity of other certificates issued by the CA. However, anyone can generate a self-signed certificate. In fact, you can probably generate self-signed certificates for testing purposes before installing production certificates. The fact that a self-signed certificate contains a valid public key does not mean that the issuer is really a trusted certificate authority. To ensure that self-signed certificates are generated by trusted CAs, such certificates must be distributed by secure means, for example hand-delivered on floppy disks, downloaded from secure sites, and so on.

Applications that use certificates store these certificates in a keystore file. This file typically contains the necessary personal certificates, its signing certificates, and its private key. The private key is used by the application to create digital signatures. Servers always have personal certificates in their keystore files. A client requires a personal certificate only if the client must authenticate to the server when mutual authentication is enabled.

To allow a client to authenticate to a server, a server keystore file contains the private key and the certificate of the server and the certificates of its CA. A client truststore file must contain the signer certificates of the CAs of each server to which the client must authenticate.

If mutual authentication is needed, the client keystore file must contain the client private key and certificate. The server truststore file requires a copy of the certificate of the client CA.

Digital signatures

A digital signature is a number attached to a document. For example, in an authentication system that uses public-key encryption, digital signatures are used to sign certificates.

This signature establishes the following information:

- The integrity of the message: Is the message intact? That is, has the message been modified between the time it was digitally signed and now?
- The identity of the signer of the message: Is the message authentic? That is, was the message actually signed by the user who claims to have signed it?

A digital signature is created in two steps. The first step distills the document into a large number. This number is the digest code or fingerprint. The digest code is then encrypted, which results in the digital signature. The digital signature is appended to the document from which the digest code is generated.

Several options are available for generating the digest code. This process is not encryption, but a sophisticated checksum. The message cannot regenerate from the resulting digest code. The crucial aspect of distilling the document to a number is that if the message changes, even in a trivial way, a different digest code results. When the recipient gets a message and verifies the digest code by recomputing it, any changes in the document result in a mismatch between the stated and the computed digest codes.

To stop someone from intercepting a message, changing it, recomputing the digest code, and retransmitting the modified message and code, you need a way to verify the digest code as well. To verify the digest code, reverse the use of the public and private keys. For private communication, it makes no sense to encrypt messages with your private key; these keys can be decrypted by anyone with your public key. This technique can be useful for proving that a message came from you. No one can create it because no one else has your private key. If some meaningful message results from decrypting a document by using someone's public key, the decryption process verifies that the holder of the corresponding private key did encrypt the message.

The second step in creating a digital signature takes advantage of this reverse application of public and private keys. After a digest code is computed for a document, the digest code is encrypted with the sender's private key. The result is the digital signature, which is attached to the end of the message.

When the message is received, the recipient follows these steps to verify the signature:

1. Recomputes the digest code for the message.
2. Decrypts the signature by using the sender's public key. This decryption yields the original digest code for the message.

3. Compares the original and recomputed digest codes. If these codes match, the message is both intact and authentic. If not, something has changed and the message is not to be trusted.

SSL authentication

SSL authentication is available for the Real Time node, the HTTP listener, and the WebSphere MQ Java Client.

SSL authentication for the Real Time node

SSL authentication in WebSphere Message Broker supports an authentication protocol known as *mutual challenge-response password authentication*. This is a non-standard variant of the industry standard SSL protocol in which the public key cryptography called for by SSL is replaced by symmetric secret key cryptography. While this protocol is both secure and convenient to administer, it might be better to use the industry standard SSL protocol exactly as defined, especially if a public key cryptography infrastructure is already deployed for other purposes. There are two standardized versions of SSL which are:

Asymmetric SSL
: This is used by most Web browsers. In this protocol, only the brokers have public/private key pairs and clients know the brokers' public keys. The SSL protocol establishes a secure connection in which the broker is authenticated to the client using public key cryptography, after which the client can send its password, encrypted by a secure session key, to authenticate itself to the broker.

Symmetric SSL
: This is where both participants have public/private key pairs. The SSL protocol uses public key cryptography to accomplish mutual authentication.

In both instances, SSL authentication does not keep the SSL protocol up for the entire lifetime of a connection, because that would incur protection overheads on all messages. The SSL protocol remains in force long enough to accomplish mutual authentication and to establish a shared secret session key that can be used by message protection (see "Message protection" on page 49). Messages are then individually protected in accordance with the protection level specified for the given topic.

The SSL protocol implementation requires a Public-Key Cryptography Standards (PKCS) file, containing X.509 V3 certificates for the broker's private key, and possibly the public keys of clients and other brokers. This file, called the key ring file, must contain at least one certificate for the broker and for the trusted certification authority (CA) that issued and signed the broker's certificate. For the R form of SSL, the key ring file can also have the public keys of clients and other brokers that need to be authenticated, and the certificates supporting those public keys. However, the SSL protocol calls for the exchange of public keys and certificates, so key ring files do not need to be fully primed in this fashion, as long as there are enough commonly-trusted authorities to ensure that authentication completes.

By convention, key ring files are encrypted and protected by a passphrase, which is stored in a second file. The passphrase file requires careful protection using operating system mechanisms to ensure that it is not exposed to unauthorized observers. An observer who learns the passphrase can learn the private keys in the

key ring file. However, only the passphrase file needs to be secure in this way and the key ring file is protected by the passphrase. Only private keys are sensitive. Other information in the key ring file, such as the broker's certificates, can be revealed without compromising security.

For more information on SSL authentication for the Real Time node, see "Enabling SSL for the Real-time nodes" on page 25.

SSL authentication for the HTTP listener

For information on SSL authentication for the HTTP listener, see "Configuring HTTPInput and HTTPReply nodes to use SSL (HTTPS)" on page 28, and "Configuring an HTTPRequest node to use SSL (HTTPS)" on page 30.

SSL authentication for the MQ Java Client

For information on SSL authentication for the MQ Java Client, see "Enabling SSL on the WebSphere MQ Java Client" on page 23.

Tunneling

When implementing WebSphere Message Broker, both the clients and their brokers can reside on different intranets, that is, separate organizational entities. This causes problems when a client attempts to connect to a broker. Tunneling addresses this problem where a broker's firewall has been configured to allow incoming connections from clients. Two options are provided for a client to connect through its own firewall to a broker with both methods achieving the same result, these are:

HTTP tunneling

This is suitable for applets where, due to sandbox security, an attempt to connect explicitly to an HTTP proxy server would be rejected. HTTP tunneling uses the Web support in Web browsers and connects through the proxy as if it were connecting to a Web site.

Activating HTTP tunneling support is configured on each node. Once a node has been configured to use HTTP tunneling, all client connections to that node must use this method of connection. Clients that don't will be rejected when an attempt to connect is made.

HTTP tunneling is not supported in conjunction with SSL authentication.

Connect via proxy

This is not suitable for applets. It is suitable for use where there are no sandbox security restrictions. It connects directly to the proxy and uses Internet protocols to request that the proxy forwards the connection to the broker. This option does not work in applets where the security manager rejects an explicit connection to the proxy.

Quality of protection

In Internet deployments, cryptographically-based protection of messages enhances security by preventing tampering and eavesdropping by hackers. The authentication services provided by WebSphere Message Broker ensure that only legitimate event broker servers and clients can connect to each other. However, a

hacker might still be able to observe messages in transit or tamper with messages on established connections. Message protection provides security against these kinds of attacks.

Message protection consumes processor time and can slow system throughput. However, not all messages are equally sensitive, so message protection is configurable on a per-topic basis, so that you get only the protection you really need. Some topics might get no message protection at all, others might get channel integrity (making it impossible for hackers to insert or delete messages undetected), or message integrity (making it impossible for hackers to alter messages undetected), or message privacy (making it impossible for hackers to observe message contents). The protection levels are cumulative. For example, if you request message privacy you get message integrity and channel integrity as well. If you request message integrity you also get channel integrity. The higher levels of protection consume more resources than the lower levels.

You can also set message protection on internal system topics. Unlike user topics this must be either enabled on all topics, or on none.

Domain awareness for Message Brokers Toolkit users on Windows

If you enable domain awareness, access to the Message Brokers Toolkit is not restricted to users from one Windows domain.

The Configuration Manager is always domain aware; when a Configuration Manager on Windows receives user information, it verifies the user's domain membership.

You can configure the Message Brokers Toolkit to send domain aware information about the user to the Configuration Manager, if required. If the user is logged on to a Windows domain and the Message Brokers Toolkit sends domain aware information, the Message Brokers Toolkit sends the user's domain membership information and the user's ID. If the user is not logged on to a Windows domain, the Message Brokers Toolkit sends only the user's ID and the computer name.

If you enable domain awareness, users from different Windows domains, who are either trusted by the primary domain, or in a Windows transitive trust relationship, can perform Message Brokers Toolkit tasks, provided that they are in the correct user role definition groups or object level security groups.

When using domain awareness:
- Domain information is retrieved by the Configuration Manager.
- Membership of user role definition or object level security groups is not restricted to users from one domain.
- Nesting in user role definition or object level security groups is supported.

Planning for security when you install WebSphere Message Broker

On Linux and UNIX systems, you must complete security tasks before you install WebSphere Message Broker; these tasks are described in Installation Guide. On Windows systems, security tasks are completed during and after installation.

Always refer to the Installation Guide for the latest information about installation tasks.

After installation, refer to “Creating user IDs” for further security considerations.

For an introduction to various aspects of security, see “Security overview” on page 3.

Setting up broker domain security

This section introduces the things to consider when you are setting up security for a broker configuration running on Windows, Linux, or UNIX platforms.

For an introduction to various aspects of security, see “Security overview” on page 3.

This section does not apply to z/OS. Refer to “Setting up z/OS security” on page 37 and “Summary of required access (z/OS)” on page 485 for information about setting up broker domain security on z/OS.

Before you start setting up security for your broker domain, refer to “Planning for security when you install WebSphere Message Broker” on page 15, which contains links to security information that you need before, during, and after installation of WebSphere Message Broker.

You can use the following list of tasks as a security checklist. Each item comprises a list of reminders or questions about the security tasks to consider for your broker configuration. The answers to the questions provide the security information that you need to configure your WebSphere Message Broker components and also give you information about other security controls that you might want to deploy.

- “Creating user IDs”
- “Considering security for a broker” on page 19
- “Considering security for a Configuration Manager” on page 21
- “Considering security for the workbench” on page 17
- “Enabling topic-based security” on page 32
- “Using security exits” on page 35
- “Database security” on page 36

Creating user IDs

When you are planning the administration of your broker configuration, consider defining user IDs for the following roles:

- Administrator user IDs that can issue mqsi* commands. Refer to:
  - “Deciding which user accounts can execute broker commands” on page 19
  - “Deciding which user accounts can execute User Name Server commands” on page 33
  - “Deciding which user accounts can execute Configuration Manager commands” on page 21
- Service user IDs under which components run. Refer to:
  - “Deciding which user account to use for the broker service ID” on page 20
  - “Deciding which user account to use for the User Name Server service ID” on page 34
  - “Deciding which user account to use for the Configuration Manager service ID” on page 22

  On all platforms, you must add broker service user IDs to the **mqbrkrs** local group.

- User IDs that access broker databases:
  1. Select the user IDs with which you intend to access the database used by your broker. Ensure that the user ID is not more than eight characters long. When you use a DB2® database, use a local user ID to access the database. If you create brokers in a domain environment where you use a domain user ID for the service user ID, set the database ID to a local ID that is authorized to access databases.
  2. Authorize your selected user IDs to access the broker and Configuration Manager databases. Refer to "Authorizing access to the databases" on page 83 for more information.
  3. When you create your broker, identify the selected user ID using the -u and -p options on the **mqsicreatebroker** command.
- Workbench users.
- Publishers and subscribers. Refer to "Enabling topic-based security" on page 32.

If you are running a Configuration Manager with one user ID and a broker with a different user ID on another system, you might see an error message when you deploy message flows and message sets to the broker. To avoid this, complete the following steps:

- Ensure that the broker's user ID is a member of the **mqm** and **mqbrkrs** groups.
- Define the broker's user ID on the system on which the Configuration Manager is running.
- Define the Configuration Manager's user ID on the system on which the broker is running.
- Ensure that all IDs are in lowercase so that they are compatible between computers.

Considering security for the workbench

During this task you consider the factors for deciding which users can take actions within the workbench.

Consider the following:

1. "Are you running with domain awareness enabled?"
2. "Are you running with domain awareness disabled?" on page 18
3. "Securing the channel between the workbench and the Configuration Manager" on page 19

Ensure that the IDs of the users who will run the workbench are not more than eight characters long.

Are you running with domain awareness enabled?

It is recommended that you run with domain awareness enabled. With this option, the domain information for a workbench user is flowed with the userid to the Configuration Manager for increased security. Assume that you are running the Configuration Manager on a computer named WKSTN1, which is a member of a domain named DOMAIN1. Users from DOMAIN2 also want to use the workbench. Perform the following steps:

1. Add any domain users or groups to the local group names that you will be using in your ACLs.

2. When you create the Configuration Manager use the -m option on the **mqsicreateaclentry** command to ensure that the domain is considered when verifying the user.

When you start the workbench, it automatically sends the domain information for your user ID to the Configuration Manager. Enable domain awareness in the Configuration Manager to access domain information.

Note: If you are running a Configuration Manager with one user ID and a broker with a different user ID on another computer, you might see an error message when trying to deploy message flows and message sets to the broker. To avoid this, do the following:

- Ensure that the broker's user ID is a member of the **mqm** and **mqbrkrs** groups.
- Define the broker's user ID on the computer where the Configuration Manager is running.
- Define the Configuration Manager's user ID on the computer where the broker is running.
- Ensure that all IDs are in lowercase so that they are compatible between computers.

Go to "Securing the channel between the workbench and the Configuration Manager" on page 19.

Are you running with domain awareness disabled?

You can set domain awareness to disabled, but running with this option means that the domain information for the workbench user is not flowed with the userid information, thus reducing security. It is therefore recommended that you run with domain awareness enabled.

You can use the -a option on the **mqsicreateaclentry** command to allow a user to be verified without considering the domain.

To set domain awareness to disabled, answer the following questions:

1. Are your workbench users drawn from a local domain?
   a. No: Go to the next question.
   b. Yes: Add any users to the local groups that you will be using in your ACLs.

      Go to "Securing the channel between the workbench and the Configuration Manager" on page 19.
2. Are your workbench users drawn from another domain?
   a. Yes: Make the other domain a trusted domain of the Configuration Manager's computer then add the groups and users from the trusted domain to the local groups of the Configuration Manager.

For additional security, run with both domain awareness and security exits enabled. For more information about security exits, refer to "Security exits" on page 8.

Turning off the toolkit domain awareness

The toolkit sends the user and domain name to the Configuration Manager queue manager, regardless of the domain awareness setting on the Configuration

Manager. This can cause problems connecting to the queue manager because of the security required to connect, put or get messages.

To turn off the domain awareness on the toolkit, run the toolkit in the following way:

1. Change to the *install_dir*\eclipse directory.
2. Run the toolkit using the command `mqsistudio -vmargs -DDomainAware=0`.

Alternatively, modify the shortcut that runs the toolkit and add on `-vmargs -DDomainAware=0`.

Go to "Securing the channel between the workbench and the Configuration Manager"

Securing the channel between the workbench and the Configuration Manager

Create and enable a pair of security exits to run at the workbench and Configuration Manager ends of the connection. Use these exits to verify workbench users with the Windows security manager on the Configuration Manager computer.

For more information about creating and enabling security exits, refer to "Security exits" on page 8.

Considering security for a broker

Several factors must be considered when you are deciding which users can execute broker commands and which users can control security for other broker resources.

When you are deciding which users are to perform the different tasks, consider the following steps:

1. "Deciding which user accounts can execute broker commands"
2. "Deciding which user account to use for the broker service ID" on page 20
3. "Setting security on the broker's queues" on page 20
4. "Enabling topic-based security in the broker" on page 21
5. .

Deciding which user accounts can execute broker commands

Decide what permissions are required for the user IDs that:

- Create, change, list, delete, start, and stop brokers
- Display, retrieve, and change trace information.

Answer the following questions:

1. Is your broker installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: Go to "Deciding which user account to use for the broker service ID" on page 20
2. Are you executing broker commands under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Assume that your local account is on a computer named, for example, WKSTN1. When you create a broker, ensure that your user ID is defined in

your local domain. When you create or start a broker, ensure that your user ID is a member of WKSTN1\Administrators.

Go to "Deciding which user account to use for the broker service ID."

3. Are you executing broker commands under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you create a broker using, for example, DOMAIN1\user1, ensure that DOMAIN1\user1 is a member of WKSTN1**Administrators**.

      Go to "Deciding which user account to use for the broker service ID."

Deciding which user account to use for the broker service ID

When you set the service ID with the -i option on the mqsicreatebroker or mqsichangebroker command, you determine the user ID under which the broker component process runs.

Answer the following questions:

1. Is your broker installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: Go to "Setting security on the broker's queues"
2. Do you have any existing brokers running on this Windows system?
   a. No: You can choose a service ID for the broker. Go to the next question.
   b. Yes: On the Windows platform, all brokers must run with the same service ID. Use your existing service ID when you create the new broker.
3. Do you want your broker to run under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Ensure that your user ID is defined in your local domain and is a member of **mqbrkrs**.

      Go to "Setting security on the broker's queues"
4. Do you want your broker to run under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you run a broker using, for example, DOMAIN1\user1, ensure that: DOMAIN1\user1 is a member of DOMAIN1**Domain mqbrkrs** and DOMAIN1**Domain mqbrkrs** is a member of WKSTN1**mqbrkrs**.

      Go to "Setting security on the broker's queues"

Setting security on the broker's queues

When you run the mqsicreatebroker command, the **mqbrkrs** group gets access authority to the following queues:

SYSTEM.BROKER.ADMIN.QUEUE

SYSTEM.BROKER.CONTROL.QUEUE

SYSTEM.BROKER.EXECUTIONGROUP.QUEUE

SYSTEM.BROKER.EXECUTIONGROUP.REPLY

SYSTEM.BROKER.INTERBROKER.QUEUE

SYSTEM.BROKER.MODEL.QUEUE

- If you have created WebSphere Message Broker components to run on different queue managers, set the permissions for the transmission queues that you define to handle the message traffic between the queue managers. Grant `put` and `setall` authority to the local **mqbrkrs** group, or to the service user ID of the component supported by the queue manager on which you defined the transmission queue.
- Ensure that the broker's service user ID has authority to:
  1. Get messages from each input queue included in a message flow
  2. Put messages to any output, reply, and failure queues included in a message flow.
- Ensure that the user IDs under which applications that interact with the broker run have authority to:
  1. Put messages to each input queue included in a message flow
  2. Get messages from any output, reply, and failure queue included in a message flow.
- Go to "Enabling topic-based security in the broker"

Enabling topic-based security in the broker

Perform this task by responding to the following question:

Do you want to enable topic-based security in the broker?

1. Yes: Go to "Enabling topic-based security" on page 32
2. No: Go to "Considering security for a Configuration Manager"

Considering security for a Configuration Manager

During this task you consider the group membership that is required for:

- Users that execute Configuration Manager commands
- Service IDs
- Access to the Configuration Manager's queues.

An ACL is associated with the Configuration Manager itself. Users or groups that have full-control membership of the Configuration Manager's ACL implicitly have full-control membership of all other ACLs. Full-control membership of the Configuration Manager's ACL also allows users or groups to modify the ACLs for any object, including the Configuration Manager.

Read the appropriate sections in this list:

1. "Deciding which user accounts can execute Configuration Manager commands"
2. "Deciding which user account to use for the Configuration Manager service ID" on page 22
3. "Setting security on the Configuration Manager's queues" on page 23
4. "Running the Configuration Manager in a domain environment" on page 23

Deciding which user accounts can execute Configuration Manager commands

During this task you decide what permissions are required for the user IDs that:

- Create, change, list, delete, start, and stop a Configuration Manager
- Display, retrieve, and change trace information.

Answer the following questions:

1. Are you executing Configuration Manager commands under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Assume that your local account is on a computer named, for example, WKSTN1. When you create a Configuration Manager, ensure that your user ID is defined in your local domain. When you create or start a Configuration Manager, ensure that your user ID is a member of WKSTN1**Administrators**.

      Go to "Deciding which user account to use for the Configuration Manager service ID"
2. Are you executing Configuration Manager commands under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you create a Configuration Manager using, for example, DOMAIN1\user1, ensure that DOMAIN1\user1 is a member of WKSTN1**Administrators**.

      Go to "Deciding which user account to use for the Configuration Manager service ID"

Deciding which user account to use for the Configuration Manager service ID

When you set the service ID with the -i option on the mqsicreateconfigmgr or mqsichangeconfigmgr command, you determine the user ID under which the Configuration Manager component process runs.

Answer the following questions:

1. Do you want your Configuration Manager to run under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Ensure that your user ID has the following characteristics:
      - It is defined in your local domain.
      - It is a member of **mqbrkrs**.
      - It is a member of **mqm**.
      - It is a member of Administrators.

      Go to "Setting security on the Configuration Manager's queues" on page 23.
2. Do you want your Configuration Manager to run under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you run a Configuration Manager using, for example, DOMAIN1\user1, ensure that:
      1) DOMAIN1\user1 is a member of DOMAIN1**Domain mqbrkrs**.
      2) DOMAIN1\user1 is a member of WKSTN1**mqm**.
      3) DOMAIN1**Domain mqbrkrs** is a member of WKSTN1**mqbrkrs**.
      4) DOMAIN1\user1 is a member of WKSTN1**Administrators**.

      Alternatively, complete the following steps:
      1) Define user1 in DOMAIN1.
      2) Add user1 to the DOMAIN1**Domain mqm** group.
      3) Add user1 to the DOMAIN1**Domain mqbrkrs** group.

4) Add the DOMAIN1**Domain mqm** group to the WKSTN1**mqm** group.
5) Add the DOMAIN1**Domain mqbrkrs** group to the WKSTN1**mqbrkrs** group.
6) Add user1 to the WKSTN1**Administrators** group.

Go to "Setting security on the Configuration Manager's queues."

Setting security on the Configuration Manager's queues

When you run the command, the **mqbrkrs** group gets access authority to the following queues:

SYSTEM.BROKER.CONFIG.QUEUE
SYSTEM.BROKER.CONFIG.REPLY
SYSTEM.BROKER.ADMIN.REPLY
SYSTEM.BROKER.SECURITY.QUEUE
SYSTEM.BROKER.MODEL.QUEUE.

The broker and the User Name Server require access to the Configuration Manager's queues.

Each group or user for which you create access control lists (ACLs), gets access authority to the following queues:

SYSTEM.BROKER.CONFIG.QUEUE
SYSTEM.BROKER.CONFIG.REPLY.

Go to "Running the Configuration Manager in a domain environment."

Running the Configuration Manager in a domain environment

- If you want to *enable* domain awareness, go to "Are you running with domain awareness disabled?" on page 18.
- If you want to *disable* domain awareness, go to "Are you running with domain awareness enabled?" on page 17.

Changing the security domain for the User Name Server

You can change the security domain only if you are not using domain awareness. To change the security domain currently in use for your User Name Server, use the "mqsichangeusernameserver command" on page 361.

Implementing SSL authentication

The following topics contain instructions for implementing SSL authentication:

- "Enabling SSL on the WebSphere MQ Java Client"
- "Enabling SSL for the Real-time nodes" on page 25
- "Configuring HTTPInput and HTTPReply nodes to use SSL (HTTPS)" on page 28
- "Configuring an HTTPRequest node to use SSL (HTTPS)" on page 30

Enabling SSL on the WebSphere MQ Java Client

The WebSphere MQ Java Client supports SSL-encrypted connections over the server-connection (SVRCONN) channel between the application and the queue

manager. This topic tells you how to make use of this SSL support when communicating between the Configuration Manager Proxy (CMP) and the Configuration Manager.

For one-way authentication (with the client (Configuration Manager Proxy) authenticating the server (Configuration Manager) only) perform the following steps:

1. Generate or obtain all the appropriate keys and certificates. This includes a signed pkcs12 certificate for the server and the appropriate public key for the certificate authority that signed the pkcs12 certificate.
2. Add the pkcs12 certificate to the queue manager certificate store and assign it to the queue manager. Use the standard WebSphere MQ facilities, for example, WebSphere MQ Explorer (for WebSphere MQ Version 6) or WebSphere MQ Services (for WebSphere MQ Version 5).
3. Add the certificate of the certificate authority to the JSEE truststore of the Java Virtual Machine (JVM) at the Configuration Manager Proxy end using a tool such as Keytool.
4. Decide which cipher suite to use.
5. Change the properties on the server-connection channel using WebSphere MQ Explorer, to specify the cipher suite to be used. This channel has a default name of `SYSTEM.BKR.CONFIG` and this name is used unless you have specified a different name on the Create a Domain Connection panel or Domain Properties panel ; see “Creating a domain connection” on page 189 and “Modifying domain connection properties” on page 191.
6. Add the required parameters (cipher suite, for example) to the Configuration Manager Proxy. If a truststore other than the default is used, its full path must be passed in via the truststore parameter.

When you have performed these steps, the Configuration Manager Proxy will connect to the Configuration Manager if it has a valid signed key that has been signed by a trusted certificate authority.

For two-way authentication (with the Configuration Manager also authenticating the Configuration Manager Proxy) perform the following additional steps:

1. Generate or obtain all the appropriate keys and certificates. This includes a signed pkcs12 certificate for the client and the appropriate public key for the certificate authority that signed the pkcs12 certificate.
2. Add the certificate of the certificate authority to the queue manager certificate store; use the standard WebSphere MQ facilities (for example, WebSphere MQ Explorer for WebSphere MQ Version 6).
3. Set the server-connection channel to always authenticate. You can use SSLCAUTH(REQUIRED) in runmqsc, or WebSphere MQ Explorer.
4. Add the pkcs12 certificate to the JSEE keystore of the JVM at the Configuration Manager Proxy end using a tool such as Keytool.
5. If not using the default keystore, its full path must be passed into the Configuration Manager Proxy via the keystore parameter

When you have performed these steps, the Configuration Manager allows the Configuration Manager Proxy to connect only if the Configuration Manager Proxy has a certificate signed by one of the certificate authorities in its keystore.

Further restrictions can be made using the sslPeerName field; for example, you can allow connections only from certificate holders with a specific company or

department name in their certificates. In addition, you can invoke a security exit for communications between the Configuration Manager Proxy and the Configuration Manager; see "Using security exits" on page 35.

Enabling SSL for the Real-time nodes

Use optional authentication services between JMS clients and Real-timeInput and Real-timeOptimizedFlow nodes.

In a default configuration, SSL authentication services are disabled.

To configure the product to use the SSL authentication services, complete the following steps:

- Configure and start a User Name Server in a broker domain.
- Configure each Real-timeInput node to use authentication, and set your chosen authentication protocol in each of the brokers that is to use the authentication services.
- Edit a file that specifies client user IDs and passwords.
- Specify the names of the files that are required to implement the SSL protocol.

Configuring the User Name Server:

The User Name Server distributes to the brokers passwords that are required to support these authentication protocols.

To configure the User Name Server to support authentication, specify the following two parameters on either the mqsicreateusernameserver or the mqsichangeusernameserver command:

- *AuthProtocolDataSource* describes the location of an local file that contains the information that is required to support the authentication protocols.
- The -j flag indicates whether the file that is pointed to by the*AuthProtocolDataSource* parameter contains group and group membership information in addition to password information.
- Set the -j flag if you want to support both authentication and publish/subscribe access control in your broker domain, and you want to draw user and group information from a file rather than from the operating system.
- Use the *AuthProtocolDataSource* parameter to specify the source of any protocol-related information. For example, you can specify the name of a file that contains user ID and password information. The user ID and password information in this file must exactly mirror the operating system user ID and password definitions. Make sure that you set the appropriate file system security for this password file.
- The default location of this file is the WebSphere Message Broker home directory. If you store the file in another location, specify the full path definition of the location of the file.
- Stop and restart the User Name Server to implement the changes.

Use the -d flag on the mqsichangeusernameserver command to disable this option.

Configuring a broker:

Configure a broker to support WebSphere Message Broker authentication services. Specify two authentication and access control parameters and use the workbench to configure the appropriate Real-timeInput nodes and the sets of protocols that are to be supported on the broker.

The following steps show you how to do this.

1. Switch to the Broker Application Development perspective.
2. For each message flow in the Message Flow Topology:
   a. Select the Real-timeInput or Real-timeOptimizedFlow node to open the Properties view, or right-click the node and click **Properties** to open the Properties dialog. The node properties are displayed.
   b. Select **Authentication**.
3. For each broker in the Broker Topology:
   a. Select the broker to open the Properties view, or right-click the broker and click **Properties** to open the Properties dialog. The broker properties are displayed.
   b. Enter the required value in **Authentication Protocol Type**.

      Choose any combination of the options P, M, S, and R; for example, S, SR, RS, R, PS, SP, PSR, SRM, MRS, and RSMP are all valid combinations of options.

      The order in which you specify the options is significant; the broker chooses the first option that the client supports. If you want the broker always to support the strongest protocol that the client supports, choose RSMP.
   c. If you have chosen S or R as one of the options in **Authentication Protocol Type**, specify the **SSL Key Ring File Name** and the **SSL Password File Name**.
   d. Click **OK**.
   e. Use the mqsicreatebroker or mqsichangebroker command, with the following two parameters, to configure the broker:

      UserNameServerQueueManagerName (-s)
      This parameter defines the name of the queue manager that it associated with the User Name Server. Specify this parameter if you require authentication services, publish/subscribe access control services, or both.

      Publish/Subscribe Access Control Flag (-j)
      Set this flag in addition to specifying the **UserNameServerQueueManagerName** parameter if you want to use publish/subscribe access control services.

      Use of the authentication services in the broker is enabled at the IP input node level, not by a parameter on these commands.

Sample password files:

Two sample files, password.dat and pwgroup.dat, are supplied with WebSphere Message Broker.

- pwgroup.dat is a sample file that can be used when you set the -j flag.
- password.dat is a sample file that can be used in the default case.

The file password.dat has the following layout:

```
# This is a password file.

# Each line contains two required tokens delimited by
# commas. The first is a user ID, the second is that user's
# password.

#USERNAME PASSWORD
```

```
========================
subscriber,subpw
admin,adminpw
publisher,pubpw
```

This file complements the user and group information that is retrieved by the User Name Server from the operating system. User names that are defined in the file, but are not defined in the operating system, are treated as unknown by the broker domain. User names that are defined in the operating system, but are not defined in the password file, are denied access to the system.

The file pwgroup.dat contains group information in addition to user and password information. Each user entry includes a list of group names that specify the groups that contain the user.

The file pwgroup.dat has the following layout:

```
#This is a password file.
#Each line contains two or more required tokens delimited by
#commas.The first is a user ID and the second is that user's
#password. All subsequent tokens
#specify the set of groups that the user belongs to.

#USERNAME PASSWORD  GROUPS
subscriber,subpw,group1,group2,group3
admin,adminpw,group2
publisher,pubpw,group2,group4
```

As mentioned above, this file can be used to provide the only source of user, group, and password information for the broker domain.

To deploy updated user and password information to the broker network if this information is drawn from an operating system file, stop the User Name Server and the brokers, update the file, and then restart the User Name Server and the brokers.

If passwords are drawn from the operating system, updates are automatically distributed to the brokers. Use normal operating system management tools to change users or passwords.

Authentication in the JMS client:

For client applications that use WebSphere MQ classes for Java Message Service Version 5.3 before CSD4, the client application always has an authentication protocol level of PM. The client application and broker negotiate on the choice of protocol for a session. Where the broker supports both protocols (that is, you have set PM or MP in the workbench definition of a broker), the first protocol specified in the workbench is chosen.

For client applications that use WebSphere MQ classes for Java Message Service Version 5.3, CSD10 (plus APAR IC47044) or CSD11 or later, or WebSphere MQ classes for Java Message Service Version 6.0 or later, the client application supports two levels of authentication.

You can configure a *TopicConnectionFactory* to support either a MQJMS_DIRECTAUTH_BASIC authentication mode or a MQJMS_DIRECTAUTH_CERTIFICATE authentication mode. The

MQJMS_DIRECTAUTH_BASIC authentication mode is equivalent to a level of PM, and the MQJMS_DIRECTAUTH_CERTIFICATE authentication mode is equivalent to a level of SR.

If you have successfully configured authentication services for a Real-timeInput node, a JMS client application must specify its credentials when creating a connection. To make a connection for this configuration, the JMS client application supplies a user ID and password combination to the *TopicConnectionFactory.createTopicConnection* method; for example:

```
factory.createTopicConnection("user1", "user1pw");
```

If the application does not specify these credentials, or specifies them incorrectly, it receives a JMS wrapped exception containing the MQJMS error text.

Configuring HTTPInput and HTTPReply nodes to use SSL (HTTPS)

This topic explains how to configure the HTTPInput and HTTPReply nodes to communicate with other applications using HTTP over SSL.

1. "Create a key store file to store the broker's certificates"
2. "Configuring the broker to use SSL on a particular port" on page 29
3. "Creating a message flow to process HTTPS requests" on page 29
4. "Testing your example" on page 29

Create a key store file to store the broker's certificates:

WebSphere Message Broker includes a Java Runtime Environment (JRE) that supplies a keystore manipulation program, which is called keytool. To invoke this command complete the following steps:

1. Select **Start → IBM WebSphere Message Brokers 6.0 → Command Console** to open the broker command console.
2. In the command console, type the following command:

   ```
   "%MQSI_FILEPATH%\jre\bin\keytool"
   ```

   This displays the help options and therefore validates that the command is working.
3. Use the keytool command to create the key store: In the command console, type the following command:

   ```
   "%MQSI_FILEPATH%\jre\bin\keytool" -genkey -keypass password
   -keystore keystore file -alias tomcat
   ```

   password
   : the password used for the keystore

   keystore file
   : the fully qualified name of the keystore file. This file is typically called .keystore and is located in the WebSphere Message Broker home directory.

   The command then prompts you for some personal details that are used to generate the certificates. You personal details are then added to a key store, if it already exists, or a key store is generated.

   These values can be set to any values that are required but the properties on the broker must be changed to reflect these values. The `-genkey` generates all the certificate files that are required to get HTTPS working but they are not

official certificates and would not be advisable for use in a production system. You must purchase a real certificate from a certificate organization. Consult your system administrator to find out your company policy for certificate creation. To import a certificate generated by a certificate authority use the `-import` option instead of the `-genkey` option.

The keystore is now created and is ready for use by the broker.

Configuring the broker to use SSL on a particular port:

The broker requires several properties to be set to make use of HTTP over SSL. All of these properties can be changed using the **mqsichangeproperties** command. Change the properties as follows:

- Turn on SSL support in message broker, by setting a value for **enableSSLConnector**

  ```
  mqsichangeproperties broker name -b httplistener -o HTTPListener
  -n enableSSLConnector -v true
  ```

- Choose the keystore file to be used, by setting a value for **keystoreFile**

  ```
  mqsichangeproperties broker name -b httplistener -o HTTPSConnector
  -n keystoreFile -v fully qualified file path to keystore file
  ```

- Specify the password for the keystore file, by setting a value for **keystorePass**

  ```
  mqsichangeproperties broker name -b httplistener -o HTTPSConnector
  -n keystorePass -v password for keystore
  ```

- Specify the **port** on which WebSphere Message Broker should listen for HTTPS requests

  ```
  mqsichangeproperties broker name -b httplistener -o HTTPSConnector
  -n port -v Port to listen on for https
  ```

Ensure that all of these properties are set with correct values for your system. Only the **enableSSLConnector** property has to be set. The other three properties have default values. However, it is advisable to change these default values. The **mqsichangeproperties** command lists the default values for all the properties.

Creating a message flow to process HTTPS requests:

The most simple message flow that shows the HTTPS functionality working is one that contains an HTTPInput node connected directly to an HTTPReply node: The two important properties to set on the HTTPInput node are:

- **Path suffix for URL**. For example `/*` or `/testHTTPS`
- **Use HTTPS**. Tick the box if you want to use HTTPS

`/*` means that the HTTPInput node will match against any request that is sent to the http listener on a designated port. This is useful for testing purposes, but is not recommended for production.

You can now deploy the message flow to the broker. If all other steps have been followed up to this point, a BIP3132 message should appear in the local system log (this is the event log on Windows) stating that the https listener has been started.

You can now test the system.

Testing your example:

The most simple method of testing whether HTTPS is configured correctly is to use a web browser to make a request to the broker over HTTPS.

Start a web browser and type the following URL:

```
https://localhost:7083/testHTTPS
```

Change any values in the URL to reflect changes you have made in your broker configuration. When a pop up window appears asking you to accept the certificate, select yes to any questions. The browser should then refresh and display the structure of an empty html page. In Mozilla browsers this will look like the following example:

```
<html>
  <body/>
</html>
```

and in Internet Explorer the following information should be displayed:

```
XML document must have a top level element. Error processing resource
'https://localhost:7083/testHTTPS'
```

These responses mean that a blank page was returned, showing that the set up worked correctly. To add content to the page that is returned, you can add a compute node to the flow.

You can use another HTTPS client to process HTTPS requests. Read the documentation for the client to find out how it should be configured to make client connections over SSL.

Another HTTPS client, such as a Java or .net client, could be used instead of the web browser. Depending on the type of client, the certificate that was created with keytool might have to be exported from the http listener's keystore file and then imported into that client's own keystore. Consult the client documentation to find out how you should configure the client to make client connections over SSL.

Configuring an HTTPRequest node to use SSL (HTTPS)

This task topic explains how to configure the HTTPRequest node to communicate with other applications using HTTP over SSL. The task covers the steps required for windows system but almost identical tasks are required for any other platform. To complete the HTTPRequest task, an HTTPS server application is required. For simplicity, the only details that are given here are for using the HTTPInput node for SSL as the server application. However, the same details also apply when you are using any other server application.

The steps required are as follows:

1. "Adding certificates to the cacerts file"
2. "Creating a message flow to make HTTPS requests" on page 31
3. "Testing your example" on page 32

Adding certificates to the cacerts file:

The certificate for the server application to be called must be added to the cacerts file for WebSphere Message Broker. This is located in the JRE security directory. To find the cacerts file on Windows, complete the following steps:

1. Select **Start → IBM WebSphere Message Brokers 6.0 → Command Console** to open a broker command console.
2. In the command console, type the following command to change directory to where the cacerts files is located:

   ```
   cd "%MQSI_FILEPATH%\jre\lib\security"
   ```

To modify the cacerts file, you must use the keytool command.

Importing a certificate into the cacerts file

1. Select **Start → IBM WebSphere Message Brokers 6.0 → Command Console** to open a broker command console.
2. In the command console, type the following command:

```
"%MQSI_FILEPATH%\jre\bin\keytool" -import -alias mykey
-file name of certificate file -keystore cacerts
-keypass changeit
```

name of certificate file
: the fully qualified name of the certificates file. This file is normally found in the message broker users home directory.

changeit
: the default password for the cacerts file. You should change this password as soon as possible. You can use keytool to change the password.

Extracting a certificate from another keystore

1. Select **Start → IBM WebSphere Message Brokers 6.0 → Command Console** to open a broker command console.
2. In the command console, type the following command:

```
"%MQSI_FILEPATH%\jre\bin\keytool" -export -alias tomcat
-file name of certificate file -keystore keystore file
-keypass changeit
```

name of certificate file
: the fully qualified name of the certificates file. This file is normally called .keystore and is usually located in the message broker users home directory.

keystore file
: the fully qualified name of the keystore file. This file is normally found in the message broker users home directory.

changeit
: the default password for the cacerts file. You should change this password as soon as possible. You can use keytool to change the password.

It is important to ensure that the correct certificate has been imported into the cacerts. The correct certificate is the certificate that the HTTP server should use.

Creating a message flow to make HTTPS requests:

The following message flow creates a generic message flow for converting an WebSphere MQ message into an HTTPRequest.:

1. Create a message flow with the nodes MQInput->HTTPRequest->Compute->MQOutput.
2. For the MQInput node, set the queue name to HTTPS.IN1 and create the MQSeries queue.
3. For the MQOutput node, set the queue name to HTTPS.OUT1 and create the MQSeries queue.
4. For the HTTPRequest node, set the Web Service URL to point to the HTTP server to call. For calling the HTTPInput task use `https://localhost:7083/testHTTPS`.

5. For the HTTPRequest node, set the advance properties to use OutputRoot.BLOB as the *Response location in tree*.
6. In the compute node add in the following esql:

```
CREATE COMPUTE MODULE test_https_Compute
    CREATE FUNCTION Main() RETURNS BOOLEAN
    BEGIN
        -- CALL CopyMessageHeaders();
        CALL CopyEntireMessage();
        set OutputRoot.HTTPResponseHeader = null;
        RETURN TRUE;
    END;

    CREATE PROCEDURE CopyMessageHeaders() BEGIN
        DECLARE I INTEGER;
        DECLARE J INTEGER;
        SET I = 1;
        SET J = CARDINALITY(InputRoot.*[]);
        WHILE I < J DO
            SET OutputRoot.*[I] = InputRoot.*[I];
            SET I = I + 1;
        END WHILE;
    END;

    CREATE PROCEDURE CopyEntireMessage() BEGIN
        SET OutputRoot = InputRoot;
    END;
END MODULE;
```

The message flow is now ready to be deployed to the broker and tested.

Testing your example:

To test that the example works, complete the following steps

1. Follow all of the instructions given in "Configuring HTTPInput and HTTPReply nodes to use SSL (HTTPS)" on page 28, including testing the example.
2. Deploy the HTTPRequest message flow.
3. Put a message to the MQSeries queue HTTPS.IN1. A message should appear on the output queue. If it fails, an error appears in the local error log (event log on windows).

Enabling topic-based security

If your applications use the publish/subscribe services of a broker, you can apply an additional level of security to the topics on which messages are published and subscribed. This topic-based security is managed by the User Name Server.

Complete the following steps:

1. Before you create a User Name Server, refer to "Considering security for a User Name Server" on page 33.
2. Create a User Name Server. Refer to "Creating a User Name Server" on page 151.
3. Select the -j flag and set the -s parameter to the name of the queue manager for the User Name Server on the mqsicreatebroker or mqsichangebroker command.
4. Set the -s parameter on the mqsicreateconfigmgr or mqsichangeconfigmgr command to the name of the queue manager for the User Name Server.

5. Create ACLs for the topics that require additional security. For more information, see “Creating ACL entries” on page 52.
6. Ensure that the broker's service user ID has authority to:
   a. Get messages from each input queue included in a message flow
   b. Put messages to any output, reply, and failure queues included in a message flow.
7. Ensure that the user IDs under which publish and subscribe applications run have sufficient authority to put to and get from message flow queues:
   a. Authorize publish applications to put messages to the input queue of the message flow.
   b. Authorize applications that register subscriptions to put to the SYSTEM.BROKER.CONTROL.QUEUE queue.
   c. Authorize subscribe applications to get from the queue to which messages are published.
   d. Authorize publish and subscribe applications to get from the reply queue.

If you are issuing publish/subscribe requests from a JMS client, additional security options are available. Refer to “SSL authentication” on page 13, “Quality of protection” on page 14, and “Authentication services” on page 46.

Go to “Considering security for a Configuration Manager” on page 21.

Considering security for a User Name Server

Complete this task by answering the following question:

Have you enabled topic-based security in your broker?

1. No: Go to “Considering security for a Configuration Manager” on page 21.
2. Yes: You need a User Name Server. Go to “Deciding which user accounts can execute User Name Server commands.”

Deciding which user accounts can execute User Name Server commands

During this task you decide what permissions are required for the user IDs that:

- Create, change, list, delete, start, and stop a User Name Server
- Display, retrieve, and change trace information.

Answer the following questions:

1. Is your User Name Server installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: The information about executing User Name Server commands on Linux and UNIX is not yet available.

      Go to “Deciding which user account to use for the User Name Server service ID” on page 34.
2. Are you executing User Name Server commands under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Assume that your local account is on a computer named, for example, WKSTN1. When you create a User Name Server, ensure that your user ID is defined in your local domain. When you create or start a User Name Server, ensure that your user ID is a member of WKSTN1**Administrators**.

Go to “Deciding which user account to use for the User Name Server service ID.”

3. Are you executing User Name Server commands under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you create a User Name Server using, for example, DOMAIN1\user1, ensure that DOMAIN1\user1 is a member of WKSTN1**Administrators**.

      Go to “Deciding which user account to use for the User Name Server service ID.”

Deciding which user account to use for the User Name Server service ID

When you set the service ID with the -i option on the mqsicreateusernameserver or mqsichangeusernameserver command, you determine the user ID under which the User Name Server component process runs.

Answer the following questions:

1. Is your User Name Server installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: The information about running your User Name Server on Linux and UNIX is not yet available.

      Go to “Setting security on the User Name Server’s queues”
2. Do you want your User Name Server to run under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Ensure that your user ID is defined in your local domain and is a member of **mqbrkrs**.

      Go to “Setting security on the User Name Server’s queues”
3. Do you want your User Name Server to run under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you run a User Name Server using, for example, DOMAIN1\user1, ensure that:DOMAIN1\user1 is a member of DOMAIN1**Domain mqbrkrs** and DOMAIN1**Domain mqbrkrs** is a member of WKSTN1**mqbrkrs**.

      Go to “Setting security on the User Name Server’s queues.”

Setting security on the User Name Server’s queues

When you run the **mqsicreateusernameserver** command, the **mqbrkrs** group gets access authority to the following queues:

SYSTEM.BROKER.SECURITY.QUEUE

SYSTEM.BROKER.MODEL.QUEUE

Only the broker and the Configuration Manager require access to the User Name Server’s queues.

Go to “Running the User Name Server in a domain environment” on page 35.

Running the User Name Server in a domain environment

When the users that issue publish and subscribe commands are domain users, set the -d option on the mqsicreateusernameserver command to the domain those users come from. All users that issue publish and subscribe commands must come from the same domain.

Using security exits

How to define a security exit when you create a domain connection.

To create a security exit for communications between the Message Brokers Toolkit and the Configuration Manager, you must define a security exit when you create a domain connection.

1. Click **File** → **New** → **Domain**. The Create a Domain Connection wizard opens.
2. Enter the values for **Queue Manager Name**, **Host**, and **Port** that you want to use.
3. Enter the Security Exit **Class** name. The name must be a valid Java class name.
4. Set the **JAR File location** for the Security Exit that is required on this connection. Click **Browse** to find the file location.

The security exit is started every time a message passes across the connection.

Alternatively, use SSL to communicate between the Configuration Manager Proxy (CMP) and the Configuration Manager; see "Implementing SSL authentication" on page 23.

Implementing HTTP tunneling

HTTP tunneling support in the broker is activated by selecting the Use HTTP Tunneling option within the properties for the Real-timeInput node or Real-timeOptimizedFlow node. Optional settings are also configured using the "mqsichangeproperties command" on page 343.

Once set, HTTP tunneling is administered using the "mqsichangeproperties command" on page 343 with the httpProtocolTimeout and httpDispatchThreads options.

Implementing quality of protection

The enableQoPSecurity option of the mqsichangeproperties command enables quality of protection. By default, quality of protection is enabled if any of the quality of protection settings have been changed from n or none. The levels of message protection are defined using the sysQoPLevel and isysQoPLevel options also in the "mqsichangeproperties command" on page 343.

From the broker properties window, you can set the values for temporary topics using:

- Temporary Topic Quality of Protection
- Sys Topic Quality of Protection
- ISys Topic Quality of Protection .

The default value is none, or you can select one of the following values from each of the drop-down lists:

- Channel Integrity (preventing hackers from inserting or deleting messages without being detected)
- Message Integrity (preventing hackers from changing the content of a message without being detected)
- Encrypted for Privacy (preventing hackers from looking at the content of a message).

The value selected is the same for all users and is independent of the user currently selected.

Database security

The service user ID for the brokers must be authorized to access databases:

- Each broker service user ID must be authorized for create and update tasks on the database that contains the broker internal tables.

  In addition to the broker service user ID, this also applies to any data source user ID if defined (using "mqsicreatebroker command" on page 374), or to any user ID specified for a data source by use of the "mqsisetdbparms command" on page 464.

Derby databases, created either by the Default Configuration wizard or by the "mqsicreatedb command" on page 393 on Windows, do not require security authorization. Refer to "Using Derby databases on Windows" on page 80 for more information.

Database security is defined and modified using various commands dependent upon the database that is being used. See the following:

- "mqsicreatebroker command" on page 374
- "mqsichangebroker command" on page 319

For information relating to specific databases see:

- "Oracle: granting and revoking user access to databases"
- "SQL Server: granting and revoking user access to databases"
- "Sybase: granting and revoking user access to databases"

Oracle: granting and revoking user access to databases

The Oracle database administrator controls user access to Oracle databases. The WebSphere Message Broker does not provide any special commands to administer an Oracle database.

SQL Server: granting and revoking user access to databases

The SQL database administrator controls user access to Microsoft SQL Server databases. WebSphere Message Broker does not provide any special commands to administer a Microsoft SQL Server database.

You must enable SQL Server Authentication mode as well as the default Windows Authentication mode.

Sybase: granting and revoking user access to databases

The Sybase database administrator controls user access to Sybase databases. WebSphere Message Broker does not provide any special commands to administer a Sybase database.

Setting up z/OS security

You need to complete some security configuration tasks before WebSphere Message Broker can work correctly. The steps you need to follow are described in this topic and also in the following topics:

- "Setting up DB2 security on z/OS" on page 38
- "Setting up WebSphere MQ" on page 39
- "Setting up workbench access on z/OS" on page 40
- "Creating Publish/Subscribe user IDs" on page 40
- "Enabling the Configuration Manager on z/OS to obtain user ID information" on page 40

Decide on the started task names of the broker, Configuration Manager, and User Name Server. These names are used to set up started task authorizations, and to manage your system performance.

Decide on a data set naming convention for your WebSphere Message Broker PDSEs. A typical name might be `WMQI.MQP1BRK.CNTL` or `MQS.MQP1UNS.BIPCNTL`, where `MQP1` is the queue manager name. You need to give the WebSphere Message Broker, WebSphere MQ, DB2, and z/OS administrators access to these data sets. You can give these professionals control access in several ways, for example:

- Give each user individual access to the specific data set.
- Define a generic data set profile, defining a group that contains the user IDs of the administrators. Grant the group control access to the generic data set profile.

If you intend to use Publish/Subscribe, define a group called `MQBRKRS` and connect the started task user IDs to this group. Define an OMVS group segment for this group so that the User Name Server can extract information from the External Security Manager (ESM) database to enable you to use Publish/Subscribe security.

Each broker needs a unique ID for its DB2 tables. This can be:

- A unique started task user ID; you could use the broker name as the started task user ID.

  A unique group for the broker (for example MQP1GRP) which has defined all necessary DB2 authorities. The broker started task user ID and the WebSphere Message Broker administrator are both members of this group.
- A shared started task user ID and a unique group specified to identify the DB2 tables to be used with the ODBC interface. Use the broker name as the group name.

Define an OMVS segment for the started task user ID and give its home directory sufficient space for any WebSphere Message Broker dumps. Consider using the started task procedure name as the started task user ID. Check that your OMVS segment is defined by using the following TSO command:

```
LU userid OMVS
```

The command output includes the OMVS segment, for example:

```
USER=MQP1BRK NAME=SMITH, JANE OWNER=TSOUSER
CREATED=99.342 DEFAULT-GROUP=TSOUSER PASSDATE=01.198
PASS-INTERVAL=30
......
OMVS INFORMATION
----------------
UID=0000070594
```

```
HOME=/u/MQP1BRK
PROGRAM=/bin/sh
CPUTIMEMAX=NONE
ASSIZEMAX=NONE
FILEPROCMAX=NONE
PROCUSERMAX=NONE
THREADSMAX=NONE
MMAPAREAMAX=NONE
```

The command:

```
df -P /u/MQP1BRK
```

displays the amount of space used and available, where `/u/MQP1BRK` is the value from `HOME` above. This command shows you how much space is currently available in the file system. Check with your data administrators that this is sufficient. You need a minimum of 400 000 blocks free; this is needed if a dump is taken.

Associate the started task procedure with the user ID to be used. For example, you can use the STARTED class in RACF®. The WebSphere Message Broker and z/OS administrators must agree on the name of the started task.

WebSphere Message Broker administrators need an OMVS segment and a home directory. Check the setup described above.

The started task user IDs and the WebSphere Message Broker administrators need access to the install processing files, the component specific files, and the home directory of the started task. During customization the file ownership can be changed to alter group access. This might require super user authority.

When the service user ID is *root*, all libraries loaded by the broker, including all user-written plug-in libraries and all shared libraries that they might access, also have root access to all system resources (for example, file sets). Review and assess the risk involved in granting this level of authorization.

For more information on various aspects of security, see “Security overview” on page 3.

Setting up DB2 security on z/OS

This is part of the larger task of setting up security on z/OS.

The user ID of the person running the DB2 configuration jobs must have *UPDATE* access to the component PDSE, *READ/EXECUTE* access to the installation directory, and *READ/WRITE/EXECUTE* access to the broker-specific directory.

A user needs SYSADM or SYSCTRL authority to run the DB2 configuration jobs.

You cannot share DB2 tables between brokers; each broker must have its own DB2 tables. The format of the table names is:

```
table_owner.table_name
```

where `table_owner` is known as the table owner.

When the broker starts up, the started task user ID is used to connect to DB2 using ODBC. The ODBC statement `Set current SQLID` is used to set the ID to table_owner; the table owner ID specifies which tables to use. You have two options in setting up the IDs:

1. Make the table owner the same as the started task user ID. This means that each broker must have a different user ID. Check that the started task user ID specified has access to SYSIBM tables. From a TSO user with no system administration authority, use SPUFI to issue the following commands:

   ```
   select *       from SYSIBM.SYSTABLES;
   select *       from SYSIBM.SYSSYNONYMS;
   select *       from SYSIBM.SYSDATABASE;
   ```

   and resolve any problems.
2. Make the table owner different from the started task user ID. For this to work the started task needs to be able to issue the Set current SQLID request. The easiest way to do this is to create a RACF group with the same name as the table owner, and connect the started task user ID to this group.

   Check that the group ID specified has access to SYSIBM tables. From a TSO user with no system administration authority, use SPUFI to issue the following commands:

   ```
   SET    CURRENT SQLID='WMQI';
   select * from   SYSIBM.SYSTABLES;
   select * from   SYSIBM.SYSSYNONYMS;
   select * from   SYSIBM.SYSDATABASE;
   ```

   and resolve any problems (WMQI is the name of the group). You might need to connect the TSO user IDs of the DB2 administrators to the group.

   If you have a unique group for each broker (and not a unique started task user ID), the started task user ID must be connected to the group for the ODBC request set currentsqlid to work successfully.

The DB2 administrator user ID must have access to one of the programs DSNTEP2 or DSNTIAD, or equivalent.

The started task user ID must be authorized to connect to DB2. The started task user ID needs a minimum of *READ* access to the subsystem.RRSAF profile in the DSNR class, if present. In this case, subsystem is the DB2 subsystem name. For example, the following RACF command lists all the resources in DSNR class:

```
RLIST DSNR *
```

The started task user ID needs *EXECUTE* authority to the DSNACLI plan or equivalent.

The DB2 subsystem started task user ID needs authority to create data sets with the high level qualifier specified in the DB2_STOR_GROUP_VCAT value.

Setting up WebSphere MQ

This is part of the larger task of setting up security on z/OS.

The user ID of the person running the create component (BIPCBRK, BIPCRCM, and BIPCRUN) jobs needs *UPDATE* access to the component PDSE, *READ/EXECUTE* access to the installation directory, and *READ/WRITE/EXECUTE* access to the component directory. If you do not use queue manager security, you do not need to read the rest of this topic. Topic “Creating the broker component” on page 139 provides detailed statements on how to protect your queues.

The broker, Configuration Manager, and the User Name Server need to be able to connect to the queue manager.

By default, the broker's internal queues, which all have names of the form:

```
SYSTEM.BROKER.*
```

should be protected. These names cannot be changed. Restrict access to the broker, Configuration Manager, and User Name Server started task user IDs, and to WebSphere Message Broker administrators.

If you are running a Configuration Manager on z/OS, remote users connecting from either the Message Brokers Toolkit or from a Configuration Manager Proxy application need to be authorized to connect to the queue manager through the channel initiator and require *PUT* and *GET* access to SYSTEM.BROKER.CONFIG.QUEUE and SYSTEM.BROKER.CONFIG.REPLY

If you are using Publish/Subscribe, subscribers need to PUT to SYSTEM.BROKER.CONTOL.QUEUE.

You can control which applications can use queues used by message flows. Applications need to be able to PUT and GET to queues defined in any nodes.

Setting up workbench access on z/OS

Access to the workbench is controlled from Windows or Linux (x86 platform). The workbench must run on Windows or Linux (x86 platform). See "Considering security for a Configuration Manager" on page 21 for further information.

Creating Publish/Subscribe user IDs

This is part of the larger task of setting up security on z/OS.

A User Name Server can only see user IDs that have been enabled to use UNIX System Services facilities. To ensure that your user or group information can be seen by your User Name Server, you must comply with the following instructions:

- Define user IDs with `OMVS(UID(nnnnn)...)` *and* their default group with `OMVS(GID(nnnnn))`.
- Define groups with `OMVS(GID(nnnnn))`.

Enabling the Configuration Manager on z/OS to obtain user ID information

This topic lists the steps you need to complete, to enable the Configuration Manager on z/OS to correctly obtain the list of user IDs for a particular group from the External Security Manager (ESM) database.

When connecting to the Configuration Manager, the local user ID on the connecting machine is sent to the Configuration Manager for the purposes of broker domain authorization. This user ID is checked against the Configuration Manager Access Control Lists (ACL) to determine the level of authorization.

For any group ACLs defined, the Configuration Manager queries the local ESM database for a list of user IDs defined to that group. The Configuration Manager then tries to match any user ID connecting to it, with this list, to grant the correct authorization to the broker domain.

For the Configuration Manager on z/OS to obtain this list of user IDs, the group and any user IDs must have an OMVS segment defined.

User IDs

- If you have suitable authorization, you can use the following Security Server (formerly RACF) command to display OMVS information about a user:

  ```
  LU id OMVS
  ```

- If you have suitable authorization, you can use the following Security Server command to give a user ID an OMVS segment:

  ```
  ALTUSER id  OMVS(UID(xxx))
  ```

Groups

- If you have suitable authorization, you can use the following Security Server command to display OMVS information about a user:

  ```
  LG group OMVS
  ```

- If you have suitable authorization, you can use the following Security Server command to give a group an OMVS segment:

  ```
  ALTGROUP id  OMVS(GID(xxx))
  ```

See the *OS/390 Security Server (RACF) Security Administrator's Guide* (or the appropriate documentation for an external security manager installed on the system) for details.

If the group, or any of the defined user IDs in that group, are not found by the Configuration Manager (either because they do not exist, or because they do not have an OMVS segment), the Configuration Manager is not able to authorize the user attempting the connection.

Publish/subscribe security

Security services are provided for your publish/subscribe domain.

- Topic-based security

  Access to messages on particular topics is controlled using access control lists (ACLs).

- Authentication services using real-time nodes

  An authentication protocol is used by a broker and a client application to confirm that they are both valid participants in a session.

- Message protection using real-time nodes

  Message protection provides security options to prevent messages from being read or modified while in transit.

These services operate independently of each other, but before you can use any of these services, you must create a User Name Server and include it in your domain.

To use one of these services, use the mqsicreatebroker or mqsichangebroker command to configure a broker with the -s parameter to specify the name of the queue manager that hosts the User Name Server.

In addition, to use topic-based security, specify the publish/subscribe access control flag (-j parameter) on the mqsicreatebroker or mqsichangebroker command.

Topic-based security

Use topic-based security to control which applications in your publish/subscribe system can access information on which topics.

For each topic to which you want to restrict access, you can specify which principals (user IDs and groups of user IDs) can publish to the topic, and which principals can subscribe to the topic. You can also specify which principals can request persistent delivery of messages.

Any principal can publish, subscribe, and request persistent delivery of, messages on any topic whose access you do not explicitly restrict.

Topic-based security is managed by a User Name Server that uses the access control lists (ACLs) that you create to decide which authorizations are applied.

Principals and the User Name Server

The User Name Server in WebSphere Message Broker manages the set of principals that are already defined in your network, on behalf of the brokers and the Configuration Manager, for use in publish/subscribe. On Windows, this list of users is taken from the domain specified on the mqsicreateusernameserver command.

The User Name Server is made known to both the broker and the Configuration Manager by specifying the User Name Server queue manager on the mqsicreatebroker and mqsicreateconfigmgr commands.

Message brokers within the broker domain interact with the User Name Server to retrieve the total set of users and groups from which the access control lists are built and against which the publish/subscribe requests are validated. The Configuration Manager interacts with the User Name Server to display the users and user groups in the ACLs that are created using the Topics Hierarchy Editor that is provided in the Broker Administration perspective of the workbench.

Access control lists

Access control lists are used to define, for any topic and principal, the right of that principal to publish on, or subscribe to, that topic, or to request persistent delivery of a publication on that topic.

You can also use the ACL to define the level of message protection that you want to apply to each topic.

Specify these definitions using the Topics Hierarchy Editor in the Broker Administration perspective of the workbench.

Access control can be set explicitly for each individual topic. However, if no explicit ACL is defined for a topic, access control is inherited from an ancestor or parent topic, as defined by the hierarchical structure of the topic tree. If no topic in the hierarchy up to the topic root has an explicit ACL, the topic inherits the ACL of the topic root.

Any defined principal that is known to the User Name Server can be associated with a topic in this way.

Resolving ACL conflicts

If the principals in your broker domain include one or more users in more than one group, the explicit or inherited ACL values might conflict. The following rules indicate how a conflict is resolved:

- If the user has an explicit user ACL on the topic of interest, this always takes priority and the broker verifies the current operation on that basis.

- If the user does not have an explicit user ACL on the topic of interest, but has explicit user ACLs against an ancestor in the topic tree, the closest ancestor ACL for that user takes priority and the broker verifies the current operation on that basis.
- If there are no explicit user ACLs for the user on the topic of interest or its ancestors, the broker attempts to verify the current operation on the basis of group ACLs:
  - If the user is a member of a group that has an explicit group ACL on the topic of interest, the broker verifies the current operation on the basis of that group ACL.
  - If the user is not a member of a group that has an explicit group ACL on the topic of interest, but is a member of a group with explicit group ACLs against an ancestor in the topic tree, the closest ancestor ACL takes priority and the broker verifies the current operation on that basis.
  - If, at a particular level in the topic tree, the user ID is contained in more than one group with an explicit ACL, permission is granted if any of the specifications are positive; otherwise it is denied.

You cannot associate ACLs with topics that include one or more wildcard characters. However, access from your client application is resolved correctly when the subscription registration is made, even when that application specifies a wildcard character in the topic.

PublicGroup authorizations

In addition to the groups that you define, WebSphere Message Broker provides an implicit group, PublicGroup, to which all users automatically belong. This implicit group simplifies the specification of ACLs in a topic tree. In particular, this group is used in the specification of the ACL for the topic root. Note that the default setting of the topic root allows publish and subscribe operations for the PublicGroup. You can view and change this ACL using the workbench, but you cannot remove it. It determines the default permissions for the entire topic tree. You can specify ACLs for the PublicGroup elsewhere in the topic tree, wherever you want to define permissions for all users.

If you have a principal named *Public* defined in your existing security environment, you cannot use this for topic-based security. If you specify this principal within an ACL, it is equated to PublicGroup and therefore always allows global access.

mqbrkrs authorizations

WebSphere Message Broker grants special publish/subscribe access control privileges to members of the mqbrkrs group, and to the corresponding Domain mqbrkrs global group if appropriate.

Brokers need special privileges to perform internal publish and subscribe operations in networks where there is access control. When you create a broker in such a network, you must specify a user ID that belongs to the group mqbrkrs as the service user ID for the broker. The mqbrkrs group is given implicit privileges so that its members can publish, subscribe and request the persistent delivery of messages on the topic root (″″). All other topics inherit these permissions. If you attempt to configure an ACL for the mqbrkrs group using the workbench, this ACL is ignored by WebSphere Message Broker.

ACLs and system topics

Messages that are used for internal publish and subscribe operations are published throughout the broker domain using system topics, which begin with the strings ″$SYS″ and ″$ISYS″.

These topics can only published from, and subscribed to, members of the mqbrkrs group, except for the following two scenarios:

1. If you are migrating topics from WebSphere MQ Publish/Subscribe, you can configure ACLs on topics that begin with the string ″$SYS/STREAM″.
2. Clients can subscribe to topics that begin with the string ″$SYS″; this means that applications that provide a management function can subscribe to the broker for administrative events.

Do not configure ACLs on topics that begin with the string ″$ISYS″. You are not prevented from doing so, but the ACLs are ignored.

Setting access control on topics

Any user that has an object-level security ACL that gives full control permission to the root topic object, can define and manipulate the ACLs that define which principals can publish on, and subscribe to, which topics. ACLs can also limit delivery of persistent messages, and define the level of message protection.

All defined principals can be associated with any topic; the permissions that can be set are shown in the following table:

Option	Description
Publish	Permits or denies the principal to publish messages on this topic.
Subscribe	Permits or denies the principal to subscribe to messages on this topic.
Persistent	Specifies whether the principal can receive messages persistently. If the principal is not permitted, all messages are sent non-persistently. Each individual subscription indicates whether the subscriber requires persistent messages.
QoP Level	Specifies the level of message protection that is enforced. One of the following four values can be chosen: • None • Channel Integrity • Message Integrity • Encrypted The default value is 'None'.

Persistent access control behavior is not identical to the publish and subscribe control:

- Clients that are denied Publish access have their publication messages refused.
- Clients that are denied Subscribe access do not receive the publication.
- The persistent access control does not deny the message to subscribers, but denies them persistence, so denied subscribers always receive messages, subject to their subscribe access control, but always have the message sent to them non-persistently, regardless of the persistence of the original message.

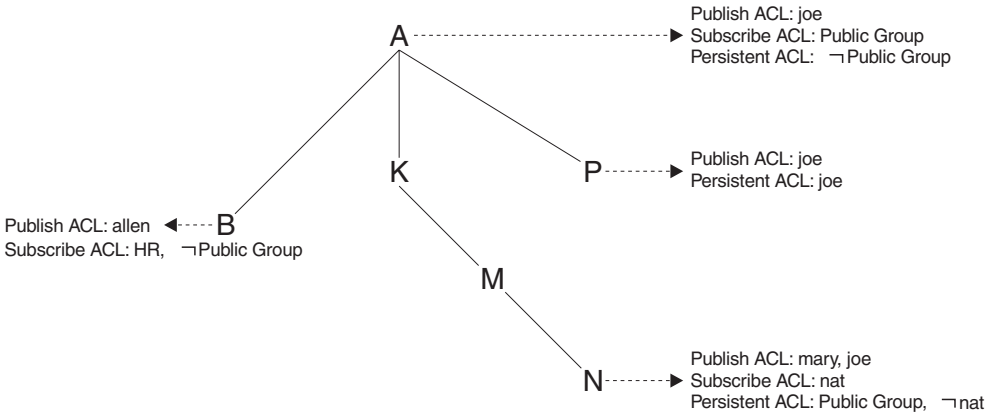
Inheritance of security policies

Typically, topics are arranged in a hierarchical tree. The ACL of a parent topic can be inherited by some or all of its descendent topics that do not have an explicit ACL. Therefore, it is not necessary to have an explicit ACL associated with each

and every topic. Every topic has an ACL policy which is that of its parent. If all parent topics up to the root topic do not have explicit ACLs, that topic inherits the ACL of the root topic.

For example, in the topic tree shown below, the topic root is not shown but is assumed to have an ACL for PublicGroup whose members can publish, subscribe, and receive persistent publications. (The symbol ″¬″ means ″not″.)

Inheriting ACLs in a topic tree



The following table shows the ACLs, inherited in some cases, that result from the topic tree shown in the figure:

Topic	Publishers	Subscribers	Persistent
A	only joe	everyone	no-one
A/P	only joe	everyone	only joe
A/K	only joe	everyone	no-one
A/K/M	only joe	everyone	no-one
A/K/M/N	only mary, joe	everyone	everyone except nat
A/B	allen, joe	HR	no-one

Dynamically created topics

Topics that are not explicitly created by the system administrator, but are created dynamically when a client publishes or subscribes to messages, are treated in the same way as those that are created by the system administrator, but they do not have explicitly defined ACLs. That is, the ACLs for dynamically created topics are inherited from the closest ancestor in the topic tree that has an explicit policy. It is therefore not necessary to define leaf topics in the tree if they do not have explicit ACLs.

ACLs and wildcard topics

With WebSphere Message Broker you cannot associate an explicit security policy with a wildcard topic. For example, you cannot associate an ACL with topic ″A/+″, which represents a two level hierarchy and includes ″A/B″, ″A/K″, and ″A/P″.

However, WebSphere Message Broker does guarantee correct access mediation when a client application subscribes to a wildcard topic.

For example, the topic ″A/+″ does not, and cannot, have a security policy explicitly associated with it. Therefore, ″A/+″ inherits its policy from ″A″. Any user can subscribe to ″A/+″ because the subscribe ACL includes everyone.

When a message is published on ″A/P″ or ″A/K″, the broker delivers it to the user who subscribed to ″A/+″. However, when a message is published to ″A/B″, that message is only delivered to subscribers who are in the HR group.

If the system administrator changes the subscribe ACL of any topic that matches ″A/+″, the broker correctly enforces the ACL when the message is delivered. Subscribing to a wildcard topic has the semantics to deliver messages on all topics that match the wild card, and for which the subscriber has authorization to receive that message.

ACLs and subscription resolution

The broker enforces access control through the topic of the message to be delivered. Messages are delivered only to those clients that have not had subscribe access to that topic denied, either explicitly or through inheritance. Because a subscription can contain a wildcard character, the actual match against the topic namespace, and hence the topic ACLs, cannot be made when the subscription is received. The decision to deliver a message to a subscriber is made only when a specific message with a topic is being processed by the message broker.

Activating topic ACL updates

Updates to a topic ACL do not become active until deployed and activated across the broker domain from the WebSphere Message Broker workbench.

You must have an object-level security ACL that gives full control permission to the root topic object.

Authentication services

Authentication services are supported only between client applications that use the WebSphere MQ Real-time Transport and WebSphere Message Broker Real-timeInput and Real-timeOptimizedFlow nodes.

The WebSphere Message Broker authentication services verify that a broker and a client application are who they claim they are, and can therefore participate in a publish/subscribe session.

Each participant in the session uses an authentication protocol to prove to the other that they are who they say they are, and are not an intruder impersonating a valid participant.

The WebSphere Message Broker product supports the following four protocols:

- P - simple telnet-like password authentication
- M - mutual challenge-response password authentication
- S - asymmetric SSL
- R - symmetric SSL

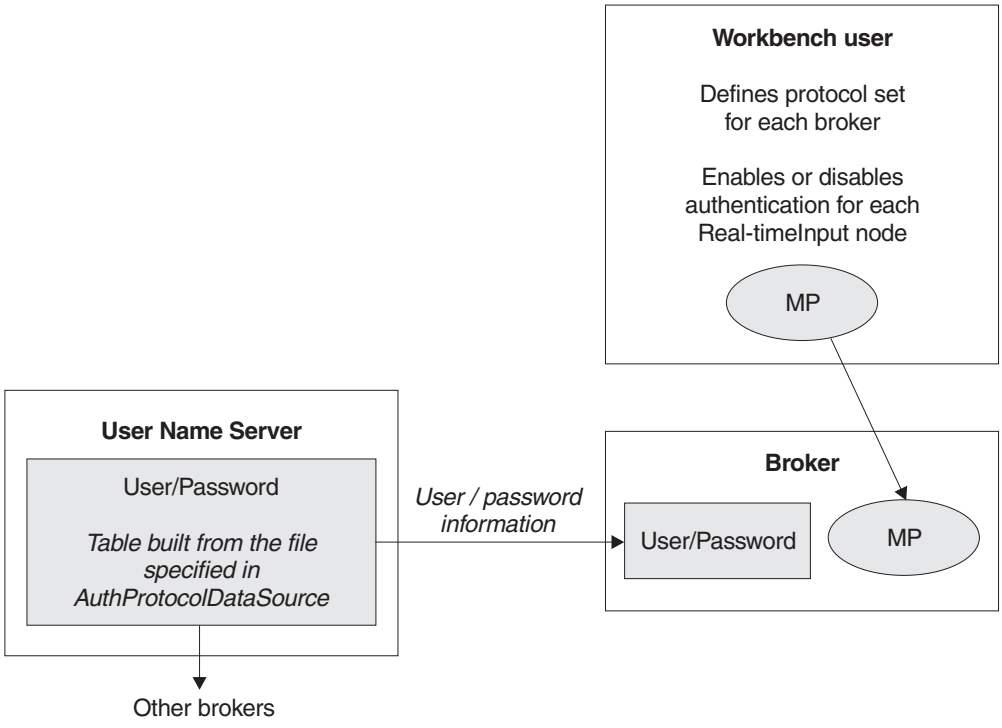
The first two of these protocols and their infrastructure requirements are described in “Simple telnet-like password authentication” on page 48 and “Mutual challenge-response password authentication” on page 49 respectively. Asymmetric and symmetric SSL protocols are described in “SSL authentication” on page 13.

The protocols vary in strength, in terms of providing protection against participants that are not valid participants in the session; P is the weakest and R is the strongest.

Configuring authentication protocols

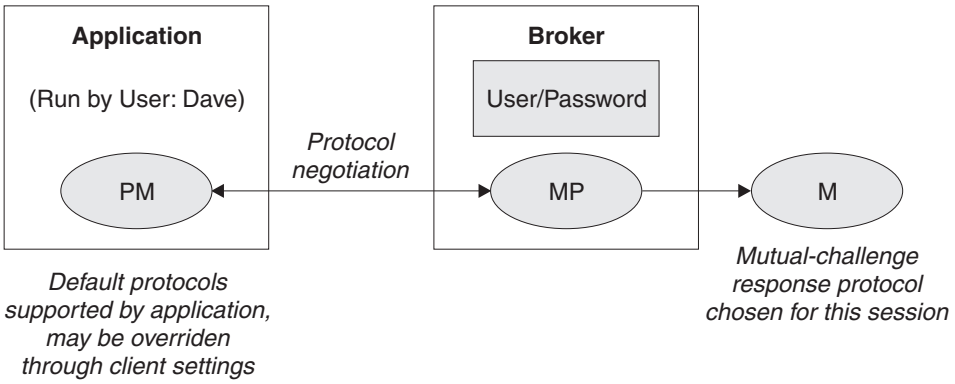
The set of protocols that can be supported by a specific broker in the broker domain can be configured using the workbench. One or more protocols can be specified for each broker. Use the workbench to enable or disable authentication on each Real-timeInput node that is defined for a particular broker. When authentication is enabled at a Real-timeInput node, that node supports the full set of protocols specified for its corresponding broker. The configuration options are illustrated in the following diagrams:

Overview of authentication configuration

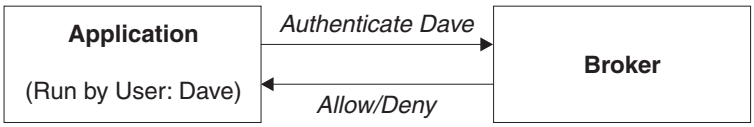


Two-stage runtime authentication process

Stage 1 - Determine protocol for session



Stage 2 - Drive chosen protocol



Simple telnet-like password authentication

This protocol can also be described as *password in the clear* because the password passes un-encrypted over the network. The client application connects to the Real-timeInput node using TCP/IP. The input node requests that the client identify itself. The client sends its ″userid″ and its password.

This simple protocol relies on both the client and the broker knowing the password associated with a user ID. In particular, the broker needs access to a repository of user and password information. The user ID and password information is distributed by theUser Name Server to all the brokers in a WebSphere Message Broker product's domain. The User Name Server extracts user and password information from an operating system file.

The User Name Server approach allows for the centralized maintenance of the source of users and passwords, with automatic distribution of the information to brokers, and automatic refreshes of the information if required. It also provides availability benefits, because user and password information is maintained persistently at each broker.

Each client application must know its own user ID and keep its password secret. When creating a connection, a client specifies its credentials as a name/password combination.

This protocol provides relatively weak security. It does not compute a session key, and should only be used in environments where there are no ″eavesdroppers″ and no untrusted ″middle-men″.

In the case where user and password information is stored in a flat file on the User Name Server system, the passwords are stored and distributed ″in-the-clear″.

The computational load on the client and server is very light.

Mutual challenge-response password authentication

This is a more sophisticated and secure protocol that involves the generation of a secret session key. Both the client and the server compute this key using the client's password. They prove to each other that they know this secret through a challenge and response protocol.

The client must satisfy the server's challenge before the server satisfies the client's challenge. This means that an attacker impersonating a client can gather no information to mount an ″offline″ password guessing attack. Both the client and the server prove to each other that they know the password, so this protocol is not vulnerable to ″impersonation″ attacks.

As in the case of the simple telnet-like password protocol, the broker must have access to user and password information. Information about the user ID and password is distributed by the User Name Server to all the brokers in the domain. The User Name Server extracts user and password information from an operating system file.

Each client application must know its own user ID and keep its password secret. When creating a connection, a client specifies its credentials as a name/password combination.

Computational demands on both client and server are fairly modest.

Message protection

The authentication services provided by WebSphere Message Broker ensure that only legitimate message brokers and client applications can connect to each other. However, a hacker might still be able to observe messages in transit or interfere with messages on established connections. Message protection provides security options to protect your messages against such activities.

You cannot use message protection if you are using 'simple telnet-like password authentication'.

Because the use of message protection can have an adverse affect on the performance of your publish/subscribe system, and because security is not equally important for all messages, you might want to define different levels of message protection for different messages. You do this by assigning a Quality of Protection (QoP) value to each topic in your publish/subscribe system.

There a four QoP values. They give the following levels of protection:

n This is the default value. It gives no message protection.

c This provides channel integrity. With this level of protection, hackers are unable to insert or delete messages without being detected.

m This provides message integrity. With this level of protection, hackers are unable to change the content of a message without being detected.

e This provides message encryption. With this level of protection, hackers are unable to look at the content of a message.

The protection levels are cumulative. For example, if you specify message encryption, you also get message integrity and channel integrity; if you request message integrity, you also get channel integrity.

If any QoP settings are made, all clients that connect to the broker must use a security level that supports message integrity or message encryption.

Securing the publish/subscribe domain

Use appropriate options to secure your publish/subscribe domain.

The following topics describe that actions that you can take to secure your publish/subscribe domain:

- "Enabling topic-based security" on page 32
- "Creating ACL entries" on page 52
- "Enabling SSL for the Real-time nodes" on page 25
- "Using message protection" on page 56
- "Securing WebSphere MQ resources" on page 56

For more information, see "Publish/subscribe security" on page 41 and "Security overview" on page 3.

Enabling topic-based security

If your applications use the publish/subscribe services of a broker, you can apply an additional level of security to the topics on which messages are published and subscribed. This topic-based security is managed by the User Name Server.

Complete the following steps:

1. Before you create a User Name Server, refer to "Considering security for a User Name Server" on page 33.
2. Create a User Name Server. Refer to "Creating a User Name Server" on page 151.
3. Select the -j flag and set the -s parameter to the name of the queue manager for the User Name Server on the mqsicreatebroker or mqsichangebroker command.
4. Set the -s parameter on the mqsicreateconfigmgr or mqsichangeconfigmgr command to the name of the queue manager for the User Name Server.
5. Create ACLs for the topics that require additional security. For more information, see "Creating ACL entries" on page 52.
6. Ensure that the broker's service user ID has authority to:
   a. Get messages from each input queue included in a message flow
   b. Put messages to any output, reply, and failure queues included in a message flow.
7. Ensure that the user IDs under which publish and subscribe applications run have sufficient authority to put to and get from message flow queues:
   a. Authorize publish applications to put messages to the input queue of the message flow.
   b. Authorize applications that register subscriptions to put to the SYSTEM.BROKER.CONTROL.QUEUE queue.
   c. Authorize subscribe applications to get from the queue to which messages are published.
   d. Authorize publish and subscribe applications to get from the reply queue.

If you are issuing publish/subscribe requests from a JMS client, additional security options are available. Refer to “SSL authentication” on page 13, “Quality of protection” on page 14, and “Authentication services” on page 46.

Go to “Considering security for a Configuration Manager” on page 21.

Considering security for a User Name Server

Complete this task by answering the following question:

Have you enabled topic-based security in your broker?

1. No: Go to “Considering security for a Configuration Manager” on page 21.
2. Yes: You need a User Name Server. Go to “Deciding which user accounts can execute User Name Server commands” on page 33.

Deciding which user accounts can execute User Name Server commands

During this task you decide what permissions are required for the user IDs that:

- Create, change, list, delete, start, and stop a User Name Server
- Display, retrieve, and change trace information.

Answer the following questions:

1. Is your User Name Server installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: The information about executing User Name Server commands on Linux and UNIX is not yet available.

      Go to “Deciding which user account to use for the User Name Server service ID” on page 34.
2. Are you executing User Name Server commands under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Assume that your local account is on a computer named, for example, WKSTN1. When you create a User Name Server, ensure that your user ID is defined in your local domain. When you create or start a User Name Server, ensure that your user ID is a member of WKSTN1**Administrators**.

      Go to “Deciding which user account to use for the User Name Server service ID” on page 34.
3. Are you executing User Name Server commands under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you create a User Name Server using, for example, DOMAIN1\user1, ensure that DOMAIN1\user1 is a member of WKSTN1**Administrators**.

      Go to “Deciding which user account to use for the User Name Server service ID” on page 34.

Deciding which user account to use for the User Name Server service ID

When you set the service ID with the -i option on the mqsicreateusernameserver or mqsichangeusernameserver command, you determine the user ID under which the User Name Server component process runs.

Answer the following questions:

1. Is your User Name Server installed on a Linux or UNIX operating system?
   a. No: Go to the next question.
   b. Yes: The information about running your User Name Server on Linux and UNIX is not yet available.

      Go to "Setting security on the User Name Server's queues" on page 34
2. Do you want your User Name Server to run under a Windows local account?
   a. No: Go to the next question.
   b. Yes: Ensure that your user ID is defined in your local domain and is a member of **mqbrkrs**.

      Go to "Setting security on the User Name Server's queues" on page 34
3. Do you want your User Name Server to run under a Windows domain account?
   a. Yes: Assume that your computer named, for example, WKSTN1, is a member of a domain named DOMAIN1. When you run a User Name Server using, for example, DOMAIN1\user1, ensure that:DOMAIN1\user1 is a member of DOMAIN1**Domain mqbrkrs** and DOMAIN1**Domain mqbrkrs** is a member of WKSTN1**mqbrkrs**.

      Go to "Setting security on the User Name Server's queues" on page 34.

Setting security on the User Name Server's queues

When you run the **mqsicreateusernameserver** command, the **mqbrkrs** group gets access authority to the following queues:

SYSTEM.BROKER.SECURITY.QUEUE

SYSTEM.BROKER.MODEL.QUEUE

Only the broker and the Configuration Manager require access to the User Name Server's queues.

Go to "Running the User Name Server in a domain environment" on page 35.

Running the User Name Server in a domain environment

When the users that issue publish and subscribe commands are domain users, set the -d option on the mqsicreateusernameserver command to the domain those users come from. All users that issue publish and subscribe commands must come from the same domain.

Creating ACL entries

You must create an access control list (ACL) for each new topic. See "Adding a new topic" on page 217 for more information about doing this.

Enabling SSL for the Real-time nodes

Use optional authentication services between JMS clients and Real-timeInput and Real-timeOptimizedFlow nodes.

In a default configuration, SSL authentication services are disabled.

To configure the product to use the SSL authentication services, complete the following steps:

- Configure and start a User Name Server in a broker domain.

- Configure each Real-timeInput node to use authentication, and set your chosen authentication protocol in each of the brokers that is to use the authentication services.
- Edit a file that specifies client user IDs and passwords.
- Specify the names of the files that are required to implement the SSL protocol.

Configuring the User Name Server

The User Name Server distributes to the brokers passwords that are required to support these authentication protocols.

To configure the User Name Server to support authentication, specify the following two parameters on either the mqsicreateusernameserver or the mqsichangeusernameserver command:

- *AuthProtocolDataSource* describes the location of an local file that contains the information that is required to support the authentication protocols.
- The -j flag indicates whether the file that is pointed to by the*AuthProtocolDataSource* parameter contains group and group membership information in addition to password information.
- Set the -j flag if you want to support both authentication and publish/subscribe access control in your broker domain, and you want to draw user and group information from a file rather than from the operating system.
- Use the *AuthProtocolDataSource* parameter to specify the source of any protocol-related information. For example, you can specify the name of a file that contains user ID and password information. The user ID and password information in this file must exactly mirror the operating system user ID and password definitions. Make sure that you set the appropriate file system security for this password file.
- The default location of this file is the WebSphere Message Broker home directory. If you store the file in another location, specify the full path definition of the location of the file.
- Stop and restart the User Name Server to implement the changes.

Use the -d flag on the mqsichangeusernameserver command to disable this option.

Configuring a broker

Configure a broker to support WebSphere Message Broker authentication services. Specify two authentication and access control parameters and use the workbench to configure the appropriate Real-timeInput nodes and the sets of protocols that are to be supported on the broker.

The following steps show you how to do this.

1. Switch to the Broker Application Development perspective.
2. For each message flow in the Message Flow Topology:
   a. Select the Real-timeInput or Real-timeOptimizedFlow node to open the Properties view, or right-click the node and click **Properties** to open the Properties dialog. The node properties are displayed.
   b. Select **Authentication**.
3. For each broker in the Broker Topology:
   a. Select the broker to open the Properties view, or right-click the broker and click **Properties** to open the Properties dialog. The broker properties are displayed.

b. Enter the required value in **Authentication Protocol Type**.

   Choose any combination of the options P, M, S, and R; for example, S, SR, RS, R, PS, SP, PSR, SRM, MRS, and RSMP are all valid combinations of options.

   The order in which you specify the options is significant; the broker chooses the first option that the client supports. If you want the broker always to support the strongest protocol that the client supports, choose RSMP.

c. If you have chosen S or R as one of the options in **Authentication Protocol Type**, specify the **SSL Key Ring File Name** and the **SSL Password File Name**.

d. Click **OK**.

e. Use the mqsicreatebroker or mqsichangebroker command, with the following two parameters, to configure the broker:

   UserNameServerQueueManagerName (-s)
   This parameter defines the name of the queue manager that it associated with the User Name Server. Specify this parameter if you require authentication services, publish/subscribe access control services, or both.

   Publish/Subscribe Access Control Flag (-j)
   Set this flag in addition to specifying the **UserNameServerQueueManagerName** parameter if you want to use publish/subscribe access control services.

   Use of the authentication services in the broker is enabled at the IP input node level, not by a parameter on these commands.

Sample password files

Two sample files, password.dat and pwgroup.dat, are supplied with WebSphere Message Broker.

- pwgroup.dat is a sample file that can be used when you set the -j flag.
- password.dat is a sample file that can be used in the default case.

The file password.dat has the following layout:

```
# This is a password file.

# Each line contains two required tokens delimited by
# commas. The first is a user ID, the second is that user's
# password.

#USERNAME PASSWORD
========================
subscriber,subpw
admin,adminpw
publisher,pubpw
```

This file complements the user and group information that is retrieved by the User Name Server from the operating system. User names that are defined in the file, but are not defined in the operating system, are treated as unknown by the broker domain. User names that are defined in the operating system, but are not defined in the password file, are denied access to the system.

The file pwgroup.dat contains group information in addition to user and password information. Each user entry includes a list of group names that specify the groups that contain the user.

The file pwgroup.dat has the following layout:

```
#This is a password file.
#Each line contains two or more required tokens delimited by
#commas.The first is a user ID and the second is that user's
#password. All subsequent tokens
#specify the set of groups that the user belongs to.

#USERNAME PASSWORD  GROUPS
subscriber,subpw,group1,group2,group3
admin,adminpw,group2
publisher,pubpw,group2,group4
```

As mentioned above, this file can be used to provide the only source of user, group, and password information for the broker domain.

To deploy updated user and password information to the broker network if this information is drawn from an operating system file, stop the User Name Server and the brokers, update the file, and then restart the User Name Server and the brokers.

If passwords are drawn from the operating system, updates are automatically distributed to the brokers. Use normal operating system management tools to change users or passwords.

Authentication in the JMS client

For client applications that use WebSphere MQ classes for Java Message Service Version 5.3 before CSD4, the client application always has an authentication protocol level of PM. The client application and broker negotiate on the choice of protocol for a session. Where the broker supports both protocols (that is, you have set PM or MP in the workbench definition of a broker), the first protocol specified in the workbench is chosen.

For client applications that use WebSphere MQ classes for Java Message Service Version 5.3, CSD10 (plus APAR IC47044) or CSD11 or later, or WebSphere MQ classes for Java Message Service Version 6.0 or later, the client application supports two levels of authentication.

You can configure a *TopicConnectionFactory* to support either a MQJMS_DIRECTAUTH_BASIC authentication mode or a MQJMS_DIRECTAUTH_CERTIFICATE authentication mode. The MQJMS_DIRECTAUTH_BASIC authentication mode is equivalent to a level of PM, and the MQJMS_DIRECTAUTH_CERTIFICATE authentication mode is equivalent to a level of SR.

If you have successfully configured authentication services for a Real-timeInput node, a JMS client application must specify its credentials when creating a connection. To make a connection for this configuration, the JMS client application supplies a user ID and password combination to the *TopicConnectionFactory.createTopicConnection* method; for example:

```
factory.createTopicConnection("user1", "user1pw");
```

If the application does not specify these credentials, or specifies them incorrectly, it receives a JMS wrapped exception containing the MQJMS error text.

Using message protection

To use message protection (sometimes known as Quality of Protection (QoP)), set the enableQopSecurity parameter of the **mqsichangeproperties** command to true. The default value of this parameter is false.

To define a level of message protection for $SYS topics, use the sysQopLevel parameter of the **mqsichangeproperties** command.

To define a level of message protection for $ISYS topics, use the isysQopLevel parameter of the **mqsichangeproperties** command.

Choose one of the following values for these parameters:

n This is the default value. It gives no message protection.

c This provides channel integrity. With this level of protection, hackers cannot insert or delete messages without being detected.

m This provides message integrity. With this level of protection, hackers cannot change the content of a message without being detected.

e This provides message encryption. With this level of protection, hackers cannot look at the content of a message.

Securing WebSphere MQ resources

Secure the WebSphere MQ resources that your configuration requires.

This section does not apply to z/OS.

WebSphere Message Broker depends on a number of WebSphere MQ resources to operate successfully. You must control access to these resources to ensure that the product components can access the resources on which they depend, and that these same resources are protected from other users.

Some authorizations are granted on your behalf when commands are issued. Others depend on the configuration of your broker domain.

- When you issue the command **mqsicreatebroker**, it grants put and get authority on your behalf to the group **mqbrkrs** for the following queues:
  - SYSTEM.BROKER.ADMIN.QUEUE
  - SYSTEM.BROKER.CONTROL.QUEUE
  - SYSTEM.BROKER.EXECUTIONGROUP.QUEUE
  - SYSTEM.BROKER.EXECUTIONGROUP.REPLY
  - SYSTEM.BROKER.INTERBROKER.QUEUE
  - SYSTEM.BROKER.MODEL.QUEUE
- When you issue the command **mqsicreateconfigmgr** it grants put and get authority on your behalf to the group **mqbrkrs** for the following queues:
  - SYSTEM.BROKER.CONFIG.QUEUE
  - SYSTEM.BROKER.CONFIG.REPLY
  - SYSTEM.BROKER.ADMIN.REPLY
  - SYSTEM.BROKER.SECURITY.REPLY
  - SYSTEM.BROKER.MODEL.QUEUE
- When you issue the command **mqsicreateusernameserver**, it grants put and get authority on your behalf to the group **mqbrkrs** for the following queues:
  - SYSTEM.BROKER.SECURITY.QUEUE
  - SYSTEM.BROKER.MODEL.QUEUE

- When you issue the command mqsicreateaclentry, it grants put and get authority on your behalf to the resource or user that you have specified for the command parameters -p or -u for the following queues:
  - SYSTEM.BROKER.CONFIG.QUEUE
  - SYSTEM.BROKER.CONFIG.REPLY
- If you have created WebSphere Message Broker components to run on different queue managers, the transmission queues that you define to handle the message traffic between the queue managers must have put and setall authority granted to the local **mqbrkrs** group, or to the service user ID of the component supported by the queue manager on which the transmission queue is defined.
- When you start the workbench, it connects to the Configuration Manager using a WebSphere MQ client/server connection. For details of WebSphere MQ channel security refer to "Setting up WebSphere MQ client security" in the *WebSphere MQ Clients* book.
- When you create and deploy a message flow, grant:
  1. get and inq authority to each input queue identified in an MQInput node, for the broker's ServiceUserID.
  2. put and inq authority to each output queue identified in an MQOutput node, or by an MQReply node, for the broker's ServiceUserID.
  3. get authority to each output queue identified in an MQOutput node or an MQReply node to the user ID under which a receiving or subscribing client application runs.
  4. put authority to each input queue identified in an MQInput node to the user ID under which a sending or publishing client application runs.

Part 2. Configuring the broker domain

Configuring WebSphere Message Broker

Configuring WebSphere Message Broker involves creating and setting up all the databases, components, and connections that are required for a broker domain to which message flow applications can be deployed.

If you want to create a simple configuration on Windows or Linux (x86 platform) to learn about WebSphere Message Broker and to run the samples in the Message Brokers Toolkit Samples Gallery, run the Default Configuration wizard. The Default Configuration wizard creates the Default Configuration, which is a basic broker domain, including a broker database, a broker, a Configuration Manager, and a queue manager. See "Using the Default Configuration wizard" on page 165.

To configure WebSphere Message Broker:

1. Plan the system.
2. Create and configure the databases.
3. If you are configuring a broker domain on z/OS: Customize the z/OS environment.
4. Ensure that you have the correct authorization and permissions to create and access components. For more information, see "Authorization for configuration tasks" on page 3 and "Setting up broker domain security" on page 16
5. Create the components.
6. If you are using the Message Brokers Toolkit, Configure the broker domain in the workbench.
7. If the broker domain will be used for publish/subscribe messaging: Configure the domain for publish/subscribe messaging.

Planning a broker domain

When you plan a new WebSphere Message Broker domain, you must first have considered your resource naming conventions, the design of the WebSphere MQ infrastructure, and any performance issues.

The following topics describe these considerations:

- "Considering resource naming conventions" on page 62
- "Designing the WebSphere MQ infrastructure" on page 64
- "Considering performance in the domain" on page 67

When you are designing a broker domain consider the following elements.

1. **Brokers:** The number of brokers that you need in your domain depends on the following factors:
   a. Performance: What is the required message throughput? See "Optimizing message flow throughput" on page 68. What is the size of the messages that are being processed? Larger messages take longer to process. A small number of brokers handling many messages might impact the broker domain's performance. See "Considering performance in the domain" on page 67.
   b. Do you need to isolate applications from each other? You might want to separate applications that serve different functions, for example personnel and finance.

c. Do the brokers need to handle publish/subscribe? See Developing publish/subscribe applications.

2. **User Name Server:** Consider the following if you have a User Name Server in your broker domain:
   a. Performance: If you have a large number of brokers in your broker domain, the requests that they send to the User Name Server can be handled more quickly if there is more than one User Name Server. More than one User Name Server might also be beneficial, in terms of network traffic, if your broker domain is complex.
   b. Resilience: Although no standby mechanism is provided by WebSphere Message Broker, you might want to be able to redirect requests to a second User Name Server if a system error occurs on the system of your first User Name Server.
3. **Configuration Manager:** Acts as an interface between the configuration repository, the set of brokers in the domain, and the workbench. It uses WebSphere MQ messages to communicate with the brokers, and thus a large number of brokers in a broker domain (if poorly designed) can cause congestion at the Configuration Manager. To solve this problem, consider dividing the brokers into more than one domain where related brokers are kept together. You can then establish connections with each domain; see "Creating a domain connection" on page 189.

Considering resource naming conventions

When you plan a new WebSphere Message Broker network, one of your first tasks must be to establish a convention for naming the resources that you create within this network. There are three aspects to this:

- Product component naming conventions
- WebSphere MQ naming conventions
- Database naming conventions

Product component naming conventions

A naming convention for WebSphere Message Broker resources throughout your network ensures that names are unique, and that users creating new resources can be confident of not introducing duplication or confusion.

The resources you must create and name within an WebSphere Message Broker network are:

Configuration Managers
When you create a Configuration Manager, give it a name that is unique on your system. Names must be unique between Configuration Managers and between Configuration Managers and brokers. Configuration Manager names are case sensitive on UNIX systems.

Brokers
When you create a broker, give it a name that is unique within your broker domain. You must use the same name for that broker when you create it on the system in which it is installed (using the command **mqsicreatebroker**) and when you create a reference to that broker in the broker domain topology in the workbench. The latter is a representation of the physical broker (created by **mqsicreatebroker**) in the configuration repository, and this single name links the two. Broker names are case-sensitive except on Windows platforms.

Execution groups
Each execution group name must be unique within a broker.

Message flows and message processing nodes
Each message processing node must be unique within the message flow it is assigned to. For example, if you include two MQOutput nodes in a single message flow, provide a unique name for each.

Message flow names must be unique within the broker domain. Any reference to that name within the broker domain is always to the same message flow. You can assign the same message flow to many brokers.

Message sets and messages
Each message name must be unique within the message set to which it belongs.

Message set names must be unique within the broker domain. Any reference to that name within the broker domain is always to the same message set. You can therefore assign the same message set to many brokers.

The User Name Server is not allocated a name when you create it. It is identified only by the name of the WebSphere MQ queue manager that hosts the services it provides.

WebSphere MQ naming conventions

All WebSphere Message Broker resources have dependencies on WebSphere MQ services and objects. You must therefore also consider what conventions to adopt for WebSphere MQ object names. If you already have a WebSphere MQ naming convention, use a compatible extension of this convention for WebSphere Message Broker resources.

When you create a broker or a Configuration Manager, you must specify a queue manager name. This queue manager is created for you if it does not already exist. Because the broker and Configuration Manager each use a unique set of WebSphere MQ queues, they can share one queue manager, if appropriate. However, every broker must have a dedicated queue manager.

If you set up a User Name Server in your broker domain, this also uses a unique set of WebSphere MQ queues. The User Name Server can therefore also share a queue manager with a broker, or the Configuration Manager, or both.

Ensure that every queue manager name is unique within your network of interconnected queue managers, whether or not every queue manager is in your WebSphere Message Broker network. This ensures that each queue manager can unambiguously identify the target queue manager to which any given message must be sent, and that WebSphere Message Broker applications can also interact with basic WebSphere MQ applications.

WebSphere MQ supports a number of objects defined to queue managers. These objects (queues, channels, and processes) also have naming conventions and restrictions.

In summary, the restrictions are:

- All names must be a maximum of 48 characters in length (channels have a maximum of 20 characters).

- The name of each object must be unique within its type (for example, queue or channel).
- Names for all objects starting with the characters SYSTEM. are reserved for use by IBM.

There are a few restrictions for naming resources: see "Naming conventions for WebSphere Message Broker for z/OS" on page 483.

Database naming conventions

Consider the naming conventions you use for databases, both for databases that you create for WebSphere Message Broker product and for databases that you create for application use.

Database tables used for brokers can be unique and local to the broker, or can be *shared*, because the rows of the tables specific to each individual broker incorporate the name of the broker. You might need to align the naming of all these databases with other databases that are in use in your broker domain.

Also ensure that the databases used for application data (accessed through message flows) are uniquely named throughout your network, so that there is no opportunity for confusion or error.

Designing the WebSphere MQ infrastructure

WebSphere Message Broker depends on the WebSphere MQ transport services to support internally-generated communications between components. Some of these resources are created for you, when you create WebSphere Message Broker components that depend on them. Others depend on the exact setup of your broker domain; you must create these resources yourself.

Communications between WebSphere Message Broker components are protocol-independent, with the exception of the connection between every instance of the workbench and the Configuration Manager. This must be a TCP/IP connection, as must connections to the WebSphere MQ Everyplace® and SCADA nodes. Other connections can use any of the protocols supported by the WebSphere MQ messaging product for the operating system for your WebSphere Message Broker product.

Except for WebSphere MQ Everyplace and SCADA applications, applications that use broker services must also use WebSphere MQ to send and receive all messages. The resources required by your applications (queues and client connection and server connection channels) are application specific; you must create these resources yourself.

The information here concentrates on the specific requirements that WebSphere Message Broker imposes on a WebSphere MQ network. For a full description of designing and connecting a WebSphere MQ network, see *WebSphere MQ Intercommunication*, which covers the basics, such as setting up transmission queues and channels, in detail.

For further information see:

- "WebSphere MQ resources for the broker" on page 65
- "WebSphere MQ resources for the Configuration Manager" on page 65
- "WebSphere MQ resources for the User Name Server" on page 66

WebSphere MQ resources for the broker

Each broker depends on a number of WebSphere MQ resources: some must be available, others depend on the broker domain setup. Some of these resources are created for you: you must define others yourself.

WebSphere MQ resources created for you

When you create a broker, the following WebSphere MQ resources are created for you:

- The broker's queue manager. Each broker must be associated with a queue manager. Specify a queue manager name when you create the broker. If this queue manager does not exist, it is created for you. (For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your broker. See "Creating a broker on z/OS" on page 133 for more details.) This can be shared with the Configuration Manager and User Name Server
- Fixed-name queues on the broker's queue manager. These allow information to be exchanged with other components in the broker domain.

WebSphere MQ resources that you must create yourself

Depending on the setup of your broker, you might need to create some WebSphere MQ resources yourself. You can create WebSphere MQ resources using commands and utilities such as runmqsc and the PCF interface, or you can use WebSphere MQ Services (with WebSphere MQ Version 5) or WebSphere MQ Explorer (with WebSphere MQ Version 6).

- For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your broker. See "Creating a broker on z/OS" on page 133 for more details.
- If the broker and Configuration Manager do not share a queue manager, you must define the channels and transmission queues to support communication between the broker's queue manager and the Configuration Manager's queue manager.
- If the broker and User Name Server do not share a queue manager, you must define the channels and transmission queues to support communication between the broker's queue manager and the Configuration Manager's queue manager.
- You must define listener connections on the broker's queue manager. You must define one listener connection for every protocol used.
- For connection between brokers, you must define the channels and transmission queues to permit two-way communication between them.

For more information about creating WebSphere MQ resources, see *WebSphere MQ Intercommunication*, available on the WebSphere MQ library Web page.

WebSphere MQ resources for the Configuration Manager

Each Configuration Manager depends on a number of WebSphere MQ resources: some must be available, others depend on the broker domain setup. Some of these resources are created for you: you must define others yourself.

WebSphere MQ resources created for you

When you create a Configuration Manager, the following WebSphere MQ resources are created for you:

- The Configuration Manager's queue manager. Each Configuration Manager must be associated with a queue manager. Specify a queue manager name when you create the Configuration Manager. If this queue manager does not exist, it is created for you. (For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your Configuration Manager. See "Creating a Configuration Manager on z/OS" on page 146 for more details.)
- Fixed-name queues on the Configuration Manager's queue manager. These allow information to be exchanged with other components in the broker domain.
- A server connection for use by the Workbench.

WebSphere MQ resources that you must create yourself

Depending on the setup of your Configuration Manager, you might need to create some WebSphere MQ resources yourself. You can create WebSphere MQ resources using commands and utilities such as runmqsc and the PCF interface, or you can use WebSphere MQ Services (with WebSphere MQ Version 5) or WebSphere MQ Explorer (with WebSphere MQ Version 6).

- For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your Configuration Manager. See "Creating a Configuration Manager on z/OS" on page 146 for more details.
- You must define the transmission queues and channels between the Configuration Manager and every broker in the domain (apart from the broker that shares a queue manager with the Configuration Manager).
- If the Configuration Manager and User Name Server do not share a queue manager, you must define the channels and transmission queues to support communication between the broker's queue manager and the Configuration Manager's queue manager.
- You must define listener connections on the Configuration Manager's queue manager for the Workbench and other components and clients that do not share the Configuration Manager's queue manager. You must define one listener connection for every protocol used.

For more information about creating WebSphere MQ resources, see *WebSphere MQ Intercommunication*, available on the WebSphere MQ library Web page.

WebSphere MQ resources for the User Name Server

Each User Name Server depends on a number of WebSphere MQ resources: some must be available, others depend on the broker domain setup. Some of these resources are created for you: you must define others yourself.

WebSphere MQ resources created for you

When you create a User Name Server, the following WebSphere MQ resources are created for you:

- The User Name Server's queue manager. Each User Name Server must be associated with a queue manager. Specify a queue manager name when you create the User Name Server. If this queue manager does not exist, it is created for you. (For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your User Name Server. See "Creating a User Name Server on z/OS" on page 155 for more details.)
- Fixed-name queues on the User Name Server's queue manager. These allow information to be exchanged with other components in the broker domain.

WebSphere MQ resources that you must create yourself

Depending on the setup of your User Name Server, you might need to create some WebSphere MQ resources yourself. You can create WebSphere MQ resources using commands and utilities such as runmqsc and the PCF interface, or you can use WebSphere MQ Services (with WebSphere MQ Version 5) or WebSphere MQ Explorer (with WebSphere MQ Version 6).

- For WebSphere Message Broker on z/OS, you must create a queue manager in WebSphere MQ for your User Name Server. See "Creating a User Name Server on z/OS" on page 155 for more details.
- If the Configuration Manager and User Name Server do not share a queue manager, you must define the channels and transmission queues to support communication between them.
- You must define the transmission queues and channels between the User Name Server and every broker in the domain (apart from the broker that shares a queue manager with the User Name Server).
- You must define listener connections on the User Name Server's queue manager for components that do not share its queue manager. You must define one listener connection for every protocol used.

For more information about creating WebSphere MQ resources, see *WebSphere MQ Intercommunication*, available on the WebSphere MQ library Web page.

Considering performance in the domain

When you design your broker domain, and the resources associated with its components, decisions that you make can affect the performance of your brokers and applications.

Message flows

A message flow includes an input node that receives a message from an application over a particular protocol (for example WebSphere MQ). The message must be parsed, although some parsers support partial parsing which might reduce processing. Other processing in a message flow that might affect performance are the amount, efficiency, and complexity of ESQL, access to databases, and how many message tree copies are made.

You need to consider how you split your business logic; how much work should the application do, and how much should the message flow do? Every interaction between an application and a message flow involves I/O and message parsing and therefore adds to processing time. Design your message flows, and design or restructure you applications, to minimize these interactions.

For more information about these factors, see Optimizing message flow response times.

Messages and message models

The type, format, and size of the messages that are processed can have a significant effect on the performance of a message flow. For example, if you process persistent messages, these have to be stored for safekeeping.

You might need to process message with a well defined structure; if so you can create MRM models for your messages. If you have no need to interrogate the structure, you can work with BLOB messages. If you are working in XML, be aware that it can be verbose, and therefore produce large messages, but XML message content is easier to understand than

other formats such as CWF. Field size and order might be important; these factors can be included in your MRM model.

For more information about these factors, see Optimizing message flow response times and Performance considerations for regular expressions in TDS messages.

Broker configuration and domain topology
You can configure your broker domain to include multiple brokers, multiple systems, multiple execution groups, and so on. These can play a part in how message flows perform, and how efficiently messages can be processed.

For more information about these factors, see "Configuring timeouts" on page 172, "Optimizing message flow throughput," and Performance considerations for Real-time transport.

All these factors are examined in more detail in the Designing for Performance SupportPac™ (IP04).

For a description of common performance scenarios, review Resolving problems with performance.

For further articles about WebSphere Message Broker and performance, review these sources:

- The Business Integration Zone on developerWorks®. This has a search facility; enter "performance" and review the links that are returned.
- The developerWorks article on message flow performance.
- The developerWorks article on monitoring resource use.
- A developerWorks article that describes other available resources including best practices, tools, and performance data.

Optimizing message flow throughput

Each message flow that you design must provide a complete set of processing for messages received from a certain source. This design might result in very complex message flows that include large numbers of nodes that can cause a performance overhead, and might create potential bottlenecks. You can increase the number of message flows that process your messages to provide the opportunity for parallel processing and therefore improved throughput.

You can also consider the way in which the actions taken by the message flow are committed, and the order in which messages are processed.

Consider the following options for optimizing message flow throughput:

Multiple threads processing messages in a single message flow
When you deploy a message flow, the broker automatically starts an instance of the message flow for each input node that it contains. This behavior is the default. However, if you have a message flow that handles a very large number of messages, the input source (for example, a WebSphere MQ queue) might become a bottleneck.

You can update the Additional Instances property of the deployed message flow in the bar file: the broker starts additional copies of the message flow on separate threads, providing parallel processing. This option is the most efficient way of handling this situation, if you are not concerned about the order in which messages are processed.

If the message flow receives messages from a WebSphere MQ queue, you can influence the order in which messages are processed by setting the Order Mode property of the MQInput node:

- If you set Order Mode to By User ID, the node ensures that messages from a specific user (identified by the UserIdentifier field in the MQMD) are processed in guaranteed order. A second message from one user is not processed by an instance of the message flow if a previous message from this user is currently being processed by another instance of the message flow.
- If you set Order Mode to By Queue Order, the node processes one message at a time to preserve the order in which the messages are read from the queue. Therefore, this node behaves as though you have set the Additional Instances property of the message flow to zero.

For publish/subscribe applications that communicate with the broker over any supported protocol, messages for any given topic are published by brokers in the same order as they are received from publishers (subject to reordering based on message priority, if applicable). Therefore each subscriber receives messages from a particular broker, on a particular topic, from a particular publisher, in the order that they are published by that publisher.

However, it is possible for messages, occasionally, to be delivered out of order. This situation can happen, for example, if a link in the network fails and subsequent messages are routed by another link.

If you need to ensure the order in which messages are received, you can use either the **SeqNum** (sequence number) or **PubTime** (publish time stamp) parameter on the **Publish** command for each published message, to calculate the order of publishing.

For more information about the techniques recommended for all MQI and AMI users, see the **Application Programming Reference** and **Application Programming Guide** sections in the WebSphere MQ Version 6 information center online or (for WebSphere MQ Version 5.3) the *WebSphere MQ Application Programming Guide* and *WebSphere MQ Application Programming Reference* manual from the WebSphere MQ library Web page for programs written to the MQI, and *WebSphere MQ Application Messaging Interface* (available as SupportPac MA0F from the WebSphere MQ SupportPacs Web page) for programs written to the AMI. The AMI is defined in the *WebSphere MQ Application Messaging Interface* book available from the WebSphere MQ library Web page. See also the **Publish/Subscribe User's Guide** section in the WebSphere MQ Version 6 information center online.

WebSphere MQ Everyplace and SCADA applications use a different method of message ordering as described in WebSphere MQ Mobile Transport and WebSphere MQ Telemetry Transport. The broker does not provide message ordering for messages received across WebSphere MQ Web Services Transport, WebSphere MQ Real-time Transport, or WebSphere MQ Multicast Transport.

Multiple copies of the message flow in a broker

You can also deploy several copies of the same message flow to different execution groups in the same broker. This option has similar effects to increasing the number of processing threads in a single message flow, although typically provides less noticeable gains.

This option also removes the ability to determine the order in which the messages are processed, because, if there is more than one copy of the

message flow active in the broker, each copy can be processing a message at the same time, from the same queue. The time taken to process a message might vary, and multiple message flows accessing the same queue might therefore read messages from the input source in a random order. The order of messages produced by the message flows might not correspond to the order of the original messages.

Ensure that the applications that receive message from these message flows can tolerate out-of-order messages.

Copies of the message flow in multiple brokers

You can deploy several copies of the same message flow to different brokers. This option requires changes to your configuration, because you must ensure that applications that supply messages to the message flow can put their messages to the right input queue or port. You can often make these changes when you deploy the message flow by setting the message flow's configurable properties.

The scope of the message flow

You might find that, in some circumstances, you can split a single message flow into several different flows to reduce the scope of work that each message flow performs. If you do split your message flow, be aware that it is not possible to run the separate message flows in the same unit of work, and if transactional aspects to your message flow exist (for example, the updating of multiple databases), this option does not provide a suitable solution.

The following two examples show when you might want to split a message flow:

1. In a message flow that uses a RouteToLabel node, the input queue has become a bottleneck. You can use another copy of the message flow in a second execution group, but this option is not appropriate if you want all of the messages to be handled in the order in which they are shown on the queue. You can consider splitting out each branch of the message flow that starts with a Label node by providing an input queue and input node for each branch. This option might be appropriate, because when the message is routed by the RouteToLabel node to the relevant Label node, it has some level of independence from all other messages.

   You might also need to provide another input queue and input node to complete any common processing that the Label node branches connect to when unique processing has been done.
2. If you have a message flow that processes very large messages that take a considerable time to process, you might be able to:
   a. Create other copies of the message flow that use a different input queue (you can set this option up in the message flow itself, or you can update this property when you deploy the message flow).
   b. Set up WebSphere MQ queue aliases to redirect messages from some applications to the alternative queue and message flow.

   You can also create a new message flow that replicates the function of the original message flow, but only processes large messages that are immediately passed on to it by the original message flow, that you modified to check the input message size and redirect the large messages.

The frequency of commits

If a message flow receives input messages on a WebSphere MQ queue,

you can improve its throughput for some message flow scenarios by modifying its default properties after you have added it to a bar file. (These options are not available if the input messages are received by other input nodes; commits in those message flows are performed for each message.)

The following properties control the frequency with which the message flow commits transactions:

- Commit Count. This property represents the number of messages processed from the input queue before an MQCMIT is issued.
- Commit Interval. This property represents the time interval that elapses before an MQCMIT is started.

Configuring databases

Create and configure the database that is required by each broker in your domain.

A broker stores internal performance and operational data in a database that you must create and configure before you create the broker. Multiple brokers can store their tables in a single database.

You might also choose to access databases to hold application or business data. These databases, known as user databases, are read from and written to by nodes within the message flows that you deploy to one or more brokers in your domain.

In some situations, the data that you hold in user databases might be significant. You might need to coordinate table updates, or the writing to one database with the deletion of data in another. To achieve these goals, you must configure your databases, your brokers, and your message flows to be globally coordinated.

For more information about the requirement for, and set up of, broker and user databases, and the restrictions that apply, see "Databases overview" on page 72.

z/OS For additional information about setting up databases on z/OS, see "DB2 planning on z/OS" on page 115 and "Customizing the z/OS environment" on page 102.

Configuration of databases has three phases:

1. Required: Create and configure a broker database. You must create and configure a database for each broker that you create, and you must configure the ODBC resources required by the broker to connect to that database.

   Optional: if you want to deploy publish/subscribe message flow applications, and you have created a broker database on a Sybase database instance, you must modify the database to operate successfully in this environment.
2. Optional: Create and configure user databases. If your message flows interact with databases, you must create and configure those databases ready for connection by the broker on behalf of the message flows. For user databases, you can configure ODBC and JDBC connections.
3. Optional: If your user databases contain critical information, coordinate their updates through a transaction manager.

   On distributed systems, the WebSphere MQ queue manager is the transaction manager that interacts with the resource managers (the database providers). On z/OS RRS provides equivalent coordination.

To complete these three phases:

1. Create and configure the broker database:
   a. Create the databases.
   b. Authorize access to the database.
   c. Enable the ODBC connection.
   d. Optional: If you are creating a publish/subscribe broker domain *and* you are using a Sybase broker database, configure the database to support retained publications.

   You have now completed the only mandatory step for database configuration; now you can create and configure your broker domain components:
   a. If you have one or more components on z/OS, customize the z/OS environment.
   b. Configure broker domain components.
   c. Configure a broker domain in the workbench.
   d. Optional: If you want to establish a publish/subscribe network, configure a publish/subscribe topology.
2. Optional: If you want to access user databases from your deployed message flows, create and configure additional databases and connections:
   a. Create the databases.
   b. Authorize access to the databases.
   c. Enable an ODBC connection.
3. Optional: If you want your databases to participate in globally coordinated transactions, configure the environment for global coordination.

Databases overview

WebSphere Message Broker components use databases for two purposes: *broker databases* are used to store internal data about the broker, and *user databases* contain your business data. You must create and configure the broker database before you can create a broker. If you have user databases, you must also configure them before you can access them from your message flow.

WebSphere Message Broker supports the databases that are listed in Supported databases for both broker and user databases. If you access user databases, you cannot access some of the data types that are supported by these databases. The supported data types are defined in Data types of values from external sources.

Broker databases

A broker stores configuration and control information in its database. You must create the broker database before you can create the broker because when the broker is created, the broker's tables are automatically created in the specified broker database. You can create a database for each broker, or you can use one database for multiple brokers if the platforms are compatible.

If you create a broker on Linux or UNIX systems, depending on your operating system, you can create the broker database in DB2, Oracle, SQL Server, or Sybase. On Windows, you can create the broker database in DB2, Oracle, SQL Server, Sybase, or Derby. See Supported databases to check which databases are supported on your operating system.

If you create a 64-bit execution groups in the broker, the broker database must be a 64-bit database instance.

When you create a broker, the database tables required by that component are created in the default schema that is associated with the user ID used to access the database. Specify this user ID when you run the mqsicreatebroker command.

- For DB2 and Oracle, the default behavior is for the schema name to be the same as the user ID that is used to access the database.
- For Sybase and SQL Server, the typical behavior is to use the database-owning schema, *dbo*.

WebSphere Message Broker does not require a particular schema or set of tablespaces; you can configure the database and access privileges of the user ID to choose your own values.

The size of the broker database is not fixed; it depends on the complexity of your message flows and message sets. If you develop message flows that support many publishers or subscribers, you might need to increase your initial sizings.

When you have created a broker database, you must enable a connection from the broker to the database. On all platforms except Linux (zSeries® platform) and Linux (POWER™ platform), the broker connects to databases using ODBC. For 32-bit brokers (all platforms except HP-UX (Integrity platform)) , you must always enable a 32-bit ODBC connection. For 64-bit brokers (HP-UX (Integrity platform) only) , you must always enable a 64-bit ODBC connection. ODBC drivers are supplied with WebSphere Message Broker.

For more information about enabling 32-bit and 64-bit connections to the broker database see "Broker database connections" on page 74

User databases

User databases are the databases in which you store the business data that is processed by message flow applications. You can create user databases using any of the database managers that you can use for broker databases. Additional local and remote database managers are also supported; for example, Informix® can be used for user databases even though it is not supported for broker databases, while SQL Server running on Windows can be accessed from some Linux and UNIX systems. For more information, see Supported databases and Database locations.

You must enable connections to the user databases so that the broker can access the databases on behalf of its deployed message flows. You must enable 32-bit or 64-bit ODBC connections to the user databases depending on whether the message flows that access the user databases are deployed to 32-bit or 64-bit execution groups and whether the message flow transactions are globally coordinated by a 32-bit or 64-bit queue manager.

For information about 32-bit and 64-bit connections to user databases see "User database connections" on page 75.

Databases created by the Default Configuration wizard

On Windows or Linux (x86 platform), if you use the Default Configuration wizard to create the Default Configuration, the wizard automatically creates a broker database for the broker. On Linux systems, the wizard creates the broker database

using DB2; on Windows, if DB2 is not installed, the wizard uses the Derby database manager by default, although you can choose to use DB2 if it is installed.

Broker database connections

Create connections from each broker to its database using ODBC.

Broker components and execution groups read and write data about internal operations to a broker database. The number of connections needed depends on the actions of the message flows that the broker processes. Each broker needs the following connections:

- Five for internal broker threads.
- One for each Publish/Subscribe neighbor, if you are using retained publications and the topology has been deployed.
- One for each message flow thread that contains a Publication node, if you are using retained publications.
- One for each message flow thread that parses MRM messages.
- A further number if you are using SCADA nodes with WebSphere MQ Everyplace. The exact number to add depends on whether thread pooling is being used (determined by the *Use Thread Pooling* property of the SCADAInput node):
  - If *Use Thread Pooling* is not selected (the default setting) add the number of SCADA clients that will connect to the SCADAInput node.
  - If *Use Thread Pooling* is selected, add the value in the *Max Threads* property of the SCADAInput node. The default value is 500.

If you are using the same database for several brokers, include all brokers in your calculations.

When you start a broker, it opens all connections that it needs to the broker database for its own operation. When you stop the broker, it releases all current database connection handles.

The broker also opens connections to WebSphere MQ queues and to user databases when it needs to use them, and these connections remain open until:

The connection has been idle for one minute

The broker is stopped

On Linux, UNIX, and Windows systems, to avoid breaking global coordination, database connections are released only for message flows that are not globally coordinated.

z/OS On z/OS, database connections for globally coordinated message flows are released if the database has not been accessed for one minute.

If you are using DB2 for your database, the default action taken by DB2 is to limit the number of concurrent connections to a database to the value of the *maxappls* configuration parameter. The default for *maxappls* is 40. Increase this parameter and the associated parameter *maxagents* to new values based on your calculations, if appropriate.

32-bit and 64-bit considerations

On all platforms except HP-UX (Integrity platform), parts of the broker need 32-bit access to the data source. You must therefore always define a 32-bit ODBC data

source name (DSN) for the broker to connect to the broker database; this is true even if the broker has a 64-bit database, in which case you must present the broker with an environment that provides a 32 bit-compatible interface to the database (see "Setting your environment to access databases" on page 99). On HP-UX (Integrity platform), the broker is a 64-bit application, therefore you must always define a 64-bit ODBC DSN for the broker to connect to the broker database.

The execution group on a broker must also be able to connect to the broker database. A 32-bit execution group on a 32-bit broker can connect to the broker database using the same 32-bit DSN definition that the broker uses. A 64-bit execution group on a 32-bit broker, however, needs a 64-bit ODBC connection to be able to connect to the broker database, therefore you must define a 64-bit ODBC DSN for the broker database in addition to the broker's 32-bit DSN definition.

When message flow transactions are globally coordinated, the queue manager must also be able to connect to the broker database; if the transactions are globally coordinated by a 64-bit queue manager (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit), you must define a 64-bit ODBC DSN for the broker database, even if the broker and the execution group are 32-bit applications.

On HP-UX (Integrity platform), the 64-bit broker supports only 64-bit execution groups, therefore the execution group can access the broker database using the same 64-bit DSN definition that the broker uses; a 32-bit DSN definition is not required.

For 32-bit and 64-bit considerations when connecting to user databases, see "User database connections."

For help when you are deciding whether to create 32-bit DSNs, 64-bit DSNs, or both, for your broker database, see "Enabling ODBC connections to the databases" on page 85.

User database connections

User databases contain your business data that is written and accessed by deployed message flows. You must create connections from the broker to the user database using ODBC.

The broker requires a database connection to the data source name (DSN) for each DSN that is referenced in the message flow, even if different DSNs resolve to the same physical database.

The number of connections to a user database that a broker requires depends on the actions of the message flows that access the database. For each message flow thread, a broker that accesses a user database makes one connection for each data source name (DSN). If a different node on the same thread uses the same DSN, the same connection is used, unless a different transaction mode is used, in which case another connection is required. For further information about transactions, see Database connections for coordinated message flows.

When you start a broker, and while it is running, it opens connections to WebSphere MQ queues and to databases. The broker makes the connections when it needs to use them, and they remain open until:

The message flow becomes idle

The message flow is stopped

The broker is stopped

Database connections from message flows that are not globally coordinated are released when a flow has no work. For example, a connection is released is the message flow input queue has no messages, and the database has not been accessed for one minute.

On Linux, UNIX, and Windows systems, to avoid breaking global coordination, database connections are released only for message flows that are not globally coordinated.

z/OS Additionally on /OS, database connections for globally-coordinated message flows are released if the database has not been accessed for one minute.

If you are using the same database for business data and for broker internal data, add the two connection requirements together when you calculate how many connections are required. For details of broker database connection requirements, see "Broker database connections" on page 74.

If you stop the broker, it releases all current database connections.

If you are using DB2 for your database, DB2's default action is to limit the number of concurrent connections to a database to the value of the *maxappls* configuration parameter. The default for *maxappls* is 40. If you believe that the connections that the broker might require exceeds the value for *maxappls*, increase this and the associated parameter *maxagents* to new values based on your calculations.

If you are using another database, check the database documentation for information about connections and the limits or restrictions that might apply.

When a message flow is idle, the execution group periodically releases database connections. Therefore, connections held by the broker reflect the broker's current use of these resources. This situation allows the broker to respond to database quiesce, where the database manager supports quiescing. Not all databases support the quiesce function, and not all databases quiesce in the same way. Check your database documentation for information about database quiescing.

32-bit and 64-bit considerations

If a message flow that accesses the user database is deployed to a 32-bit execution group, you must define a 32-bit ODBC data source name (DSN) for the user database so that the broker can connect to the user database on behalf of the message flow.

If the message flow is deployed to a 32-bit execution group and the message flow transactions are globally coordinated by a 64-bit queue manager (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit), you must define both a 32-bit ODBC DSN and a 64-bit ODBC DSN for the user database (you must also define a 64-bit ODBC DSN for the broker database; see "Broker database connections" on page 74).

If a message flow that accesses the user database is deployed to a 64-bit execution group, you must define a 64-bit ODBC DSN for the user database so that the broker can connect to the user database on behalf of the message flow. You cannot

use a 32-bit queue manager to globally coordinate a message flow that is deployed to a 64-bit execution group so you do not need to define a 32-bit ODBC DSN for the user database.

For 32-bit and 64-bit considerations when connecting to the broker database, see "Broker database connections" on page 74.

For help when you are deciding whether to create 32-bit DSNs, 64-bit DSNs, or both, for your user databases, see "Enabling ODBC connections to the databases" on page 85.

Creating the databases

Before you can create a broker, you must create a database for the broker to use to store its internal data; multiple brokers can store their tables in a single database.

If you need to create user databases to store your application and business data so that message flows can store, update, or retrieve the data, create the databases using these same instructions.

For information about which databases you can use, see Supported databases.

z/OS For information about setting up databases on z/OS, see "DB2 planning on z/OS" on page 115 and "Customizing the z/OS environment" on page 102.

To create the databases on distributed systems:

1. If you are creating Oracle databases on UNIX systems, run the mqsi_setupdatabase command before you create any database. For details, see "mqsi_setupdatabase command" on page 468. Do not complete this task for any other database manager, or for Oracle databases on Linux or Windows.
2. Create the databases that you require. Choose a unique name for each broker database, for example WBRKBKDB, and keep a note of it for when you create the broker.
   - For DB2, follow the instructions in "Creating a DB2 database on Windows" or "Creating a DB2 database on Linux and UNIX systems" on page 78.
   - For Derby, see the "mqsicreatedb command" on page 393. Derby database support is described in "Using Derby databases on Windows" on page 80.
   - For other supported database managers, see the documentation supplied with that database manager.
3. If you are creating Sybase databases on AIX®, run the Sybase profile before you run mqsiprofile. For more information about command environments on Linux and UNIX platforms, see Command environment: Linux and UNIX systems

You have now created a database for your broker and, if required, databases for your business data.

Next: return to the instructions in "Configuring databases" on page 71.

Creating a DB2 database on Windows

You can use the **mqsicreatedb** command or the DB2 Control Center to create a DB2 database. Alternatively, if you prefer, you can use any other method supported by DB2 (including command line or batch files); refer to the DB2 documentation for details of how to do this.

When you create a broker, you specify the user name and password that are used to connect to the broker database. The process of creating a broker creates the necessary broker tables in the user's schema within the broker database if the tables do not already exist. DB2 authenticates the user name using operating system user management; you do not have to define the user name to DB2 itself.

1. If you want to create a database with the **mqsicreatedb** command, enter the command at the command line, specifying the appropriate parameters. You must provide a user name and password that is known to DB2. Indicate that you want to create a DB2 database (not a Derby database). For more information about these and other parameters, refer to the **mqsicreatedb** command.

   If you want to use the Control Center instead of the **mqsicreatedb** command, complete step 2.
2. Start the DB2 Control Center. For each database you want to create:
   a. Expand **All Systems** in the object tree in the DB2 Control Center until you find **Databases**. Right-click **Databases** and click **Create Database → Standard**.
   b. Enter a name and alias for your database. If you have a naming convention for databases, choose a compatible name. The alias name can be the same as the database name. Database names are limited to eight characters. For example, enter `WBRKBKDB`.
   c. Click **Done**.
3. You must increase the database heap size to ensure it is sufficient for the broker. This task is described in "Changing the Database Heap Size on DB2 broker databases" on page 79.
4. When you have completed these steps for every database you have created, click **OK**.

If you use the DB2 command line to create the databases, you must bind the db2cli package to the database. You do not have to do this if you used the DB2 Control Center wizard, the **mqsicreatedb** command, or if you created the broker with the Default Configuration wizard.

1. Open a DB2 Command Line Processor window.
2. Connect to the broker database using the following command:

   ```
   db2cmd db2 CONNECT to <YourBrokerDatabaseName>
   ```
3. Enter the following commands, where `c:\` is the drive on which you installed DB2. You must enter your full DB2 installation path; do not use spaces or quotes.

   ```
   db2 bind C:\SQLLIB\BND\@db2ubind.lst GRANT PUBLIC
   db2 bind C:\SQLLIB\BND\@db2cli.lst GRANT PUBLIC
   ```
4. Repeat the previous two steps for every broker database.

Creating a DB2 database on Linux and UNIX systems

When you create a broker, you specify the user name and password that are used to connect to the broker database. The process of creating a broker creates the necessary broker tables in the user's schema within the broker database if the tables do not already exist. DB2 authenticates the user name using operating system user management; you do not have to define the user name to DB2 itself.

To create a DB2 database on Linux or UNIX:

1. Log on as `root`.

2. Create a database instance. Use the commands shown here for guidance for the different platforms.
   a. On AIX:
      ```
      /usr/lpp/db2_08_01/instance/db2icrt -u fence_userID username
      ```
   b. On Linux, Solaris, or HP-UX:
      ```
      /opt/IBM/db2/V8.1/instance/db2icrt -u fence_userID username
      ```
   The *username* that you specify on this command determines the nominated owner of the database instance. You are recommended to log on as this user whenever you perform any actions against the database instance (for example, creating or modifying a database). The command examples that are used in this help assume that you are logged on as *username*, and use the tilde (~) character to indicate this user ID in the DB2 commands issued.

   If you are not logged on as the user that owns the database instance, you must modify the commands shown to specify explicit ownership by specifying the owner user ID *username* following the ~ character wherever it is used in the examples.

   The *fence_userID* refers to the user ID under which stored procedures execute. You can specify a different ID to the instance owner ID for the database for extra security and protection, which is achieved because the stored procedure runs under a different ID, and therefore in a different process, to the database instance itself.

   For further explanation of database ownership, refer to the DB2 library (follow the links in Related Links)..
3. Log on as *username*
4. Create a database (in this example called `WBRKBKDB`) using the following commands (on some platforms, an explicit path name is required).

   You *must* insert a space between the starting period and the tilde character in the first command shown here:
   ```
   . ~/sqllib/db2profile
   db2start
   db2 create database WBRKBKDB
   db2 connect to WBRKBKDB
   db2 bind ~/sqllib/bnd/@db2cli.lst grant public CLIPKG 5
   ```
5. You must increase the database heap size to ensure it is sufficient for the broker. This task is described in "Changing the Database Heap Size on DB2 broker databases."
6. If you are using a 64-bit DB2 instance, add `<DB2 instance directory>/sqllib/lib32` to the start of the library search path environment variable.
7. If you are using 64-bit execution groups, set the environment variable `MQSI_LIBPATH64` to include the regular 64-bit database libraries.

When you issue the command that creates the broker, tables are created within the database to hold the information required.

Changing the Database Heap Size on DB2 broker databases

Increase the value of the Database Heap Size parameter for each broker database to ensure that the heap size is sufficient.

Each database in a DB2 instance is associated with a heap (temporary storage) but the default size of the heap (measured in 4 KB pages) is too low for the broker to use. Therefore, if you create broker databases in DB2, you must increase the heap size to at least 900, which gives the broker database 3600 KB of storage space (that is, 900 multiplied by 4 KB pages).

Using the DB2 Control Center:
To change the Database Heap Size using the DB2 Control Center:

1. Start the DB2 Control Center.
   - On Windows, click **Start → Programs → IBM DB2 → General Administration Tools → Control Center**
   - On Linux and UNIX , enter the following command (ensure that you have already run the DB2 profile so that the shell is running the DB2 environment): db2cc
2. For each broker database that you have created:
   a. In the tree, expand the right-click the database name, then click **Configure Parameters**. The Database Configuration dialog opens.
   b. In the Database Configuration window, click **Performance → DBHEAP**.
   c. Click the cell in the **Value** column, then click the button labelled **...** The Change Database Configuration Parameters dialog opens.
   d. Set the value of the DBHEAP parameter to at least 900 (the maximum value that you can enter is 60000), then click **OK**. The Change Database Configuration Parameters dialog closes and the new value is shown in the cell in the **Pending Value** column.
   e. Click **OK**. The new value is applied and a message is displayed to show that it was changed successfully.
   f. Click **Close** to close the message and return to the main DB2 Control Center window.

The heap size of the broker database is changed.

Using the command line:

1. Open a DB2 command window.
2. Enter the following command, where *WBRKBKDB* is the name of the broker database and *900* is the number of 4 KB pages:

```
db2 update database configuration for WBRKBKDB using dbheap 900
```

The heap size of the broker database is changed.

Using Derby databases on Windows

Set up your environment to access a Derby database.

Derby refers to the DB2 database product that is based on the Apache Derby open source project from the Apache Software Foundation. Derby database support is embedded in the broker component on Windows only.

This topic describes the processes, services, IP ports, and database files that are required to support Derby on Windows.

Security

The Derby database has no associated security controls, and no optimizations have been performed. For these reasons, do not use Derby in a production environment.

DB2 Run-Time Client use

A broker uses ODBC to connect to Derby databases. Derby is a native Java database engine without ODBC support. The DB2 Run-Time Client provides the drivers that allow ODBC to access Derby databases. The DB2 Run-Time Client is

used only for providing and managing the ODBC connection between a broker and the Derby database. It does not provide a DB2 database and therefore does not consume the resources that a full DB2 installation typically requires.

Database Instance Manager (managing, creating, deleting, and running databases)

You must create and start a network server to enable access to Derby databases through ODBC from external programs. When you create the first Derby database using the mqsicreatedb command, a Windows service is also created. The service is called IBM MQSeries® Broker DatabaseInstanceMgr6, and starts automatically when Windows starts, under the user name that you supplied with the mqsicreatedb command. The service is referred to as DatabaseInstanceMgr component, and starts the network server. DbInstMgr is the internal component name of the Database Instance Manager.

All Derby databases that you create using the mqsicreatedb command are served by one instance of the DatabaseInstanceMgr and network server. Before the network server can function, it requires a TCP/IP port number. The default port number for Derby is 1527 (use this port when you create a Derby database). You can specify a different port number when you issue the mqsicreatedb command to create a Derby database for the first time. However, you cannot subsequently change the port number after a network server has been set up, without first using mqsideletedb to remove all Derby databases.

Run the command `mqsilist DatabaseInstanceMgr` to produce a list all of the databases that have been created by the mqsicreatedb command. You can remove the DatabaseInstanceMgr and the network server after the last Derby database has been deleted, using the mqsideletedb command.

If the password of the user name under which the Windows service runs is changed, use the mqsichangedbimgr command to update the service with the new password. You can also use the mqsichangedbimgr command to change the user name of the service. Use the mqsistart and mqsistop commands to start and stop the DatabaseInstanceMgr component.

Multiplicity (brokers, dbiMgrs, installations, databases)

The number of databases that you can create with the mqsicreatedb command is limited only by availability of system resources. A maximum of one DatabaseInstanceMgr is created irrespective of how many databases have been created. If you have installed multiple instances of WebSphere Message Broker, all instances use a single instance of the DatabaseInstanceMgr component.

Removing databases and the DatabaseInstanceMgr component

Use the mqsideletedb command to clear all resources created by the mqsicreatedb command. When the last Derby database is deleted, the DatabaseInstanceMgr and network server are also stopped and removed. If the database files cannot be deleted using the mqsideletedb command, you can delete them manually.

Issuing database commands on Windows

On Windows, use special commands to create and delete databases for use by a broker or by applications.

Only DB2 and Derby databases are supported with the supplied commands:

- "mqsicreatedb command" on page 393
- "mqsideletedb command" on page 415
- "mqsichangedbimgr command" on page 333

The mqsilist command lists the databases that have been created using the mqsicreatedb command. Only databases created using the mqsicreatedb command can be deleted using the mqsideletedb command.

The Default Configuration wizard and the Prepare Samples wizard use the mqsicreatedb command to create the databases for the broker and the samples, using the default database engine. Therefore, you can list these databases using the mqsilist DatabaseInstanceMgr command.

Use the mqsisetdbparms command to manage the access security for user databases only. It has no effect on Derby databases, which have no access security protection, nor on broker databases in general, which are governed by the access security settings in the broker itself. The rest of this page applies only to the mqsicreatedb, mqsideletedb, and mqsichangedbimgr commands.

Supported database engines

If DB2 version 8.1 Fix Pak 7 or later is installed, both DB2 and Derby databases can be created and used. If DB2 Run-time Client Version 8.2 is installed, only Derby databases are supported. If an earlier version of DB2 is installed, only DB2 databases can be created.

The mqsicreatedb command has an option to select the database engine to use (either DB2 or Derby). The default for this option depends on which database engines are installed. If DB2 Run-time Client Version 8.2 is installed, the default is Derby, otherwise the default is DB2.

Database Instance manager

The databases that are created by mqsicreatedb are managed by a component called the Database Instance manager. This component exists only on Windows. The component stores a list of all the databases created and which database engine is used for each database. No process or Windows service is required for the Database Instance manager component, and if you start the component it is not recognized.

The first time a Derby database is created, a Windows service called IBM® MQSeries Broker DatabaseInstanceMgr6 is created and started. This service is required in order to access Derby databases. This service can be started or stopped by the mqsistart and mqsistop commands, and automatically starts when Windows is started, if necessary. The service is deleted when the last Derby database is deleted. At most one Database Instance manager Windows service exists, even if you install WebSphere Message Broker more than once on your Windows computer (multiple installed instances).

The database commands affect all the databases created in any installed instance on your Windows computer, regardless of the instance under which they are created. For example, the mqsilist DatabaseInstanceMgr6 command lists all the databases that have been created using the mqsicreatedb command on this Windows computer. Use the mqsichangedbimgr command to change the user name and password under which the Database Instance manager Windows service

is run. Run this command only if passwords change or if user names are updated after the initial installation and configuration. For more information, see "Using Derby databases on Windows" on page 80.

Creating and deleting databases

Use the mqsicreatedb command to create databases for broker use or for application use. The Prepare Samples wizard and the Default Configuration wizard, for example, use the mqsicreatedb command to create their databases on Windows. Not only is the database itself created (in either DB2 or Derby), but the ODBC data source name (DSN) is also created (with the same name).

Because the data source names and the instance manager component are system wide, you cannot create two databases with the same name, on the same Windows computer, even if they are for brokers on different installed instances of WebSphere Message Broker. The mqsicreatedb command warns you if this is attempted. Any database created using the mqsicreatedb command can be deleted by the mqsideletedb command, even if that database is in use by a broker. See the links to the command descriptions for more information.

Authorizing access to the databases

When you have created a broker or user database, you must authorize the broker and its execution groups to access it.

Before you start, create the databases.

When you run the mqsicreatebroker command, you must specify at least one user ID for runtime authorization (the service user ID); you can specify a second user ID specifically for the broker to use when connecting to databases (the data source user ID). If you do not specify a separate data source user ID for connecting to databases, the broker uses its service user ID for database access as well.

The user ID that the broker uses to access databases must have the following authorizations:

- The user ID must be authorized to connect to the database.
- Before you can create a broker, the user ID must have authorization to create tables in the broker database.
- The user ID must have appropriate privileges on the user database objects that are accessed by the message flow application; for example, tables, procedures, and indexes.

You specify the service user ID and its password with the `-i` and `-a` flags, and the optional database connection user ID and password with the `-u` and `-p` flags.

The way that you authorize access depends on the database manager you are using, and the platform on which you have created it. This topic provides instructions for the DB2 and Oracle database managers:

- "DB2 authorization"
- "Oracle authorization" on page 84

DB2 authorization

To authorize access to a DB2 database using the DB2 Control Center:

1. Start the DB2 Control Center.

2. Expand the object tree until you find the database that you created for the broker.
3. Expand the tree under the database then click the **User and Group Objects** folder. The **DB Users** and **DB Groups** folders are displayed in the right pane.
4. In the right pane, right-click the **DB Users** folder then click **Add**. The Add User notebook opens.
5. From the list, click the user ID that you want to authorize to access the database (for example, `mqsiuid`). The user ID that you select must be the user ID that you specify to be used for database access when you create the broker. The user ID must exist on the operating system before you can select it; if it does not exist, define the user ID on the operating system.
6. Select the appropriate options from the choices in the dialog that is labelled **Choose the appropriate authorities to grant to the selected user** for the database. The available options are:
   - Connect database
   - Create tables
   - Create packages
   - Register functions to execute in database manager's process
7. Click **OK**. The authorities are granted. The dialog closes.
8. Close the DB2 Control Center.

If you prefer, you can use the following commands instead of using the DB2 Control Center.

To authorize access to a DB2 database:

1. Connect to the database with a user ID that has DB2 system administration (SYSADM or DBADM) authority (substitute the correct database and ID in this command):

   ```
   db2 connect to broker_db user SysAd_id
   ```

2. Issue the following command to grant the required privileges to the user ID that the broker will use to connect to the database (substitute the correct ID for your broker in this command if you are not using the sample `mqsiuid`):

```
db2 grant connect, createtab, bindadd, create_external_routine on database to user mqsiuid
```

For more information, see the documentation that is supplied with the DB2 Control Center. Your database administrator might also be able to offer advice and assistance.

Next: return to the instructions in "Configuring databases" on page 71.

Oracle authorization

You must have database administrator (DBA) privileges to authorize access to an Oracle database.

To authorize access to an Oracle database:

1. Log on as the Oracle DBA (database administrator) to the database using SQL*Plus.
2. Modify the privileges of the user ID that you have specified for database connection to ensure that the broker can successfully access the database. The user ID needs quota in its tablespaces and sufficient privilege to allow the creation of, and updates to, the broker tables:

```
GRANT CREATE SESSION TO dbid;
GRANT CREATE TABLE TO dbid;
```

If you expect to deploy message flows that participate in globally coordinated transactions to a broker, you must provide additional authorization. For more information, see “Configuring databases for global coordination of transactions” on page 100.

For further information, refer to the Oracle documentation.

Next: return to the instructions in “Configuring databases” on page 71.

Enabling ODBC connections to the databases

Set up the environment that the broker needs to connect to broker and user databases with ODBC.

The broker uses Open Database Connectivity (ODBC) to connect to databases. You must define ODBC data source names (DSNs) for the broker database on each computer that hosts a broker. You must also define ODBC DSNs for any user databases that are accessed by message flows that are deployed to the broker. At any one time, multiple connections can use the same DSN definition.

z/OS On z/OS systems, see Data sources on z/OS for information about enabling connections to databases.

Linux On Linux (POWER platform) and Linux (zSeries platform), DB2 is the only supported database manager; the broker and message flows connect to the databases directly using the DB2 supplied driver and do not use a driver manager. The DB2 alias is used as the DSN.

On distributed systems, when you define the DSNs, consider the following two factors that determine whether you must define a 32-bit DSN for the database, a 64-bit DSN, or both:

- Whether the execution group and the database instance are 32-bit or 64-bit
- Whether the message flow transactions will be globally coordinated

Linux UNIX On Linux and UNIX systems, DSNs are defined in a plain text file on the computer that hosts the broker:

- Define 32-bit DSNs in the odbc.ini file.
- Define 64-bit DSNs in the odbc64.ini file

Set the ODBCINI environment variable to point to the .ini file that contains the DSN that is defined for the broker to connect to the broker database; the file is odbc.ini on all platforms except HP-UX (Integrity platform) where it is odbc64.ini. If you define 64-bit DSNs in odbc64.ini on 64-bit platforms, you must also set ODBCINI64 to point to odbc64.ini.

For more information about the 32-bit and 64-bit considerations, see “Broker database connections” on page 74 and “User database connections” on page 75.

When you have defined the appropriate DSNs, you must also configure the environment so that the broker can access the correct database libraries (see “Setting your environment to access databases” on page 99).

To enable connections on distributed systems:

1. Define the ODBC DSNs according to your platform:

   Windows **On Windows:**
   Windows provides only 32-bit support. Follow the instructions in "Connecting to a database from Windows" on page 87.

   On Linux (x86 platform):
   Linux (x86 platform) provides only 32-bit support. Follow the instructions in "Connecting to a database from Linux and UNIX systems" on page 89.

   Linux UNIX **On other Linux and UNIX systems:**
   Depending on your broker configuration, for each database you might need to define a 32-bit ODBC DSN, a 64-bit ODBC DSN, or both.

   Use the following tables to check which DSNs you must define, and follow the links for the appropriate instructions. For more information about 32-bit and 64-bit considerations, see "Broker database connections" on page 74 and "User database connections" on page 75.

	32-bit execution group	**64-bit execution group**
32-bit broker	Broker database: 32-bit User database: 32-bit	Broker database: 32-bit and 64-bit User database: 64-bit
64-bit broker (HP-UX (Integrity platform) only)	Not possible	Broker database: 64-bit User database: 64-bit

   The following tables provide links to topics for connecting databases when you are using global coordination and a 64-bit queue manager. All WebSphere MQ Version 6 queue managers on 64-bit platforms run in 64-bit mode.

	32-bit execution group	**64-bit execution group**
32-bit broker	Broker database: 32-bit and 64-bit User database: 32-bit and 64-bit	Broker database: 32-bit and 64-bit User database: 64-bit
64-bit broker (HP-UX (Integrity platform) only)	Not possible	Broker database: 64-bit User database: 64-bit

   The following table provides links to topics for connecting databases when you are using global coordination and a 32-bit queue manager. All WebSphere MQ Version 6 queue managers on 32-bit platforms run in 32-bit mode. All WebSphere MQ Version 5.3 queue managers run in 32-bit mode.

	32-bit execution group	**64-bit execution group**
32-bit broker	Broker database: 32-bit User database: 32-bit	Not possible

	32-bit execution group	64-bit execution group
64-bit broker (HP-UX (Integrity platform) only)	Not possible	Not possible

You have now configured the ODBC DSN for your broker database and the ODBC DSNs for any user databases.

2. Configure the environment for issuing console commands and for running the broker so that it can access the required database libraries. For more information, see "Setting your environment to access databases" on page 99.

You have now enabled the broker to make connections to the broker database and to any user databases.

Next, return to the instructions in "Configuring databases" on page 71.

Connecting to a database from Windows

This topic describes how to connect to supported databases from Windows.

Configure an ODBC data source using the ODBC Data Source Administrator:

1. Click **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Data Sources (ODBC)**.
2. Click the **System DSN** tab.

When you define a new data source, select the appropriate driver for your database and complete the dialog that is displayed. Refer to your relevant database product documentation for more information.

Setup considerations specific to WebSphere Message Broker are described below for the supported databases.

The Default Configuration wizard and the database commands to create a broker, or a database, on Windows automatically create the ODBC data source names (DSNs) for you.

DB2 UDB

When you define a data source for DB2 UDB you must choose the driver:

- `IBM DB2 ODBC DRIVER`

1. Enter the data source name (DSN) and description.
2. Select the correct database alias from the list.

You must register the data source as a system data source.

You might find it easier to use the Configuration Assistant:

1. Open the DB2 Configuration Assistant.
2. Right-click the database. Select **Change Database**.
3. Select **Data Source**.
4. Select **Register this database for ODBC**. Select the system data source option.
5. Click **Finish**.
6. The Test Connection dialog opens automatically and you can test the various connections.

Informix Dynamic Server

When you define a data source for Informix Dynamic Server, choose the driver:

- `IBM INFORMIX ODBC DRIVER`

Complete these steps to configure the driver:

1. On the **Connection** tab, specify:
   - The Informix server name.
   - The machine host name.
   - The Informix network service name (as defined in the services file).
   - The network protocol (for example, olsotcp).
   - The Informix data source name.
   - The user identifier to access the data source within.
   - The password for that user identifier.
2. Click **Apply**.
3. Click **Test Connection** to check your supplied values.
4. Click **OK** to finish.

Microsoft® SQL Server

When you define a data source for Microsoft SQL Server you must choose the driver:

- `SQL Server`

The driver level must be Version 3.60, or later.

1. Specify a name and description.
2. Select the correct server from the list.

Oracle

When you define a data source for Oracle, choose the driver:

- `MQSeries DataDirect Technologies 5.00 32-BIT Oracle`

The ODBC Oracle Driver Setup dialog opens.

Complete these steps to configure the driver:

1. On the **General** tab:
   a. Enter the DSN name, description, and server name (where the server name is the ″Service Name″ that resolves to a ″Connect Descriptor″, for example through a mapping in the `TSNAMES.ORA` file).
   b. Select the appropriate Oracle client version from the list.
2. On the **Advanced** tab:
   a. Select **Enable SQLDescribeParam**.
   b. Select **Procedure Returns Results**. The resultant ODBC definition in the Windows registry has a string value called **ProcedureRetResults** with the value 1.
3. Click **Start → Run**.
4. Type `REGEDIT` in the **Open** field.
5. Click **OK**.
6. Use `REGEDIT` to navigate to the correct location. Create a new registry subkey for each of your DSNs that reference an Oracle database.

```
HKEY_LOCAL_MACHINE
    SOFTWARE
        ODBC
            ODBC.INI
```

7. Click **OK** to close ODBC Data Source Administrator.
8. Right-click **DSN**. Select **New** → **String Value**.
9. Specify **WorkArounds** for the string.
   a. Right-click **WorkArounds**.
   b. Select **Modify**.
   c. Type the data value `536870912`.

Sybase Adaptive Server Enterprise

When you define a data source for Sybase Adaptive Server Enterprise, choose the driver:

- `MQSeries DataDirect Technologies 5.00 32-BIT Sybase Wire Protocol`

Complete these steps to configure the driver:

1. Enter the DSN name, description, and network address of the server (for a description of the format of this address, see the explanation for *NetworkAddress*= in "odbc.ini sample file" on page 275).
2. Select **Enable Describe Parameter**. This parameter is on the **Advanced** tab.
3. Ensure the **Prepare Method** setting is `1 - Partial`. This parameter is on the **Performance** tab.
4. Use `REGEDIT` to navigate to the correct location. Create a new registry subkey for each of your DSNs that reference an Sybase database.

```
HKEY_LOCAL_MACHINE
    SOFTWARE
        ODBC
            ODBC.INI
```

5. Right-click the DSN, and select **New** → **String Value**. Specify **SelectUserName** for the string, and set the value to 1.

You have now configured your ODBC data source names on Windows.

Next:

You must configure the environment for issuing console commands, and for running the broker, so that the broker can access the required database libraries. For more information, see "Setting your environment to access databases" on page 99.

Connecting to a database from Linux and UNIX systems

To enable the broker to connect to a database, define the ODBC data source name (DSN) for the database.

Before you start:

- Ensure that the database has been created
- Ensure that the broker is authorized to access the database

Important:

- Before you can create a broker on any platform except HP-UX (Integrity platform), you must define the **32-bit** ODBC data source name (DSN) that the broker will use to connect to the broker database, even if you are connecting to a 64-bit database, because the broker is a 32-bit application.
- If the message flows that you deploy to the broker access one or more user databases, you must also define a **32-bit** DSN for each user database.

- If you are using 64-bit execution groups, or if you are globally coordinating transactions using a 64-bit queue manager, you might also need to define a 64-bit DSN for your broker and user databases; for more information, see "Enabling ODBC connections to the databases" on page 85.
- The broker on HP-UX (Integrity platform) is a 64-bit application, therefore you must define a **64-bit** ODBC DSN for the broker database (see "Connecting to a database from Linux and UNIX systems: 64-bit considerations" on page 94).

The ODBC Driver Manager has no graphical application to help you to configure the ODBC DSNs. You must define each database 32-bit ODBC connection as a DSN in a plain text file called odbc.ini on the computer that hosts the broker.

To configure a 32-bit DSN for a database:

1. Copy the odbc.ini sample file that is supplied in the merant directory of your WebSphere Message Broker installation to a location of your choice; for example, to your user ID's home directory. This enables each broker service user ID on the system to use its own DSN definitions.

   See the sample file contents in "odbc.ini sample file" on page 275.
2. Ensure that the odbc.ini file has file ownership of `mqm:mqbrkrs` and has the same permissions as the supplied sample file.
3. Set the ODBCINI environment variable to point to your odbc.ini file, specifying a full path and file name. If you have already run the mqsiprofile script, the ODBCINI environment variable is set to a default value. In this case, just change the value of the variable so that it points at the location of your odbc.ini file, ensuring that the fully-qualified file path is correct (the default environment variable names the file odbc.ini).
4. Set the library search path environment variable to show the location of the 64-bit libraries for the database manager that you are using. Ask your database administrator (DBA) for information about the database manager that you are using.

   If you are using a 64-bit queue manager (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit) to globally coordinate transactions, setting the library search path might prevent you running any WebSphere MQ commands in the same environment. For more information, see 'Implications of a 64-bit queue manager' in the *Quick Beginnings* section for your platform in the WebSphere MQ Version 6 information center online.

   For more information about the library search path, see the database manager's documentation.

   The library search path environment variable depends on your platform:

   - On Linux and Solaris: LD_LIBRARY_PATH
   - On HP-UX: SHLIB_PATH
   - On AIX: LIBPATH

   a. If you are connecting to a 64-bit DB2 database instance, add *DB2 instance directory*`/sqllib/lib32` to the start of the library search path environment variable.

      For example, on Solaris:

      ```
      export LD_LIBRARY_PATH=DB2 instance directory/sqllib/lib32:$LD_LIBRARY_PATH
      ```

      This step is necessary because some parts of the broker must see a 32-bit environment. Completing this step, however, might prevent you from running DB2 commands in this environment shell; to enter DB2 commands, start a separate environment shell and run `db2profile` for the relevant database instance.

b. If you are using a 64-bit Oracle database, add `$ORACLE_HOME/lib32` to the start of the library search path environment variable.

   For example, on HP-UX:

   ```
   export SHLIB_PATH=$ORACLE_HOME/lib32:$SHLIB_PATH
   ```

   This step is necessary because some parts of the broker must see a 32-bit environment.

5. If you are using a DB2 database instance that is installed on AIX, a single process can make a maximum of 10 connections using shared memory to a DB2 database. Use TCP/IP mode to connect to the database instance. For detailed instructions on how to do this, see DB2 error message SQL1224N is issued when you connect to DB2.
6. Edit the final stanza in the odbc.ini file, the [ODBC] stanza, to specify the location of the ODBC Driver Manager and to control tracing. The exact details in the stanza depend on the platform.

   To ensure that you edit the correct odbc.ini file, you can open the file in the vi text editor using the following command:

   ```
   vi $ODBCINI
   ```

   a. In **InstallDir**, add the WebSphere Message Broker installation location to complete the fully qualified path to the ODBC directory shown in the sample odbc.ini file. If you do not specify this value correctly, the ODBC definition will not work.

   b. In **Trace**, set the value to `0`; if your IBM Service representative asks you to enable ODBC trace, set the value to 1.

   c. In **TraceFile**, type the fully-qualified path and file name to which the ODBC trace is written. Trace files can become quite large; specify a directory with plenty of free disk space.

   d. In **TraceDll**, add the WebSphere Message Broker installation location to complete the fully qualified path to the ODBC trace DLL shown in the sample odbc.ini file.

   e. Accept the default values shown in the sample odbc.ini file for all the other entries in the stanza.

      For example, on AIX:

      ```
      [ODBC]
      Trace=0
      TraceFile=<A Directory with plenty of free space>/odbctrace.out
      TraceDll=<Your install directory>/DD64/lib/odbctrac.so
      InstallDir=<Your install directory>/DD64
      UseCursorLib=0
      IANAAppCodePage=4
      UNICODE=UTF-8
      ```

7. Edit the first stanza in the odbc.ini file, the [ODBC Data Sources] stanza, to list the DSN of each database. For example, on AIX: The DB2 database called WBRKBKDB in the example is the broker database that is created by the Default Configuration wizard (available on Linux (x86 platform) only). If you are not using the default configuration, you do not need to list this database in the odbc.ini file.

   List all your DSNs in your odbc.ini file, regardless of the database manager. You can define multiple DSNs to resolve to the same database; however, if you are using global coordination of transactions, do not use this option because it might cause problems.
8. For each database that you listed in the [ODBC Data Sources] stanza, create a stanza in the odbc.ini file after the [ODBC Data Sources] stanza. The entries in

the stanza depend on the database manager. Slight differences also occur between operating systems, for example the file paths to the drivers.

For a **DB2** database instance:

a. In **Driver**, type the location of the 32-bit driver library that matches your DB2 installation.

b. In **Description**, type a meaningful description of the database. This text field is for information only and does not affect the connection.

c. In **Database**, type the DB2 alias. The data source name must be the same as the database alias name. If you are using a remote DB2 database, you must set up your client-server connection to resolve this alias to the correct database. For more information, see the DB2 documentation.

   For example, on AIX:

```
[MYDB]
Driver=libdb2Wrapper64.so
Description=MYDB DB2 ODBC Database
Database=MYDB
```

For an **Oracle** database:

a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver shown in the sample odbc.ini file.

b. In **Description**, type a meaningful description of the database. This text field is for information only and does not affect the connection.

c. In **ServerName**, type the Oracle Service Name or Connect Descriptor that resolves to the target Oracle database; for example through a mapping in the TSNAMES.ORA file.

d. Accept the default values shown in the sample odbc.ini file for all the other entries in the stanza.

   For example, on AIX:

```
[ORACLEDB]
Driver=<Your_install_directory>/merant/lib/UKor820.so
Description=DataDirect 5.0  Oracle
EnableDescribeParam=1
OptimizePrepare=1
ServerName=<Your Oracle host>
WorkArounds=536870912
ProcedureRetResults=1
ColumnSizeAsCharacter=1
```

For a **Sybase** database:

a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver shown in the sample odbc.ini file.

b. In **Description**, type a meaningful description of the database. This text field is for information only and does not affect the connection.

c. In **Database**, type the name of the database to which you want to connect by default. If you do not specify a value, the default value is the database defined by your system administrator for each user.

d. In **ServerName**, type the name of the Sybase ASE server that you have defined on the server computer and which hosts the database.

e. In **NetworkAddress**, type the network address of your Sybase ASE server (this is required for local and remote databases). Specify an IP address as follows:

```
<servername or IP address>,<portnumber>
```

For example: `Sybaseserver,5000`. You can also specify the IP address directly, for example `199.226.224.34,5000`. You can find the port number in the Sybase interfaces file which is named `interfaces`.

f. Accept the default values shown in the sample odbc.ini file for all the other entries in the stanza.

For example, on AIX:

```
[SYBASEDB]
Driver=<Your install directory>/DD64/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ApplicationsUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1
```

For an **SQLServer** database:

a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver shown in the sample odbc.ini.

b. In **Description**, type a meaningful description of the database. This text field is for information only and does not affect the connection.

c. In **Address**, type the network address of your database server (this is required for local and remote databases). Specify an IP address as follows:

```
<servername or IP address>,<portnumber>
```

d. In **Database**, type the name of the database to which you want to connect by default. If you do not specify a value, the default value is the database defined by your system administrator for each user.

e. Accept the default values shown in the sample odbc.ini file for all the other entries in the stanza.

For example, on AIX:

```
[SQLSERVERDB]
Driver=<Your install directory>/DD64/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQL Server host>,<Your SQL Server server port>
AnsiNPW=Yes
Database=<Your Database Name>
QuoteId=No
```

For an **Informix** database:

a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver shown in the sample odbc.ini file.

b. In **Description**, type a meaningful description of the database. This text field is for information only and does not affect the connection.

c. In **ServerName**, type the name of the Informix IDS server.

d. In **Database**, type the name of the database on the IDS server.

For example, on AIX:

```
# Informix stanza
[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.so
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>
```

9. Ensure that you have edited all three parts of the odbc.ini file:

- The [ODBC Data Source] stanza at the top of the odbc.ini file.
- A stanza for each data source.
- The [ODBC] stanza at the end of the odbc.ini file.

If you do not configure all three parts correctly, the ODBC DSNs will not work and the broker will not be able to connect to the database.

10. If you are running DB2 Version 9.1 on HP-UX (PA-RISC platform), export environment variable MQSI_SIGNAL_EXCLUSIONS in the broker environment:

```
export MQSI_SIGNAL_EXCLUSIONS=10
```

You have now configured database connections from 32-bit applications on Linux and UNIX.

Now, you must configure the environment for issuing console commands, and for running the broker, so that it can access the required database libraries. For more information, see "Setting your environment to access databases" on page 99.

Connecting to a database from Linux and UNIX systems: 64-bit considerations

To enable a broker to connect to a database, define the ODBC data source name (DSN) for the database.

Before you start:

- Ensure that the database has been created
- Ensure that the broker is authorized to access the database
- Ensure that you have installed WebSphere MQ Version 6, which is required for 64-bit execution groups.

The ODBC Driver Manager has no graphical application to help you to configure the ODBC DSNs. You must define a 64-bit ODBC connection as a DSN in a plain text file (called odbc64.ini) on the computer that hosts the broker.

Important: Before you can create a broker on HP-UX (Integrity platform), define the **64-bit** ODBC data source name (DSN) that the broker will use to connect to the broker database.

Define 64-bit DSNs in the following situations:

- On HP-UX (Integrity platform), the broker is a 64-bit application, and all database connections must be 64-bit. Define a 64-bit DSN for the broker database and for any user databases.
- If you deploy message flows to a 64-bit execution group on any Linux or UNIX system, define a 64-bit DSN for the broker database and any user databases. The broker database, and any user databases, must also be 64-bit instances.
- If you configure a 64-bit queue manager to globally coordinate transactions, the broker database and any user databases must be 64-bit instances (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit applications).

  Define all your user databases as 64-bit DSNs in the odbc64.ini file, even if you deploy message flows to 32-bit execution groups, and you have defined 32-bit DSNs in odbc.ini.

  If the globally coordinated message flow applications use MRM messages, also define a 64-bit DSN for the broker database.

If you deploy message flow applications to a 32-bit execution group, enable 32-bit connections to all databases, including the broker database; see “Connecting to a database from Linux and UNIX systems” on page 89.

To configure a 64-bit DSN for a database:

1. Copy the odbc64.ini sample file that is supplied in the DD64 directory of your WebSphere Message Broker installation to a location of your choice; for example, copy the file to your user ID’s home directory. Copying this file enables each broker service user ID to use its own DSN definitions.

   See the sample file contents in “odbc64.ini sample file” on page 279.
2. Ensure that the odbc64.ini file has file ownership of `mqm:mqbrkrs`, and has the same permissions as the supplied odbc64.ini sample file.
3. Set the ODBCINI64 environment variable to point to yourodbc64.ini file, specifying a full path and file name.

   If you have already run the mqsiprofile script, the ODBCINI64 environment variable is set to a default value. Change the value of the variable so that it points to the location of your odbc64.ini file, ensuring that the fully-qualified file path is correct.
4. On all systems except HP-UX (Integrity platform), set the library search path environment variable to show the location of the 32-bit libraries for the database manager that you are using.

   If you are using a 64-bit queue manager (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit) to globally coordinate transactions, setting the library search path might prevent you from running any WebSphere MQ commands in the same environment. For more information, see "Implications of a 64-bit queue manager" in the *WebSphere MQ Quick Beginnings* book for your operating system. This book is available online on the WebSphere MQ library Web page.

   For more information about the library search path, see the database manager’s documentation.

   The library search path environment variable depends on your operating system:

   - On Linux and Solaris: LD_LIBRARY_PATH
   - On HP-UX: SHLIB_PATH
   - On AIX: LIBPATH

   a. If you are connecting to a 64-bit DB2 database instance, add *DB2 instance directory*/sqllib/lib32 to the start of the library search path environment variable; for example, on Solaris:

      ```
      export LD_LIBRARY_PATH=DB2 instance directory/sqllib/lib32:$LD_LIBRARY_PATH
      ```

      This step is necessary because some parts of the broker must see a 32-bit environment. However, this step might prevent you from running DB2 commands in this environment shell. To enter DB2 commands, start a separate environment shell, and run db2profile for the relevant database instance. If you have DB2 Version 9 installed, and are connecting to a 64-bit DB2 database instance on HP-UX, add *DB2 instance directory*/sqllib/lib32 to the start of the library search path for environment variable LD_LIBRARY_PATH, and SHLIB_PATH.

   b. If you are using a 64-bit Oracle instance, add `$ORACLE_HOME/lib32` to the start of the library search path environment variable.

      For example, on HP-UX:

      ```
      export SHLIB_PATH=$ORACLE_HOME/lib32:$SHLIB_PATH
      ```

This step is necessary because some parts of the broker must see a 32-bit environment.

5. If you are using a DB2 instance, set the environment variable MQSI_LIBPATH64 to include the regular 64-bit database libraries. For example, on AIX:

   ```
   export MQSI_LIBPATH64=DB2_instance_directory/sqllib/lib64:$MQSI_LIBPATH64
   ```

6. If you are using a DB2 database instance that is installed on AIX, a single process can make a maximum of 10 connections using shared memory to a DB2 database. Therefore, if you deploy more than one or two message flows at the same time, you might see connection failures characterized by the DB2 error message SQL1224N. The connection errors are reported in the system log from the broker's execution group. To resolve this issue, use TCP/IP mode to connect to the database instance; see DB2 error message SQL1224N is issued when you connect to DB2 for details.

7. Edit the final stanza in the odbc64.ini file (the [ODBC] stanza) to specify the location of the ODBC Driver Manager, and to control tracing. The exact details in the stanza depend on the operating system.

   To ensure that you edit the correct odbc64.ini file, open the file in the vi text editor using the following command:

   ```
   vi $ODBCINI64
   ```

   or `vi $ODBCINI` on Linux (x86 platform)

   a. In **InstallDir**, add the WebSphere Message Broker installation location to complete the fully qualified path to the ODBC directorythat is shown in the sample odbc64.ini. If you do not specify this value correctly, the ODBC definition will not work.

   b. In **Trace**, set the value to `0`; if your IBM Service representative asks you to enable ODBC trace, set the value to 1.

   c. In **TraceFile**, type the fully-qualified path and file name to which the ODBC trace is written. Trace files can become large; specify a directory with plenty of free disk space.

   d. In **TraceDll**, add the WebSphere Message Broker installation location to complete the fully qualified path to the ODBC trace DLLthat is shown in the sample odbc64.ini.

   e. Accept the default values that are shown in the sample odbc64.ini file for all the other entries in the stanza; for example, on AIX:

   ```
   [ODBC]
   Trace=0
   TraceFile=<A Directory with plenty of free space>/odbctrace.out
   TraceDll=<Your install directory>/DD64/lib/odbctrac.so
   InstallDir=<Your install directory>/DD64
   UseCursorLib=0
   IANAAppCodePage=4
   UNICODE=UTF-8
   ```

8. Edit the first stanza in the odbc64.ini file (the [ODBC Data Sources] stanza) to list the DSN of each database; for example: The DB2 database called *WBRKBKDB* in the example, is the broker database that is created by the Default Configuration wizard (available on Linux (x86 platform) only). If you are not using the default configuration, you do not need to list this database in the odbc64.ini file.

   List all your DSNs in your odbc64.ini file, regardless of the database manager. You can define multiple DSNs to resolve to the same database; however, if you are using global coordination of transactions, do not use this option because it might cause problems.

9. For each database that you listed in the [ODBC Data Sources] stanza, create a stanza in the odbc64.ini file after the [ODBC Data Sources] stanza. The entries in the stanza depend on the database manager. The information for different operating systems can differ; for example, the file paths to the drivers.

   For a DB2 database instance:

   a. In **Driver**, accept the value shown in the sample odbc64.ini file.
   b. In **Description**, type a meaningful description of the database. This text field is for information only, and does not affect the connection.
   c. In **Database**, type the DB2 alias. The data source name must be the same as the database alias name. If you are using a remote DB2 database, set up your client-server connection to resolve this alias to the correct database. For more information, see the DB2 documentation.

      For example, on AIX:

      ```
      [MYDB]
      Driver=libdb2Wrapper64.so
      Description=MYDB DB2 ODBC Database
      Database=MYDB
      ```

   For an Oracle database:

   a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver that is shown in the sample odbc64.ini file.
   b. In **Description**, type a meaningful description of the database. This text field is for information only, and does not affect the connection.
   c. In **HostName**, type the IP address of the instance on which the Oracle database is running.
   d. In **PortNumber**, type the port number on which the Oracle database is listening.
   e. In **SID**, type the Oracle System Identifier of the database as known on the Oracle database server.
   f. Accept the default values that are shown in the sample odbc64.ini file for all the other entries in the stanza; for example, on AIX:

      ```
      [ORACLEDB]
      Driver=<Your_install_directory>/merant/lib/UKor820.so
      Description=DataDirect 5.0  Oracle
      EnableDescribeParam=1
      OptimizePrepare=1
      ServerName=<Your Oracle host>
      WorkArounds=536870912
      ProcedureRetResults=1
      ColumnSizeAsCharacter=1
      ```

   For a Sybase database:

   a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver that is shown in the sample odbc64.ini file.
   b. In **Description**, type a meaningful description of the database. This text field is for information only, and does not affect the connection.
   c. In **Database**, type the name of the database to which to connect by default. If you do not specify a value, the default is the database that is defined by your system administrator for each user.

d. In **NetworkAddress**, type the network address of your Sybase ASE server (which is required for local and remote databases). Specify an IP address in the following format:

```
<servername or IP address>,<portnumber>
```

For example, `Sybaseserver,5000`. You can also specify the IP address directly; for example, `199.226.224.34,5000`. You can find the port number in the Sybase interfaces file, which is named `interfaces` on Linux and UNIX systems.

e. Accept the default values that are shown in the sample odbc64.ini file for all the other entries in the stanza; for example, on AIX:

```
[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<Your Server Name>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1
```

For an SQL Server database:

a. In **Driver**, add the WebSphere Message Broker installation location to complete the fully qualified path to the driver that is shown in the sample odbc64.ini file.

b. In **Description**, type a meaningful description of the database. This text field is for information only, and does not affect the connection.

c. In **Address**, type the network address of your database server (which is required for local and remote databases). Specify an IP address in the following format:

```
<servername or IP address>,<portnumber>
```

d. In **Database**, type the name of the database to which to connect by default. If you do not specify a value, the default is the database that is defined by your system administrator for each user.

e. Accept the default values that are shown in the sample odbc64.ini file for all the other entries in the stanza; for example, on AIX:

```
[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQLServer Host>,<Your SQLServer server port>
Database=<Your Database Name>
AnsiNPW=Yes
QuoteId=No
```

10. Ensure that you have edited all three parts of the odbc64.ini file:
    - The [ODBC Data Source] stanza at the top of the odbc64.ini file.
    - A stanza for each data source.
    - The [ODBC] stanza at the end of the odbc64.ini file.

    If you do not configure all three parts correctly, the ODBC DSNs will not work, and the broker will not be able to connect to the database.

You have now configured 64-bit ODBC database connections.

Now configure the environment for issuing console commands, and for running the broker, so that it can access the required database libraries. For more information, see "Setting your environment to access databases."

Setting your environment to access databases

When you have configured your ODBC data source names, you must also configure the environment for issuing console commands, and for running the broker, so that it can access the required database libraries. For example, if you have a DB2 broker database, you must add the DB2 client libraries to your library search path.

On Windows platforms, this is likely to have been done for you when you installed the database product.

On UNIX systems, and Linux, you need to run a profile for each database you need to access. For example, on DB2 you must run `db2profile`; other database vendors have similar profiles.

If you intend to use 32-bit execution groups on AIX, HP-UX, Solaris (SPARC platform) or Linux (x86-64 platform) you must ensure that the broker has an environment that presents 32-bit database libraries; the default database profile might present 64-bit libraries.

If you are using WebSphere MQ Version 6, refer to the section 'Implications of a 64-bit queue manager' in *WebSphere MQ Quick Beginnings* for your operating environment.

To set the broker's environment to present 32-bit database libraries:

- If you are using a 64-bit DB2 instance, ensure that you add to the end of the library search path environment variable after running `db2profile`.
- If the broker needs to access an Informix user database, add `$INFORMIX/lib:$INFORMIX/lib/esql:$INFORMIX/lib/cli` to the library search path environment variable (see the Informix product documentation for more information). You must ensure that any WebSphere Message Broker libraries appear *before* any Informix libraries in the library search path.
- If you are using a 64-bit Oracle instance, ensure that you add `$ORACLE_HOME/lib32` to the end of the library search path environment variable.
- If you are using 64-bit execution groups, ensure that you set the environment variable `MQSI_LIBPATH64` to include the regular 64-bit database libraries.

When you have set your environment to access databases, return to the instructions in "Configuring databases" on page 71.

Using retained publications with a Sybase database

If you have created a broker that uses a Sybase database, and you expect extensive use of retained publications with multiple topics, apply row-level locking to the retained publications table in the database. If you do not plan to use retained publications, or expect their use to be infrequent, you do not have to make this change.

If you do not apply row-level locking, and your use of retained publications is too great, the broker will experience deadlock problems.

To apply row-level locking:

1. At a command prompt enter the following command:

   ```
   isql -Umqsiuid -Pmqsipw
   ```

   If you have authorized another user ID and password for broker access to this database, substitute your values for `mqsiuid` and `mqsipw` in that command.
2. Connect to the broker database with this command:

   ```
   use WBRKBKDB
   ```

   If you have created your broker database with a different name, substitute your broker database name for `WBRKBKDB` in that command.
3. Update the retained publications table to use row-level locking with this command:

   ```
   alter table mqsiuid.BRETAINEDPUBS lock datarows
   ```

   If the owner of this database instance is not `mqsiuid`, substitute the correct schema name in that command.
4. Apply the change with this command:

   ```
   go
   ```

You can check that the change has been successfully applied by entering the commands:

```
sp_help BRETAINEDPUBS
go
```

The locking scheme is displayed: `lock scheme datarows`.

If the change has **not** completed, it is displayed as: `lock scheme allpages`.

Configuring databases for global coordination of transactions

If your message flow interacts with a user database, and you want to globally coordinate the updates made to the database with other actions within the message flow, configure your databases for global coordination.

Before you start, set up the required ODBC connections to the databases; see "Enabling ODBC connections to the databases" on page 85.

If you restart a user database while the broker is still running, you must also restart the broker. The broker cannot detect that the database has stopped, therefore WebSphere MQ retains its connections to the database. When the database starts again, the broker tries and fails to use these old connections.

To configure databases for coordinated message flows, follow the instructions relevant to your database manager:

- "Configuring DB2 for global coordination of transactions"
- "Configuring Oracle for global coordination of transactions" on page 102
- "Configuring Sybase for global coordination of transactions" on page 102

Configuring DB2 for global coordination of transactions

You must have database administrator (DBA) privileges to perform the following tasks.

To configure DB2 database instances for global coordination of transactions:

1. Windows On Windows systems only: for each 32-bit instance that will be involved in the global coordination, run the following commands to set the Transaction Process Monitor name (TP_MON_NAME) to MQ:

   ```
   db2 update dbm cfg using TP_MON_NAME MQ
   db2stop
   db2start
   ```

   UNIX Linux On Linux and UNIX systems, do not set this variable for 32-bit or 64-bit instances.

2. Ensure that you have adequate connection resources and find out from the broker administrator whether the broker will use TCP/IP or shared memory to connect to databases.

   To use TCP/IP connections, see the example in the section about message SQL1224N in Resolving problems when using databases.

   To enable shared memory:

   a. On the DB2 server, run the following commands to turn on extended shared memory:

      ```
      export EXTSHM=ON
      db2set DB2ENVLIST=EXTSHM
      db2stop
      db2start
      ```

   b. Ensure that shared memory support is turned on in the broker environment. For more information, see "Configuring global coordination with DB2 using a 32-bit queue manager" on page 222 or "Configuring global coordination with DB2 using a 64-bit queue manager" on page 226.

3. If you are connecting a broker on a distributed platform to a DB2 instance on z/OS, you must configure DB2 Connect™ to enable support for global coordination. Ensure that you have already configured a DB2 alias to represent the database using DB2 Connect.

   Perform the following tasks on the system that hosts the broker:

   a. Turn on the Connection Concentrator by configuring the DB2 database manager's configuration parameters so that the value of the MAX_CONNECTIONS parameter is greater than the value of the MAX_COORDAGENTS parameter:

      ```
      db2 update dbm cfg using MAX_CONNECTIONS MAX_CONNECTIONS_value
      ```

      where *MAX_CONNECTIONS_value* is greater than the existing value of the MAX_COORDAGENTS parameter.

   b. Define the SPM name as the name of the system that hosts the broker:

      ```
      db2 update dbm cfg using SPM_NAME host_name
      ```

      where *host_name* is the TCP/IP name of the system that hosts the broker.

   c. Stop then restart DB2 on the system that hosts the broker to apply the changes:

      ```
      db2stop
      db2start
      ```

      DB2 Connect is now configured to enable global coordination of message flows that are deployed to the broker (on a distributed platform) and that access DB2 on z/OS.

The DB2 database instances are now configured for global coordination.

Next: see “Configuring global coordination of transactions (two-phase commit)” on page 219.

Configuring Oracle for global coordination of transactions

You must have database administrator (DBA) privileges to perform the following tasks.

To configure Oracle databases for global coordination of transactions:

1. If you are using WebSphere MQ Version 6 to globally coordinate transactions, ensure that the JAVA_XA package is present on the Oracle database. Typically you can perform this task by running the initjvm.sql and initxa.sql scripts which are supplied with the Oracle installation; your database administrator (DBA) can tell you if these scripts have been run. For more information, see the Oracle product documentation.
2. Ensure that the user ID that the broker uses to access the database has the necessary Oracle privileges to access the DBA_PENDING_TRANSACTIONS view. You can grant the required access using, for example, the following Oracle SQLPLUS command:

   ```
   grant select on DBA_PENDING_TRANSACTIONS to <userid>;
   ```

The Oracle databases are now configured for global coordination.

Next: see “Configuring global coordination of transactions (two-phase commit)” on page 219.

Configuring Sybase for global coordination of transactions

You must have database administrator (DBA) privileges to perform the following task.

To configure Sybase databases for global coordination of transactions ensure that the user ID that the broker uses to access the database has been granted the Sybase role of `dtm_tm_role`.

The Sybase databases are now configured for global coordination.

Next: see “Configuring global coordination of transactions (two-phase commit)” on page 219

Customizing the z/OS environment

Although you might be installing only one broker initially, you might want to consider how the product will be used in your organization in a few years time. Planning ahead makes developing your WebSphere Message Broker configuration easier.

You might consider creating the Configuration Manager on z/OS to manage the broker domain:

- In a new installation of WebSphere Message Broker, or
- If you are migrating from an earlier version of the product, where the Configuration Manager was previously on Windows.

If you want to run a Configuration Manager on z/OS, you can either:

- Connect to the Message Brokers Toolkit directly, if you have the optional WebSphere MQ Client Attach feature installed; see "Connecting directly to a Configuration Manager on z/OS" on page 125, or
- Connect through an intermediate queue manager (for example, on Windows) and define the necessary WebSphere MQ components to communicate with the z/OS queue manager; see "Connecting to a z/OS Configuration Manager through an intermediate queue manager" on page 125.

If you are using publish/subscribe with security, you also require a User Name Server, which can be on z/OS or another platform.

The following rules apply:

- Queue managers must be interconnected, so that information from the User Name Server can be distributed to the brokers on other queue managers.
- A broker requires access to a queue manager and to DB2. See Database contents for details of the DB2 database user tables that are created.
- A Configuration Manager and User Name Server require access to a queue manager only.
- A broker cannot share its queue manager with another broker, but a broker can share a queue manager with a Configuration Manager and User Name Server.
- You cannot use WebSphere MQ shared queues to hold data related to WebSphere Message Broker as SYSTEM.BROKER queues, but you can use shared queues for your message flow queues.

You can find details of the WebSphere MQ queues that are created and used by WebSphere Message Broker on z/OS in "mqsicreatebroker command" on page 374.

When planning to work in a z/OS environment, you must complete the following tasks:

- Create started task procedures for the broker, User Name Server, and Configuration Managers that you plan to use. These procedures must be defined, in the started task table, with an appropriate user ID.
- Decide on your recovery strategy. As part of your systems architecture, you must have a strategy for restarting systems if they end abnormally. Common solutions are to use automation products like NetView or the Automatic Restart Manager (ARM) facility. You can configure WebSphere Message Broker to use ARM.
- Plan for corequisite products, including UNIX System Services, Resource Recovery Services, DB2, WebSphere MQ, and Java.
- Ensure that the runtime library system (RTLS) for the broker is turned off in the default options of the language environment for the system. This setting is required because the broker code is compiled using `XPLINK`, and `XPLINK` applications cannot be started while RTLS is active.
- Collect broker statistics on z/OS.

See the following topics for more information:

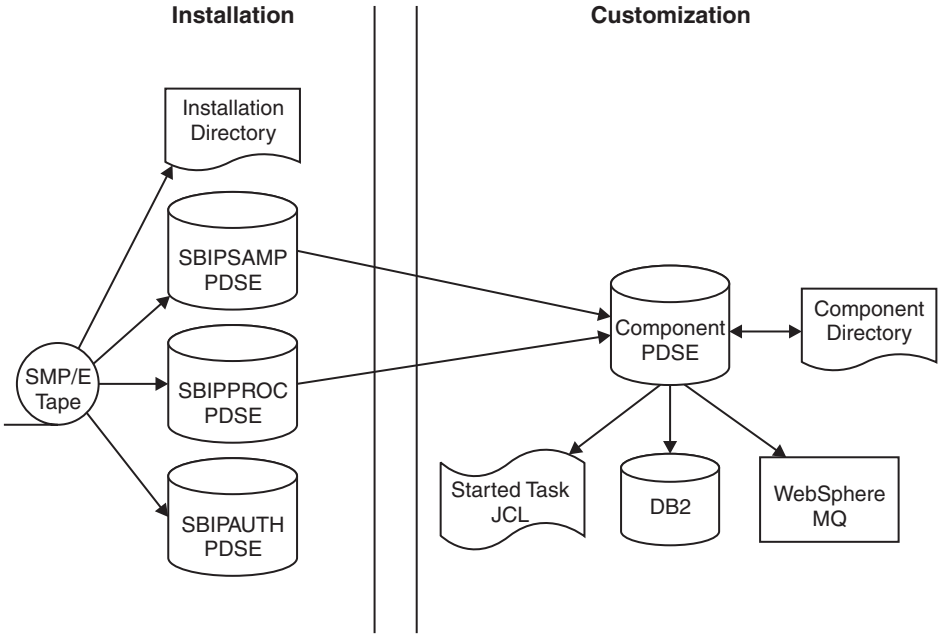
- "z/OS customization overview" on page 104
- "Customizing UNIX System Services on z/OS" on page 113
- "DB2 planning on z/OS" on page 115
- "WebSphere MQ planning for z/OS" on page 118
- "Resource Recovery Service planning on z/OS" on page 119
- "Defining the started tasks to z/OS Workload Manager (WLM)" on page 120

- "Automatic Restart Manager planning" on page 120
- "Mounting file systems" on page 121
- "Checking the permission of the installation directory" on page 121
- "Customizing the level of Java on z/OS" on page 122
- "Checking APF attributes of bipimain on z/OS" on page 122
- "Collecting broker statistics on z/OS" on page 123
- "Configuring an execution group address space as non-swappable on z/OS" on page 123

For an overview of how to create WebSphere Message Broker components, see "Creating WebSphere Message Broker components on z/OS" on page 124.

z/OS customization overview

After you have used SMP/E to install WebSphere Message Broker for z/OS, the installed executable code is located inside the file system. JCL samples are located in the PDS `<hlq>.SBIPSAMP`, the JCL procedures are located in the PDS `<hlq>.SBIPPROC`, and load module for synchronizing statistics with SMF are located in the PDS `<hlq>.SBIPAUTH`. The following diagram gives an overview of the post-installation process.



To perform the customization, update and submit the required JCL. All necessary JCL is supplied to create the runtime environments of your broker, Configuration Manager, and User Name Server. You start the broker, Configuration Manager, or User Name Server using one of the supplied JCL files, which is run as a started task.

For more information, see:

- "Installation directory on z/OS" on page 105
- "Components on z/OS" on page 105
- "Component directory on z/OS" on page 105

Installation directory on z/OS

On z/OS, the SMP/E installation places all the product executable files into a directory of a file system under UNIX System Services (USS).

For further information on mounting file systems and allocating space see "Mounting file systems" on page 121

Components on z/OS

A *component* is a set of runtime processes that perform a specific set of functions, and can be a broker, a Configuration Manager, or a User Name Server.

A broker processes messages, a Configuration Manager acts as an interface between the configuration repository and the set of brokers in the domain, and a User Name Server extracts information from a security product and makes it available to brokers and the workbench.

A broker that is running has a control address space and one additional address space for each deployed execution group. When the control address space is started, the broker component is started automatically. This behavior can be changed by an optional start parameter in the started task.

A Configuration Manager and User Name Server each have a single address space. When the address space is started, the components are started automatically. This behavior can be changed by an optional start parameter in the started task.

The *component name* is the external name of the component and is used, for example, in the WebSphere Message Broker workbench.

Each component requires a name, which is usually the name of the started task that runs the component. This is typically the queue manager name with a suffix of the facility; for example:

- `MQP1BRK` for the broker
- `MQP1UNS` for the User Name Server
- `MQP1CMGR` for the Configuration Manager

You only need a User Name Server if you are using publish/subscribe security. This User Name Server can exist anywhere in the network, including z/OS.

Each component has its own runtime environment in UNIX System Services and needs its own WebSphere MQ queue manager, although a broker, Configuration Manager, and User Name Server can share a single queue manager. A broker component also needs access to a database.

Component directory on z/OS

The *component directory* is the root directory of the component's runtime environment.

The *component directory* is also referred to as `ComponentDirectory` in some instances within the code. Both the WebSphere Message Broker administrator and the component require read and write access to the component directory. An example directory for each of the three components follows:

- `/mqsi/brokers/MQP1BRK` for the broker
- `/mqsi/uns/MQP1UNS` for the User Name Server
- `/mqsi/configmgrs/MQP1CMGR` for the Configuration Manager

For further information on mounting file systems and allocating space see "Mounting file systems" on page 121

Component PDSE on z/OS

On z/OS, the *component PDSE* contains jobs customized for a single component. These jobs are used to create and administer the component.

The members specific to a component type are copied from`<hlq>.SBIPSAMP` and `<hlq>.SBIPPROC` to the component PDSE. These are then customized for the component.

The broker started-task user ID requires read access to its component PDSE at runtime.

XPLink on z/OS

XPLink is a z/OS technology used by the C and C++ compilers to reduce the cost of function calling for programs written in these languages.

Many products, including WebSphere Message Broker for z/OS, use XPLink technology to improve their performance. To ensure the highest possible performance gains, WebSphere Message Broker requires as many as possible of the software components it uses to be XPLink-compliant. These include the broker, Java runtime, ODBC, and z/OS Language Environment.

The WebSphere Message Broker broker has been compiled by IBM to use XPLink technology and has been link-edited within the SMP/E environment to call the appropriate XPLink routines of the software components it uses. Normally, these XPLink-enabled components are configured during their customization, and the broker needs only to locate the appropriate libraries to become XPLink-enabled.

Binding a DB2 plan to use data-sharing groups on z/OS

During customization, you can specify which plan name to use, or use the default `DSNACLI`. If you are using XPLink, the default plan is called `DSNACLX`. If you want your broker to access DB2 data-sharing groups other than its own, the `DSNACLI` plan must be bound in a special way. If the broker uses one data-sharing group, but might want to access tables on `DSNONE` and `DSNTWO`, which are in different data-sharing groups, amend the DB2 supplied job `DSNTIJCL` so that it looks like this:

```
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIQR)
```

```
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIQR)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIQR)
BIND PLAN(DSNACLI)-
PKLIST(*.DSNAOCLI.DSNCLICS -
*.DSNAOCLI.DSNCLINC -
*.DSNAOCLI.DSNCLIRR -
*.DSNAOCLI.DSNCLIRS -
*.DSNAOCLI.DSNCLIUR -
*.DSNAOCLI.DSNCLIC1 -
*.DSNAOCLI.DSNCLIC2 -
*.DSNAOCLI.DSNCLIF4 -
*.DSNAOCLI.DSNCLIMS -
*.DSNAOCLI.DSNCLIQR )
```

Using the file system on z/OS

This is part of the larger task of customizing your z/OS environment.

If you have more than one MVS™ image, consider how you will use the file system. You can share files in a file system across different members of a sysplex. The file system is mounted on one MVS image and requests to the file are routed to the owning system using XCF from systems which do not have it mounted.

Moving a broker, User Name Server, or Configuration Manager from one image to another is straightforward and the files for each component can be shared.

However, there is a performance overhead when using files shared between images in a file system because the data flows through the Coupling Facility (this is true for trace and other diagnostic data).

For further information on mounting file systems and allocating space see "Mounting file systems" on page 121

Space requirements:

For details of the disk space required, see "Disk space requirements on z/OS" on page 489.

Event log messages on z/OS

This is part of the larger task of customizing your z/OS environment.

On z/OS, all address spaces have a job log where BIP messages issued by WebSphere Message Broker appear. Additionally, all messages appear on the `syslog` and important operator messages are filtered to the console using MPF (Message Processing Facility).

To prevent the operator's console receiving unnecessary BIP messages, you must configure MPF to suppress all BIP messages, with the exception of important messages. Note that you do not need to have the `USS SYSLOG` configured.

Security considerations on z/OS

This is part of the larger task of customizing your z/OS environment.

The role of the WebSphere Message Broker administrator includes customizing and configuring, running utilities, performing problem determination, and collecting diagnostic materials. People involved in these activities need WebSphere Message Broker authorities. You must set up some security for WebSphere Message Broker to work properly. The information that you need to do this is in "Setting up z/OS security" on page 37.

Overview of message serialization on z/OS

Some messaging transactions depend upon the exact sequence of messages from a queue, and for that sequence to be maintained in the event of a failure of the queue manager. In these instances you must serialize the access to those messages.

Serialization of messages is achieved through the use of specialized connection options, and a unique connection token when the application that empties the messages from a queue issues a connect call to the WebSphere MQ queue manager that owns that queue.

A typical situation in which WebSphere Message Broker can exploit this feature is the case where multiple brokers, with multiple execution groups, are each running message flows that empty from a shared input queue. If one broker queue manager fails, then the message flow can be automatically started on another broker while maintaining the transactional integrity and original sequencing of the messages on the shared queue.

The following examples demonstrate how these features can be applied:

1. "Serialization of input between separate brokers on z/OS" on page 109
2. "Serialization of input between separate execution groups running on the same broker on z/OS" on page 110
3. "Serialization of input within an execution group on z/OS" on page 111

Note the following:

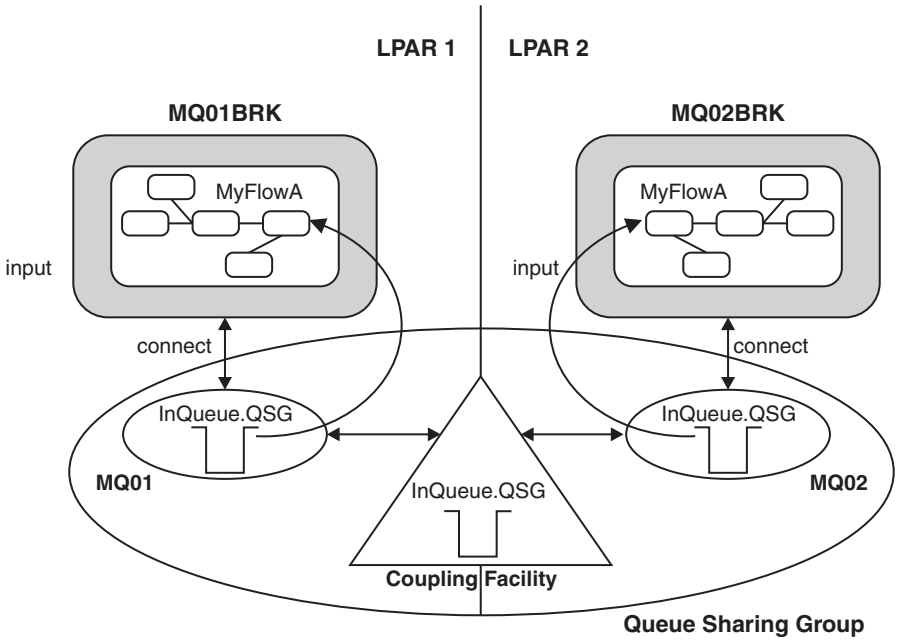
- In each of the first two examples there are two brokers configured, referred to as `MQ01BRK` and `MQ02BRK`; the broker's respective queue managers are called `MQ01` and `MQ02`.
- The queue managers participate in the same queue sharing group. Each queue manager has a shared queue `INQueue.QSG` that has been defined with a disposition of `QSG`, and a local queue called `INQueue`
- The queue managers can be running in the same Logical Partition (LPAR) or separate LPARs.
- The Coupling Facility shown in the following diagrams is a zSeries component that allows z/OS WebSphere MQ queue managers in the same system image, or different system images, to share queues.

Serialization of input between separate brokers on z/OS: This example demonstrates that only one input node at a time takes messages from a shared queue when the same serialization token is used by message flows running on separate brokers.

An identical message flow `MyFlowA` is deployed to an execution group called `MYGroupA` on each broker. Note that the message flows do not have to be identical; the significant point is that an identical serialization token is used in both flows.

The simple message flow in this example consists of an `MQInput` node connected to an `MQOutput` node. The `MQInput` node in both message flows gets messages from the shared queue `INQueue.QSG`; the node attribute `Serialization Token` is configured as `MyToken123ABC` in both `MQInput` nodes.

The message flow property `additional Instances` takes the default value of zero in both message flows, which ensures that input is serialized within the flow.



A typical sequence of events for this example follows:

1. The first broker `MQ01BRK` starts and runs message flow `MyFlowA` in execution group `MyGroupA`. The input node `MyInputNode` connects to queue manager `MQ01` using a serialization token `MyToken123ABC`. The input node successfully opens shared queue `INQUeue.QSG` and gets input messages.
2. The second broker `MQ02BRK` starts and begins to run its copy of message flow `MyFlowA` in execution group `MyGroupA`. The Input node `MyInputNode` attempts to connect to queue manager `MQ02` , also using a serialization token `MyToken123ABC`.

   The following SDSF console message is logged:

   ```
   BIP2656I MQ02BRK MyGroupA 17 UNABLE TO OPEN QUEUE
   'INQueue.QSG' ON WEBSPHERE BUSINESS INTEGRATION QUEUE
   MANAGER 'MQ02': COMPLETION CODE 2; REASON CODE 2271.
   :ImbCommonInputNode(759) BECAUSE SERIALIZATION TOKEN
   MyToken123ABC is already in use. NO USER ACTION REQUIRED.
   ```

   Note that this message is output every 30 minutes.

Message flow MyFlowA in execution group MyGroupA running on broker MQ02BRK is unable to process input because the serialization token it has passed is already in use within the queue sharing group. This is indicated by the reason code 2271 (MQRC_CONN_TAG_IN_USE) in message bip2623.

3. Broker MQ01BRK stops. Message flow MyFlowA in execution group MyGroupA in broker MQ02BRK2 is now able to get messages from the shared queue INQueue.QSG.

   A sequence of SDSF console messages is logged, of which the following two are relevant:

```
 BIP2091I MQ02BRK MyGroupA 17 THE BROKER HAS
RECONNECTED TO WEBSPHERE BUSINESS INTEGRATION
SUCCESSFULLY : ImbCommonInputNode(785)
 BIP9142I MQ01BRK 0 THE COMPONENT HAS STOPPED. :
ImbControlService(594)
```

The preceding sequence of events also occurs should broker MQ01BRK fail, rather than stop through a request from the operator, or if a new broker configuration is deployed to MQ01BRK that deletes or modifies message flow MyFlowA.

This arrangement can also be used where the requirement is to migrate message processing between brokers running in different z/OS system images that are attached to the same Coupling Facility.

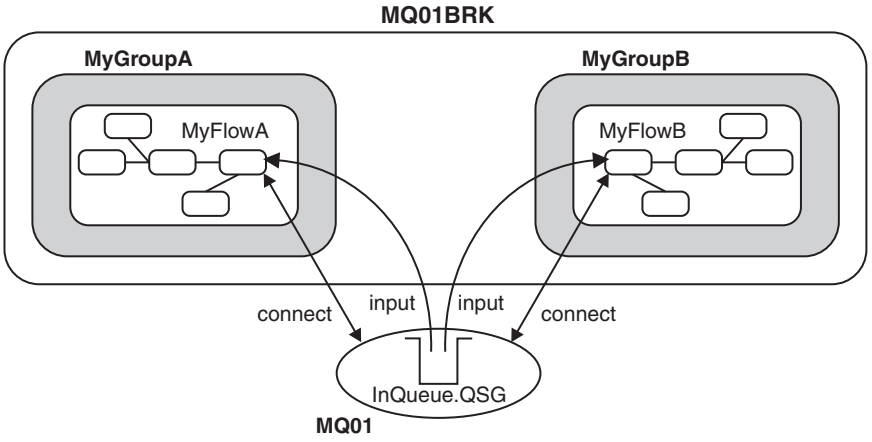
Serialization of input between separate execution groups running on the same broker on z/OS: This example demonstrates that only one MQInput node at a time is allowed to take messages from a shared queue when the same serialization token is used by message flows running in separate execution groups on the same broker.

An identical message flow MyFlowA is deployed to two execution groups called MYGroupA and MYGroupB on broker MQ01BRK.

In this case it is not a requirement that the queue manager participates in a queue sharing group. The input queue INQueue is defined as local with disposition QMGR.

As in "Serialization of input between separate brokers on z/OS" on page 109:

- Note that the message flows do not have to be identical; the significant point is that an identical serialization token is used in both flows.
- The simple message flow in this example consists of an MQInput node connected to an MQOutput node. The MQInput node in both message flows gets messages from the shared queue INQueue.QSG; the node attribute Serialization Token is configured as MyToken123ABC in both MQInput nodes.
- The message flow property additional Instances takes the default value of zero in both message flows, which ensures that input is serialized within the flow.



A typical sequence of events for this example follows:

1. Broker MQ01BRK starts and the first message flow to begin is MyFlowA in execution group MyGroupA. The MQInput node MyInputNode connects to queue manager MQ01 using the serialization token MyToken123ABC. The MQInput node successfully opens shared queue INQUeue and gets input messages.
2. The second execution group MyGroupB starts and message flow MyFlowA in execution group MyGroupB begins. The MQInput node MyInputNode now attempts to connect to queue manager MQ01 using serialization token MyToken123ABC. The following SDSF console message is logged:

   ```
   BIP2656I MQ01BRK MyGroupB 11 UNABLE TO OPEN QUEUE
   'INQueue' ON WEBSPHERE BUSINESS INTEGRATION QUEUE
   MANAGER 'MQ01':  BECAUSE SERIALIZATION TOKEN
   MyToken123ABC is already in use. NO USER ACTION REQUIRED
   ```

   Message flow MyFlowA in execution group MyGroupB is unable to process input because the serialization token it has passed is already in use within the queue manager (by the MQInput node in message flow MyFlowA in execution group MyGroupA). This is indicated by the reason code 2271 (MQRC_CONN_TAG_IN_USE) in message bip2623.
3. The first execution group is deleted or cancelled.

   If the first execution group is cancelled by the operator, abends, or is deleted during a redeployment of the broker configuration, then the input node in the second execution group is now able to get input messages from queue INQueue.

   A sequence of SDSF console messages is logged, of which the following one is relevant:

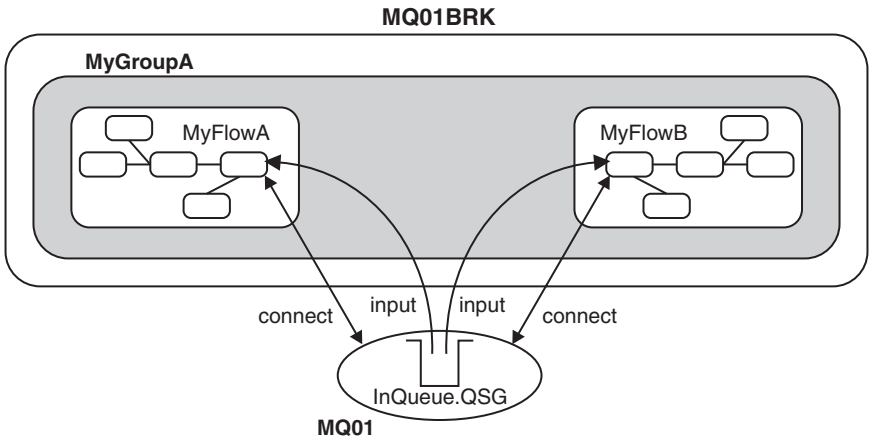
   ```
   BIP2091I MQ01BRK MyGroupB 11 THE BROKER HAS
   RECONNECTED TO WEBSPHERE BUSINESS INTEGRATION
   SUCCESSFULLY : ImbCommonInputNode(785)
   ```

Message flow MyFlowA in execution group MyGroupB is now able to recover processing of messages from the shared queue INQueue.QSG.

Note that, although serialization of input can be achieved in a similar manner by configuring the input queue for exclusive input, this does not ensure message integrity during a recovery situation. This can be achieved only through the use of the serialization token as described in this example.

Serialization of input within an execution group on z/OS: To allow concurrent processing within a message flow, while still serializing messages between message

flows in separate execution groups, the scope of the serialization token is restricted within a single execution group.



This example demonstrates that the serialization token is restricted within a single execution group running on a broker::

- Two `MQInput` nodes in separate message flows (in this case `MyFlowA` and `MyFlowB`) are running within the same execution group `MyGroupA`. Both `MQInput` nodes concurrently get messages from the shared input queue even though they are using the same serialization token.
- If serialization is required within a single message flow then the message flow attribute `additional instances` must be set to zero which is the default setting. However, if greater throughput is required and serialization of input within the flow is not important, you can set `additional instances` to a value greater than zero.
- The use of the `serialization token` attribute on the `MQInput` node does not serialize input between message flows operating within the same execution group. However, setting the attribute has no adverse affect on the processing within that execution group
- In this way it is possible to maximize throughput in a message flow on one broker while still serializing input between brokers. This is useful where the requirement is to have one or more brokers acting as an immediate standby, should the currently active broker need to be stopped for servicing, or fail unexpectedly.

Serialization token - user tasks on z/OS:

This topic gives an overview of the steps needed to:

- Configure a shared input queue for message flows
- Define a serialization token

Configure a shared input queue for message flows

The WebSphere Message Broker broker makes use of WebSphere MQ queue-sharing groups on z/OS.

Queue managers that can access the same set of shared queues form a group called a queue-sharing group (QSG) and they communicate with each other by means of

a coupling facility (CF) that stores the shared queues. A shared queue is a type of local queue whose messages can be accessed by one or more queue managers that are in a QSG.

To further enhance the availability of messages in a QSG, WebSphere MQ detects if another queue manager in the group disconnects from the CF in an unusual way, and completes pending units of work for that queue manager where possible; this is known as peer recovery.

To understand more fully the concepts of shared-queues and queue-sharing groups, see the *WebSphere MQ for z/OS Concepts and Planning Guide* and perform the following steps:

- Add a QSG to the DB2 tables
- Add a queue manager to a QSG
- Create the shared queue as a member of the QSG

Define a serialization token

Define the same value for the serialization token attribute for each `MQInput node` that is required to access the shared queue.

For the situations described in the preceding text to work you must:

- Ensure that the Coupling Facility Structure is at `CFLEVEL(3)` or above and that you set `RECOVER=YES`.

  If you do not do this, when an `MQInput node` attempts to get a message from the shared queue, the action fails with the WebSphere MQ return code 2048(`MQRC_PERSISTENT_NOT_ALLOWED`)
- Set the Backout Threshold for the shared queue to at least 2.

  This is to avoid input messages that are in progress being sent to the Dead Letter Queue because, during recovery, a message is restored to the input queue before another broker is able to get it and resume processing.

Customizing UNIX System Services on z/OS

This is part of the larger task of customizing your z/OS environment.

WebSphere Message Broker requires the setup of some UNIX System Services system parameters. You can use the SETOMVS operator command for dynamic changes or the BPXPRMxx PARMLIB member for permanent changes. See the *z/OS UNIX System Services Planning* manual for more information.

You can use the D OMVS,O command to display your current OMVS options (view the syntax for this command).

Do not include the broker addresses if you use the IEFUSI exit to limit the region size of OMVS address spaces.

Set the UNIX System Services parameters as follows:

Description	*Parameter*	*Value*
The maximum core dump file size (in bytes) that a process can create. Allow an unlimited size.	MAXCORESIZE	2 147 483 647

The CPU time (in seconds) that a process is allowed to use. Allow an unlimited CPU time.	MAXCPUTIME	2 147 483 647
The address space region size. Set to the size of the biggest address space.	MAXASSIZE	> 1 073 741 824 A minimum of 393 216 000 bytes is required.
Specifies the maximum number of threads that a single process can have active. Depends on the definitions of message flows.	MAXTHREADS MAXTHREADTASKS	The value of MAXTHREADS and MAXTHREADTASKS depends on your application. To calculate the value needed for each message flow: 1. Multiply the number of input nodes by the number of instances (additional threads +1). 2. Sum the values of all message flows, then add 10 to the sum. 3. Add to the sum the number of threads used for each HTTP listener.

Deploying a message flow, that starts an execution group in a new address space, uses USS Semaphore and SharedMemorySegment resources. In particular, each new address space uses a semaphore and SharedMemorySegment. The SharedMemorySegment is deleted immediately after the new address space has started, but the semaphore remains for the life of the new address space.

Certain USS system parameters can affect the start of a new execution group address space, if you set them incorrectly. These parameters include:

- IPCSEMNIDS
- IPCSHMNIDS
- IPCSHMNSEGS

You need a minimum of three semaphores for each execution group address space that is started.

You must set IPCSEMNIDS to a value four times the number of potential execution group address spaces on a system.

You need one SharedMemorySegment for each execution group address space started. You must set IPCSEMNIDS to a value that exceeds the number of potential execution group address spaces on a system.

A control address space (BIPSERVICE and BIPBROKER processes) can be attached to many SharedMemorySegments - potentially, one for each execution group address space started for that broker. You must set IPCSHMNSEGS to a value that exceeds the potential number of execution groups for each broker.

Ensuring sufficient space for temporary files

The environment variable TMPDIR is the path name of the directory being used for temporary files. If it is not set, the z/OS shell uses /tmp.

When starting WebSphere Message Broker components, sufficient space is required in the directory referenced by TMPDIR. In particular, Java needs sufficient space to hold all JAR files required by WebSphere Message Broker.

If you do not allocate sufficient space, the execution group address spaces will abend with a 2C1 code.

Allow at least 50 MB of space in this directory for broker components and 10 MB of space for Configuration Manager components. More space might be needed if you deploy large user-defined nodes or other JAR files to the broker component.

Defining WebSphere Message Broker files as shared-library programs

If you plan to deploy to more than one execution group on z/OS, the amount of storage required by the execution group address spaces can be reduced by setting the shared-library extended attribute on the following WebSphere Message Broker files:

```
/usr/lpp/mqsi/bin/*
/usr/lpp/mqsi/lil/*
/usr/lpp/mqsi/lib/*
/usr/lpp/mqsi/lib/wbirf/*
/usr/lpp/mqsi/lib/wbimb/*
/usr/lpp/mqsi/lib/wbieb/*
```

To set the shared-library attribute, use the **extattr** command with the +l option. For example:

```
extattr +l /usr/lpp/mqsi/bin/*
```

To find out if the shared-library extended attribute has been set, use the `ls -E` command. For example, use the `ls -E bipimain` command:

```
-rwxr-x---  a-s-  1 USER  GROUP   139264 Mar 15 10:05 bipimain
```

where **s** shows that the program is enabled to run in a shared address space.

Use the following command to check that you have enough SHRLIBRGNSIZE to contain all of the shared-library programs that are to be used on the system (view the syntax for this command):

```
/D OMVS,LIMITS
```

DB2 planning on z/OS

This is part of the larger task of customizing your z/OS environment and is relevant only to the broker component. The Configuration Manager and User Name Server do not require access to DB2.

WebSphere Message Broker for z/OS accesses DB2 tables using ODBC. To connect to DB2 using ODBC, the location name of the DB2 subsystem is used.

See the *DB2 UDB for OS/390 and z/OS V7 Data Sharing: Planning and Administration* manual for more details.

You need to give certain user IDs access to DB2 resources and these are summarized below:

- DB2 systems administrator
  1. Create database, storage groups and table spaces (`BIPCRDB`).

2. Drop database (BIPDLDB)

- Administrator for the broker database (DBA). This should be the WebSphere Message Broker administrator.
  1. Create tables and indexes (BIPCRBK)
  2. Create tables, drop tables and create indexes (BIPMGCMP)
- Broker started task user Id:
  1. SQL to select, insert, and delete rows from the broker database tables, and select from DB2 system tables.
- WebSphere Message Broker administrator and other users
  1. SQL to select, insert, and delete rows from the broker database tables, and select from DB2 system tables.

When your DB2 system starts up there should be a message DSNL004I DDF START COMPLETE. The location name is displayed just after this message. When you customize a broker component on z/OS you create a dsnaoini file called BIPDSNAO in the broker PDSE. It contains necessary information to establish the ODBC connection.

See the *DB2 UDB for OS/390 and z/OS V7 ODBC Guide and Reference* manual for more details.

You should avoid using a data source name that is the same as the subsystem ID or data sharing ID. If the same name is used, this might affect the granularity of directives on connection with the database.

If you choose to use the same value for the data source name and subsystem ID, you must edit BIPDSNAO in the broker PDSE so that the Datasource and Subsystem keywords are in one section.

See the *DB2 UDB for OS/390 and z/OS V7 ODBC Guide and Reference* manual for more information on customizing this file.

During customization you can specify which plan name to use, or use the default DSNACLI. If you want your broker to access DB2 data-sharing groups other than its own, the DSNACLI plan must be bound in a special way. Check the wildcard location is specified by using SPUFI and issuing the following command:

```
select * from SYSIBM.SYSPACKLIST where planname ='DSNACLI';
```

You should rebind if the location column is blank and not '*'.

You should also check that DSNACLI is in the SYSIBM.SYSPLAN table.

You will get significant performance benefits from using the CACHE DYNAMIC SQL facility of DB2, because this eliminates the need to reprocess DB2 statements.

See CACHEDYN=YES in the DB2 V7 library (z/OS).

If your user database is configured to use a comma as a decimal separator using the DSNHDECP module, you will find there is a restriction. If there is a mismatch between DB2 and the locale settings of the user ID under which the broker runs (specifically LC_NUMERIC), your user database updates can be unpredictable. LC_NUMERIC is set through the LC_ALL setting in the BIPBPROF member, and therefore the environment file. The following list details the four possibilities:

- If DB2 is configured to use a period as a decimal point and LC_NUMERIC is set to a value that indicates a period decimal point; user database updates should work correctly.
- If DB2 is configured to use a comma as a decimal point and LC_NUMERIC is set to a value that indicates a comma decimal point; user database updates should work correctly.
- If DB2 is configured to use a period as a decimal point and LC_NUMERIC is set to a value that indicates a comma decimal point; user database updates can lead to unpredictable behavior.
- If DB2 is configured to use a comma as a decimal point and LC_NUMERIC is set to a value that indicates a period decimal point; user database updates can lead to unpredictable behavior.

You can use the DB2 security mechanism, or if on z/OS 1.5 and DB2 Version 8 use an external security manager, for example, RACF.

DB2 security mechanism

The most practical way of managing access to a broker's DB2 resources is to define two RACF groups and connect users to these groups. For example, RACF groups MQP1ADM and MQP1USR are defined for broker MQP1BRK as follows:

- For group MQP1ADM
  1. Grant this group DBADM authority for the broker database.
  2. Typically owned by the WebSphere Message Broker administrator; user Ids must be added to this group who need to submit BIPCRBK to create a broker, or BIPMGCMP to migrate a broker.
- For group MQP1USR
  1. Give this group access to manipulate rows in the broker tables and allow select access to DB2 system tables. For example:

```
GRANT DELETE, INSERT, SELECT, UPDATE
     ON TABLE
              DB2_TABLE_OWNER.BSUBSCRIPTIONS
             ,DB2_TABLE_OWNER.BPUBLISHERS
             ,DB2_TABLE_OWNER.BCLIENTUSER
             ,DB2_TABLE_OWNER.BTOPOLOGY
             ,DB2_TABLE_OWNER.BNBRCONNECTIONS
             ,DB2_TABLE_OWNER.BRETAINEDPUBS
             ,DB2_TABLE_OWNER.BACLENTRIES
             ,DB2_TABLE_OWNER.BMQPSTOPOLOGY
             ,DB2_TABLE_OWNER.BUSERNAME
             ,DB2_TABLE_OWNER.BGROUPNAME
             ,DB2_TABLE_OWNER.BUSERMEMBERSHIP
             ,DB2_TABLE_OWNER.BROKERAA
             ,DB2_TABLE_OWNER.BROKERAAEG
             ,DB2_TABLE_OWNER.BROKERRESOURCES
             ,DB2_TABLE_OWNER.BRMINFO
             ,DB2_TABLE_OWNER.BRMRTDINFO
             ,DB2_TABLE_OWNER.BRMRTDDEPINFO
             ,DB2_TABLE_OWNER.BRMWFDINFO
             ,DB2_TABLE_OWNER.BRMPHYSICALRES
             ,DB2_TABLE_OWNER.BAGGREGATE
             ,DB2_TABLE_OWNER.BMULTICASTTOPICS
     TO MQP1USR;

GRANT SELECT
     ON TABLE
```

```
                SYSIBM.SYSTABLES
               ,SYSIBM.SYSSYNONYMS
               ,SYSIBM.SYSDATABASE
    TO MQP1USR;
```

2. If a message flow issues a CALL statement to invoke a stored procedure, add select access to the following DB2 system tables:

```
GRANT SELECT
     ON TABLE
                SYSIBM.SYSROUTINES
               ,SYSIBM.SYSPARMS
     TO MQP1USR;
```

3. Connect the broker started task user Id and the WebSphere Message Broker administrator to this group, and connect any other users who might need access to the tables, for example those submitting BIPRELG to run the mqsireadlog command.

Note the following:

- When accessing DB2 resources, you specify a CURRENT SQLID as a DB2 command, or through the BIPDSNAO member.

  If this Id is a group, then DB2 checks to see if your user Id is connected to this group, and if it is, you inherit the access from the group; if the user Id is not in the group, you get SQL code -551.

  If your Id is in multiple groups, then the highest authorities are used.
- For BIPCRDB and BIPDLDB the CURRENT SQLID is specified as a command in the JCL. For all other JCL it is specified in BIPDSNAO.
- If you do not use groups to define permissions, but use a specific user Id to define the permissions to individual user Ids, then, if the granting user Id is removed from DB2 any permissions that it gave are also removed. This can prevent other users working.
- When the BIPDLDB job drops the broker DB2 database, it also deletes any Image Copy references to itself that you currently have. If you restore the broker in future you need to reinstate the Image Copy references.

If this Id is a group, then DB2 checks to see if your user Id is connected to this group, and if it is, you inherit the access from the group; if the user Id is not in the group, you get SQL code -551. If your Id is in multiple groups, then the highest authorities are used.

If you do not use groups to define permissions, but use a specific user ID to define the permissions to individual user Ids, then, if the granting user Id is removed from DB2 any permissions that it gave are also removed. This can prevent other users working.

See “z/OS JCL variables” on page 495 for further information on the WebSphere Message Broker for z/OS jobs that are supplied.

WebSphere MQ planning for z/OS

This is part of the larger task of customizing your z/OS environment.

You are required to have a separate WebSphere MQ queue manager for each broker, User Name Server (although you would typically have only one User Name Server in your environment), and Configuration Manager. A broker, User

Name Server, and Configuration Manager however, can share the same queue manager. All WebSphere Message Broker for z/OS system queues are defined during customization.

Your queue manager needs a dead-letter queue. Check this by using the WebSphere MQ command:

```
+cpf  DIS QMGR DEADQ
```

Check the queue exists by using the command:

```
 +cpf DIS QL(name) STGCLASS
```

Then use the:

```
+cpf DIS STGCLASS(...)
```

to check the STGCLASS value is valid. If the queue manager does not have a valid dead-letter queue, you must define one.

Set up your channel initiator to use distributed queuing. You need channels between the z/OS queue manager and the queue manager of your Configuration Manager (if not on z/OS). If you are using Publish/Subscribe security, you also need access to the queue manager used by the User Name Server, which can be on z/OS or on another platform. You should be able to successfully start channels between the various queue managers before you can test that the broker is working. When configuring the transmission queues between the brokers on z/OS and the Configuration Manager, ensure you set the maximum message size of the queues to 100 MB. This allows large reply messages concerning deployment to be returned to the Configuration Manager. See “Creating a domain connection” on page 189 for details.

Creating and deleting components on z/OS requires the command server on the WebSphere MQ queue manager to be started, which is normally done automatically (refer to the *WebSphere MQ for z/OS System Administration Guide* for more details).

This requires a reply-to queue based on SYSTEM.COMMAND.REPLY.MODEL; by default, this model queue is defined as permanent dynamic. However, if you leave the queue defined in this way, each time you run a create or delete component command these reply-to queues remain defined to the queue manager. To avoid this you can set the SYSTEM.COMMAND.REPLY.MODEL queue as temporary dynamic.

Resource Recovery Service planning on z/OS

This is part of the larger task of customizing your z/OS environment.

WebSphere Message Broker for z/OS uses Resource Recovery Service (RRS) to coordinate changes to WebSphere MQ and DB2 resources. Ensure it is configured and active on your system, because your broker cannot connect to DB2 unless RRS is active.

Refer to the following manuals for detailed information about RRS: *z/OS V1R5.0 MVS Setting Up a Sysplex* and *z/OS V1R5.0 MVS Programming: Resource Recovery SA22-7616*.

Defining the started tasks to z/OS Workload Manager (WLM)

This is part of the larger task of customizing your z/OS environment.

If you are running z/OS in Workload mode, change the classification rules to add the started task names of the brokers, User Name Server, and Configuration Manager to the Started Task Control (STC) subsystem types, for example MQP1BRK, MQP1UNS, and MQP1CMGR to the OMVS subsystem types.

If you are running in compatibility mode, add the broker and User Name Server address spaces to the IEAICSxx member in SYS1.PARMLIB. For example, for a broker MQP1BRK, use the commands:

```
SUBSYS=STC
  ..
TRXNAME=MQP1BRK,PGN=35,RPGN=2010
  ..
SUBSYS=OMVS
 ..
TRXNAME=MQP1BRK%(1),PGN=35,RPGN=2011
  ../* Broker address spaces*/
```

The %(1) represents jobs beginning with MQP1BRK with one character following it. Define the priority of the broker lower than DB2 and WebSphere MQ.

Automatic Restart Manager planning

This is part of the larger task of customizing your z/OS environment.

WebSphere Message Broker for z/OS allows you to register a component to the Automatic Restart Manager (ARM).

When customizing a component, you register it with ARM by editing the following environment variables in the component's profile:

Description	Name
Switch that determines whether ARM will be used (YES or NO).	MQSI_USE_ARM
ARM element name	MQSI_ARM_ELEMENTNAME
ARM element type	MQSI_ARM_ELEMENTTYPE

By default components do not register to ARM; the initial setting is MQSI_USE_ARM=NO. You can override this by setting MQSI_USE_ARM=YES and providing an ARM element name and type.

MQSI_ARM_ELEMENTNAME must be a maximum of 8 characters in length, because WebSphere Message Broker adds a prefix of SYSWMQI. For example, if you supply the value MQP1BRK to ARM_ELEMENTNAME, the element you define in your ARM policy is SYSWMQI_MQP1BRK.

To enable automatic restart you must also:

- Set up an ARM couple data set.
- Define the automatic restart actions that you want z/OS to perform in an ARM policy.
- Start the ARM policy.

The following manuals provide detailed information about ARM couple data sets, including samples:

- *z/OS MVS Programming: Sysplex Services Guide*
- *z/OS MVS Programming: Sysplex Services Reference*
- *z/OS MVS Setting up a Sysplex*

Mounting file systems

For directories such as ++HOME++, ++COMPONENTDIRECTORY++, and ++INSTALL++ you must either create a directory, or mount a file system of this name, before using the directory.

To create a directory in an already mounted file system use the `mkdir` command. For example:

```
mkdir -p /mqsi/brokers/MQP1BRK
```

To mount a new file system, follow the instructions given in the *z/OS UNIX System Services Planning* manual.

From USS, use the following instruction:

```
mkdir -p /mqsi/brokers/MQP1BRK
```

From TSO, use the following instructions:

```
ALLOCATE DATASET('MQSI.BROKER.MQP1BRK') DSNTYPE(HFS) SPACE(5,5) DIR(1) CYL
FREE DATASET('MQSI.BROKER.MQP1BRK')
MOUNT FILESYSTEM('MQSI.BROKER.MQP1BRK') TYPE(HFS)
      MOUNTPOINT('/mqsi/brokers/MQP1BRK')
```

Note that the preceding `ALLOCATE` command is an example; the dataset should be allocated the correct amount of storage as described in "Disk space requirements on z/OS" on page 489

Checking the permission of the installation directory

This is part of the larger task of customizing your z/OS environment.

You must ensure that the appropriate user IDs, for example, the WebSphere Message Broker Administrator and any component Started Task user IDs have READ and EXECUTE permission to the WebSphere Message Broker installation directory.

You are recommended to set these permissions using the group access control.

1. Display the permissions on the installation directory using the `ls` command.

   ```
   ls -l /usr/lpp/mqsi
   ```

   This command displays lines similar to the following:

   ```
   drwxr-xr-x   2 TSOUSER  MQM     8192 Jun 17 09:54 bin
   ```

   In this example, MQM is the group associated with the directory. Those user IDs requiring permission to the directory must be a member of this group.

   This example also shows the permissions defined for the directory. User `TSOUSER` has `rwx` (READ, WRITE and EXECUTE), group MQM has `rx`, and any other user ID has `rx`.

2. Ensure that the user IDs requiring permission have a group that matches that of the installation directory. Use the following command, where `userid` is the ID you want to check:

   ```
   id <userid>
   ```

3. If the installation directory does not have a valid group, use the command `chgrp` to set the group of the directory:

   ```
   chgrp -R <group> <pathname>
   ```

   For example:

   ```
   chgrp -R MQSI /usr/lpp/mqsi
   ```

   You have to be the owner of the group or have superuser authority to use this command.

4. If the installation directory does not have the correct permissions for the group (READ / EXECUTE), use the command `chmod` to change the permissions:

   ```
   chmod -R g=rx <pathname>
   ```

   For example:

   ```
   chmod -R g=rx /usr/lpp/mqsi
   ```

Customizing the level of Java on z/OS

This task is part of the larger task of customizing your z/OS environment.

WebSphere Message Broker supports two versions of Java, version 1.4.2 and version Java 5(SR2). (Version 5 is also known as Java 1.5.) You can customize your environment to use either version.

1. Enter the following command from an OMVS window to check the current version of Java:

   ```
   java -version
   ```

   You receive a response similar to the following:

```
java version "1.4.2"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2)
Classic VM (build 1.4.2 J2RE 1.4.2 IBM z/OS Persistent Reusable VM build cm142-20040917
 (JIT enabled: jitc))
```

   The response in this example confirms that Java 1.4.2 is the current version. which is the minimum required level for this platform.

2. Enter the following command from an OMVS window to check the current version of Java:

   ```
   java -version
   ```

3. If you want to change the current Java version, edit the profile for the component (BIPBPROF for a broker, BIPUPROF for a User Name Server, BIPCPROF for a Configuration Manager). Because the version of Java used is defined in the component profile, you can specify a different version for each component. For further details about component profiles, see “Creating WebSphere Message Broker components on z/OS” on page 124.

Checking APF attributes of bipimain on z/OS

This is part of the larger task of setting up your z/OS environment.

Use the extattr command to display the attributes of the object bipimain. For example:

```
extattr /usr/lpp/mqsi/bin/bipimain
```

It should show APF authorized = YES. If it does not, use extattr +a bipimain to set this attribute. For example:

```
extattr +a /usr/lpp/mqsi/bin/bipimain
```

Note that you need the appropriate authorization to issue this command.

Collecting broker statistics on z/OS

If you need to write broker statistics to SMF, you need to have the library <HLQ>.SBIPAUTH in your STEPLIB.

This library and all the libraries in the STEPLIB concatenation need to be APF authorized.

You can use the "mqsichangeflowstats command" on page 334 with o=SMF for this purpose.

Configuring an execution group address space as non-swappable on z/OS

Because broker execution groups run as processes in UNIX System Services they cannot be set as NOSWAP in the PPT.

Instead, you can set the following environment variables in the broker environment file so that some, or all, of the address spaces of the broker execution groups request that they become non-swappable by the system; see "Creating the environment file" on page 138 for further information on adding an environment variable to a broker.

```
MQSI_NOSWAP=yes
```

sets the address spaces of all the execution groups to be non-swappable.

```
MQSI_NOSWAP_egname=yes
```

issues a request to the system, for each execution group labelled egname, that the address space be set as non-swappable.

```
MQSI_NOSWAP_uuid=yes
```

issues a request to the system, for each execution group with the UUID labelled uuid, that the address space be set as non-swappable.

In order for the above requests to succeed, the broker's started task ID needs READ access to the BPX.STOR.SWAP facility class through their external security manager, for example, RACF.

When an application makes an address space non-swappable, it can cause additional real storage in the system to be converted to preferred storage. Because preferred storage cannot be configured offline, using this service can reduce the installation's ability to re-configure storage in the future.

Creating WebSphere Message Broker components on z/OS

This is an overview of how you create WebSphere Message Broker components on z/OS.

Before you start

Before starting this task, you must have installed:

- WebSphere MQ for z/OS, with the optional JMS feature applied; for example, mounted at `/usr/lpp/mqm`.
- WebSphere Message Broker for z/OS, with a broker file system mounted, for example, `/usr/lpp/mqsi`.

Note: If you want to connect a Message Brokers Toolkit directly to the Configuration Manager on z/OS, you *must* install the optional WebSphere MQ Client Attach feature.

If you do not have the WebSphere MQ Client Attach feature installed you can connect the Message Brokers Toolkit through an intermediate queue manager.

You should also read through all the sub topics in the "Customizing the z/OS environment" on page 102 section, and follow any recommendations within those topics.

1. Determine the customization information for your environment. The following list of topics contains tables of information that needs to be gathered before you can proceed with creating a broker domain on z/OS. Complete the information that your enterprise requires.

   If necessary, discuss the requirements with your system, DB2, and WebSphere MQ administrators.

   - Broker:
     - "Installation information - broker and User Name Server" on page 133
     - "DB2 information" on page 134
     - "Component information - broker" on page 134
   - Configuration Manager:
     - "Installation information - Configuration Manager" on page 147
     - "Component information - Configuration Manager" on page 147
   - User Name Server:
     - "Installation information - broker and User Name Server" on page 133
     - "Component information - User Name Server" on page 156
2. Set up security for the started task user IDs. Start with "Setting up z/OS security" on page 37.
3. Plan your DB2 requirements; start with "DB2 planning on z/OS" on page 115
4. Create the broker by carrying out the tasks listed in "Creating a broker on z/OS" on page 133. Start at "Creating the broker PDSE" on page 135.
5. Create the Configuration Manager by carrying out the tasks listed in "Creating a Configuration Manager on z/OS" on page 146. Start at "Creating the Configuration Manager PDSE" on page 148
   a. Set up the connections between the Message Brokers Toolkit and the Configuration Manager .
      - If you are using the WebSphere MQ Client Attach feature, see "Connecting directly to a Configuration Manager on z/OS" on page 125.

- If you are connecting through an intermediate queue manager, see "Connecting to a z/OS Configuration Manager through an intermediate queue manager."

6. Optionally, create the User Name Server by carrying out the tasks listed in "Creating a User Name Server on z/OS" on page 155. Start at "Creating the User Name Server PDSE" on page 157.

Connecting directly to a Configuration Manager on z/OS

Connection to the z/OS Configuration Manager directly, can be from:

- The Message Brokers Toolkit.
- A Configuration Manager Proxy (CMP) application.
- One of the WebSphere Message Broker commands used for the Configuration Manager, for example mqsicreateexecutiongroup.

All of these connect through a WebSphere MQ server-connection channel. The default name for this is `SYSTEM.BKR.CONFIG` but you can use another value. You can connect directly to this channel only if you have the optional WebSphere MQ Client Attach feature installed.

An alternative is to connect through an intermediate queue manager; see "Connecting to a z/OS Configuration Manager through an intermediate queue manager."

Before you start

Before starting this task, you must have set up your system components as described in "Creating WebSphere Message Broker components on z/OS" on page 124.

Set up the connections between the Message Brokers Toolkit and the Configuration Manager by carrying out the following tasks:

1. Verify that your queue manager and channel initiator are running and that the channel initiator is listening on the appropriate port.

   For more information see your WebSphere MQ documentation.

2. Ensure that your Configuration Manager is running; see "Starting and stopping a Configuration Manager on z/OS" on page 259.
3. Ensure that your user ID has been given the appropriate authorization on the z/OS Configuration Manager.

   In SDSF, grant FULL domain access to user ID `test1`. For all machines enter:

   ```
   '/F WMQxCFG CA U=test1,A=YES,P=YES,X=F'
   ```

   To grant access to a specific machine for user `test1`, enter:

   ```
   '/F WMQxCFG CA U=test1,M=mymachine,P=YES,X=F'
   ```

4. Create a new domain connection; see "Creating a domain connection" on page 189.

Connecting to a z/OS Configuration Manager through an intermediate queue manager

This procedure enables you to connect a Message Brokers Toolkit to a z/OS Configuration Manager without the need for the WebSphere MQ Client Attach feature.

You do this by using an intermediate queue manager on another platform, for example, Windows.

When carrying out this task, see your WebSphere MQ documentation for more information.

Before you start

Before starting this task, you must have set up your system components as described in "Creating WebSphere Message Broker components on z/OS" on page 124

1. Set up the connections between the Message Brokers Toolkit and the Configuration Manager by carrying out the following tasks:
   a. Verify that your queue manager and channel initiator are running and that the channel initiator is listening on the appropriate port.

      For more information see your WebSphere MQ documentation.
   b. Ensure that your user ID has been given the appropriate authorization on the z/OS Configuration Manager.

      In SDSF, grant FULL domain access to user Id `test1`. For all machines enter:

      ```
      '/F WMQxCFG CA U=test1,A=YES,P=YES,X=F'
      ```

      To grant access to a specific machine for user `test1`, enter:

      ```
      '/F WMQxCFG CA U=test1,M=mymachine,P=YES,X=F'
      ```
2. Connect the Windows queue manager to the z/OS queue manager using WebSphere MQ channels and a transmission queue. The connection must be bidirectional.
3. Ensure that you have started all the channels.
4. Create a server connection on the Windows queue manager. The default name for this connection is `SYSTEM.BKR.CONFIG`, but you can use another value for the WebSphere Message Broker client connection. The Message Brokers Toolkit connects to a server connection of this name on the identified queue manager.
5. Start the Configuration Manager on z/OS; see "Starting and stopping a Configuration Manager on z/OS" on page 259.
6. Start the Message Brokers Toolkit on Windows.
7. Create a new domain connection; see "Creating a domain connection" on page 189.
8. Enter the following connection parameters for the domain connection:

   ```
   hostname = (windows machine name, for example, localhost)
   port = (listener port for Windows queue manager, for example, 1414)
   queue manager = (z/OS queue manager, for example, MQ05)
   ```
9. Right click on **Domain** and select **Connect** to connect the Message Brokers Toolkit to the z/OS Configuration Manager.

WebSphere Message Broker and WebSphere MQ setup verification

Whenever a component (that is a broker, User Name Server, or Configuration Manager) starts, a basic component verification runs automatically. This verification checks:

- Basic WebSphere MQ information
- DB2 information

- Registry information
- Setup verification

If an error is found the component does not start. All output from the verification step is written to the component's JOBLOG.

You also need to validate that the entire WebSphere Message Broker system you installed is running correctly; that is, there are no errors in the system and that the system is performing as expected. This is especially important where you are installing WebSphere Message Broker for the first time.

You should download and review *WebSphere Message Broker SupportPac IP13*.

This SupportPac provides:

- Tools to help test WebSphere Message Broker flows running on z/OS. These tools provide:
  - Put and get user messages
  - Measurement of the elapsed time
  - CPU time used to process the messages
  - Recommendations on the environment configuration.
- Recommendations on designing flows for evaluation, to reduce the need for applications outside of the WebSphere Message Broker environment.
- WebSphere Message Broker flows, which allow you to compare the throughput you achieve in your environment with that achieved at IBM. Using the tools supplied in *WebSphere Message Broker SupportPac IP13* can give suggestions as to why the results might be different.

Select the following link to access *WebSphere Message Broker SupportPac IP13* - IP13.

Configuring broker domain components

Create and configure the components you want on the platform of your choice.

Before you start:

Ensure that the following requirements are met:

- Your user ID has the correct authorizations to perform the task. These are defined in "Security requirements for administrative tasks" on page 537.
- On Windows platforms, you have created a new user ID, the service user ID. This ID is specified during component creation and is used to run the component (the Configuration Manager, broker, and User Name Server).
- Refer to "Planning for security when you install WebSphere Message Broker" on page 15 for more information on user ID authorization and creation.
- You have initialized the command environment on distributed systems. See Setting up a command environment.

To create, modify, or delete a WebSphere Message Broker component:

- Select the task for the component and action that you require from the following list.
- Select the platform that you require from within the task.

or

- From within the Table of Contents, select the top-level container for the component and that action that you require.

- Expand the container.
- Select the platform that you require from the list.

On Windows, you can create, modify, and delete physical components using the Command Assistant wizard.

If you require a default broker domain configuration on Linux or Windows, you can use the Default Configuration wizard. The Default Configuration wizard creates all the components you need to start exploring WebSphere Message Broker and run the supplied samples. See "Using the Default Configuration wizard" on page 165.

When you have created your physical components you can configure the broker domain using either the workbench, or programmatically using the Configuration Manager Proxy Java API.

The following set of tasks describes creating and configuring component databases, and creating, modifying, and deleting the physical broker domain components and associated resources using the command line. For information on the using the Configuration Manager Proxy Java API, see Developing applications using the CMP.

This collection of tasks uses specific resource names, user IDs, and so on. These names are examples only; if you want to use your own names, make a note of the changes that you want to make, and remember to apply them. Follow existing naming conventions for WebSphere MQ and other resources.

- "Configuring databases" on page 71
- "Creating a broker" on page 129
- "Adding an execution group to a broker using the command line" on page 140
- "Adding an execution group to a broker on z/OS" on page 141
- "Creating a Configuration Manager" on page 141
- "Enabling a User Name Server" on page 151
- "Creating a User Name Server" on page 151
- "Using the Default Configuration wizard" on page 165
- "Using the Command Assistant wizard" on page 168
- "Verifying components" on page 169
- "Connecting components" on page 170
- "Configuring timeouts" on page 172
- "Modifying a broker" on page 173
- "Modifying a Configuration Manager" on page 176
- "Modifying a User Name Server" on page 179
- "Modifying access to the broker database" on page 181
- "Moving from WebSphere Message Broker on a distributed platform to z/OS" on page 182
- "Deleting a broker" on page 183
- "Deleting an execution group from a broker using the command line" on page 182
- "Deleting a Configuration Manager" on page 185
- "Disabling a User Name Server" on page 186
- "Deleting a User Name Server" on page 187

Creating a broker

You can create brokers on any platform supported by WebSphere Message Broker. On all platforms apart from HP-UX (Integrity platform), the broker runs as a 32-bit application, even if you subsequently create 64-bit execution groups on the broker. On HP-UX (Integrity platform), the broker is always a 64-bit application.

Create a broker using the command line on the system where the broker component is installed. On Windows and Linux (x86 platform), you can alternatively use the Command Assistant in the Message Brokers Toolkit to complete this task.

You must give the broker a name that is unique within the broker domain. Broker names are case-sensitive on all supported platforms, except Windows.

Follow the instructions appropriate to the platform on which you are creating the broker:

- "Creating a broker on Windows" on page 132
- "Creating a broker on Linux and UNIX systems" on page 130
- "Creating a broker on z/OS" on page 133

Using WebSphere MQ trusted applications

Before you start:

You must complete the following tasks:

- Ensure that your user ID is a member of the **mqm** group. On HP-UX and Solaris, specify the user ID **mqm** as the service user ID when you create the broker. On Windows, use any service user ID that is a member of **mqm**. Refer to "Security requirements for administrative tasks" on page 537.
- Review the restrictions that WebSphere MQ places on trusted applications that apply to your environment. See the section "Connection to a queue manager using the MQCONNX call" in the *WebSphere MQ Application Programming Guide*, available on the WebSphere MQ library Web page.

You can configure a broker to run as a trusted (fastpath) application on all supported platforms, with the exception of z/OS where the option is not applicable. If the broker is configured as a trusted application, it runs in the same process as the WebSphere MQ queue manager agent, and all broker processes benefit from an improvement in the overall system performance.

A broker does not run as a trusted application by default; you either create a trusted application using the **"mqsicreatebroker command" on page 374**, or modify an existing broker using the **"mqsichangebroker command" on page 319**.

Configuring a broker as a trusted application does not affect the operation of WebSphere MQ channel agents or listeners. For more information about running these as trusted applications, see the section "Running channels and listeners as trusted applications" in *WebSphere MQ Intercommunication*, available on the WebSphere MQ library Web page.

Take care when deploying user-defined nodes or parsers. Because a trusted application (the broker) runs in the same operating system process as the queue manager, a user-defined node or parser might compromise the integrity of the

queue manager. Consider fully the restrictions that apply to your environment and test user-defined nodes and parsers in a non-trusted environment before deploying them in a trusted broker.

You can either configure a new broker to run as a trusted application, or modify an existing broker.

- To configure a new broker, on a command line run the **mqsicreatebroker** command with the -t flag, which specifies that the broker is created as a trusted application.

  For example, enter the following command to create a broker called WBRK_BROKER as a trusted application:

  ```
  mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw
  -q WBRK_QM -n WBRKBKDB -u wbrkuid -p wbrkpw -t
  ```

  Refer to "Creating a broker" on page 129 for more detailed information about how to create a broker for your platform.
- To modify an existing broker:
  1. Run the **mqsistop** command on the command line to stop the broker.
  2. Run the **mqsichangebroker** command with the -t flag. For example, enter the following command to modify a broker called WBRK_BROKER to run as a trusted application:

     ```
     mqsichangebroker WBRK_BROKER -t
     ```

     You might need to change the service user ID and password if you did not originally create the broker to use an appropriate service user ID.

     Refer to "Modifying a broker" on page 173 for more detailed information on how to modify a broker for your platform.
  3. Restart the broker using the **mqsistart** command. The broker restarts with fastpath set.

Creating a broker on Linux and UNIX systems

On Linux and UNIX systems, you create brokers on the command line; on Linux (x86 platform), you can also create brokers in the Message Brokers Toolkit using the Command Assistant wizard.

Before you start:

- Ensure that the broker database has been created. If you are not sure, check with your database administrator (DBA).
- If you want to configure the broker as a WebSphere MQ trusted application, see "Using WebSphere MQ trusted applications" on page 129.
- Read "Considering security for a broker" on page 19.

When you create a broker, if the queue manager does not already exist, the queue manager is automatically created. The broker database must already exist, but the tables in which the broker stores its internal data are created automatically when the first broker to use that database is created. Subsequent brokers that are created using the same database and database user ID will share these tables.

To create a broker:

1. Ensure that the user ID that the broker uses to connect to the broker database is authorized to create tables in the broker database. If you are not sure, check with your database administrator (DBA). The broker connects to the broker database using the user ID and password that you specify in the **-i** and **-u** parameters of the mqsicreatebroker command when you create the broker.

For more information, see "Authorizing access to the databases" on page 83.

2. Define the ODBC data source name (DSN) of the broker database to enable the broker to make a connection. Multiple brokers on the same host can use the same ODBC DSN to connect to the same broker database.

   Linux On Linux (zSeries platform) and Linux (POWER platform), the only supported database manager is DB2, ODBC is not used; the broker connects to the broker database directly. When you create the broker, use the DB2 alias of the database as the data source name.

   For more information, see "Enabling ODBC connections to the databases" on page 85.

3. Ensure that you are logged in using a user ID that has authority to run the mqsicreatebroker command.

4. Run the mqsiprofile script to set up the command environment for the broker:

   ```
   . install_dir/bin/mqsiprofile
   ```

   You must run this script before you can run any of the WebSphere Message Broker commands.

   For more information, see Setting up a command environment.

5. Run the SQL profile that was created when the broker database was created. For example, if the broker database is a DB2 instance, run the `db2profile`. For more information, see "Setting your environment to access databases" on page 99.

6. Use the mqsicreatebroker command to create the broker.

   For example, if you want to create a broker called WBRK_BROKER on a queue manager called WBRK_QM with a broker database that has the data source name WBRKBKDB, enter the following command:

   ```
   mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw
   -q WBRK_QM -n WBRKBKDB -u dbuid -p dbpw
   ```

   where:

   - *wbrkuid* and *wbrkpw* are the user name and password under which the broker runs.
   - *dbuid* and *dbpw* are the user name and password that the broker uses to access the broker database and create tables to store its internal data.

   If you want to add a User Name Server to your broker domain, create the broker with the additional **-s** and **-j** parameters on the mqsicreatebroker command. For more information, see "Enabling a User Name Server" on page 151.

   For more information about the command options, see "mqsicreatebroker command" on page 374.

You have created and started a broker.

Next, you must perform the following tasks:

1. Create any other components that you need.
2. Create a WebSphere MQ infrastructure to connect the components together; see "Connecting components" on page 170.
3. Add the broker to the broker domain:
   - To add the broker using the workbench, see "Adding a broker to a broker domain" on page 193.
   - To add the broker using the Configuration Manager Proxy Java API, see Creating domain objects using the Configuration Manager Proxy.

When you have completed these tasks, the broker is ready to use.

Creating a broker on Windows

On Windows, you can create brokers on the command line or using the Command Assistant wizard in the Message Brokers Toolkit.

Before you start:

- Ensure that the broker database has been created. If you are not sure, check with your database administrator (DBA).
- If you want to configure the broker as a WebSphere MQ trusted application, see "Using WebSphere MQ trusted applications" on page 129.
- Read "Considering security for a broker" on page 19.

When you create a broker, if the WebSphere MQ queue manager does not already exist, the queue manager is automatically created. The broker database must already exist but the tables in which the broker stores its internal data are created automatically when the first broker to use that database is created. Subsequent brokers that you create specifying the same database and database user ID share these tables.

To create a broker:

1. Ensure that the user ID that the broker uses to connect to the broker database is authorized to create tables in the broker database. If you are not sure, check with your database administrator (DBA). The broker connects to the broker database using the user ID and password that you specify in the **-i** and **-u** parameters of the mqsicreatebroker command when you create the broker.

   For more information, see "Authorizing access to the databases" on page 83.
2. Define the ODBC data source name (DSN) of the broker database to enable the broker to make a connection. Multiple brokers on the same host can use the same ODBC DSN to connect to the same broker database.

   For more information, see "Enabling ODBC connections to the databases" on page 85.
3. Open a WebSphere Message Broker command prompt for the runtime installation in which you want to create the broker. For more information about initializing the runtime environment, see Command environment: Windows platforms.
4. Use the mqsicreatebroker command to create the broker.

   For example, if you want to create a broker called WBRK_BROKER on a queue manager called WBRK_QM with a broker database that has the data source name WBRKBKDB, enter the following command:

   ```
   mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw
   -q WBRK_QM -n WBRKBKDB -u dbuid -p dbpw
   ```

   where:

   - *wbrkuid* and *wbrkpw* are the user name and password under which the broker runs.
   - *dbuid* and *dbpw* are the user name and password that the broker uses to access the broker database and create tables to store its internal data.

   If you want to add a User Name Server to your broker domain, create the broker with the additional **-s** and **-j** parameters on the mqsicreatebroker command. For more information, see "Enabling a User Name Server" on page 151.

For more information about the command options, see “mqsicreatebroker command” on page 374.

You have created and started a broker.

Next, you must perform the following tasks:

1. Create any other components that you need.
2. Create a WebSphere MQ infrastructure to connect the components together; see “Connecting components” on page 170.
3. Add the broker to the broker domain:
   - To add the broker using the workbench, see “Adding a broker to a broker domain” on page 193.
   - To add the broker using the Configuration Manager Proxy Java API, see Creating domain objects using the Configuration Manager Proxy.

When you have completed these tasks, the broker is ready to use.

Creating a broker on z/OS

The process for creating a broker involves the following tasks:

1. “Collecting the information required to create a broker”
2. “Creating the broker PDSE” on page 135
3. “Creating the broker directory on z/OS” on page 135
4. “Customizing the broker component data set” on page 136
5. “Customizing the broker JCL” on page 136
6. “Creating the environment file” on page 138
7. “Priming DB2” on page 138
8. “Creating the broker component” on page 139
9. “Copying the broker started task to the procedures library” on page 140

Collecting the information required to create a broker:

This is part of the larger task of creating a broker on z/OS.

You need to complete the information in each of the tables, at the following links, before continuing:

- “Installation information - broker and User Name Server”
- “DB2 information” on page 134
- “Component information - broker” on page 134

Installation information - broker and User Name Server:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in “z/OS JCL variables” on page 495.

Description	JCL variable	Example installation value	Your installation value
Fully qualified name of the product’s SBIPPROC dataset	N/A	<hlq>.SBIPPROC	
Fully qualified name of the product’s SBIPSAMP dataset	N/A	<hlq>.SBIPSAMP	

File system directory where the product has been installed	++INSTALL++	/usr/lpp/mqsi	
WebSphere MQ high-level qualifier	++WMQHLQ++	MQM.V531	
Location of Java installation	++JAVA++	/usr/lpp/java/IBM/J1.4	
Location of IBM XML Toolkit installation	++XMLTOOLKIT++	/usr/lpp/ixm/IBM/xml4c-5_5	
Locale of environment where commands are run by submitting JCL	++LOCALE++	C	
Time zone of environment where commands are run by submitting JCL	++TIMEZONE++	GMT0BST	

DB2 information:

Collect the information explained in the Description column and complete the values you require for your particular system. You can see a complete list of variables that you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example installation value	Your installation value
DB2 high-level qualifier	++DB2HLQ++.	SYS2.DB2.V710	
DB2 run library value	++DB2RUNLIB++	DSN710PK.RUNLIB.LOAD	
DB2 subsystem identifier	++DB2SUBSYSTEM++	DFK4	
DB2 plan name	++DB2DSNACLIPLAN++	DSNACLI	
DB2 program value	++DB2SAMPLEPROGRAM++	DSNTEP2	
DB2 plan value	++DB2SAMPLEPROGRAMPLAN++	DSNTEP71	
DB2 location value of the DB2 subsystem	++DB2LOCATION++	DSN710PK	
DB2 converter	++DB2CONVERSION++	SINGLE	
DB2 user ID for the component and commands	++DB2CURRENTSQLID++	MQPIBRK	
DB2 table owner user ID	++DB2TABLEOWNER++	MQP1BRK	

Component information - broker:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example component value	Your component value
Home directory of the file system for the broker's user ID	++HOME++	/u/mqp1brk	
Queue Manager associated with the broker	++QUEUEMANAGER++	MQP1	

File system directory where the broker is to exist	++COMPONENTDIRECTORY++	/mqsi/brokers/MQP1BRK	
Broker name	++COMPONENTNAME++	MQP1BRK	
Data set where all JCL relevant to the broker is saved	++COMPONENTDATASET++	TESTDEV.BROKER.MQP1BRK	
Profile name	++COMPONENTPROFILE++	BIPBPROF	**BIPBPROF**
Name of the Started Task JCL; can be a maximum of 8 characters	++STARTEDTASKNAME++	MQP1BRK	
Name of the broker DB2 database	++DB2DATABASE++	DMQP1BRK	
Name of the broker DB2 storage group	++DB2STORAGEGROUP++	MQP1STOR	
Name of the broker DB2 bufferpool	++DB2BUFFERPOOL++	BP0	
DB2 index bufferpool	++DB2INDEXBP++	BP0	
DB2 LOB table bufferpool	++DB2LOBBP++	BP0	
mqsicreatebroker options	++OPTIONS++	Any additional optional parameters for the **mqsicreatebroker** command	

Creating the broker PDSE:

This is part of the larger task of creating a broker on z/OS.

Each broker requires a PDSE or a PDS. A PDSE is preferable to a PDS because free space is available without the need to compress the data set.

Create the broker PDSE, for example using option 3.2 on ISPF. The name of the PDSE must be the same as the JCL variable `++COMPONENTDATASET++`. Allocate a data set with:

- Eight directory blocks
- 15 tracks (or 1 cylinder) of 3390 DASD with a record format of fixed blocked 80
- A suitable block size (for example 27920)
- A data set type of `library`

Creating the broker directory on z/OS:

This is part of the larger task of creating a broker on z/OS .

Before you start

Before starting this task, you must have completed “Collecting the information required to create a broker” on page 133 and “Creating the broker PDSE.”

1. Use the TSO command OMVS to get into OMVS.
2. Create the broker root directory using the command:

   ```
   mkdir -p <ComponentDirectory>
   ```

   The name of the directory must be the same as the JCL variable `++COMPONENTDIRECTORY++`.

3. Display the contents of the directory, which is currently empty, using the command:
   ```
   ls -dl /var/wmqi/MQP1BRK
   ```
4. Display the permissions on the directory using the command:
   ```
   ls -l /var/wmqi/MQP1BRK
   ```
5. Ensure that the user ID of the person doing the customization has a group that matches the group of the directory. Use the command, where `userid` is the ID you want to check:
   ```
   id <userid>
   ```
6. Check that the directory has a valid group and that the group has rwx permissions. If they do not, use the command to set the group of the directory:
   ```
   chgrp <group> <pathname>
   ```

   For example:
   ```
   chgrp WMQI /var/wmqi/MQP1BRK
   ```

   You have to be the owner of the group or have superuser authority to use this command.
7. To give the group READ, WRITE, and EXECUTE access, use the command:
   ```
   chmod g=rwx <pathname>
   ```

   For example:
   ```
   chmod g=rwx /usr/wmqi/MQP1BRK
   ```
8. To display the amount of space used and available, use the command:
   ```
   df -P /var/wmqi/MQP1BRK
   ```

Customizing the broker component data set:

This is part of the larger task of creating a broker on z/OS.

Before you start

Before starting this task, you must have completed “Collecting the information required to create a broker” on page 133.

Create the broker data set in TSO, identified by `++COMPONENTDATASET++`, as instructed below:

1. Copy the members specified in “Broker PDSE members originating in <hlq>.SBIPSAMP” on page 491 from `<hlq>.SBIPSAMP` to `++COMPONENTDATASET++`. Ensure that you copy only the listed files.
2. Copy the members specified in “Broker PDSE members originating in <hlq>.SBIPPROC” on page 491 from `<hlq>.SBIPPROC` to `++COMPONENTDATASET++`. Ensure that you copy only the listed files.
3. Customize the JCL.

Customizing the broker JCL:

This is part of the larger task of creating a broker on z/OS.

Before you start

Before starting this task, you must have completed “Customizing the broker component data set.”

All JCL has a standard header, comprising:

- A brief description of its function.
- A description where further information can be found, relating to the function of the JCL.
- If appropriate, a topic number.
- The section listing the JCL variables themselves.

Each JCL file defines its own STEPLIB. Some JCL files, for example BIPRELG, might require DB2 defined in the STEPLIB for a broker component. This must be removed from the JCL if the component is either a Configuration Manager or User Name Server, because it is not required.

You can customize the files using an ISPF edit macro that you have to tailor, or you can make changes to each of the PDSE members manually.

BIPEDIT is a REXX program that you can use to help you customize your JCL. After you have customized BIPEDIT you can run this REXX program against the other JCL files to change their JCL variables.

When you update BIPBPROF (the broker profile), the changes are not accessible until you run BIPGEN to copy the profile to the file system and create the ENVFILE. You must do this each time you update BIPBPROF for the changes to take effect.

1. Customize the renamed BIPEDIT file. Use the information you collected in:
   - "Installation information - broker and User Name Server" on page 133
   - "DB2 information" on page 134
   - "Component information - broker" on page 134
2. Activate the renamed BIPEDIT file before you customize any other JCL files. Do this by running the following TSO command:

   ```
   ALTLIB ACTIVATE APPLICATION(EXEC) DA('COMPONENTDATASET')
   ```

   where 'COMPONENTDATASET' is identical to ++COMPONENTDATASET++.

   This command is active for the local ISPF session for which it was issued. Note that if you have split screen sessions, the other sessions are not able to use this. If you use ISPF option 6 to issue the command, use ISPF option 3.4 to edit the data set; this enables you to use the edit command.
3. Edit each JCL file. Run the renamed BIPEDIT exec by typing its name on the command line (for example MQ01EDBK). Instead of editing a member, you might want to View it until you have resolved any problems in your REXX program. Alternatively, you can Cancel the Edit session instead of saving it.

   You must set a value for all the variables listed in the JCL; if you do not do so, the JCL will not work correctly.

Some JCL files include ++OPTIONS++ for a command; you must replace them with additional optional parameters specific to the command on z/OS, or remove them. It is likely that you will have to do this in addition to running BIPEDIT. If you do not require any additional options, remove ++OPTIONS++ using the following command:

```
"c ++OPTIONS++ '' all"
```

where ' ' represents two single quotation marks.

Save the edit macro and run this macro against all of the members except the edit macro itself.

If the user ID submitting the BIPCBRK command has the appropriate DB2 and WebSphere MQ authorities, you can ignore the optional **mqsicreatebroker** parameters -1, -2, and -3.

If you intend to have different administrators create the DB2 and WebSphere MQ resources, you can consider using one of these optional parameters; see "mqsicreatebroker command" on page 374 for further information.

You need to be aware that another process might be using the current ENVFILE, so you need to consider whether updating the current ENVFILE in the file system will have any impact.

Creating the environment file:

This is part of the larger task of creating a broker on z/OS.

Before you start

Before starting this task, you must have completed "Customizing the broker JCL" on page 136

1. Review the BIPBPROF member. If you define parameters for all users, you can configure BIPBPROF to use these parameters.

   For example, if the time zone option TZ is set as a system-wide parameter for all users, you can remove it from BIPBPROF.
2. Submit member BIPGEN. Review the job output and make sure the environment file in the output contains the parameters you expect.

   If you change BIPBPROF, or system-wide parameters, you must submit BIPGEN again to pick up the changes.

Priming DB2:

This is part of the larger task of creating a broker on z/OS. The broker uses DB2 tables to hold its internal data. These tables are defined in table spaces, which in turn, are defined within a DB2 database.

Data from tables is accessed through in-memory buffer pools, and typically you have different buffer pools for:

- Different applications
- Indexes
- Tables
- LOB tables

The DASD volumes that can be used by a database are defined using a storage group (STOGROUP). Your DB2 systems administrator will tell you which buffer pools and storage groups to use.

The BIPCRDB job issues commands that require the following authorities:

- CREATESG - to create a storage group
- CREATEDBA - to create the database

Note that you might also need authority to grant use of a buffer pool.

If you have any problems with this job, you can edit and customize member BIPDLDB to delete the database. You can run the BIPCRDB job again when you have resolved the problems.

Before you start

Before starting this task, you must have completed "Creating the environment file" on page 138.

1. Edit the BIPCRDB job.
2. Review and change the BUFFERPOOL and INDEXBP buffer pools on the CREATE DATABASE statement
3. Change the buffer pool specification on the CREATE LOB TABLESPACE statements to a value suitable for your enterprise.
4. Submit BIPCRDB from your broker PDSE. You need the authority described earlier to submit the DB2 job.

   BIPCRDB creates the DB2 StorageGroup, Database, and Table Spaces but does not create any tables or indexes.

   The steps in the BIPCRDB job must complete with return code zero.

Creating the broker component:

This is part of the larger task of creating a broker on z/OS.

Before you start

Before starting this task, you must have completed "Priming DB2" on page 138.

If the user ID submitting the BIPCBRK command has the appropriate DB2 and WebSphere MQ authorities, you can ignore the optional **mqsicreatebroker** parameters -1, -2, and -3. If it is your intention to have different administrators create the DB2 and WebSphere MQ resources, you can consider using one of these optional parameters; see "mqsicreatebroker command" on page 374 for further information.

1. Submit job BIPCRBK with option -1. This job creates the files and directories that are placed in the default storage group. You must run this job first, and to do this you need authority to access the broker root directory.
2. Edit BIPCRBK and submit the job with option -2. This job creates the WebSphere MQ queues. If you do not have the requisite authority, ask your WebSphere MQ system administrator to run the job.
3. Edit BIPCRBK and submit the job with option -3. This job creates the DB2 queues. If you do not have the requisite authority, ask your DB2 system administrator to run the job.
4. Ensure that the jobs have run successfully by:

   Checking the STDOUT stream in the JOBLOG.

   Viewing STDOUT for any errors and checking forBIP8071I: Successful command completion.

If you encounter any problems, delete the broker and recreate it using the following procedure. Note that you need the appropriate authority to run the jobs.

1. Edit and configure job BIPDLBK.
2. Run job BIPDLBK with the same option, or options, that caused the problems when you ran the BIPCRBK job.

3. Correct the problems and run the BIPCRBK job again.

Copying the broker started task to the procedures library:

This is part of the larger task of creating a broker on z/OS.

Before you start

Before starting this task, you must have completed "Creating the broker component" on page 139.

1. Ensure that the user ID for the broker started task is defined and that the broker procedure is associated with the user ID. If you are using a security manager, for example RACF, update the started class for your broker. See "Setting up z/OS security" on page 37 and "Summary of required access (z/OS)" on page 485 for more information.
2. Copy the Started Task JCL (BIPBRKP) to the procedures library, for example USER.PROCLIB.

Adding an execution group to a broker using the command line

When you create a broker, it has a default execution group. If you want additional execution groups, you must create them explicitly.

Before you start:

You must complete the following tasks:

- "Adding a broker to a broker domain" on page 193

You can use one of three methods to complete this task:

- The workbench
- The mqsicreateexecutiongroup command
- The CMP API

This task describes the second method. For information about creating an execution group in the workbench, see "Adding an execution group to a broker in the workbench" on page 198. For information about using the CMP API, see Developing applications that use the Configuration Manager Proxy Java API.

For details about why you might want to create multiple execution groups, see Execution groups.

To add an execution group to a broker using the command line on Linux, UNIX and Windows systems:

1. Open a command prompt that has the environment configured for your current installation.
2. Enter the following command to add the execution group:

   ```
   mqsicreateexecutiongroup -i host -p 1414 -q QMGR -b BROKER –e EG1
   ```

   where

   host The host name or IP address of the Configuration Manager for the domain on which the broker resides.

1414 The port on which the queue manager for the Configuration Manager is listening.

QMGR
The name of the queue manager for the Configuration Manager.

BROKER
The name of the broker.

EG1 The name of the execution group that you want to create.

When you've completed this task the execution group has been created in the workbench and you must deploy to the broker to update the brokers configuration.

Adding an execution group to a broker on z/OS

Before you start:

You must complete the following tasks:

- "Adding a broker to a broker domain" on page 193

When you create a broker, it has a default execution group. If you want additional execution groups, you must create them explicitly.

For more details about why you might want to create multiple execution groups, see Execution groups.

Instead of employing the Message Brokers Toolkit, you can use this task as an alternative method of creating an execution group .

For more details on creating an execution group from the Message Brokers Toolkit see "Adding an execution group to a broker in the workbench" on page 198

To add an execution group to a broker on z/OS:

Configure and run the `BIPCREG` job to create an execution group. Note that you need to create the broker in the Configuration Manager before you run the `BIPCREG` job.

On completion of this task, you have requested that the Configuration Manager creates an execution group on the broker when it is next deployed.

Creating a Configuration Manager

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537.
- For platforms other than z/OS, see "Considering security for a Configuration Manager" on page 21 for information about security matters relevant to a Configuration Manager during the configuration task.

  To create a Configuration Manager, follow the link for the appropriate platform.
- Create a Configuration Manager using the command line on the system where the Configuration Manager component is installed. On Windows, you can also use the Command Assistant to complete this task.

- On Windows, UNIX systems, and Linux, you must set up your command-line environment before creating a Configuration Manager, by running the product profile or console; refer to Setting up a command environment.
- AIX
- HP-UX
- Linux
- Solaris
- Windows
- z/OS

Creating a Configuration Manager on AIX

AIX The following steps show you how to create a Configuration Manager.

1. Run `'. <install_dir>/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. Log on using your user ID. If you use the su command to switch user from *root*, enter `su - <user ID>` to run your user profile.
3. Enter the following command to create the Configuration Manager:

   ```
   mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   CMGR01
   Is the name of the Configuration Manager that you are creating.

   wbrkuid
   Is the service user ID that is used to run the Configuration Manager.

   wbrkpw
   Is the password for the service user ID.

   WBRK_QM
   Is the name of the WebSphere MQ queue manager that will host the Configuration Manager. This is created if it does not exist.

On completion of this task, you have:

- Created a Configuration Manager.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the Configuration Manager, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateconfigmgr** command.
- Set up the authorizations that the Configuration Manager requires to access WebSphere MQ resources.

Now that you have created the Configuration Manager, you are ready to:

1. Create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.

2. Create a broker domain connection using the workbench. Refer to “Creating a domain connection” on page 189.

Creating a Configuration Manager on HP-UX

HP-UX The following steps show you how to create a Configuration Manager.

1. Run `'. <install_dir>/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. Log on using your user ID. If you use the su command to switch user from `root`, enter `su - <user ID>` to run your user profile.
3. Enter the following command to create the Configuration Manager:

   ```
   mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   CMGR01
   Is the name of the Configuration Manager that you are creating.

   wbrkuid
   Is the service user ID that is used to run the Configuration Manager.

   wbrkpw
   Is the password for the service user ID.

   WBRK_QM
   Is the name of the WebSphere MQ queue manager that will host the Configuration Manager. This is created if it does not exist.

On completion of this task, you have:

- Created a Configuration Manager.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the Configuration Manager, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateconfigmgr** command.
- Set up the authorizations that the Configuration Manager requires to access WebSphere MQ resources.

Now that you have created the Configuration Manager, you are ready to:

1. Create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.
2. Create a broker domain connection using the workbench. Refer to “Creating a domain connection” on page 189.

Creating a Configuration Manager on Linux

Follow the steps detailed in this task for creating a Configuration Manager onLinux platforms.

Linux To create a Configuration Manager.

1. Run `'. <install_dir>/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. Log on using your user ID. If you use the su command to switch user from *root*, enter `su - <user ID>` to run your user profile.
3. Enter the following command to create the Configuration Manager:

   ```
   mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   CMGR01
   Is the name of the Configuration Manager that you are creating.

   wbrkuid
   Is the service user ID that is used to run the Configuration Manager.

   wbrkpw
   Is the password for the service user ID.

   WBRK_QM
   Is the name of the WebSphere MQ queue manager that will host the Configuration Manager. This is created if it does not exist.

On completion of this task, you have:

- Created a Configuration Manager.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the Configuration Manager, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateconfigmgr** command.
- Set up the authorizations that the Configuration Manager requires to access WebSphere MQ resources.

Now that you have created the Configuration Manager, you are ready to:

1. Create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.
2. Create a broker domain connection using the workbench. Refer to “Creating a domain connection” on page 189.

Creating a Configuration Manager on Solaris

Solaris The following steps show you how to create a Configuration Manager.

1. Run `'. <install_dir>/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. Log on using your user ID. If you use the su command to switch user from `root`, enter `su - <user ID>` to run your user profile.
3. Enter the following command to create the Configuration Manager:

   ```
   mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_QM
   ```

If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

In the command above:

CMGR01
Is the name of the Configuration Manager that you are creating.

wbrkuid
Is the service user ID that is used to run the Configuration Manager.

wbrkpw
Is the password for the service user ID.

WBRK_QM
Is the name of the WebSphere MQ queue manager that will host the Configuration Manager. This is created if it does not exist.

On completion of this task, you have:

- Created a Configuration Manager.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the Configuration Manager, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateconfigmgr** command.
- Set up the authorizations that the Configuration Manager requires to access WebSphere MQ resources.

Now that you have created the Configuration Manager, you are ready to:

1. Create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to "Connecting components" on page 170.
2. Create a broker domain connection using the workbench. Refer to "Creating a domain connection" on page 189.

Creating a Configuration Manager on Windows

Windows You create a Configuration Manager using the command line. Create the Configuration Manager on the system where the Configuration Manager component is installed.

Use the **mqsicreateconfigmgr** command. The parameters on this command provide the Configuration Manager with all the additional information it requires to be ready for action as soon as it is started .

To create a Configuration Manager:

1. Open a WebSphere Message Broker command prompt for the desired runtime.
2. Enter the following command to create the Configuration Manager:

```
mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_QM
```

If you are using different names or values for any parameter on this command, you **must** replace the appropriate values with your own.

In the command above:

CMGR01
Is the name of the Configuration Manager that you are creating. This is an optional parameter; if you do not specify it, the default is 'ConfigMgr'.

wbrkuid
is the service user ID used to run the Configuration Manager.

This ID must be a member of the `mqm`, `mqbrkrs` and `Administrators` groups.

wbrkpw
Is the password for the service user ID.

WBRK_QM
Is the name of the WebSphere MQ queue manager that will host the Configuration Manager. This is created if it does not exist.

On completion of this task, you have:

- Created a Configuration Manager and added its Windows service to the Services (viewable from the Control Panel).
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the Configuration Manager, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateconfigmgr** command.
- Set up the authorizations that the Configuration Manager requires to access WebSphere MQ resources.
- Defined a service user ID wbrkuid, and database password wbrkpw.

Now that you have created the Configuration Manager, you are ready to:

1. Create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to "Connecting components" on page 170.
2. Create a broker domain connection using the workbench. Refer to "Creating a domain connection" on page 189.

Creating a Configuration Manager on z/OS

To create your Configuration Manager, perform the following tasks in order.

1. "Collecting the information required to create a Configuration Manager on z/OS"
2. "Creating the Configuration Manager PDSE" on page 148
3. "Creating the Configuration Manager directory on z/OS" on page 148
4. "Customizing the Configuration Manager component data set" on page 148
5. "Customizing the Configuration Manager JCL" on page 149
6. "Creating the Configuration Manager component" on page 150
7. "Copying the Configuration Manager started task to the procedures library" on page 151

Collecting the information required to create a Configuration Manager on z/OS:

This is part of the larger task of creating a Configuration Manager on z/OS.

You need to complete the information in each of the following tables before continuing:

- "Installation information - Configuration Manager"
- "Component information - Configuration Manager"

Installation information - Configuration Manager:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example installation value	Your installation value
Fully qualified name of the product's SBIPPROC dataset	N/A	<hlq>.SBIPPROC	
Fully qualified name of the product's SBIPSAMP dataset	N/A	<hlq>.SBIPSAMP	
File system directory where the product has been installed	++INSTALL++	/usr/lpp/mqsi	
WebSphere MQ high-level qualifier	++WMQHLQ++	MQM.V531	
Location of Java installation	++JAVA++	/usr/lpp/java/IBM/J1.4	
Location of IBM XML Toolkit installation	++XMLTOOLKIT++	/usr/lpp/ixm/IBM/xml4c-5_5	
Locale of environment where commands are run by submitting JCL	++LOCALE++	C	
Time zone of environment where commands are run by submitting JCL	++TIMEZONE++	GMT0BST	
WebSphere MQ file system install directory	++MQPATH++	/usr/lpp/mqm	

Component information - Configuration Manager:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example component value	Your component value
Configuration Manager name	++COMPONENTNAME++	MQP1CMGR	
Configuration Manager's user ID file system home directory	++HOME++	/u/mqp1cmgr	
File system directory where the Configuration Manager is to exist	++COMPONENTDIRECTORY++	/mqsi/configmgrs/MQP1CMGR	
Data set where all JCL relevant to the Configuration Manager is saved	++COMPONENTDATASET++	TESTDEV.CMGR.MQP1CMGR	
Profile name	++COMPONENTPROFILE++	BIPCPROF	**BIPCPROF**

Name of the Started Task JCL; can be a maximum of 8 characters	++STARTEDTASKNAME++	MQP1CMGR	
mqsicreateconfigmgr options	++OPTIONS++	Any additional optional parameters for the **mqsicreateconfigmgr** command	

Creating the Configuration Manager PDSE:

This is part of the larger task of creating a Configuration Manager on z/OS.

Create the Configuration Manager PDSE, for example using option 3.2 on ISPF. The name of the PDSE must be the same as the JCL variable ++COMPONENTDATASET++. Allocate a data set with:

- Eight directory blocks
- 15 tracks (or 1 cylinder) of 3390 DASD with a record format of fixed blocked 80
- A suitable block size (for example 27920)
- A data set type of `library`

Creating the Configuration Manager directory on z/OS:

This is part of the larger task of creating a Configuration Manager on z/OS.

Before you start

To complete this task, you must have completed the following tasks:

- "Collecting the information required to create a Configuration Manager on z/OS" on page 146
- "Creating the Configuration Manager PDSE"

Create the Configuration Manager directory manually using:

```
mkdir <ComponentDirectory>
```

The name of the directory must be the same as the JCL variable ++COMPONENTDIRECTORY++.

Use the `chmod` command to set the required authorizations. See "Creating the broker directory on z/OS" on page 135 for more information.

Customizing the Configuration Manager component data set:

This is part of the larger task of creating a Configuration Manager on z/OS.

Before you start

Before starting this task, you must have completed "Collecting the information required to create a Configuration Manager on z/OS" on page 146.

Create the Configuration Manager data set in TSO, identified by ++COMPONENTDATASET++, as instructed below:

1. Copy `BIPCPROF` from `<hlq>.SBIPSAMP` to ++COMPONENTDATASET++.

2. Copy the members specified in "Configuration Manager PDSE members originating in <hlq>.SBIPPROC" on page 494 from <hlq>.SBIPPROC to ++COMPONENTDATASET++. Ensure that you copy only the listed files.
3. Customize the JCL.

Customizing the Configuration Manager JCL:

This is part of the larger task of creating a Configuration Manager on z/OS.

Before you start

Before starting this step, you must have completed "Customizing the Configuration Manager component data set" on page 148.

- A brief description of its function.
- A description where further information can be found, relating to the function of the JCL.
- If appropriate, a topic number.
- The section listing the JCL variables themselves.

Each JCL file defines its own STEPLIB. Some JCL files, for example BIPRELG, might require DB2 defined in the STEPLIB for a broker component. This must be removed from the JCL if the component is either a Configuration Manager or User Name Server, because it is not required.

You can customize the files using an ISPF edit macro that you have to tailor, or you can make changes to each of the PDSE members manually.

BIPEDIT is a REXX program that you can use to help you customize your JCL. After you have customized BIPEDIT you can run this REXX program against the other JCL files to change their JCL variables.

When you update BIPCPROF (the Configuration Manager profile), the changes are not accessible until you run BIPGEN to copy the profile to the file system and create the ENVFILE. You must do this each time you update BIPCPROF for the changes to take effect, which happens when you restart the Configuration Manager.

Do not set either of the optional pass parameters (-1 or -2) in BIPCRCM at this time because you want to create the registry and the WebSphere MQ queues.

1. Customize the renamed BIPEDIT file. Use the information you collected in:
   - "Installation information - Configuration Manager" on page 147
   - "Component information - Configuration Manager" on page 147
2. Activate the renamed BIPEDIT file before you customize any other JCL files. Do this by running the following TSO command:

   ```
   ALTLIB ACTIVATE APPLICATION(EXEC) DA('COMPONENTDATASET')
   ```

   where 'COMPONENTDATASET' is identical to ++COMPONENTDATASET++.

   This command is active for the local ISPF session for which it was issued. Note that if you have split screen sessions, the other sessions are not able to use this. If you use ISPF option 6 to issue the command, use ISPF option 3.4 to edit the data set; this enables you to use the edit command.
3. Edit each JCL file. Run the renamed BIPEDIT exec by typing its name on the command line (for example MQ01EDCM). Instead of editing a member, you might

want to View it until you have resolved any problems in your REXX program. Alternatively, you can Cancel the Edit session instead of saving it.

You must set a value for all the variables listed in the JCL; if you do not do so, the JCL will not work correctly.

Some JCL files include ++OPTIONS++ for a command; you must replace them with additional optional parameters specific to the command on z/OS, or remove them. It is likely that you will have to do this in addition to running BIPEDIT. If you do not require any additional options, remove ++OPTIONS++ using the following command:

```
"c ++OPTIONS++ '' all"
```

where ' ' represents two single quotation marks.

Save the edit macro and run this macro against all of the members except the edit macro itself.

You need to be aware that another process might be using the current ENVFILE, so you need to consider whether updating the current ENVFILE in the file system will have any impact.

Creating the Configuration Manager component:

This is part of the larger task of creating a Configuration Manager on z/OS.

Before you start

Complete "Customizing the Configuration Manager JCL" on page 149.

If the user ID submitting the BIPCRCM command has the appropriate WebSphere MQ authorities, you can ignore the optional mqsicreateconfigmgr parameters -1 and -2. If you expect that a different administrator will create the WebSphere MQ resources, consider using one of these optional parameters; see the "mqsicreateconfigmgr command" on page 384 for further information.

1. Submit job BIPCRCM with option -1. This job creates the Configuration Manager together with the files and directories that are placed in the registry. To run this job, you must have authority to access the Configuration Manager.
2. Edit BIPCRCM and submit the job with option -2. This job creates the WebSphere MQ queues. If you do not have the requisite authority, ask your WebSphere MQ system administrator to run the job.
3. Ensure that the jobs have run successfully:

   Check the STDOUT stream in the JOBLOG.

   View STDOUT for any errors and checking forBIP8071I: Successful command completion.

If you encounter any problems, delete the Configuration Manager and recreate it using the following procedure. You must have the appropriate authority to run the jobs.

1. Edit and configure job BIPDLCM.
2. Run job BIPDLCM with the same option, or options, that caused the problems when you ran the BIPCRCM job.
3. Correct the problems and run the BIPCRCM job again.

The BIPCRCM job can take several minutes to run, depending on the content of the remote database.

Copying the Configuration Manager started task to the procedures library:

This is part of the larger task of creating a Configuration Manager on z/OS.

Before you start

Before starting this task, you must have completed "Creating the Configuration Manager component" on page 150.

Copy the Started Task JCL (BIPCMGRP) to the procedures library, for example USER.PROCLIB.

Enabling a User Name Server

If you require a User Name Server as a component of your broker domain, you must create the necessary connections between the broker, Configuration Manager, and User Name Server, so that they can communicate effectively.

Specify additional parameters on the **mqsicreatebroker** and **mqsicreateconfigmgr** commands, *before* you create the User Name Server. The following steps show you how to do this.

1. Create a broker with the additional -s and -j parameters on the **mqsicreatebroker** command. These parameters allow the broker to communicate with the WebSphere MQ queue manager for the User Name Server, and also enable the broker for publish/subscribe access control.

   If you have created the broker without these parameters, modify the broker, defining the -s and -j parameters. Refer to "Modifying a broker" on page 173.
2. Create a Configuration Manager with the additional -s parameter on the **mqsicreateconfigmgr** command. This parameter allows the Configuration Manager to communicate with the WebSphere MQ queue manager for the User Name Server.

   If you have created the Configuration Manager without this parameter, modify the Configuration Manager, defining the -s parameter. Refer to "Modifying a Configuration Manager" on page 176.

Now that you have made the required changes to the broker and Configuration Manager, you can create the User Name Server, and thus enable publish/subscribe services.

Creating a User Name Server

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537.
- Create a broker and Configuration Manager, with the additional parameters on the **mqsicreatebroker** and **mqsicreateconfigmgr** commands to allow them to communicate with the User Name Server. Refer to "Enabling a User Name Server."

- On Windows, UNIX systems, and Linux, you must set up your command-line environment before creating a User Name Server, by running the product profile or console; refer to Setting up a command environment

Create a User Name Server using the command line on the system where the User Name Server component is installed. On Windows, you can also use the Command Assistant to complete this task.

To create a User Name Server, follow the link for the appropriate platform.

- AIX
- HP-UX
- Linux
- Solaris
- Windows
- z/OS

Creating a User Name Server on AIX

AIX The following steps show you how to create a User Name Server.

1. Log on using your user ID. If you use the su command to switch user from *root*, enter `su - <user ID>` to run your user profile.
2. Enter the following command to create the User Name Server:

   ```
   mqsicreateusernameserver -i wbrkuid -a wbrkpw -q WBRK_UNS_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   wbrkuid
   Is the service user ID that is used to run the User Name Server.

   wbrkpw
   Is the password for the service user ID.

   WBRK_UNS_QM
   Is the name of the WebSphere MQ queue manager for the User Name Server. This is created if it does not exist.

On completion of this task, you have:

- Created a User Name Server.
- Created a default startup status of manual for the User Name Server.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the User Name Server, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateusernameserver** command.

Now that you have created the User Name Server, you are ready to create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.

Creating a User Name Server on HP-UX

HP-UX The following steps show you how to create a User Name Server.

1. Log on using your user ID. If you use the su command to switch user from `root`, enter `su - <user ID>` to run your user profile.
2. Enter the following command to create the User Name Server:

   ```
   mqsicreateusernameserver -i wbrkuid -a wbrkpw -q WBRK_UNS_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   wbrkuid
   Is the service user ID that is used to run the User Name Server.

   wbrkpw
   Is the password for the service user ID.

   WBRK_UNS_QM
   Is the name of the WebSphere MQ queue manager for the User Name Server. This is created if it does not exist.

On completion of this task, you have:

- Created a User Name Server.
- Created a default startup status of manual for the User Name Server.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the User Name Server, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateusernameserver** command.

Now that you have created the User Name Server, you are ready to create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.

Creating a User Name Server on Linux

Follow the steps detailed in this task for creating a User Name Server on Linux platforms.

1. Log on using your user ID. If you use the su command to switch user from *root*, enter `su - <user ID>` to run your user profile.
2. Enter the following command to create the User Name Server:

   ```
   mqsicreateusernameserver -i wbrkuid -a wbrkpw -q WBRK_UNS_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   wbrkuid
   Is the service user ID that is used to run the User Name Server.

   wbrkpw
   Is the password for the service user ID.

WBRK_UNS_QM
Is the name of the WebSphere MQ queue manager for the User Name Server. This is created if it does not exist.

On completion of this task, you have:

- Created a User Name Server.
- Created a default startup status of manual for the User Name Server.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the User Name Server, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateusernameserver** command.

Now that you have created the User Name Server, you are ready to create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to "Connecting components" on page 170.

Creating a User Name Server on Solaris

Solaris The following steps describe how to create a User Name Server.

1. Log on using your user ID. If you use the su command to switch user from `root`, enter `su - <user ID>` to run your user profile.
2. Enter the following command to create the User Name Server:

   ```
   mqsicreateusernameserver -i wbrkuid -a wbrkpw -q WBRK_UNS_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   wbrkuid
   Is the service user ID that is used to run the User Name Server.

   wbrkpw
   Is the password for the service user ID.

   WBRK_UNS_QM
   Is the name of the WebSphere MQ queue manager for the User Name Server. This is created if it does not exist.

On completion of this task, you have:

- Created a User Name Server.
- Created a default startup status of manual for the User Name Server.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the User Name Server, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateusernameserver** command.

Now that you have created the User Name Server, you are ready to create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are

supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.

Creating a User Name Server on Windows

Windows The following steps show you how to create a User Name Server.

1. Open a command prompt.
2. Enter the following command to create the User Name Server:

   ```
   mqsicreateusernameserver -i wbrkuid -a wbrkpw -q WBRK_UNS_QM
   ```

   If you are using different names or values for any parameter on this command, you *must* replace the appropriate values with your own.

   In the command above:

   wbrkuid
   Is the service user ID that is used to run the User Name Server.

   wbrkpw
   Is the password for the service user ID.

   WBRK_UNS_QM
   Is the name of the WebSphere MQ queue manager for the User Name Server. This is created if it does not exist.

On completion of this task, you have:

- Created a User Name Server.
- Created a default startup status of manual for the User Name Server.
- Created and started a WebSphere MQ queue manager called WBRK_QM.
- Created and set up the WebSphere MQ resources required by the User Name Server, and defined these on the queue manager. This includes the default dead-letter queue (DLQ), which is automatically enabled by running the **mqsicreateusernameserver** command.

Now that you have created the User Name Server, you are ready to create and start the WebSphere MQ queue manager channels that are required to connect WebSphere Message Broker components (brokers, User Name Servers, and Configuration Manager). This allows components in your broker domain that are supported by different queue managers to exchange messages and communicate effectively. Refer to “Connecting components” on page 170.

Creating a User Name Server on z/OS

To create your User Name Server, perform the following tasks in order.

1. “Collecting the information required to create a User Name Server on z/OS”
2. “Creating the User Name Server PDSE” on page 157
3. “Creating the User Name Server directory on z/OS” on page 157
4. “Creating the User Name Server runtime environment on z/OS” on page 157
5. “Customizing the User Name Server component data set” on page 158
6. “Customizing the User Name Server JCL” on page 158
7. “Creating the User Name Server component” on page 160
8. “Copying the User Name Server started task to the procedures library” on page 160

Collecting the information required to create a User Name Server on z/OS:

This is part of the larger task of creating a User Name Server on z/OS.

You need to complete the information in each of the following tables before continuing:

- "Installation information - broker and User Name Server" on page 133
- "Component information - User Name Server"

Installation information - broker and User Name Server:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example installation value	Your installation value
Fully qualified name of the product's SBIPPROC dataset	N/A	<hlq>.SBIPPROC	
Fully qualified name of the product's SBIPSAMP dataset	N/A	<hlq>.SBIPSAMP	
File system directory where the product has been installed	++INSTALL++	/usr/lpp/mqsi	
WebSphere MQ high-level qualifier	++WMQHLQ++	MQM.V531	
Location of Java installation	++JAVA++	/usr/lpp/java/IBM/J1.4	
Location of IBM XML Toolkit installation	++XMLTOOLKIT++	/usr/lpp/ixm/IBM/xml4c-5_5	
Locale of environment where commands are run by submitting JCL	++LOCALE++	C	
Time zone of environment where commands are run by submitting JCL	++TIMEZONE++	GMT0BST	

Component information - User Name Server:

Collect the information shown in the Description column and complete the values you require for your particular system. You can see a complete list of variables you can customize in "z/OS JCL variables" on page 495.

Description	JCL variable	Example component value	Your component value
User Name Server's user ID file system home directory	++HOME++	/u/mqp1uns	
File system directory where the User Name Server is to exist	++COMPONENTDIRECTORY++	/mqsi/uns/MQP1UNS	
Data set where all JCL relevant to the User Name Server is saved	++COMPONENTDATASET++	TESTDEV.UNS.MQP1UNS	
Profile name	++COMPONENTPROFILE++	BIPUPROF	**BIPUPROF**
Name of the Started Task JCL; can be a maximum of 8 characters	++STARTEDTASKNAME++	MQP1UNS	

mqsicreateusernameserver options	++OPTIONS++	Any additional optional parameters for the **mqsicreateusernameserver** command	

Creating the User Name Server PDSE:

This is part of the larger task of creating a User Name Server on z/OS.

Create the User Name Server PDSE, for example using option 3.2 on ISPF. The name of the PDSE must be the same as the JCL variable `++COMPONENTDATASET++`. Allocate a data set with:

- Eight directory blocks
- 15 tracks (or 1 cylinder) of 3390 DASD with a record format of fixed blocked 80
- A suitable block size (for example 27920)
- A data set type of `library`

Creating the User Name Server directory on z/OS:

This is part of the larger task of creating a User Name Server on z/OS.

Before you start

To complete this task, you must have completed the following tasks:

- "Collecting the information required to create a User Name Server on z/OS" on page 155
- "Creating the User Name Server PDSE"

Create the User Name Server directory manually using:

```
mkdir <ComponentDirectory>
```

The name of the directory must be the same as the JCL variable `++COMPONENTDIRECTORY++`.

Use the `chmod` command to set the required authorizations. See "Creating the broker directory on z/OS" on page 135 for more information.

Creating the User Name Server runtime environment on z/OS:

This is part of the larger task of creating a User Name Server on z/OS

Before you start

To complete this task, you must have completed the following task:

- "Creating the User Name Server directory on z/OS."

Use the **mqsicreateusernameserver** command to create a User Name Server and its runtime environment. The command syntax is:

```
mqsicreateusernameserver -q QueueManagerName [-r RefreshInterval] [-1] [-2]
```

where:

-q *QueueManagerName*
is a required parameter and is the name of the WebSphere MQ queue manager associated with your User Name Server, for example `MQP1`.

-r *RefreshInterval*
is an optional parameter and is the interval, specified in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes. If an interval is not specified, the User Name Server default interval of 60 seconds is used.

-1 is an optional parameter and is the registry pass; this creates only the User Name Server registry.

-2 is an optional parameter and is the WebSphere MQ pass; this creates only the User Name Server WebSphere MQ queues.

You will be asked to confirm that the parameters you enter are correct. Enter `Y` to confirm, or `N` to change the parameters. If you choose to change the parameters, run **mqsicreateusernameserver** again.

Check that you are using the correct installation path, particularly if you are customizing the system after applying maintenance to an alternate set of WebSphere MQ Integrator Broker libraries. If you are applying service to the broker, you might want a different installation path.

The functionality of this command is not the same as on distributed platforms, because no WebSphere MQ-related definitions are performed. You have to follow further steps to complete the User Name Server creation and customization.

Customizing the User Name Server component data set:

This is part of the larger task of creating a User Name Server on z/OS.

Before you start

Before starting this task, you must have completed "Collecting the information required to create a User Name Server on z/OS" on page 155.

Create the User Name Server data set in TSO, identified by `++COMPONENTDATASET++`, as instructed below:

1. Copy `BIPUPROF` from `<hlq>.SBIPSAMP` to `++COMPONENTDATASET++`.
2. Copy the members specified in "User Name Server PDSE members originating in <hlq>.SBIPPROC" on page 493 from `<hlq>.SBIPPROC` to `++COMPONENTDATASET++`. Ensure that you copy only the listed files.
3. Customize the JCL.

Customizing the User Name Server JCL:

This is part of the larger task of creating a User Name Server on z/OS.

Before you start

Before starting this task, you must have completed "Customizing the User Name Server component data set."

All JCL has a standard header, comprising:

- A brief description of its function.

- A description where further information can be found, relating to the function of the JCL.
- If appropriate, a topic number.
- The section listing the JCL variables themselves.

Each JCL file defines its own STEPLIB. Some JCL files, for example BIPRELG, might require DB2 defined in the STEPLIB for a broker component. This must be removed from the JCL if the component is either a Configuration Manager or User Name Server, because it is not required.

You can customize the files using an ISPF edit macro that you have to tailor, or you can make changes to each of the PDSE members manually.

BIPEDIT is a REXX program that can be used to assist you in customizing your JCL. Once you have customized BIPEDIT you can run this REXX program against the other JCL files to change their JCL variables.

When you update BIPUPROF (the User Name Server profile), the changes are not accessible until you run BIPGEN to copy the profile to the file system and create the ENVFILE. You must do this each time you update BIPUPROF for the changes to take effect.

Do not set either of the optional pass parameters (-1 or -2) in BIPCRUN at this time because you want to create the registry and the WebSphere MQ queues.

1. Customize the renamed BIPEDIT file. Use the information you collected in:
   - "Installation information - broker and User Name Server" on page 133
   - "Component information - User Name Server" on page 156
2. Activate the renamed BIPEDIT file before you customize any other JCL files. Do this by running the following TSO command:

   ```
   ALTLIB ACTIVATE APPLICATION(EXEC) DA('COMPONENTDATASET')
   ```

   where 'COMPONENTDATASET' is identical to ++COMPONENTDATASET++.

   This command is active for the local ISPF session for which it was issued. Note that if you have split screen sessions, the other sessions are not able to use this. If you use ISPF option 6 to issue the command, use ISPF option 3.4 to edit the data set; this enables you to use the edit command.
3. Edit each JCL file. Run the renamed BIPEDIT exec by typing its name on the command line (for example MQ01EDUN). Instead of editing a member, you might want to View it until you have resolved any problems in your REXX program. Alternatively, you can Cancel the Edit session instead of saving it.

   You must set a value for all the variables listed in the JCL; if you do not do so, the JCL will not work correctly.

Some JCL files include ++OPTIONS++ for a command, these **must** be replaced with additional optional parameters specific to the command on z/OS, or removed. It is likely that you will have to do this in addition to running BIPEDIT. If you do not require any additional options, remove ++OPTIONS++ using the following command:

```
"c ++OPTIONS++ '' all"
```

where ' ' represents two single quotation marks.

Save the edit macro and run this macro against all the members except the edit macro itself.

You need to be aware that another process might be using the current ENVFILE, so you need to consider whether updating the current ENVFILE in the file system will have any impact.

Creating the User Name Server component:

This is part of the larger task of creating a User Name Server on z/OS.

Before you start

Before starting this task, you must have completed "Customizing the User Name Server JCL" on page 158.

If the user ID submitting the BIPCRUN command has the appropriate WebSphere MQ authorities, you can ignore the optional **mqsicreateusernameserver** parameters -1 and -2. If it is your intention to have a different administrator create the WebSphere MQ resources, you can consider using one of these optional parameters; see "mqsicreateusernameserver command" on page 397 for further information.

1. Submit job BIPCRUN with option -1. This job creates the User Name Server together with the files and directories which are placed in the registry. You must run this job first, and to do this you need authority to access the User Name Server.
2. Edit BIPCRUN and submit the job with option -2. This job creates the WebSphere MQ queues. If you do not have the requisite authority, ask your WebSphere MQ system administrator to run the job.
3. Ensure that the jobs have run successfully by:

   Checking the STDOUT stream in the JOBLOG.

   Viewing STDOUT for any errors and checking for`BIP8071I: Successful command completion.`

If you encounter any problems, delete the User Name Server and recreate it using the following procedure. Note that you need the appropriate authority to run the jobs.

1. Edit and configure job BIPDLUN.
2. Run job BIPDLUN with the same option, or options, that caused the problems when you ran the BIPCRUN job.
3. Correct the problems and run the BIPCRUN job again.

Copying the User Name Server started task to the procedures library:

This is part of the larger task of creating a User Name Server on z/OS.

Before you start

Before starting this task, you must have completed "Creating the User Name Server component"

Copy the Started Task JCL (BIPUNSP) to the procedures library, for example USER.PROCLIB.

Connecting the User Name Server to the WebSphere Message Broker network

This is part of the larger task of creating a User Name Server.

Before you start

On z/OS, to complete this task, you must have completed the following task:

- "Starting and stopping the User Name Server on z/OS" on page 261.

To enable communication between all the components, define and start WebSphere MQ channels between the following components:

- Configuration Manager, queue manager and the User Name Server queue manager.
- Configuration Manager and the broker queue manager.
- User Name Server queue manager and the broker queue managers.
- All brokers used in publish/subscribe.

You connect a User Name Server to another component in the same way as you connect the Configuration Manager to another component. This task is described in detail in "Connecting components" on page 170.

The Configuration Manager requests user IDs and group information from the User Name Server. The WebSphere Message Broker administrator defines Access Control Lists (ACLs) on the workbench . These ACLs are sent to each broker using WebSphere MQ channels following a deploy.

For further details of connecting your User Name Server to a broker and enabling Publish/Subscribe, refer to "Configuring Publish/Subscribe security."

Configuring Publish/Subscribe security:

Refer to the following tasks:

- "Connecting the User Name Server to a broker"
- "Connecting the User Name Server to a broker on z/OS" on page 162
- "Starting the WebSphere MQ channels and listeners" on page 163
- "Enabling applications to use Publish/Subscribe" on page 164
- "Enabling applications to use Publish/Subscribe security on z/OS" on page 165

Connecting the User Name Server to a broker:

Before you start:

To complete this task, you must have completed the following task:

- "Creating a User Name Server" on page 151

You need to make the broker known to the User Name Server. You can do this using either of the following methods.

- Create a broker and specify s=UserNameServerQueueManagerName on the **mqsicreatebroker** command.
- Change an existing broker using the **mqsichangebroker** command.

If the User Name Server is not connected to the broker's queue manager, you need channels between the broker's queue manager and the User Name Server's queue manager. You need channels between the Configuration Manager queue manager and the broker's queue manager to receive message flows and Access Control Lists.

Change the Configuration Manager to use the queue manager name used by the User Name Server. You can use the **mqsicreateconfigmgr** or **mqsichangeconfigmgr** commands to set this value.

On the Topics panel in the workbench, you can view user information sent from the User Name Server.

Check that the User Name Server has registered the Configuration Manager. For more information on implementing topic-based security using the workbench, see "Enabling topic-based security" on page 32.

Example startup messages:

When a broker starts for the first time, and a User Name Server queue manager has been specified, and no response has ever been received from the User Name Server, you will receive the following message:

```
+BIP9141W  UserNameServer 0 The component was started.
```

When the User Name Server starts and indicates that it has registered with the broker, you will receive the following message:

```
18:17:18.54 BIP9141W: The component was started.
18:17:18.57 BIP2001I: The WebSphere Message Broker service has started, process  ID 196827.
18:17:24.31 BIP8201I: User Name Server starting with refresh interval 60.
18:17:28.21 BIP8204I: User Name Server is registering a client with UUID
                12345678-1234-1234-1234-123456789abc, and cache version 0.
```

Connecting the User Name Server to a broker on z/OS:

Before you start:

To complete this task, you must have completed the following task:

- "Creating a User Name Server on z/OS" on page 155

You need to make the broker known to the User Name Server. You can do this using either of the following methods.

- Create a broker and specify -s UserNameServerQueueManagerName on the **mqsicreatebroker** command.
- Change an existing broker using the **mqsichangebroker** command.

If the User Name Server is not connected to the broker's queue manager, you need channels between the broker's queue manager and the User Name Server's queue manager. You need channels between the Configuration Manager queue manager and the broker's queue manager to receive message flows and Access Control Lists.

Check the z/OS console for the message BIP8204, which is issued when the User Name Server has successfully registered a client.

Change the Configuration Manager to use the queue manager name used by the User Name Server on z/OS, or another supported platform. You can use the **mqsicreateconfigmgr** or **mqsichangeconfigmgr** commands to set this value.

On the Topics panel in the workbench, you can view user information sent from the User Name Server.

Check that the User Name Server has registered the Configuration Manager. Also, check the z/OS console for message BIP8204, which is issued when the User Name Server has successfully registered a client. For more information on implementing topic-based security using the workbench, see "Enabling topic-based security" on page 32.

Example startup messages:

When a broker starts for the first time, and a User Name Server queue manager has been specified, and no response has ever been received from the User Name Server, you will receive the following message:

```
+BIP9141W  UserNameServer 0 The component was started.
```

When the User Name Server starts and indicates that it has registered with the broker, you will receive the following message:

```
18:17:18.54 BIP9141W: The component was started.
18:17:18.57 BIP2001I: The WebSphere Message Broker service has started, process  ID 196827.
18:17:24.31 BIP8201I: User Name Server starting with refresh interval 60.
18:17:28.21 BIP8204I: User Name Server is registering a client with UUID
                12345678-1234-1234-1234-123456789abc, and cache version 0.
```

Starting the WebSphere MQ channels and listeners:

This topic tells you how to start the channels and listeners on Linux, UNIX systems and Windows platforms.

To complete the connection between two components that are supported by different queue managers, start the server channels that you created in "Connecting the User Name Server to a broker on z/OS" on page 162.

Before you can do that, you need to start the WebSphere MQ listeners that are to receive the messages sent out from these channels.

Note: All the examples use port 1414, the default WebSphere MQ port. You **must** ensure that you use the port space in the channel definition and that this port is not in use by another application.

UNIX systems:

1. To start a listener enter the following command in a shell window:

   ```
   runmqlsr -t tcp -p 1414 -m WBRK_QM
   ```

2. To start a sender channel, enter the following command in a shell window:

   ```
   runmqchl -c BROKER.CONFIG -m WBRK_QM
   ```

LINUX systems:

- If you are using WebSphere MQ Version 6.0, listeners and channels can be started using the WebSphere MQ Explorer, in the same way as with Windows platforms, as described in "Windows platforms using WebSphere MQ Version 6" on page 164.

- If you are using WebSphere MQ Version 5, listeners and channels must be started by entering commands in a shell window, as described in this section.

1. To start a listener, enter the following command in a shell window:
   ```
   runmqlsr -t tcp -p 1414 -m WBRK_QM
   ```
2. To start a sender channel, enter the following command in a shell window:
   ```
   runmqchl -c BROKER.CONFIG -m WBRK_QM
   ```

Windows platforms using WebSphere MQ Version 6:
If you are using WebSphere MQ Version 6.0, start listeners and channels using WebSphere MQ Explorer.

1. To start a listener as a background task:
   a. Click **Start** → **Programs** → **IBM WebSphere MQ** → **WebSphere MQ Explorer**.
   b. In the left pane expand the queue manager, expand **Advanced**, and select **Listeners**
   c. Right-click **Listeners** → **New** → **TCP Listener...**, enter a name for the listener, then click **Finish**. A new listener is created with transport type TCP and (default) port number 1414.
   d. Right-click the new listener and click **Start** to start it.
2. To start the sender channels as background tasks using WebSphere MQ Explorer expand the queue manager, expand **Advanced**, and select **Channels**.
3. If you prefer, you can start listeners and channels as foreground tasks:
   a. To start a listener, enter the following command on the command line:
      ```
      runmqlsr -t tcp -p 1414 -m WBRK_CONFIG_QM
      ```
   b. To start channels, enter the following commands:
      ```
      runmqchl -m WBRK_UNS_QM -c WBRK_UN_TO_BR

      runmqchl -m WBRK_QM -c WBRK_BR_TO_UN
      ```

Windows platforms using WebSphere MQ Version 5:
If you are using WebSphere MQ Version 5, start the listeners using WebSphere MQ Services, and start channels by entering commands on the command line.

1. To start a listener as a background task:
   a. Click **Start** → **Programs** → **IBM WebSphere MQ** → **WebSphere MQ Services**.
   b. Expand the left pane and select the queue manager WBRK_CONFIG_QM to display its services in the right pane.
   c. If the listener is displayed, right-click and select **All Tasks** → **Start** to start the listener.
   d. If the listener is not displayed:
      1) Right-click the queue manager and select **New** → **Listener**. A new listener is created with (default) transport type TCP and (default) port number 1414.
      2) Right-click the new listener and select **Start** to start it.
2. If you prefer, you can start a listener as a foreground task. Enter the following command on the command line:
   ```
   runmqlsr -t tcp -p 1414 -m WBRK_CONFIG_QM
   ```
3. To start the channels as foreground tasks, enter the following commands:
   ```
   runmqchl -m WBRK_UNS_QM -c WBRK_UN_TO_BR

   runmqchl -m WBRK_QM -c WBRK_BR_TO_UN
   ```

Enabling applications to use Publish/Subscribe:

If WebSphere MQ queue security is enabled, users who want to subscribe need UPDATE authority to put to the SYSTEM.BROKER.CONTROL.QUEUE on the User Name Server's queue manager. Publish/Subscribe users also need UPDATE authority to allow them to use input and output queues in message flow nodes.

Enabling applications to use Publish/Subscribe security on z/OS:
This topic lists the steps that you need to complete to enable applications to use Publish/Subscribe security on z/OS.

- For the User Name Server on z/OS to extract user ID and group information from the External Security Manager (ESM) database, user IDs and groups must have an OMVS segment defined.
- To use publish/subscribe security, you need to have an ESM group defined called **mqbrkrs**. This group needs to have an OMVS segment defined. The user ID of the started task needs to be in this group.
- If you are using RACF, use the LG group OMVS command. For example:

  ```
  LG MQBRKRS OMVS
  ```

User IDs:

- If you have suitable authorization, you can use the following RACF command to display OMVS information about a user:

  ```
  LU id OMVS
  ```

- To give a user ID an OMVS segment, you can use the following RACF command if you have suitable authorization:

  ```
  ALTUSER id  OMVS(UID(xxx))
  ```

Groups:

- You can use the following RACF command to display OMVS information about a group if you have suitable authorization:

  ```
  LG group OMVS
  ```

- To give a group an OMVS segment you can use the following RACF command if you have suitable authorization:

  ```
  ALTGROUP id  OMVS(GID(xxx))
  ```

  Refer to the *OS/390 Security Server (RACF) Security Administrator's Guide* (or the appropriate documentation for an external security manager installed on the system) for details.

If an application tries to use publish/subscribe with security, and the user ID is not found by the User Name Server (either because the user ID does not exist or the user ID does not have an OMVS segment), the message BIP7017W is written to the SYSLOG.

If an application tries to use publish/subscribe with security, and the user ID is found by the User Name Server, but an access control list denies access to the topic, either of the following messages are written to SYSLOG:

```
BIP7025 User does not have permission to subscribe to a topic.
BIP7026 User does not have publish permission on a topic.
```

Using the Default Configuration wizard

Use the Default Configuration wizard to set up and test a basic broker domain configuration.

Before you run the Default Configuration wizard:

- The Message Brokers Toolkit and all runtime components must be installed on this system. You access the Default Configuration wizard through the Message Brokers Toolkit, which is therefore available on Linux (x86 platform) and Windows only.
- Windows You must have Administrator privileges on Windows, and your user ID must be a local ID (not a domain ID).
- A database must be available, and your user ID must be authorized to create databases:
  - Linux On Linux (x86 platform), install DB2 Enterprise Server.
  - Windows On Windows, install either DB2 Enterprise Server or the ODBC Drivers for Cloudscape (to use the embedded Derby database).

Using the Default Configuration wizard, you set up a basic configuration on your local machine so that you can explore the product and run the samples that are supplied in the Samples Gallery. You can also remove the default configuration, if it already exists, that has been set up on your logon account.

- "Creating the default configuration"
- "Removing the default configuration" on page 167

The default configuration is described in more detail in the Installation Guide, which also describes how you can verify your installation using the sample programs.

Creating the default configuration

The wizard creates the following resources:

- A broker domain.
- A sample broker.
- A database to be used by the broker.

  On Windows, the wizard defaults to whatever database manager is available. The database that has been used is recorded on the Default Configuration Summary page. Details of the database manager are also written to the wizard's log file.
- A WebSphere MQ queue manager.

1. On Windows, the Default Configuration wizard starts automatically at the end of the installation of WebSphere Message Broker. You can launch the wizard manually from the Message Brokers Toolkit Welcome page, which is displayed the first time you launch the Message Brokers Toolkit. If the Welcome page is not displayed, open it in the Message Brokers Toolkit by clicking **Help → Welcome**.
2. The Welcome page of the wizard describes what is about to happen. Enter your password to log on and click **Next** to continue. You can click **Cancel** at any time to cancel the creation of the default configuration.

   The wizard checks that the default configuration is not already installed.
3. The Default Configuration Summary page lists the resources that will be created. The information field in this page confirms whether Derby has been set as the default broker database on Windows. It also suggests an alternative option of installing and configuring an enterprise database server instead. Click **Next** to continue.
4. The Default Configuration Progress page lists the background configuration actions as they occur, and indicates successful completion. You can cancel the creation of the default configuration at this point by clicking **Cancel**. The

wizard backs out all configuration tasks and then displays the progress and success of the process. The configuration process is written to a log file in the Eclipse workspace directory:

- Linux *user_home_directory*/IBM/wmbt6.0/workspace/.metadata/DefaultConfigurationWizard.log
- Windows *user_home_directory*\eclipse\workspace\.metadata\DefaultConfigurationWizard.log

.

If the default configuration is set up successfully, you see an appropriate message. If errors occur, you see an appropriate message and the wizard backs out all configuration tasks. If an error occurs during the back out process, the wizard displays a list of resources that you must remove manually.

5. You can use the samples to verify the default configuration. **Launch Samples Wizard when finished** is selected by default. Click **Finish** to launch the Prepare the Samples wizard.

   If you do not need to launch the Prepare the Samples wizard, clear **Launch Samples Wizard when finished** before clicking **Finish**.

   If you are viewing this information from within the Message Brokers Toolkit, you can launch the samples manually by clicking on the following sample:

   - Pager samples

   Alternatively, click **Help → Samples Gallery**, and expand **Application samples → Message Broker - Getting Started samples**.

   You can view samples only when you use the information center that is integrated with the Message Brokers Toolkit.

Removing the default configuration

1. Launch the Default Configuration wizard from the Message Brokers Toolkit Welcome page, which is displayed after you launch the Message Brokers Toolkit. If the Welcome page is not displayed, open it in the Message Brokers Toolkit by clicking **Help → Welcome**.
2. The Welcome page of the wizard describes what is about to happen. Enter your password to log on and click **Next** to continue. You can click **Cancel** at any time to cancel the removal of the default configuration.

   The wizard checks that the default configuration is already installed.
3. The Remove Default Configuration Summary page lists the resources that will be removed. Click **Next** to continue.
4. The Default Configuration Progress page lists the removal actions as they occur, and indicates successful completion. The removal process is written to a log file in the Eclipse workspace directory:

   - Linux *user_home_directory*/IBM/wmbt6.0/workspace/.metadata/DefaultConfigurationWizard.log
   - Windows *user_home_directory*\eclipse\workspace\.metadata\DefaultConfigurationWizard.log
5. A message confirms that the default configuration has been removed successfully. Click **Finish** to close the wizard.

   If errors occur during the removal of the default configuration, the wizard displays the errors and also writes them to the log file. Follow the advice in the log and try each step again.

If you experience problems using the wizard to remove the default configuration, you might need to remove the default configuration manually. For more information see You experience problems with the default configuration.

Using the Command Assistant wizard

Before you start:

- The Message Brokers Toolkit and all runtime components must be installed on this system. The Command Assistant wizard is available through the toolkit, and is available on Windows only.
- You must have administration privileges.

Use the Command Assistant wizard to create, modify, and delete the following physical runtime components:

- Brokers
- Configuration Managers
- User Name Servers

Using the wizard, you access the equivalent command line command through a graphical interface:

- "mqsicreatebroker command" on page 374, "mqsicreateconfigmgr command" on page 384, and "mqsicreateusernameserver command" on page 397
- "mqsichangebroker command" on page 319, "mqsichangeconfigmgr command" on page 328, and "mqsichangeusernameserver command" on page 361
- "mqsideletebroker command" on page 408, "mqsideleteconfigmgr command" on page 410, and "mqsideleteusernameserver command" on page 418

The wizard displays a series of panels that lead you through the task that you want to complete. The wizard provides help, in the banner at the top of each panel, that indicates what actions you should take to complete the panel and continue. Not every optional parameter on each of these commands is supported through the wizard; if you are using some of the more advanced features (for example, setting or modifying LDAP directory access for a broker), you must use the command line interface.

Use the buttons displayed at the bottom of each panel to move **Back** to the previous panel, to move to the **Next** panel, to **Finish** working with the wizard, or to **Cancel** the current action and end the wizard.

1. Switch to the Broker Application Development perspective or the Broker Administration perspective.
2. Select **File** → **New** → **Other**. The **New** dialog opens.
3. Select **Command Assistant Wizard** within the **Broker Administration - Getting Started** category and click **Next**. The wizard opens and displays its first panel.
4. Select the type of component that you want to work with. The wizard checks which components have been installed on this system. You must select a value from the available list; you cannot enter a different value.
5. Navigate to the **Name** input field. If the wizard has found any existing components of the type that you entered, it shows these in this field. If no components of this type exist, or you want to create a new component, enter a new unique name in this field, following the naming restrictions enforced by the product and any naming conventions that are in use in your environment.

The name of a resource is case insensitive. If a resource of the same name exists, but with characters in a different case to those that you typed into this field, the name that you typed is overwritten with the existing name.

6. Navigate to the **Action** input field and choose the action that you want to complete. The wizard prevents you from entering an invalid action for the resource that you have entered in the **Name** field. For example, if you have entered a name that the wizard has not found on this system, you can choose only to create a new resource. If the resource already exists, you can choose to modify it or delete it.
7. If you have more than one installation of the product on this system, select the correct value in the **Location** field. This field displays the home directory of the installation identified by the wizard:
   - If only one installation exists on this system, the directory is displayed and the field is read-only.
   - If you have specified an existing, uniquely named, resource in the **Name** field, the wizard displays the location of the installation that is associated with that resource, and the field is read-only.
   - If more than one installation exists, and might be the target for your request, select the correct location in this field.
8. Click **Next**. The wizard displays the next panel, the content of which depends on your choices so far.

   Use the help that is displayed by the wizard on each panel, and navigate through the entry fields, selecting or entering text where appropriate.

   If you enter a password, the characters are displayed as asterisk characters in the entry field to increase security.
9. When you have completed the entry field on the panel, click **Next**. The wizard displays a summary that shows you the commands that will be invoked, and any additional actions that will be taken.
10. Check the information in the summary; if it is correct, click **Next**.

    If you want to change anything, click **Back** to return to a previous panel and change your input.
11. The wizard starts processing your request. If the action succeeds, the wizard displays messages in the summary panel.

    If an action fails, the wizard reports the error in a message dialog. If you know what is causing the error, and can fix it, correct the error and click **Yes**. The wizard reissues the command.

    If you do not know what is causing the error, or you cannot fix it, click **No**. The wizard backs out any actions that have already completed and returns your system to its initial state.
12. Click **Finish** to end the wizard, or click **Next** to return to the first page and select another task to complete.

Verifying components

To verify that the WebSphere Message Broker components that you have created exist, use the **mqsilist** command. On the command line type:

```
mqsilist
```

Note, that on z/OS it is not possible to display all the components.

If you do not specify any parameters when you issue this command, a list of components and queue manager names is displayed for each component created on this system, in the form:

```
BIP8099I: Broker: brokername - queuemanagername
BIP8099I: UserNameServer: UserNameServer - queuemanagername
BIP8099I: ConfigMgr: configmgrname - queuemanagername
BIP8071I: Successful command completion
```

Connecting components

How to make connections between the Configuration Manager, the brokers, and the User Name Server.

Before you start:

You must complete the following tasks:

- "Creating a Configuration Manager" on page 141
- "Creating a broker" on page 129
- "Creating a User Name Server" on page 151

The following steps describe how to make connections between the Configuration Manager, the brokers, and the User Name Server.

If the components in your broker domain are supported by different queue managers, then you must establish WebSphere MQ connections between those queue managers to enable messages to be exchanged. It is important that each broker is able to exchange messages with the User Name Server that provides user name services for the broker.

If your broker domain components all run on the same system, and use a single queue manager, you do not need to create any WebSphere MQ connections between your brokers.

To achieve the required connection, complete the following steps. All of the steps are illustrated with MQSC examples. You can use any appropriate method for defining these resources. These examples assume that the queue managers are called `COMP1` and `COMP2`.

In the following steps the value of 104857600 for `maxmsgl` is an example. Check the appropriate WebSphere MQ documentation to confirm the value for `maxmsgl` that you can use on your platforms.

You must set the `maxmsgl` attribute only on the transmission queue that sends messages from the Configuration Manager's queue manager to the broker's queue manager.

1. Define a transmission queue on each component's queue manager. These transmission queues collect messages ready for transmission between components. The transmission queue must have the same name as the queue manager to which it transmits messages (that is `COMP1` and `COMP2` for this example). Set the `maxmsgl` attribute to its maximum value.

   For example, on queue manager `COMP1`:

   ```
   define qlocal('COMP2') usage(XMITQ) maxmsgl (104857600) replace
   ```

   and on queue manager `COMP2`:

   ```
   define qlocal('COMP1') usage(XMITQ) replace
   ```

2. Define the channels for the connection. Use sender-receiver pairs of channels for all two-way communications between queue managers that host WebSphere Message Broker components.
   a. Define the sender channel on the first component's queue manager (Sender(3)). This sender channel transports messages sent by the first component to the second component.

      Allocate connection names according to your WebSphere MQ network conventions, and specify the protocol that you are using for this connection and the port on which the listener is listening.

      For example, on queue manager COMP1:

      ```
      define channel('COMP1_TO_COMP2') chltype(sdr) trptype(tcp)
      conname('WBRKSYS1(1415)') xmitq('COMP2')
      maxmsgl (104857600) replace
      ```

   b. Define a receiver channel on the first component's queue manager (Receiver(2)). Messages sent by the second component to the first component are received by this channel.

      This receiver channel must have the same name as the sender channel on COMP2, defined in Step 2c. For example, on queue manager COMP1:

      ```
      define channel('COMP2_TO_COMP1') chltype(rcvr) trptype(tcp)
      maxmsgl (104857600) replace
      ```

   c. Define the sender channel on the second component's queue manager (Sender(1)). This sender channel transports messages sent by the second component to the first component.

      Allocate connection names according to your WebSphere MQ network conventions, and you must specify the protocol you are using for this connection.

      For example, on queue manager COMP2:

      ```
      define channel('COMP2_TO_COMP1') chltype(sdr) trptype(tcp)
      conname('WBRKSYS1(1414)') xmitq('COMP1')
      maxmsgl (104857600) replace
      ```

   d. Define a receiver channel on the second component's queue manager (Receiver(4)). Messages sent by the first component to the second component are received by this receiver channel.

      This receiver channel must have the same name as the sender channel on COMP2, defined in Step 2a. For example, on queue manager COMP2:

      ```
      define channel('COMP1_TO_COMP2') chltype(rcvr) trptype(tcp)
      maxmsgl (104857600) replace
      ```

3. Create and start a listener for each protocol in use. Create the listener in WebSphere MQ Services in WebSphere MQ v5, WebSphere MQ Explorer in WebSphere MQ v6, or use the DEFINE LISTENER MQSC command. For more information see "Starting the WebSphere MQ channels and listeners" on page 163.
4. Start the sender channels (1) and (3) on the respective queue managers. You can set up channel initiators for these channels. Setting up receiver channels reduces overheads by allowing the channels to stop when there is no message traffic, but ensures automatic startup when there are messages to transport.

You can set up a single receiver channel on the Configuration Manager's queue manager to support all sender channels created for the brokers. Setting up a single receiver channel requires a single definition on the Configuration Manager and a single sender definition on each broker, the sender definitions on each broker must have the same name on each broker. You can also use this receiver channel on the Configuration Manager to support communications from the User Name Server.

All WebSphere MQ connections between WebSphere Message Broker components, and between clients and WebSphere Message Broker components, can be set up using any of the communications protocols supported by WebSphere MQ (TCP/IP and SNA on all operating systems; also, NetBIOS and SPX on Windows).

Configuring timeouts

Change timeouts that affect configuration tasks in the broker.

Before you start:

Read Deployment overview to understand the conditions under which these timeouts apply.

The broker processes configuration requests from the Configuration Manager:

- User requests. When you issue a command against the broker, for example the mqsideploy.
- Internal requests.

Several factors affect the time that a broker takes to apply and respond to these requests. These include the load on the broker's computer, network delays between components, and the work that execution groups are performing at the time the request is received. The number of message flows in an execution group, and their complexity, and large message sets, also affect the time taken.

You can change the length of time that a broker can take to perform these actions using two parameters that you can set on the mqsicreatebroker and mqsichangebroker commands. The combined default value for these parameters is approximately six minutes (360 seconds).

During development and test of message flows and broker configurations, experiment with the values that you set for these timeout to determine appropriate values for your resources.

- **-g** *ConfigurationChangeTimeout*

  This value defines the maximum time (in seconds) that is allowed for a user configuration request to be processed, and defaults to five minutes (300 seconds). The value is affected by the system load (including CPU utilization), and by each execution group's load. If the request is not completed in this time, the broker generates warning message BIP2066, but continues to implement the change. The broker records further diagnosis information in the system and event logs.

- **-k** *InternalConfigurationTimeout*

  This value defines the maximum time (in seconds) that is allowed for an internal configuration change to be processed and defaults to one minute (60 seconds). For example, it defines the length of time that is allowed for the broker to start an execution group before a response is required.

  The broker starts an internal process to start an execution group and to make all the message flows active. Part of this initialization is performed serially (one execution group at a time), therefore if the change affects more than one execution group the time required increases. If an execution group exceeds this timeout, the broker generates a warning message BIP2080. However, the initialization continues and the execution group is started. The broker records further diagnosis information in the system and event logs.

The sum of the *ConfigurationChangeTimeout* and the *InternalConfigurationTimeout* represents the maximum length of time that a broker can take to process a deployed configuration message before it generates a negative response. Check that typical configurations complete successfully within the time that you have specified, to minimize warning messages. Look for warning messages in the Broker Administration perspective in the Alerts view. When all messages disappear, the deployment has completed. If you start a deploy and record how long it takes for all messages to disappear from the Alerts view, you can use this time interval as the basis for setting these timeout values.

If the broker is on a production system, increase the values for both *ConfigurationChangeTimeout* and *InternalConfigurationTimeout* to allow for application messages that are currently being processed by message flows to be completed before the configuration change is applied. Also consider increasing the value if you have merged message flows into fewer execution groups that you are using for testing.

If the broker is on a development or test system, you might want to reduce timeouts (in particular, the *ConfigurationChange Timeout*) to improve perceived response times, and to force a response from a broker that is not showing expected behavior. However, reducing the timeout values decreases the probability of deploying a configuration change successfully.

Modifying a broker

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537
- "Creating a broker" on page 129
- On Windows, UNIX systems, and Linux, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment

Modify a broker using the command line on the system where the broker component is installed. On Windows, you can also use the Command Assistant to complete this task.

The parameters you can change on the broker affect the physical broker, created using the command line.

You can also modify the broker reference in the workbench, where it is possible to change broker properties, such as multicast properties.

Follow the link for the appropriate platform.

- "Modifying a broker on Linux and UNIX systems"
- "Modifying a broker on Windows" on page 174
- "Modifying a broker on z/OS" on page 175

Modifying a broker on Linux and UNIX systems

Use the mqsichangebroker command on Linux and UNIX to modify your broker.

Linux UNIX To modify a broker on Linux and UNIX systems:

1. Stop the broker using the mqsistop command.
2. Enter the mqsichangebroker command with the parameters that you want to change:

```
mqsichangebroker brokername <<-i ServiceUserID> -a ServicePassword>
<-p DatabaseSourcePassword> <-s UserNameServerQueueManagerName>
<-j | -d> <-t | -n> <-l UserLilPath> <-g ConfigurationTimeout>
 <-k ConfigurationDelayTimeout> <-v StatisticsMajorInterval> <-P HttpPort>
```

   where:

   brokername
   Is the broker name.

   -i Is the service user ID that is used to run the broker.

   -a Is the password for the broker user ID.

   -p Is the password for the broker's database user ID.

   -s Is the WebSphere MQ queue manger for the User Name Server

   -j Indicates that publish/subscribe access control is to be enabled for this broker.

   -d Indicates that publish/subscribe access control is to be disabled for this broker.

   -t Indicates that the broker runs as a WebSphere MQ trusted application.

   -n Indicates that the broker must cease to run as a WebSphere MQ trusted application.

   -l Indicates from where LIL (loadable implementation libraries) files are loaded.

   -g Is the maximum time (in seconds) to allow a broker to process a deployed message.

   -k Is the maximum time (in seconds) to allow a broker to process a minimum size deployed message.

   -v Is the time (in minutes) for the duration of the interval for collecting statistics archive records.

   -P Is the port that the broker HTTP listener will use.

   The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started

   For example, to change the user ID that is used to run the broker, enter the following command at the command prompt:

```
mqsichangebroker WBRK_BROKER -i wbrkuid -a wbrkpw
```

3. Restart the broker using the mqsistart command. The broker restarts with the new properties.

If you cannot change a property using mqsichangebroker, delete the broker and then create a new one with the new properties.

Modifying a broker on Windows

Use the mqsichangebroker command on Windows to modify your broker.

Windows To modify a broker on Windows:

1. Stop the broker using the mqsistop command.

2. Enter the mqsichangebroker command with the parameters that you want to change:

   ```
   mqsichangebroker brokername <<-i ServiceUserID> -a ServicePassword>
   <-p DatabaseSourcePassword> <-s UserNameServerQueueManagerName>
   <-j | -d> <-t | -n> <-l UserLilPath> <-g ConfigurationTimeout>
   <-k ComfigurationDelayTimeout> <-v StatisticsMajorInterval> <-P HttpPort>
   ```

   where:

   brokername
   Is the broker name.

   -i Is the service user ID that is used to run the broker.

   -a Is the password for the broker user ID.

   -p Is the password for the broker's database user ID.

   -s Is the WebSphere MQ queue manger for the User Name Server.

   -j Indicates that publish/subscribe access control is enabled for this broker.

   -d Indicates that publish/subscribe access control is disabled for this broker.

   -t Indicates that the broker runs as a WebSphere MQ trusted application.

   -n Indicates that the broker must cease to run as a WebSphere MQ trusted application.

   -l Indicates from where LIL (loadable implementation libraries) files are loaded.

   -g Is the maximum time (in seconds) to allow a broker to process a deployed message.

   -k Is the maximum time (in seconds) to allow a broker to process a minimum size deployed message.

   -v Is the time (in minutes) for the duration of the interval for collecting statistics archive records.

   -P Is the port that the broker HTTP listener will use.

   The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started

   For example, to change the user ID that is used to run the broker, enter the following command at the command prompt:

   ```
   mqsichangebroker WBRK_BROKER -i wbrkuid -a wbrkpw
   ```

3. Restart the broker using the mqsistart command. The broker restarts with the new properties.

If you cannot change a property using mqsichangebroker, delete the broker and then create a new one with the new properties.

Modifying a broker on z/OS

Before you start:

To complete this task, you must have completed the following task:

- "Creating a broker on z/OS" on page 133

To modify a broker:

1. Ensure that the broker is running
2. Stop the broker components by issuing the command/F BROKERNAME, PC.
3. When it has stopped, use the MVS MODIFY command with the changebroker parameters that you want to change. For example:

   ```
   /F <BROKERNAME>,cb g=100,k=200
   ```
4. Restart the broker components by issuing the following command/F BROKERNAME, SC

   The broker now uses the changed parameters.

You cannot change all the parameters with which you created a broker. If you cannot modify a parameter that you need to change using the changebroker command, delete the broker and then create a new one. This will allow you to redefine all the parameters.

The parameters that you can change are:

g ConfigurationTimeOut

k ConfigurationDelayTimeout

s UserNameServerQueueManagerName

l UserLilPath

v StatisticsArchiveInterval

P HTTPPort

See “mqsichangebroker command” on page 319 for further information on these parameters.

Modifying a Configuration Manager

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to “Security requirements for administrative tasks” on page 537
- “Creating a Configuration Manager” on page 141
- On Windows, UNIX systems, and Linux, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment

Modify a Configuration Manager using the command line on the system where the Configuration Manager component is installed. On Windows, you can also use the Command Assistant to complete this task.

Parameters that are required in order to start, stop and migrate the Configuration Manager (such as the service user ID and password, and the connection parameters to a configuration database for migration) can be modified only by using the command line on the system where the Configuration Manager component is installed.

Parameters that control a running Configuration Manager or domain (such as the set of broker references stored in the Configuration Manager) can be modified

using the Message Brokers Toolkit or a Configuration Manager Proxy application, which might or might not be on the same machine as the Configuration Manager component.

Follow the link for the appropriate platform.

- "Modifying a Configuration Manager on Linux and UNIX systems"
- "Modifying a Configuration Manager on Windows"
- "Modifying a Configuration Manager on z/OS" on page 178

If you need to transfer the Configuration Manager onto another queue manager, follow the steps described in "Moving the Configuration Manager to a new queue manager" on page 179.

Modifying a Configuration Manager on Linux and UNIX systems

The following steps show you how to modify a Configuration Manager's service user ID, service password, database password, User Name Server queue manager, and the maximum JVM heap size, on Linux and UNIX systems:

1. Stop the Configuration Manager using the **mqsistop** command.
2. Enter the **mqsichangeconfigmgr** with the parameters you want to change:

   ```
   mqsichangeconfigmgr configmgrName <<-i ServiceUserID> -a ServicePassword>
   <-p DatabasePassword> <-s UserNameServerQueueManagerName> <-j  MaxJVMHeapSize>
   ```

   where:

   configmgrName
   Is the Configuration Manager name.

   -i Is the service user ID that is used to run the Configuration Manager.

   -a Is the password for the Configuration Manager user ID.

   -p If an existing DB2 database from a pervious version of the product has not yet been migrated, use this option to set the password used to access the database.

   -s Is the WebSphere MQ queue manger for the User Name Server.

   -j Is the maximum Java virtual machine heap size, in megabytes (minimum 64).

   For example, to modify the Configuration Manager so that it can communicate with the User Name Server, enter the following command at the command prompt:

   ```
   mqsichangeconfigmgr CMGR01 -s WBRK_UNS_QM
   ```

3. Restart the Configuration Manager using the **mqsistart** command. The Configuration Manager restarts with the new properties.

If you cannot change a property, delete the Configuration Manager then create a new one with the new property. Creating a new Configuration Manager does not cause any loss of data as long as the previous Configuration Manager's database tables were not deleted (for example, by specifying the **-n** parameter on the **mqsideleteconfigmgr** command).

Modifying a Configuration Manager on Windows

The following steps show you how to modify a Configuration Manager's service user ID, service password, database password, User Name Server queue manager, and the maximum JVM heap size, on Windows:

1. Stop the Configuration Manager using the **mqsistop** command.

2. Enter the **mqsichangeconfigmgr** with the parameters you want to change:

   ```
   mqsichangeconfigmgr configmgrName <<-i ServiceUserID> -a ServicePassword>
   <-p DatabasePassword> <-s UserNameServerQueueManagerName> <-j  MaxJVMHeapSize>
   ```

   where:

   configmgrName
   Is the Configuration Manager name. This is optional.

   -i Is the service user ID that is used to run the Configuration Manager.

   -a Is the password for the Configuration Manager user ID.

   -p If an existing DB2 database from a pervious version of the product has not yet been migrated, use this option to set the password used to access the database.

   -s Is the WebSphere MQ queue manger for the User Name Server.

   -j Is the maximum Java virtual machine heap size, in megabytes (minimum 64).

   For example, to modify the Configuration Manager so that it can communicate with the User Name Server, enter the following command at the command prompt:

   ```
   mqsichangeconfigmgr CMGR01 -s WBRK_UNS_QM
   ```

3. Restart the Configuration Manager using the **mqsistart** command. The Configuration Manager restarts with the new properties.

If you cannot change a property, delete the Configuration Manager then create a new one with the new property. Creating a new Configuration Manager does not cause any loss of data as long as the previous Configuration Manager's database tables were not deleted (for example, by specifying the **-n** parameter on the **mqsideleteconfigmgr** command).

Modifying a Configuration Manager on z/OS

Before you start:

To complete this task, you must have completed the following task:

- "Creating a Configuration Manager on z/OS" on page 146

The following steps show you how to modify a Configuration Manager's database password, User Name Server queue manager, and the maximum JVM heap size:

1. At the command prompt, issue the stopcomponent command to stop the Configuration Manager.
2. When it has stopped, use the `MODIFY` command with the changeconfigmgr parameters that you want to change. Note that you can abbreviate changeconfigmgr to `cc`. For example:

   ```
   MODIFY <configurationmanagername>,changeconfigmgr s=WBRK_UNS_QM
   ```

3. At the command prompt issue the startcomponent command.

   The Configuration Manager now uses the changed parameters.

You cannot change all the parameters with which you created a Configuration Manager. If you cannot modify a parameter that you need to change using the changeconfigmger command, delete the Configuration Manager and then create a new one. This will allow you to redefine all the parameters.

The parameters that you can change are:

s= Is the WebSphere MQ queue manger for the User Name Server.

j= Is the maximum Java virtual machine heap size, in megabytes (minimum 64).

See “mqsichangeconfigmgr command” on page 328 for further information on these parameters.

Moving the Configuration Manager to a new queue manager

The following steps show you how to move the Configuration Manager to a new queue manager that is on the same computer or on a different computer:

1. Use the **mqsicreateconfigmgr** command to create a new Configuration Manager that uses the new queue manager. Do not specify a database name.
2. If possible, stop all brokers in the domain using the **mqsistop** command.
3. Stop the original Configuration Manager using the **mqsistop** command.
4. Back up the original Configuration Manager using the **mqsibackupconfigmgr** command.
5. On the computer that contains the new Configuration Manager, use the **mqsirestoreconfigmgr** command to overwrite the new Configuration Manager’s repository with the one that you backed up.
6. Start the new Configuration Manager using the **mqsistart** command.
7. Perform a complete deployment of the topology, using the Message Brokers Toolkit, the **mqsideploy** command, or the Configuration Manager Proxy. This tells all the brokers in the domain to associate themselves with the new Configuration Manager.
8. If you stopped the brokers in the domain in Step 2, start them using the **mqsistart** command as soon as deployment is initiated, so that the deployments can now be processed.
9. If it was not possible to stop the brokers in Step 2, ensure that any messages on the original Configuration Manager’s queue manager’s SYSTEM.BROKER.ADMIN.QUEUE are transferred manually to the new Configuration Manager’s queue manager’s SYSTEM.BROKER.ADMIN.QUEUE. This is the queue that brokers use to communicate their status to the Configuration Manager and if any status change event occurred between stopping the original Configuration Manager in Step 3 and the complete deployment in Step 7, any messages that report a change in status will have been sent to the old Configuration Manager.

Modifying a User Name Server

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to “Security requirements for administrative tasks” on page 537
- “Creating a User Name Server” on page 151
- On Windows, UNIX systems, and Linux, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment

Modify a User Name Server using the command line on the system where the User Name Server component is installed. On Windows, you can also use the Command Assistant to complete this task.

Follow the link for the appropriate platform.

- "Modifying a User Name Server on Linux and UNIX systems"
- "Modifying a User Name Server on Windows"
- "Modifying a User Name Server on z/OS" on page 181

Modifying a User Name Server on Linux and UNIX systems

To modify a User Name Server on Linux and UNIX systems; AIX, HP-UX, Linux (zSeries platform), Linux (x86 platform) and Solaris:

1. Stop the User Name Server using the **mqsistop** command.
2. Enter the **mqsichangeusernameserver** command with the parameters that you want to change: mqsichangeusernameserver <<-i ServiceUserID> <-a ServicePassword> <-d SecurityDomainName> <-r RefreshInterval> <-g AuthProtocolDataSource> <-j`` | -o> where:

   -i Is the service user ID that is used to run the User Name Server

   -a Is the password for the User Name Server user ID.

   -d Is the security domain that the User Name Server uses on the Windows platform.

   -r Is the number of seconds between each refresh of the User Name Server internal cache.

   -j Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

   -o Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

   -g Is the name of the data source required by the authentication protocol.

   For example, to change the number of seconds between each refresh of the User Name Server internal cache, enter the following command at the command prompt:

   ```
   mqsichangeusernameserver -r 2000
   ```
3. Restart the User Name Server using the **mqsistart** command. The User Name Server restarts with the new properties.

If you cannot change a property using **mqsichangeusernameserver**, delete the User Name Server and then create a new one with the required properties.

Modifying a User Name Server on Windows

Windows To modify a User Name Server:

1. Stop the User Name Server using the **mqsistop** command.
2. Enter the **mqsichangeusernameserver** command with the parameters you want to change:

   ```
   mqsichangeusernameserver <<-i ServiceUserID> <-a ServicePassword>
   <-d SecurityDomainName> <-r RefreshInterval> <-k AuthProtocoltype>
   <-j AuthProtocolModule> <-g AuthProtocolDataSource>
   ```

   where:

   -i Is the service user ID that is used to run the User Name Server

   -a Is the password for the User Name Server user ID.

-d Is the security domain that the User Name Server uses.

-r Is the number of seconds between each refresh of the User Name Server internal cache.

-k Indicates that the authentication protocol is supported by brokers.

-j Indicates that the authentication services product library is to be used.

-g Indicates the name and location of the password file used to source any protocol related information.

For example, to change the number of seconds between each refresh of the User Name Server internal cache, enter the following command at the command prompt:

```
mqsichangeusernameserver -r 2000
```

3. Restart the User Name Server using the **mqsistart** command. The User Name Server restarts with the new properties.

If you cannot change a property using **mqsichangeusernameserver**, delete the User Name Server and then create a new one with the new properties.

Modifying a User Name Server on z/OS

Before you start:

To complete this task, you must have completed the following task:

- "Creating a User Name Server on z/OS" on page 155

To modify a User Name Server.

1. At the command prompt issue the stopcomponent command to stop the User Name Server.
2. When it has stopped, use the MODIFY command with the changeusernameserver parameters that you want to change. For example:

   ```
   MODIFY <usernameserver>,changeusernameserver r=2000
   ```

3. At the command prompt issue the startcomponent command.

   The User Name Server now uses the changed parameters.

You cannot change all the parameters with which you created the User Name Server: if you cannot modify a parameter that you need to change using the changeusernameserver command, delete the User Name Server and then create a new one. This will allow you to redefine all the parameters.

Modifying access to the broker database

When you created the broker, you set the user ID through which the broker accesses its database tables using the DataSourceUserID parameter on the **mqsicreatebroker** command. You cannot change this user ID using the **mqsichangebroker** command.

To change the user ID that the broker uses to access the tables in the broker database:

1. Back up the database tables. The tables are listed in "mqsicreatebroker command" on page 374.
2. Delete the broker. For more information, see "Deleting a broker" on page 183.
3. Restore the database tables to the new location.

4. Create a new broker, specifying the new user ID. For more information, see "Creating a broker" on page 129.

The new broker accesses the database tables using the new user ID.

Moving from WebSphere Message Broker on a distributed platform to z/OS

Recommendations on how to define resources for WebSphere Message Broker for z/OS are given in the following topics:

- "z/OS customization overview" on page 104
- "Customizing the z/OS environment" on page 102
- "Creating a broker on z/OS" on page 133
- "Creating a User Name Server on z/OS" on page 155
- "Creating a Configuration Manager on z/OS" on page 146
- "Administration in z/OS" on page 481

Taking these into account, recreate your broker and User Name Server resources on z/OS and deploy your message flows and execution groups to a WebSphere Message Broker for z/OS broker. If you have extended WebSphere Message Broker in a distributed environment with user-defined parsers or message processing nodes, port them to run under z/OS.

Also consider the following points:

- Floating point conversion: z/OS runs under z/OS floating point format, so floating point operations on z/OS run in a different range and accuracy from distributed platforms.
- Administration commands are partially implemented as console commands and partially as JCL commands.
- Event log messages: All address spaces have a JOBLOG where messages appear. In addition to this, all messages appear on the SYSLOG, with important operator messages being filtered to the console through MPF (Message Processing Facility).

For information about message flow transactionality, see Message flow transactions.

Moving user applications

You can write your own applications to work with WebSphere Message Broker. If these applications use the common subset of functionality of all WebSphere Message Broker brokers, no migration is necessary. If you are using functionality that is available on some WebSphere Message Broker platforms only, for example message segmentation and WebSphere MQ message groups, be aware that WebSphere Message Broker for z/OS does not provide support for this migration.

Deleting an execution group from a broker using the command line

Before you start:

You must complete the following tasks:

- "Adding an execution group to a broker using the command line" on page 140

Instead of employing the Message Brokers Toolkit, you can use this task as an alternative method of deleting an execution group .

For more details on deleting an execution group from the Message Brokers Toolkit see "Deleting an execution group" on page 200

To delete an execution group from a broker using the command line:

1. Open a command prompt that has the environment configured for this version of WebSphere Message Broker.
2. Enter the following command to delete the execution group:

   ```
   mqsideleteexecutiongroup -i host -p 1414 -q QMGR -b BROKER –e EG1
   ```

   where

   host Is the host name or IP address of the Configuration Manager for the domain on which the broker resides.

   1414 Is the port on which the Configuration Manager's queue manager is listening.

   QMGR
   Is the name of the Configuration Manager's queue manager.

   BROKER
   Is the name of the broker.

   EG1 Is the name of the execution group that you want to delete.

On completion of this task, the execution group is no longer running on the specified broker. In addition, any message flows that were running on the execution group are no longer running.

Deleting a broker

Before you start:

You must complete the following tasks:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537
- Remove the broker from the broker domain in the workbench ("Removing a broker from a broker domain" on page 196).

Delete a broker using the command line on the system where the broker component is installed. On Windows, you can also use the Command Assistant to complete this task.

On Windows, UNIX systems, and Linux, you must set up your command-line environment before deleting a broker, by running the product profile or console; refer to Setting up a command environment.

You can remove the broker from the broker topology using the workbench, but the physical broker will not be deleted until the broker is physically deleted from the command line.

Follow the link for the appropriate platform.

- "Deleting a broker on Linux and UNIX systems"
- "Deleting a broker on Windows"
- "Deleting a broker on z/OS"

Deleting a broker on Linux and UNIX systems

To delete a broker on Linux and UNIX systems:

1. Stop the broker using the **mqsistop** command.
2. Enter the following command to delete the broker:

   ```
   mqsideletebroker WBRK_BROKER
   ```

   where:

   `WBRK_BROKER` is the broker name.

On completion of this task, you have:

- Removed the broker's data from the database.
- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the **mqsilist** command.

Deleting a broker on Windows

Windows To delete a broker:

1. Stop the broker using the **mqsistop** command.
2. Enter the following command to delete the broker:

   ```
   mqsideletebroker WBRK_BROKER
   ```

   where:

   `WBRK_BROKER` is the broker name.

On completion of this task, you have:

- Stopped the Windows service that runs the broker.
- Removed the broker's data from the database.
- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the **mqsilist** command.

Deleting a broker on z/OS

To delete a broker:

1. Remove the broker from the broker domain, in the workbench. Refer to "Removing a broker from a broker domain" on page 196.
2. Stop the broker, by stopping the started task.
3. Customize and submit the following delete jobs in your component PDSE to delete WebSphere MQ and DB2 definitions:

Delete jobs	Description
BIPDLBK	Delete component including WebSphere MQ broker queues and channels and rows in the DB2 database
BIPDLDB	Drop the broker DB2 database, storage group and table spaces.

Note:

a. Not all files are deleted from the component directory in the file system.
b. When the BIPDLDB job drops the broker DB2 database, it also deletes any Image Copy references to itself that you currently have. If you restore the broker in future you need to reinstate the Image Copy references.

Deleting a Configuration Manager

Before you start:

Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537

Delete a Configuration Manager using the command line on the system where the Configuration Manager component is installed. On Windows, you can also use the Command Assistant to complete this task.

On Windows, UNIX systems, and Linux, you must set up your command-line environment before deleting a Configuration Manager, by running the product profile or console; refer to Setting up a command environment.

Follow the link for the appropriate platform:

- "Deleting a Configuration Manager on Linux and UNIX systems"
- "Deleting a Configuration Manager on Windows" on page 186
- "Deleting a Configuration Manager on z/OS" on page 186

Deleting a Configuration Manager on Linux and UNIX systems

You delete the Configuration Manager using the command line. The Configuration Manager can be deleted only from the system where the Configuration Manager component is installed.

You can delete a Configuration Manager without also deleting your domain connection parameters in the workbench. If you want to delete a Configuration Manager and create a new one, you can keep your connection parameters in the workbench, even if you specify different parameters when creating the new Configuration Manager. When you reconnect to your domain in the workbench your new settings are displayed.

To delete a Configuration Manager on Linux and UNIX systems:

1. Stop the Configuration Manager using the "mqsistop command" on page 474command.
2. Delete the Configuration Manager using the "mqsideleteconfigmgr command" on page 410 command.

On completion of this task, you have:

- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the "mqsilist (list resources) command" on page 431 command.
- Preserved all internal data associated with the Configuration Manager, unless you specify the -n parameter on the "mqsideleteconfigmgr command" on page 410 command.

Deleting a Configuration Manager on Windows

You delete the Configuration Manager using the command line. The Configuration Manager can be deleted only from the system where the Configuration Manager component is installed.

You can delete a Configuration Manager without also deleting your domain connection parameters in the workbench. If you want to delete a Configuration Manager and create a new one, you can keep your connection parameters in the workbench, even if you specify different parameters when creating the new Configuration Manager. When you reconnect to your domain in the workbench your new settings will be displayed.

Windows To delete a Configuration Manager:

1. Stop the Configuration Manager using the “mqsistop command” on page 474 command.
2. Delete the Configuration Manager using the “mqsideleteconfigmgr command” on page 410 command.

On completion of this task, you have:

- Stopped the Windows service that runs the Configuration Manager.
- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the “mqsilist (list resources) command” on page 431 command.
- Preserved all internal data associated with the Configuration Manager, unless you specify the -n parameter on the “mqsideleteconfigmgr command” on page 410 command.

Deleting a Configuration Manager on z/OS

To delete a Configuration Manager:

1. Stop the Configuration Manager, by stopping the started task.
2. Customize and submit the following delete jobs in your component PDSE to delete WebSphere MQ definitions:

Delete jobs	Description
BIPDLCM	Delete component including WebSphere MQ broker queues and channels.

Note that not all files are deleted from the component directory in the file system.

Disabling a User Name Server

When you delete a User Name Server you disable publish/subscribe services within the broker domain.

To delete a User Name Server from the broker domain, remove the connections between the broker, Configuration Manager, and User Name Server. This ensures that the broker and Configuration Manager do not continue to communicate with the User Name Server.

Modify the broker and Configuration Manager using the **mqsichangebroker** and **mqsichangeconfigmgr** commands, *before* you delete the User Name Server. The following steps show you how to do this.

- Modify the broker by removing the reference to the queue manager for the User Name Server. Use the **mqsichangebroker** command to modify the -s and -d parameters:
  1. Specify an empty string (two double quotation marks, ″″) on the -s parameter.
  2. Specify the -d parameter to disable publish/subscribe access for the broker.

  This ensures that the broker does not try to communicate with the User Name Server.
- Modify the Configuration Manager by removing the reference to the queue manager for the User Name Server. Use the command to modify the -s parameter, by specifying an empty string (two double quotation marks, ″″). This ensures that the Configuration Manager does not try to communicate with the User Name Server.

Now that you have made the required changes to the broker and Configuration Manager, you can delete the User Name Server, and thus disable publish/subscribe services.

Deleting a User Name Server

Before you start:

You must complete the following task:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to “Security requirements for administrative tasks” on page 537
- Modify the broker and Configuration Manager so that they do not continue to communicate with the User Name Server. See “Disabling a User Name Server” on page 186 for details of the changes you must make.

Delete a User Name Server using the command line on the system where the User Name Server component is installed. On Windows, you can also use the Command Assistant to complete this task.

On Windows, UNIX systems, and Linux, you must set up your command-line environment before deleting a User Name Server, by running the product profile or console; refer to Setting up a command environment.

Follow the link for the appropriate platform.

- “Deleting a User Name Server on Linux and UNIX systems”
- “Deleting a User Name Server on Windows” on page 188
- “Deleting a User Name Server on z/OS” on page 188

Deleting a User Name Server on Linux and UNIX systems

To delete a User Name Server on Linux and UNIX systems; AIX, HP-UX, Linux (zSeries platform), Linux (x86 platform) and Solaris:

1. Stop the User Name Server using the **mqsistop** command.
2. Enter the following command to delete the User Name Server:

```
mqsideleteusernameserver
```

On completion of this task, you have:

- Deleted the queue associated with the User Name Server on the local queue manager
- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the **mqsilist** command.

Deleting a User Name Server on Windows

Windows To delete a User Name Server:

1. Stop the User Name Server using the **mqsistop** command.
2. Enter the following command to delete the User Name Server:

```
mqsideleteusernameserver
```

On completion of this task, you have:

- Stopped the Windows service that runs the User Name Server.
- Deleted the queue associated with the User Name Server on the local queue manager.
- Removed the record for the component in the broker registry. It is therefore removed from the list of components displayed by issuing the **mqsilist** command.

Deleting a User Name Server on z/OS

To delete a User Name Server:

1. Stop the User Name Server, by stopping the started task.
2. Customize and submit the following delete job manually to delete WebSphere MQ definitions:

Delete jobs	*Description*
BIPDLUN	Deletes components WebSphere MQ queues and channels

Note that not all files are deleted from the component directory in the file system.

Configuring a broker domain in the workbench

Create the resources for your broker domain in the workbench on Linux (x86 platform) or Windows.

Before you start:

Created the physical broker domain components. Refer to "Configuring broker domain components" on page 127.

This task is the second part of the two-stage process to create and configure your broker domain. Use the workbench to configure and administer the broker domain components.

Launch the workbench in one of the following ways:

- Linux From the main menu:
  - On Red Hat, click **Programming** → **WebSphere Message Brokers Toolkit**.

– On SUSE Linux, click **IBM WebSphere Message Brokers 6.0 → WebSphere Message Brokers Toolkit**.

- Windows Click **Start → Programs → IBM WebSphere Message Brokers 6.0 → WebSphere Message Brokers Toolkit**, or double-click the shortcut on your desktop that is added during installation, labelled 'WebSphere Message Brokers Toolkit'.
- Use the following commands in a command prompt from their location in either the RAD root directory (if Rational® products such as Rational Application Developer were installed on your system before WebSphere Message Broker was installed), or the WebSphere Message Broker installation directory (if no Rational products were installed on your system before WebSphere Message Broker was installed).

  – Linux

  ```
  wmbt.bin
  ```

  – Windows

  ```
  wmbt.exe
  ```

See the following tasks for instructions on how to configure a broker domain in the workbench:

- "Creating a domain connection"
- "Modifying domain connection properties" on page 191
- "Deleting a domain connection" on page 193
- "Adding a broker to a broker domain" on page 193
- "Modifying broker properties" on page 195
- "Removing a broker from a broker domain" on page 196
- "Removing deployed children from a broker" on page 197
- "Adding an execution group to a broker in the workbench" on page 198
- "Deleting an execution group" on page 200
- "Removing deployed children from an execution group" on page 201

When configuring your broker domain, you are prompted to deploy all changes to the Configuration Manager. You can set your user preferences to suppress the prompt to deploy after each change. See "Changing Broker Administration preferences" on page 243.

When you make changes to the broker domain, and deploy to the Configuration Manager, a short delay might occur before the workspace is updated and the Configuration Manager tells you that the deploy has worked. The delay depends on the network configuration, and the number of changes to make to the configuration of the broker domain during the deployment.

Creating a domain connection

This topic describes how to create a domain connection.

Before you start:

Complete the following tasks:

- "Creating a Configuration Manager" on page 141.

- Create and start a listener for the Configuration Manager. For details on how to create and start a listener, follow the instructions for listeners in the topic: "Starting the WebSphere MQ channels and listeners" on page 163.

This topic shows you how to:

- Create a domain connection in the workbench using the Create a Domain Connection wizard.
- Enter a set of parameters to create a .configmgr file.
- Use the parameters contained within the .configmgr file to connect to the Configuration Manager, where you can view and edit your broker domain.

To create a domain connection:

1. Switch to the Broker Administration perspective.
2. Right-click Domain Connection in the Broker Administration Navigator view.
3. Click **New Domain** to open the Create a Domain Connection wizard. In the Create a Domain Connection wizard, enter:
   a. The value for the WebSphere MQ **Queue Manager Name** that the Configuration Manager is using. This property is mandatory.
   b. The **Host** name or IP address of the machine on which the Configuration Manager is running (the default is `localhost`). This property is mandatory.
   c. The TCP **Port** on which the WebSphere MQ queue manager is listening (the default is `1414`). This property must be a valid positive number.
   d. Optional: The name of the server-connection channel in the **SVRCONN Channel Name** field. The channel has a default name of `SYSTEM.BKR.CONFIG`.

      You can create more than one server-connection channel and define a different SSL certificate on each channel to enforce; for example, users with `view` access on to one channel and users with `deploy` access on to a different channel.

      You can then create WebSphere MQ exits on each channel to provide additional authentication of the WebSphere MQ message sent to the Configuration Manager.

      You must create the server-connection channel manually on the Configuration Manager's queue manager by using one of the following options:

      - The WebSphere MQ runmqsc command to create a channel with options `CHLTYPE(SVRCONN)` and `TRPTYPE(TCP)`.
      - The WebSphere MQ Explorer to create a server-connection channel with the transmission protocol set to TCP.

      For more information see your WebSphere MQ documentation.

      The default name of `SYSTEM.BKR.CONFIG` is assumed if you do not change the name, or attempt to delete it. The name of the server-connection channel is changed only if you enter another name in place of `SYSTEM.BKR.CONFIG`.
   e. Optional: The **Class** of the Security Exit required to connect to the WebSphere MQ queue manager. This property must be a valid Java class name, but you can leave this field blank if it does not apply to your domain connection.
   f. Optional: The **JAR File Location** for the Security Exit required to connect to the WebSphere MQ queue manager. Click **Browse** to find the file location. You can leave this field blank if it does not apply to your domain connection. You must provide a **JAR File Location** if you enter a Security Exit **Class**.

g. Optional: The **Cipher Suite**, **Distinguished Names**, **CRL Name List**, **Key Store**, and **Trust Store** parameters are required to enable SSL. For more information, see "Implementing SSL authentication" on page 23. The **Cipher Suite** field displays available cipher suites. Click **More** to configure Custom SSL Cipher Suites in the Broker Administration Preferences window. If a **Cipher Suite** is not specified, all of the other fields in the SSL section are unavailable.

   You can configure several domain connections in your workspace. Each domain connection has to address a different Configuration Manager, which needs to have a different WebSphere MQ **Queue Manager Name**, **Host** name, or TCP **Port** number. An error message is displayed in the Create a Domain Connection wizard if you try to create a second broker domain using the same **Queue Manager Name**, **Host** name, and **Port** number.

4. Click **Next** to begin the domain connection to the Configuration Manager.

   You cannot connect to a Version 2.1 Configuration Manager. An error is thrown, and you will not be able to populate the domain with brokers or topics, or connect to it using the workbench.

5. If you click **Cancel**, the Create a Domain Connection wizard closes, forcing disconnection from the domain.
6. After the domain connection has been made, enter:
   a. The name of your **Server Project**. The Server Project is the container for your domain connection. If you have not already created a server project, you can specify the name of a new project here. The server project is created with the domain connection.
   b. The **Connection name**. The Connection name is the name that you give to the .configmgr file that contains the parameters to connect to the Configuration Manager.
7. Click **Finish** to create the domain connection.

   The new domain connection is added to the Broker Administration Navigator view, in Domain Connections. The server project holds the .configmgr domain connection file.

   The view of the broker domain is displayed in the Domains view.

Modifying domain connection properties

Before you start:

To complete this task, you must have completed the following tasks:

- "Creating a domain connection" on page 189
- Disconnect from the broker domain. Refer to "Connecting to and disconnecting from the broker domain" on page 253.

Modify the parameters of the `.configmgr` domain connection file that are used to connect to the Configuration Manager.

To modify the domain connection properties.

1. Switch to the Broker Administration perspective.
2. In the Broker Administration Navigator view, expand Domain Connections, and open your server project.
3. Right-click the `.configmgr` domain connection file and click **Open With → Domain Connection Editor**. From here you can change:

a. The name of the WebSphere MQ queue manager that the Configuration Manager is using. This property is mandatory.
b. The host name or IP address of the machine on which the Configuration Manager is running. This property is mandatory.
c. The TCP port on which the WebSphere MQ queue manager is listening. This property must be a valid positive number.
d. Optional: The name of the server-connection channel. The channel has a default name of `SYSTEM.BKR.CONFIG`.

   You can create more than one server-connection channel and define a different SSL certificate on each channel to enforce, for example, users with `view` access on to one channel and users with `deploy` access on to a different channel.

   You can then create WebSphere MQ exits on each channel to provide additional authentication of the WebSphere MQ message sent to the Configuration Manager.

   You must create the server-connection channel manually on the Configuration Manager's queue manager by using the WebSphere MQ:

   - runmqsc command to create a channel with options `CHLTYPE(SVRCONN)` and `TRPTYPE(TCP)`, or
   - Explorer to create a server-connection channel with the transmission protocol set to TCP.

   For more information see your WebSphere MQ documentation.

   The default name of `SYSTEM.BKR.CONFIG` is assumed if you do not change the name, or attempt to delete it. The name of the server-connection channel is changed only if you enter another name in place of `SYSTEM.BKR.CONFIG`.
e. Optional: The name of the Security Exit required to connect to the WebSphere MQ queue manager. This property must be a valid Java class name, but it is not mandatory and you can leave it blank, if it does not apply to your domain connection.
f. Optional: The location of the JAR file for the Security Exit required to connect to the WebSphere MQ queue manager. Use the Browse button to find the file location. You can leave this box blank if it does not apply to your domain connection.

   Note: The location of the JAR file is required if a Security Exit class is entered.
g. Optional: The cipher suite, distinguished names, CRL name list, key store, and trust store parameters required when enabling SSL (see "Implementing SSL authentication" on page 23 for more information). The cipher suite field displays available cipher suites. Click **More** to configure a custom cipher suite in the Broker Administration preferences window. If a cipher suite is not specified, all other fields in the SSL section are unavailable.

4. Close the editor.
5. You are prompted to save the changes; click **Yes**. If the broker domain is connected, you are prompted to disconnect before you can save your changes. The `.configmgr` domain connection file is updated with the new parameters.

You can also change the domain connection parameters for a *disconnected* domain, from the Domains view. Right-click the disconnected domain and click **Edit Parameters**. This opens the Domain Connection editor. Follow steps 3 to 5 above to make the changes you require.

Deleting a domain connection

Before you start:

You must complete the following task:

- "Creating a domain connection" on page 189

To delete a domain connection, delete the corresponding `.configmgr` file from your server project.

The configuration of the broker domain is stored in the Configuration Manager and is not affected by deleting the domain connection. If you create a new domain connection to the same Configuration Manager, the broker domain will be configured and available for use.

The following steps show you how to delete a domain connection.

1. Switch to the Broker Administration perspective.
2. In the Broker Administration Navigator view:
   a. Expand Domain Connections
   b. Open the servers project (called Servers by default).
3. Right-click the domain connection file(`<connection name>.configmgr`) and click **Delete**.
4. Click **OK** at the prompt, to confirm that you want to delete the domain connection.

   If the broker domain in the Domains view is connected, you are prompted to disconnect from the broker domain before it can be deleted. Click **Yes** to disconnect from the broker domain. Clicking **Cancel** at this prompt, cancels deletion of the domain connection.

On completion of this task:

- The `.configmgr` file is removed from the server project.
- The view of the broker domain and its hierarchy is removed from the Domains view.

Adding a broker to a broker domain

How to add a broker to a broker domain.

Before you start:

You must complete the following tasks:

- "Creating a broker" on page 129
- "Connecting to and disconnecting from the broker domain" on page 253

Adding a broker to the broker topology creates a broker reference in the configuration repository; it does not create the physical broker. When you add a broker, you must use the same name that you used to create the broker.

To add a broker to a broker domain:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the default configuration manager, and click **New → Broker**.

3. In the Create a Broker wizard:
   a. Select the broker domain to which you want to add the broker. If the selected broker domain is not connected, you are prompted to connect to the domain. Click **OK**. If you click **Cancel** at this prompt, the wizard remains open.
   b. Type the name of the broker.
   c. Type the WebSphere MQ **Queue Manager Name** that the Configuration Manager is using.

      Note:

      1) If the WebSphere MQ queue manager is on a separate machine, make sure that you have performed the steps listed in "Connecting components" on page 170.
      2) You can associate a WebSphere MQ **Queue Manager Name** with only one broker, even if the brokers are in different broker domains.
4. Click **Next**.
5. Optional: Enter a short or long description for the broker.
6. Click **Finish** to add the broker to the broker domain.
7. You are, by default, prompted to deploy the updated publish/subscribe topology configuration.

   You only need to deploy the topology (either **Complete** or **Delta**) if you are using publish/subscribe and want to share publications or subscriptions. For more information see Publish/subscribe topology deployment.

   If you are *not* using publish/subscribe, click **None**. A deployment now (to associate the broker with the Configuration Manager) is not necessary; the broker is automatically associated with the Configuration Manager the first time a broker archive (bar) file is deployed. See Deploying a broker archive file.

   You can set user preferences so that you are not prompted to deploy the publish/subscribe topology. See "Changing Broker Administration preferences" on page 243. Instead, you can choose for either a complete or delta deployment to be performed automatically. Alternatively, if you are not using publish/subscribe, you might want to set the preference so that *no* automatic deployment takes place.

In the Domains view, the broker is added to the broker domain and a default execution group is added to the broker.

Adding a broker to the broker topology creates security ACL groups, which give the user ID full control of the broker and its default execution group. These ACL groups exist until this broker is removed from the broker domain. The user ID can be removed from the mqbr* groups, but the user still has the full control access level for the broker and its default execution group.

Next:

Add any further execution groups to the broker that you require. Then create, modify, or reuse message flows, message sets and other required files, and add them to the broker archive for deploying to the broker.

Copying a broker

Before you start:

You must complete the following task:

- "Adding a broker to a broker domain" on page 193

You can copy a broker that you have previously added to a broker domain. The new broker reference can be pasted within the same broker domain only.

The new broker inherits the same short and long description as the original broker, and the same execution groups are added; the message flows under the execution groups of the original broker are not inherited by the new broker's execution groups. All other broker properties and multicast properties are *not* inherited by the new broker.

The new broker is automatically given a unique broker name, and queue manager name.

The following steps show you how to copy a broker.

1. Switch to the Broker Administration perspective.
2. In the Domains view, open the broker domain and right-click the broker that you want to copy. Click **Copy**.
3. In the broker domain right-click the Broker Topology and click **Paste**.
4. You are prompted to deploy the updated topology configuration. Click **Delta** to perform a delta deploy. If user preferences are not set to *prompt*, the topology deploy is automatic.

   The new broker reference is added to the broker domain. It inherits the short and long description and the same execution groups as the original broker.

   The new broker is given a unique name in the broker domain, and a new queue manager name.

The newly-created broker does not necessarily reference a physical broker correctly. The workbench does not check if a physical broker exists for the new broker reference.

To ensure that the broker reference does not contain any errors, rename the broker and the broker's queue manager to be exactly the same names as those specified on the **mqsicreatebroker** command when the physical broker was created:

- To rename the broker, refer to "Renaming a broker" on page 196.
- To rename the broker's queue manager, refer to "Modifying broker properties."

Modifying broker properties

You can modify broker properties by adding a long or short description, and by customizing the broker and multicast properties.

Before you start:

To perform this task, you must have completed the following tasks:

- "Adding a broker to a broker domain" on page 193
- Start the broker. See "Starting and stopping a broker" on page 257.

To modify the broker properties:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the broker that you want to modify, and click **Properties**. In the properties window you can modify:
   a. The broker properties.

      Click **Broker** in the left panel of the properties window. For details of all of the broker properties, see "Broker properties" on page 285.
   b. The multicast properties.

      Expand **Multicast** in the left panel of the properties window.

      Click **Advanced** to access the advanced multicast properties.

      For details of all of the multicast properties, see "Setting up a multicast broker" on page 208.
   c. The description for the broker.

      Click **Description** in the left panel of the properties window. Enter either a short or a long description, or both, for the broker.
3. Click **OK** to save all of the modifications to the broker.

   An automatic broker configuration deployment is performed immediately to implement the changed broker properties, except for the broker queue manager name, and the short and long descriptions, for which deployment is not required to update the broker properties.

Renaming a broker

Before you start:

You must complete the following tasks:

- "Adding a broker to a broker domain" on page 193

You might need to rename a broker (and possibly its queue manager; refer to "Modifying broker properties" on page 195) if your original attempt at creating a broker reference contained an error.

Renaming a broker is simpler than deleting and re-creating it.

The following steps show you how to rename a broker:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the broker and click **Rename**. The **Rename Broker** dialog is displayed.
3. In the **New name** field, type the new name of the broker.

   The name must be exactly the same name as that specified on the **mqsicreatebroker** command.
4. Click **Finish** to rename the broker.

The broker's name is updated in the Domains view, and in the Topology editor.

Removing a broker from a broker domain

Before you start:

You must complete the following task:

- "Adding a broker to a broker domain" on page 193

Removing a broker from a broker domain deletes its broker reference in the configuration repository. The broker is not deleted from the system when you perform this task; it simply marks the broker as logically deleted from the configuration repository.

If you want to move a broker from one topology to another, you need to delete and recreate the broker physically (using the **mqsideletebroker** and **mqsicreatebroker** commands) even if the Configuration Manager in both domains are at the same product and service release level. See "Deleting a broker" on page 183 for further information.

The following steps show you how to remove a broker from a broker domain.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the broker domain to reveal the broker that you want to remove.

   To remove more than one broker from the same broker domain, select each broker while holding down the Ctrl key.
3. Right-click the broker and click **Delete**.
4. Click **OK** at the prompt to confirm that you want to remove the broker from the broker domain.
5. You are, by default, prompted to deploy the updated publish/subscribe topology configuration.

   You only need to deploy the topology if you are using publish/subscribe and want to share publications or subscriptions.

   If you are *not* using publish/subscribe, click **None**, as a deployment is not necessary; when removing a broker from the domain, the Configuration Manager automatically requests the broker component to stop message flows that are running and to tidy up any resources being used. (Although if this operation fails for any reason, you can again request the broker to tidy up by deploying a delta topology.)

   You can set user preferences so that you are not prompted to deploy the publish/subscribe topology. Instead, you can choose for either a complete or delta deployment to be performed automatically. Alternatively, if you are not using publish/subscribe, you might prefer to set the preference so that *no* automatic deployment takes place.

The broker and its execution groups are removed as components of the broker domain. Confirmation of the broker's deletion is in two places:

- The broker is removed from the Domains view.
- The broker icon is removed from the Broker Topology editor. If the broker was connected to another broker, this connection is also removed.

To delete the physical broker after you have removed the broker from the domain, refer to "Deleting a broker" on page 183.

Removing deployed children from a broker

Remove the deployed children from a broker if the synchronization between the broker and the Configuration Manager falls into an inconsistent state. Removing deployed children from an execution group removes all message flows, message sets and all other deployed objects from all execution groups on the selected broker. All execution groups are deleted. A new default execution is then created for the broker.

Although these objects are all removed from the broker, they are still available in the file system and toolkit and may be reused if required.

To remove the deployed children from a broker:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the broker domain to reveal the broker with which you want to work.
3. Right-click the broker, and click **Remove Deployed Children**.
4. Click **OK** at the prompt to confirm that you want to delete all execution groups on the broker.

   This will remove all message flows and message sets from all execution groups, and delete all execution groups. An automatic broker configuration deploy is immediately performed for the broker to save the changes.

A BIP08921 information message is displayed, to show that the request was received by the Configuration Manager. Verify the results of the deployment by opening the Event Log.

Adding an execution group to a broker in the workbench

Use the workbench to add execution groups to a broker.

Before you start:

- Add the broker to the broker domain
- Connect to the broker domain

When you create a broker, it has a default execution group. If you want additional execution groups, you must create them explicitly.

You can use one of three methods to complete this task:

- The workbench
- The mqsicreateexecutiongroup command
- The CMP API

This task describes the first method. If you prefer, you can create an execution group using the command line; see "Adding an execution group to a broker using the command line" on page 140. For information about the CMP API, see Developing applications that use the Configuration Manager Proxy Java API.

To add an execution group to a broker:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the default configuration manager.
3. Right-click **Broker Topology**, and click **New → Execution Group**.
4. In the Create an Execution Group wizard:
   a. Select the broker to which you want to add the execution group.

      If the selected broker domain is not connected, a Confirm Connection dialog box prompts you to connect to the domain. If you click **OK**, the domain is connected and populated with the defined brokers. If you click **Cancel** at this prompt, the wizard remains open.
   b. Enter the **Execution Group name**.
   c. Select the **Processor Architecture** for this execution group to specify if the execution group process runs as a 32-bit or as a 64-bit application.

To create a 64-bit execution group, the broker's queue manager must also be 64-bit.

You can change the default value for this option, which is initially set to 32-bit; click **Window** → **Preferences** → **Broker Administration** and update the setting for *Execution Group Platform Processor Architecture*.

5. Click **Next**.
6. Optional: Enter a short or long description for the execution group.
7. Click **Finish** to add the execution group to the broker.

In the Domains view, the execution group is added to the appropriate broker.

Copying an execution group

You can copy an existing execution group from a broker to another broker within the same broker domain.

Before you start:

You must complete the following tasks:

- "Adding an execution group to a broker in the workbench" on page 198
- "Adding a broker to a broker domain" on page 193

The new execution group inherits the same short and long description as the original execution group, and is automatically given a new name. The new execution group does not inherit any other properties of the original execution group. The message flows in the original execution group are not copied to the new execution group.

To copy an execution group:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the name of the execution group that you want to copy, then click **Copy**.
3. Right-click the name of the broker to which you want to copy the execution group, then click **Paste**. The broker must be in the same broker domain as the original execution group.

A copy of the execution group is created on the broker; the new execution group has a unique name.

Modifying execution group properties

You can add a long or short description to an execution group. This can be an execution group that you have added to the broker, or the default execution group.

The following steps show you how to modify execution group properties.

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the execution group broker that you want to modify, and click **Properties**. The **Execution Group Properties** dialog is displayed.
3. Add a long or short description to the execution group.
4. Click **OK** to add the description.

Renaming an execution group

Before you start:

You must complete the following task:

- "Adding an execution group to a broker in the workbench" on page 198

You can rename any execution group that you have added to a broker.

To rename an execution group:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the execution group and click **Rename**. The **Rename Execution Group** dialog is displayed.
3. In the **New name** field, type the new name of the execution group.
4. Click **Finish**.
5. Deploy a bar file to the execution group to apply the change to the execution group. You can use any valid bar file to do this. For more information about deploying bar files, see Deploying a broker archive file. If you do not deploy a bar file to the execution group, the changes that you made in the Message Brokers Toolkit are not applied to the runtime execution group.

The name of the execution group is updated in the Domains view.

Deleting an execution group

Before you start:

You must complete the following task:

- "Adding an execution group to a broker in the workbench" on page 198

You can delete an execution group from the broker to which it belongs.

A broker must always have at least one execution group; you cannot delete the last group belonging to a broker.

Instead of employing this method, you can delete an execution group using the command line; see "Deleting an execution group from a broker using the command line" on page 182.

The following steps show you how to delete an execution group from a broker.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain to reveal the execution group that you want to delete.

   To delete more than one execution group from the same broker domain, select each execution group while holding down the Ctrl key.
3. Right-click the execution group and click **Delete**.
4. Click **OK** at the prompt to confirm that you want to delete the execution group from the broker.

   An automatic broker configuration deploy is immediately performed for the broker parent.

A BIP08921 information message is displayed to show that the request was received by the Configuration Manager. Verify the results of the deployment by opening the Event Log.

No message flows or message sets are deleted from the development workspace. The execution group and its assigned message flows and message sets are deleted from the Domains view. However, the messages flows and message sets remain in the Broker Administration Navigator view.

Their assignment reference to the execution group is removed from the configuration repository.

Removing deployed children from an execution group

Removing deployed children from an execution group removes all message flows, message sets and all other deployed objects. These are deleted from the execution group, although they are still available in the file system and toolkit.

To remove the deployed children from a broker:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the broker domain to reveal the execution group with which you want to work.
3. Right-click the execution group, and click **Remove Deployed Children**.
4. Click **OK** at the prompt to confirm that you want to remove all message flows and message sets from the execution group.

   An automatic broker configuration deploy is immediately performed for the broker parent.

   A BIP08921 information message is displayed to show that the request was received by the Configuration Manager. Verify the results of the deployment by opening the Event Log.

Configuring a publish/subscribe topology

To configure a publish/subscribe topology, you need to do the following things:

1. Design and configure your broker domain.

   For further information, refer to “Planning a broker domain” on page 61 and “Configuring broker domain components” on page 127
2. Define the topic trees that you require.

   For further information, refer to Topics and “Adding a new topic” on page 217.
3. Decide which security options to use.

   For further information, refer to “Publish/subscribe security” on page 41 and “Securing the publish/subscribe domain” on page 50.

Setting up the broker domain for publish/subscribe

Refer to the following topics:

“Creating a broker” on page 129

“Modifying a broker” on page 173

“Adding a broker to a broker domain” on page 193

“Configuring broker domain components” on page 127

Publish/subscribe topologies

A *publish/subscribe topology* consists of the brokers, the collectives, and the connections between them, that support publish/subscribe applications in the broker domain.

A publish/subscribe application can consist of a network of brokers connected together. The brokers can all be on the same physical system, or they can be distributed over several physical systems. By connecting brokers together, publications can be received by a client on any broker in the network.

This provides the following benefits:

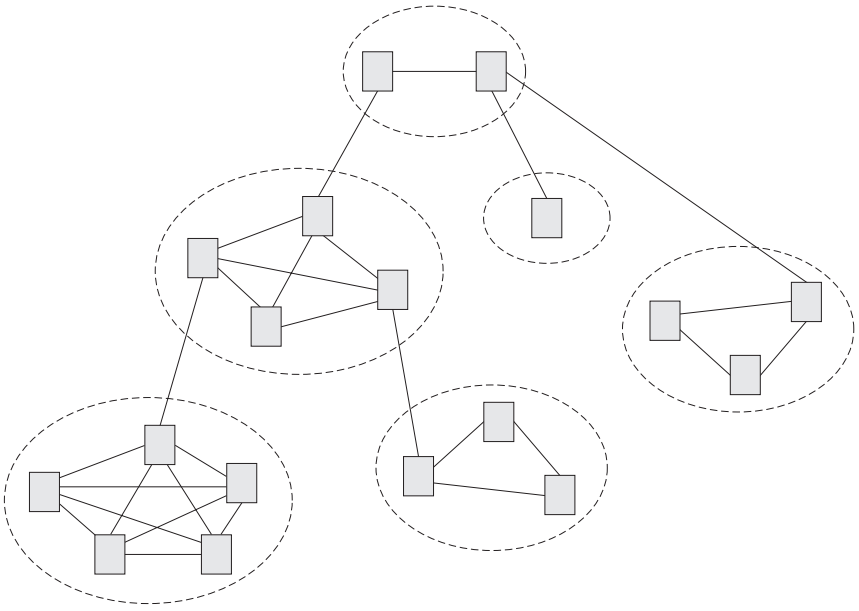
- Client applications can communicate with a nearby broker rather than with a distant broker, thereby getting better response times.
- By using more than one broker, more subscribers can be supported.

Publications are sent only to brokers that have subscribers that have expressed an interest in the topics being published. This helps to optimize network traffic.

Broker networks: There are three ways of connecting brokers together to make a broker domain:

- Brokers can be simply joined together.
- Brokers can be grouped together into collectives, where a collective is a set of one or more brokers that are directly connected to each other.
- Collectives can be joined together; this is a combination of the previous two ways of grouping brokers together.

The following diagram shows a network of six collectives.

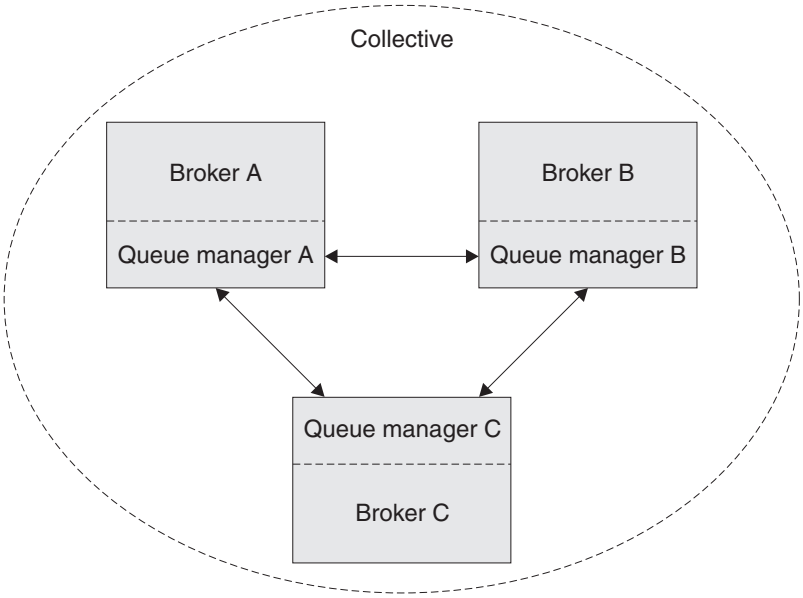


Collectives: A *collective* is a set of brokers that are fully interconnected and form part of a multi-broker network for publish/subscribe applications.

A broker cannot belong to more than one collective. Brokers within the same collective can exist on physically separate computers. However, a collective cannot span more than one broker domain.

Each pair of broker queue managers must be connected together by a pair of WebSphere MQ channels.

The following figure shows a simple collective of three brokers:



A collective provides the following benefits:

- Messages destined for a specific broker in the same collective are transported directly to that broker and do not need to pass through an intermediate broker. This improves broker performance and optimizes inter-broker publish/subscribe traffic, in comparison with a hierarchical tree configuration.
- If your clients are geographically dispersed, you can set up a collective in each location, and connect the collectives (by joining a single broker in each collective) to optimize the flow of publications and subscription registrations through the network.
- You can group clients according to the shared topics that they publish and to which they subscribe.

  Clients that share common topics can connect to brokers within a collective. The common publications are transported efficiently within the collective, because they pass through only brokers that have at least one client with an interest in those common topics.
- A client can connect to its nearest broker, to improve its own performance. The broker receives all messages that match the subscription registration of the client from all brokers within the collective.

  The performance of a client application is also improved for other services that are requested from this broker, or from this broker's queue manager. A client application can use both publish/subscribe and point-to-point messaging.
- The number of clients per broker can be reduced by adding more brokers to the collective to share workload within that collective.

When you create a collective, the workbench ensures that the connections that you make to other collectives and brokers are valid. You are prevented from making connections that would cause messages to cycle forever within the network. You are also prevented from creating a collective of brokers that does not have the required WebSphere MQ connections already defined.

The queue manager of each broker in a collective must connect to every other queue manager in the collective by a pair of WebSphere MQ channels.

Each broker in the collective maintains a list of its neighbors.

A neighbor can be one of the following:

- a broker in the same collective
- a broker outside its collective to which it has an explicit connection; that is, for which it is acting as a gateway

The complete list of neighboring brokers forms a broker's neighborhood.

Multicast publish/subscribe: In a publish/subscribe system there are client applications, some of which are publishers and some of which are subscribers, that are connected to a network of message brokers that receive publications on a number of topics, and send the publications on to the subscribers for those topics.

Normally, a separate message is sent to each subscriber of a publication. However, with *multicast*, regardless of how many subscribers to a topic there are on a subnet, only one message is sent. This improves network utilization.

The more subscribers there are in your publish/subscribe system, the greater the improvement to network utilization there might be if you use multicast.

The subscriber must be a JMS client if you want to use Multicast publish/subscribe.

To use multicast, you must change some of the properties of the broker. Some of these properties apply to specific topics, but some properties apply to all Multicast messages that are controlled by that broker.

For each topic, you can define whether the topic can be multicast, and the IP address to which Multicast messages are sent.

You can also change those properties in the broker that define, for example, the following things:

- The multicast protocol type
- The port that is used for Multicast messages
- A 'Time To Live (TTL)' setting that determines how far from its source a Multicast packet can be sent
- The size of a Multicast packet
- Whether there is a maximum transmission rate and, if there is, its value
- What interface to use for Multicast transmissions

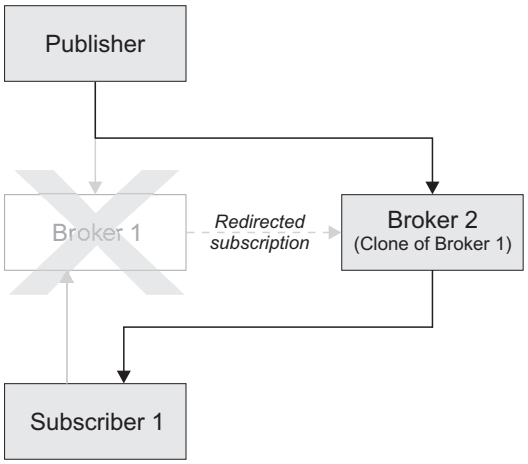
These properties apply to all Multicast messages.

Cloned brokers: A *cloned broker* is a broker for which you have defined one or more clones; the subscription table of a cloned broker is replicated to all other brokers with which it is cloned.

When a subscriber requests a subscription from a cloned broker, the subscription is also sent to each of the clones of that broker.

Use cloned brokers to improve the availability of your publish/subscribe system. By defining cloned brokers on different computers, you make sure that a publication is delivered to a subscriber even when one of the computers is unavailable.

The diagram shows what happens when Subscriber 1 sends a subscription to Broker 1, but Broker 1 becomes unavailable; because Broker 1 and Broker 2 have been defined as clones, the subscription is redirected to Broker 2 and Subscriber 1 gets the publication from Broker 2 instead of Broker 1.



If two brokers are clones within a collective, duplicate messages might be sent to subscribers that are registered with brokers inside that collective.

Use the mqsichangeproperties command to define cloned brokers; the property *clonedPubSubBrokerList* is used to do this.

Migrated topologies:

If you have a WebSphere MQ Publish/Subscribe broker network, you can continue to use this network unchanged.

The introduction of WebSphere Message Broker to your environment, and the creation of brokers in that broker domain, does not affect your WebSphere MQ Publish/Subscribe broker domain until you take specific action to connect the two networks.

If you want to have two separate, independent networks, you do not have to do anything. You can retain your existing WebSphere MQ Publish/Subscribe network, and install and configure a WebSphere Message Broker network, without any interaction.

Heterogeneous networks: A *heterogeneous network* is a network of brokers, some of which form a WebSphere MQ Publish/Subscribe network and some of which belong to the WebSphere Message Broker product.

With the WebSphere Message Broker product, there are two ways in which a broker can be joined to the WebSphere MQ Publish/Subscribe network; it can be joined as a leaf node or as a parent node.

Leaf node: When a broker is joined as a leaf node, it is joined as a child broker of another broker in the WebSphere MQ Publish/Subscribe network.

Adding the broker as a leaf node rather than as a parent node causes the new broker to receive only some of the WebSphere MQ Publish/Subscribe message traffic that is directed to the brokers for which this new broker is a child broker.

Parent node: When a broker is joined as a parent node, it is joined as a parent broker of one or more brokers in the WebSphere MQ Publish/Subscribe network.

Adding the broker as a parent node rather than as a leaf node causes the new broker to receive all the WebSphere MQ Publish/Subscribe message traffic that is directed to the child brokers for which this new broker is the parent broker.

Changing Broker Topology editor properties

After you have launched the Broker Topology editor in the editor area, you can change or remove the default background image displayed in the editor area.

The following steps show you how to change the properties of the Broker Topology editor.

1. Switch to the Broker Administration perspective.
2. In the **Domains** view, expand the appropriate broker domain to display its contents.
3. Double-click **Broker Topology** to launch the Broker Topology editor.
4. Right-click the editor, then click **Properties** to display the Broker Topology editor properties.
5. On the **Editor** page, you can change the background image file, and modify its scale factor in a range of 1 to 5. The default value is 3. Alternatively, you can choose to not display a background image.
6. Optional: On the **Description** page, you can provide a description for the background image file.
7. Click **OK** to save your changes and close the Properties dialog.

Any changes you made to the background image are displayed when the Properties dialog closes.

Connecting brokers in a collective

A *collective* is a set of brokers that are fully interconnected and form part of a multi-broker network for publish/subscribe applications.

You connect brokers in a collective by using either the Message Brokers Toolkit or the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.CollectiveProxy.

To following steps show you how to connect brokers in a collective.

1. Define the WebSphere MQ channels between the queue managers of each pair of the brokers in the collective; use the standard WebSphere MQ facilities (for example, WebSphere MQ Explorer).
2. Assign the brokers as members of the collective using the Broker Topology editor in the workbench; the brokers do not have to be connected together using the connect function.

Tip: Compare the use of collectives with the use of WebSphere MQ cluster queues, as described in Developing applications using the CMP.

Deleting a collective

You can delete a collective by using either the Message Brokers Toolkit or the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.CollectiveProxy.

The following steps show you how to delete a collective.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click the Topology item to open the Broker Topology editor.
4. Right-click the collective that is to be deleted and select Delete, or select the collective that is to be deleted and press the Delete key, or select Delete from the Edit menu.

   The collective is deleted locally, but the delete operation is not completed until you save or close the editor.

Connecting a broker to a collective

You can connect a broker to a collective using either the Message Brokers Toolkit or the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.CollectiveProxy.

The following steps show you how to connect a broker to a collective.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click the Topology item to open the Broker Topology editor.
4. In the Broker Topology editor, click the Connection tool.
5. Click the broker to be connected and then click the collective that you want to connect the broker to.

   The connection is added locally, but the connection is only effective after you have saved, or closed the editor.

Removing a broker from a collective

You can remove a broker from a collective using either the Message Brokers Toolkit or the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.CollectiveProxy.

To following steps show you how to remove a broker from a collective.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click the Topology item to open the Broker Topology Editor.
4. Right-click the connection that you want to delete and select Delete.

Setting up a multicast broker

Set up a multicast broker either by using the workbench or by using the Configuration Manager Proxy Java API. This topic describes how to use the workbench.

Before you can use multicast, you must define the topics that are capable of being multicast. See "Making topics multicast" on page 214.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications that use the Configuration Manager Proxy Java API and Class com.ibm.broker.config.proxy.BrokerProxy.MulticastParameterSet.

To enable a broker to handle multicast requests:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click the Topology item to open the Broker Topology editor.
4. In the Broker Topology editor, right-click the broker that you want to modify, and select **Properties**.
5. In the left pane of the properties window, select **Multicast**.
6. Select **Multicast Enabled**.
7. Optional: Modify the following properties; any properties that are not modified take the default value.

   Protocol Type
   The multicast protocol type.

   Valid values are PTL, PGM/IP, and UDP encapsulated PGM.

   The default value is PTL.

   For more information, see "Multicast protocol types" on page 213.

   IPv4 Minimum Address
   The lowest IPv4 address that the broker can use for its multicast transmissions.

   This address must be in the range 224.0.0.0 through 239.255.255.255

   The default value is 239.255.0.0

IPv4 Maximum Address
The highest IPv4 address that the broker can use for its multicast transmissions.

This address must be in the range 224.0.0.0 through 239.255.255.255 and must not be lower than the value of the Minimum Address.

The default value is 239.255.255.255

Data Port
The UDP data port through which multicast packets are sent and received.

The default value is 34343.

Broker Packet Size
The size, in bytes, of multicast packets.

This size must be in the range 500 through 32000.

The default value is 7000.

Broker Heartbeat Timeout
The broker sends a control packet periodically, approximately every second, to each client. This packet is used to send control information, and to keep the heartbeat. The heartbeat timeout value is made known to the clients to help the clients detect a transmitter or network failure. If a control packet does not arrive within a number, defined as twice the value specified by this property, of seconds of the previous control packet's arrival, a client can suspect that there has been a transmitter failure or a network failure.

The default value is 20.

Broker Multicast TTL
The maximum number of hops that a multicast packet can make between the client and the broker. This value is one more than the maximum number of routers that there can be between the client and the broker.

The default value is 1, indicating that the multicast packet must remain local to its originator and does not pass through any routers.

The maximum value is 255.

Do not use a value of 0. In some operating systems using a value of 0 might prevent messages from being received, but in other operating systems (for example, Windows 2003, Windows XP, and Linux), a value of 0 does not have this effect.

IPv4 Broker Network Interface
The name of the network interface over which multicast packets are transmitted. This name is relevant only when the broker is running on a host with more than one network interface.

This name can be a host name or an IPv4 address.

The default value is None. If the default value is chosen, the network interface used is operating system dependent.

Overlapping Multicast Topic Behavior
Valid values are Accept, Reject, or Revert.

The default value is Accept.
The *Overlapping Multicast Topic Behavior* property controls the behavior

of the broker when a client requests a multicast subscription for a topic that is part of a topic hierarchy containing topics that are explicitly disabled for multicast.
For example, consider a topic hierarchy where multicast is a topic with two children, *foo* that is enabled for multicast, and *bar* that is not enabled for multicast.
The three possible settings are:

Accept
The default value. A matching multicast subscription is accepted and all publications matching the topic, except those that are specifically excluded, are multicast. In the preceding example, a multicast subscription to *multicast/#* receives messages published on *foo* over multicast, but does not receive any messages published on *bar*.

Reject A multicast subscription to a topic with children that are disabled for Multicast is rejected by the broker. Subscriptions to *multicast/#* are rejected.

Revert Subscriptions to a topic that is disabled for multicast, or has children that are disabled for multicast, result in unicast transmission. A multicast subscription to *multicast/#* receives messages published on *foo* and *bar*, but the messages are sent unicast rather than multicast.

Maximum Key Age
The maximum age, in minutes, of a topic encryption key before it must be redefined.

The default value is 360.

8. Optional: In the left pane of the properties window, expand Multicast and click **Advanced**. You can now modify the following additional properties:

Broker Transmission Rate Limit Activation
Use the *Broker Transmission Rate Limit Activation* property in conjunction with *Broker Transmission Rate Limit Value* to control network congestion. Select one of the following values from the menu:

Disabled
The default value. Multicast data is transmitted as fast as possible. If the rate at which messages are submitted to be multicast exceeds the server or network limits (that is, the speed of Ethernet or the host CPU becomes the bottleneck), these limits define the maximum transmission rate, and message submissions are stopped until all previously submitted messages have been sent.

Static The transmission rate is limited by the value that is specified in *Broker Transmission Rate Limit Value*.

If you select Static, you can also select a value for the property *Broker Transmission Rate Limit Value*.

Dynamic
The limit on the transmission rate can vary during run time, depending on congestion conditions and data losses reported by clients. However, the rate never exceeds the *Broker Transmission Rate Limit Value*.

Broker Transmission Rate Limit Value
Limits the overall transmission rate, in kilobits per second, of multicast packets. This parameter is effective only if the *Broker Transmission Rate Limit Activation* property is Static. This property must not exceed the capabilities of the server or network.

This value must be in the range 10 through 1000000.

Client NACK Back Off Time
The maximum time, in milliseconds, that a client listens for another clients NACKs before sending its own NACK.

This value must be in the range 0 through 1000.

The default value is 100.

Client NACK Check Period
The time, in milliseconds, between periodic checks of reception status and sequence gap detection for NACK building.

This value must be in the range 10 through 1000.

The default value is 300.

Client Packet Buffer Number
The number of memory buffers that are created at startup for packet reception. Having a high number of buffers available improves the reception performance and minimizes packet loss at high delivery rates, but requires increased memory use. Each buffer is 33 KB; The default value of 500 buffers uses approximately 15 MB of main memory.

If memory use is important, try using different values for this property and look at the effect on the overall performance of your application when transmission rates are high.

This value must be in the range 1 through 5000.

The default value is 500.

Client Socket Buffer Size
The size, in kilobytes, of the client's socket receiver buffer. Increasing this value reduces the number of data packets that might be dropped by the client receiver.

This value must be in the range 65 through 10000.

The default value is 3000.

Broker History Cleaning Time
The time, in seconds, that is defined for cleaning the retransmission buffer.

This value must be in the range 1 through 20.

The default value is 7.

This property is not used in Version 6,0.

Broker Minimal History Size
The minimum size, in kilobytes, of a buffer that is allocated to archive all transmitted packets. This buffer is shared by all reliable topics, and can be used to recover lost packets.

This value must be in the range 1000 through 1000000.

The default value is 60000.

Broker NACK Accumulation Time
The time, in milliseconds, that NACKs are aggregated in the broker before recovered packets are sent.

This value must be in the range 50 through 1000.

The default value is 500.

Maximum Client Memory Size
The maximum amount of memory, in kilobytes, that can be used by reception buffers in the client.

This property is applicable only to PGM multicast protocols.

The default value is 262144 which represents 256 MB.

Important: Be aware that by increasing the value of a property, for example *Broker Minimal History Size*, you increase the amount of memory that is required by the Java Virtual Machine (JVM). This increase might cause a `JVM Out of Memory` error when a subscription to the broker is attempted for the first time after this change. If this error occurs, either increase your JVM heap size, or reduce the value of the property (for example, *Broker Minimal History Size*) that you have just increased.

9. Click **OK**.
10. Restart the broker for the changes that you have made to take effect.

The preferred way to change the broker's multicast configuration is to use the workbench. However, you can also use the command mqsichangeproperties to change the broker's properties.

Warning: Any changes to the broker configuration that you make on the mqsichangeproperties are overwritten with the configuration that is held in the Configuration Manager whenever the broker configuration is deployed.

The following table relates the preceding properties to the corresponding names of the parameters on the mqsichangeproperties command that support multicast. For full details of this command, see the "mqsichangeproperties command" on page 343.

Property name	mqsichangeproperties parameter
Multicast Enabled	multicastEnabled
Protocol Type	multicastProtocolType
IPv4 Minimum Address	multicastAddressRangeMin
IPv4 Maximum Address	multicastAddressRangeMax
Data Port	multicastDataPort
Broker Packet Size	multicastPacketSizeBytes
Broker Heartbeat Timeout	multicastHeartbeatTimeoutSec
Broker Multicast TTL	multicastMCastSocketTTL
IPv4 Broker Network Interface	multicastMulticastInterface
Overlapping Multicast Topic Behavior	multicastOverlappingTopicBehavior
Maximum Key Age	multicastMaxKeyAge

Property name	mqsichangeproperties parameter
Broker Transmission Rate Limit Activation	multicastLimitTransRate
Broker Transmission Rate Limit Value	multicastTransRateLimitKbps
Client NACK Back Off Time	multicastBackoffTimeMillis
Client NACK Check Period	multicastNackCheckPeriodMillis
Client Packet Buffer Number	multicastPacketBuffers
Client Socket Buffer Size	multicastSocketBufferSizeKbytes
Broker History Cleaning Time (deprecated in V6)	Not applicable
Broker Minimal History Size	multicastMinimalHistoryKBytes
Broker NACK Accumulation Time	multicastNackAccumulationTimeMillis
Maximum Client Memory Size,	multicastMaxMemoryAllowedKBytes

To enable multicast for the broker WBRK_BROKER use the following command:

```
mqsichangeproperties WBRK_BROKER -o DynamicSubscriptionEngine -n multicastEnabled -v true
```

This command enables the broker for multicast, but does not change any other properties of the broker.

To enable multicast for the broker WBRK_BROKER, and to restrict the transmission rate to 50 000 kilobits per second, use the following command:

```
mqsichangeproperties WBRK_BROKER -o DynamicSubscriptionEngine -n multicastEnabled,
 multicastLimitTransRate,multicastTransRateLimitKbps -v true,Static,50000
```

None of the other properties of the broker are changed.

Use commas to separate the properties that are being changed, and their values.

For the changes to be effective, restart the broker.

Multicast protocol types: WebSphere Message Broker supports two different types of multicast protocol:

- PTL (Packet Transfer Layer)
- PGM (PGM/IP and PGM UDP encapsulated)

PTL provides compatibility with WebSphere Business Integration Message Broker Version 5.0, where it is the only multicast protocol that is supported. For new multicast deployments, use one of the two PGM multicast protocols.

The broker supports two implementations of the PGM multicast protocol, PGM/IP and PGM UDP encapsulated. The complexity of your network topology affects which option you choose:

- If your network topology consists of two or more subnets with many receiver clients in each subnet, use PGM/IP. PGM/IP takes advantage of PGM router assist support.
- For a simpler network topology, use the PGM UDP encapsulated implementation, which does not use PGM router assist.

Important: To use PGM/IP, both the broker and the client applications must run with superuser authority. Because of the security risks that are associated with running with superuser authority, do not run any other work on the broker.

Making topics multicast:

To make individual topics, or groups of topics, capable of being multicast you need to make changes to the topic hierarchy.

To make changes to the topic hierarchy:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click Topics to open the Topics Hierarchy editor.
4. In the Topics Hierarchy editor, right-click the topic, or group of topics, that you want to make capable of being multicast, and select Properties.
5. In the left panel of the Properties for Topics window, select **Multicast**.
6. Select **Enabled** for the topic root, or child topic root, in the *Multicast* property that you want to enable:

   For the topic root, the options are either Enabled or Disabled. The default is Disabled.

   For a child topic root, the options are Inherit, Enabled, or Disabled. The default is Inherit.
7. **Automatic Multicast IPv4 Address** is selected by default. If you clear **Automatic Multicast IPv4 Address** you must type in the name of the *IPv4 MC Group Address*. This property is mandatory.
8. Optional: Select **Encrypted**.
9. Select the *Quality of Service* that you require. The options are Reliable or Unreliable. The default is Reliable.
10. Click **OK**.

Handling high-volume publish/subscribe activity on z/OS:

Brokers that handle large numbers of retained subscriptions or publications can use up all the IRLM storage that is allocated by default for DB2 locks. This might cause problems when you try to restart the broker.

The following actions might help stop this happening.

1. Tune the publish/subscribe topology:
   a. Balance execution groups across more brokers; this means that fewer execution groups need to start at the same time and have concurrent locks for the same DB2 subsystem.
   b. Put the brokers in publish/subscribe collectives; this reduces the number of subscriptions in a single broker table and reduces the amount of concurrent access to DB2. See “Publish/subscribe topologies” on page 202 for more information about this.
2. Increase the IRLM storage that is available:
   a. Set the value of MAXCSA so high that the ECSA that is required by the IRLM never reaches this value. Because IRLM gets storage only when it needs it, choose a value that is higher than you expect IRLM to need.
   b. If you are unable to choose a value of MAXCSA sufficiently high that it cannot be exceeded by the ECSA that is required by the IRLM, use the

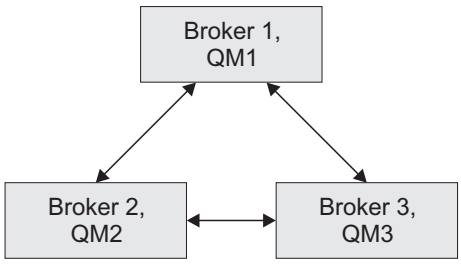
option PC=YES on the START irlmproc command. This causes the IRLM to place in its private address space the control block structures that relate to locking. There is more information about this in the IBM Redbooks publication *DB2 UDB for OS/390 Version 7 Performance Topics, SG24-5351*.

Note: There might be a slight (approximately 1 to 2 percent) performance degradation when you run with PC=YES. See *DB2 Universal Database for OS/390 and z/OS Version 7 Administration Guide, SC26-9931* for more information.

Setting up cloned brokers

Each broker that is to be cloned with other brokers must be told which brokers are to be its clones.

- Windows Linux UNIX To set up three brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3) to be clones of each other, as shown in the diagram below, use the mqsichangeproperties command for each of the brokers:
  1. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"broker2,QM2,broker3,QM3\"`
  2. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"broker1,QM1,broker3,QM3\"`
  3. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"broker1,QM1,broker2,QM2\"`
- z/OS To set up three brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3) to be clones of each other, as shown in the diagram below, use the mqsichangeproperties command for each of the brokers:
  1. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "broker2,QM2,broker3,QM3"`
  2. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "broker1,QM1,broker3,QM3"`
  3. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "broker1,QM1,broker2,QM2"`



Adding a cloned broker

To add a broker to a set of cloned brokers, use the **mqsichangeproperties** command to define the brokers that are its clones, and to tell each of the other brokers that it has a new clone.

- Windows Linux UNIX To add broker4 (with queue manager QM4) to a set of three cloned brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3), use the following **mqsichangeproperties** commands:

  1. `mqsichangeproperties broker4 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"broker1,QM1,broker2,QM2,broker3,QM3\"`
  2. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"+broker4,QM4\"`
  3. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"+broker4,QM4\"`
  4. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"+broker4,QM4\"`

- z/OS To add broker4 (with queue manager QM4) to a set of three cloned brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3), use the following **mqsichangeproperties** commands:

  1. `mqsichangeproperties broker4 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "broker1,QM1,broker2,QM2,broker3,QM3"`
  2. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "+broker4,QM4"`
  3. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "+broker4,QM4"`
  4. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "+broker4,QM4"`

Deleting a cloned broker

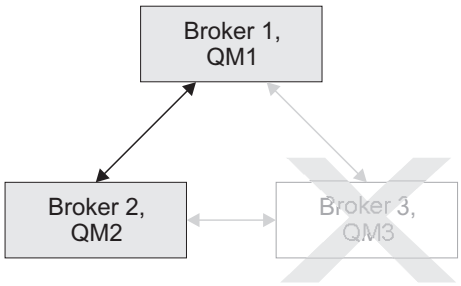
To delete a broker from a set of cloned brokers, use the **mqsichangeproperties** command to delete the brokers that were its clones, and to tell each of the other brokers that one of its clones has been deleted.

- Windows Linux UNIX To delete broker3 from a set of three cloned brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3), as shown in the diagram below, use the following **mqsichangeproperties** commands:

  1. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"-broker3\"`
  2. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"-broker3\"`
  3. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v \"\"`

- z/OS To delete broker3 from a set of three cloned brokers (broker1 with queue manager QM1, broker2 with queue manager QM2, and broker3 with queue manager QM3), as shown in the diagram below, use the following **mqsichangeproperties** commands:

  1. `mqsichangeproperties broker1 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "-broker3"`
  2. `mqsichangeproperties broker2 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v "-broker3"`
  3. `mqsichangeproperties broker3 -e default -o DynamicSubscriptionEngine -n clonedPubSubBrokerList -v ""`



Operating a publish/subscribe domain

After you have set up your publish/subscribe broker domain, you might want to create or delete topics, or view the current status of your subscriptions.

For information about how to do this, refer to the following topics:

- "Adding a new topic"
- "Deleting a topic" on page 218
- "Querying subscriptions" on page 218

Adding a new topic

You can define a new topic explicitly by using either the Message Brokers Toolkit or the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit.

For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.TopicProxy.

You can define a new topic implicitly by sending to the message broker a Publish command that specifies the new topic.

However, to define a new topic explicitly, do the following:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click on the Topics item to open the Topics Hierarchy editor.
4. Right-click **Topics** in the topics hierarchy that is displayed by the Topics Hierarchy Editor.
5. From the menu shown, click **Create Topic**; a topic window opens that shows the topic hierarchy.
6. In the topic hierarchy, select the topic that you want to be the parent topic of the topic that you are creating. In the lower pane of the topic window, type the name of your new topic.
7. Click **Next**; the next wizard page opens. The pane on the left of this window shows all the principals (groups and users) that are defined.
8. Select the groups and users that you want to relate to your new topic and click the> icon between the two panes of the window; the pane on the right of the window is updated with the groups and users that you have chosen.

9. For each principal selected in the right-hand pane, you can set **Publish**, **Subscribe**, and **Persistent** attributes by choosing a value from the corresponding list.

   By selecting more than one principal, you can choose values for a set of principals.

10. Click **Finish** to insert the topic into the topic hierarchy and update the access control list (ACL) for the topic. The ACL is in a table with four columns that are entitled Principal, Publish, Subscribe, and Persistent. The rows of the table show the properties of each principal that is relevant to the topic.

    The topic is created locally, but the change is not effective until you have saved or closed the editor.

    When saving or closing the editor, you might be prompted to deploy the new topics hierarchy or the deployment might be automatic, depending on the **Perform topics deploy after change** preference.

Deleting a topic

You can delete a topic by either using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.TopicProxy.

To delete a topic:

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the appropriate broker domain.
3. Double-click **Topics** to open the Topics Hierarchy Editor.
4. In the Topics Hierarchy editor, right-click the topic that you want to delete, and select **Delete**; alternatively, select the topic that you want to delete and press the Delete key, or select Delete from the Edit menu.

   The topic is deleted locally, but the delete is not effective until you do a save.

Querying subscriptions

You can query a subscription either by using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.TopicProxy.

To query a subscription:

1. Switch to the Broker Administration perspective.
2. In the **Domains** view, click **Subscriptions** from the list of domain objects shown; the Subscriptions Query Editor opens in the workbench.

   You can also open the editor by double-clicking the **Subscriptions** item in the tree, or by right-clicking the **Subscriptions** item and clicking **Open**, or by clicking the **Subscriptions** item and clicking **Enter**.

3. Fill in the fields that are required to generate your subscriptions query.

   To generate your query, you might not need to fill in all the fields shown.

4. Click **Query**. The results of your query are displayed in the lower part of the edit window.

Configuring global coordination of transactions (two-phase commit)

Globally coordinate message flow transactions with a WebSphere MQ queue manager to ensure the data integrity of transactions.

Before you start:

Complete the following tasks:

- Create and configure databases
- Create a broker

On distributed platforms, the default behavior of the broker is to manage all message flow transactions using a one-phase commit approach. In many contexts this approach is sufficient, but if your business requires assured data integrity (for example, for audit reasons or for financial transactions), configure the broker's WebSphere MQ queue manager to manage the message flow transactions in a two-stage commit approach using the XA protocol standard. For more information about global coordination of transactions, see "The Transactional model" on page 220.

z/OS On z/OS, all transactions are globally coordinated by Resource Recovery Service (RRS), therefore the instructions in this topic do not apply. RRS must, however, be available. See "Resource Recovery Service planning on z/OS" on page 119.

To configure your system for global coordination of transactions:

1. Ensure that the databases are configured for global coordination. For information about how to perform this configuration, see "Configuring databases for global coordination of transactions" on page 100.
2. Configure the broker environment so that the broker's queue manager coordinates transactions. The steps to configure the broker environment depend on the database manager that you are using and whether the broker's queue manager and the execution group are 32-bit or 64-bit.

   If you are using shared memory to connect directly to a 64-bit database instance, you must use a 64-bit queue manager to globally coordinate transactions (all WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit). A 32-bit queue manager cannot connect directly to a 64-bit database instance.

   - "Configuring global coordination with DB2 using a 32-bit queue manager" on page 222
   - "Configuring global coordination with DB2 using a 64-bit queue manager" on page 226
   - "Configuring global coordination with Oracle using a 32-bit queue manager" on page 230
   - "Configuring global coordination with Oracle using a 64-bit queue manager" on page 233
   - "Configuring global coordination with Sybase using a 32-bit queue manager" on page 237
   - "Configuring global coordination with Sybase using a 64-bit queue manager" on page 239
3. Configure the message flow for global coordination. For information about how to perform this configuration, see Configuring globally coordinated message flows.

When you have completed these steps, your message flows are processed using global coordination, which is managed by the queue manager.

You must complete all of the steps correctly; if you do not, global coordination will not work.

For an example of how you can use WebSphere MQ to globally coordinate transactions, look at the following sample:

- Error Handler sample

You can view samples only when you use the information center that is integrated with the Message Brokers Toolkit.

The Transactional model

A message flow can consist of the following constituent parts:

- An input queue
- The message flow
- One or more database tables
- One or more output queues

A typical sequence of events when a message flow processes a message is described below:

1. A message is taken from the input queue.
2. Data is read from or written to the database tables and queues.
3. The system is inactive and awaits the next input message.

Note that this sequence of events makes no distinction between accessing tables and writing output messages. Although a flow often produces some sort of output message, there is no real distinction between producing an output message and updating a database table; in both cases, the state of the data in the system changes.

Consider the following diagram:

```
=====x=========x===x=======x=============x====x=====
     1         2   3       4             5    6
```

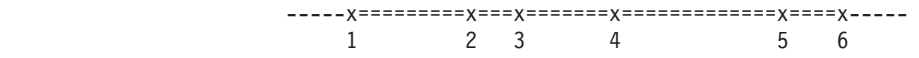
The line represents the data in the system as time passes. At time 1, a message arrives and is taken from the input queue. At times 2, 3, 4, and 5, data is used to update database tables or it is written to queues. Changes in the state of the data are indicated in the diagram by the *x* symbol. At time 6, the output messages are sent and the system is inactive. Between these events, there is no change to the state of the data; this is indicated in the diagram by the = symbol.

If a failure occurs on the system (for example, a loss of power to the computer on which the broker is running), the changes to the state of tables and queues that were made before the failure have taken place, but no more changes will take place after the failure. This situation is unacceptable in certain circumstances; for example, if a system failure occurs when making a payment from a current account to a mortgage account, the payment might be taken from the current account, but it is not added to the mortgage account.

Transactions

To avoid the problem that is described above, the broker, queuing systems, and databases have a *transactional model*. As processing proceeds, additional data is

stored that allows the original state to be restored in the event of a failure. The following diagram illustrates the state of this extra data:



The line in the diagram represents the extra data in the system as time passes. At time 1, a message arrives and is taken from the input queue. Before time 1, there is no extra data in the system; this is indicated in the diagram by the - symbol. After time 1, the state represents the fact that a message has been taken from the queue so that it can be put back on the queue if necessary. At times 2, 3, 4, and 5, data is used to update database tables or it is written to queues. Again, the state of the extra data changes so that the changes to tables and queues can be undone if necessary. At time 6, the output messages are sent, the system is inactive, and there is no extra data in the system once more. Between these events, there is no change to the state of the extra data and this is indicated by the = symbol. If a failure occurs at any time between time 1 and time 6, the extra data is used to restore the original state of the system's data, so effectively, no data has been written to the output queues, none of the tables have been updated, and the input message has not been taken from the input queue. If no failure occurs, the changes become permanent at time 6 (an undo operation following a subsequent failure will not undo the changes).

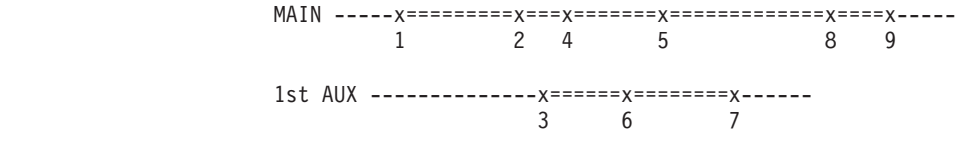
The mode of operation that is described above is known as *coordinated transaction mode*. The successful completion of a transaction is known as its *commit*. Unsuccessful completion is known as *rollback*.

Uncoordinated Auxiliary Transactions

The key feature of the coordinated transaction mode of operation is that, regardless of where or when the failure appears, either all of the changes to queues and tables that are associated with one input message are made, or none of the changes are made. However, this behavior is not always suitable, as the following examples illustrate:

- You want to create an audit log of all attempts at processing. The log entries need to be committed even when updates to the main tables and queues are rolled back.
- You want to send an acknowledgment or non-acknowledgment message back to the originator of the messages that you are processing, according to whether the message processing succeeds or fails. These messages need to be sent even when the updates to the main tables and queues are rolled back.

To satisfy such requirements, WebSphere Message Broker allows changes to queues and tables to be take place in a separate transaction. This behavior is illustrated in the following diagram:



The *MAIN* line represents the main transaction, which includes the extra data that is needed to restore the original state should the need arise. The *1st AUX* line represents an auxiliary transaction. At time 3, an update to a table or queue is made and another update is made at time 6. At time 7, the message flow determines that all the changes that need to be made under the auxiliary transaction are complete and it commits the changes.

If the message flow were to fail before time 7, the state of the system would be unchanged because both transactions would be rolled back. If failure occurs after time 7 but before time 9, the auxiliary transaction would already have been committed but the main transaction would be rolled back. If a failure has not occurred by time 9, both transactions are committed.

Database Auxiliary Transactions

You can use more than one auxiliary transaction and make a number of updates to database tables that can be committed or rolled back. You can then make additional changes to the same database tables, or to different tables, and then commit or rollback these changes.

Each database that you use has its own auxiliary transaction so, if the message flow updates tables that belong to different database instances (different data source names), there is an auxiliary transaction for each database. You must commit or roll back these transactions individually. Any updates that have not been committed or rolled back when the operation completes (at time 9 in the example above) are committed or rolled back automatically by the broker, according to whether the processing succeeded or failed.

Some databases types, such as DB2 on AIX, do not allow both coordinated and uncoordinated transactions in the same database instance. In these cases, you must create separate database instances. Configure one database instance for coordinated transactions and configure the other instance for uncoordinated transactions.

Use the ESQL COMMIT and ROLLBACK statements to commit and roll back auxiliary database transactions. Obtain operations outside the main transaction by specifying the UNCOORDINATED keyword on the individual database statements (for example, the INSERT and UPDATE statements).

Queue Auxiliary Transactions

Not all queuing systems have the database capability that is described above. In the case of WebSphere MQ, each individual uncoordinated read or write operation to a queue has an implied commit action so you cannot put two messages and then decide to commit both or roll back both. The COMMIT and ROLLBACK statements therefore operate only on databases.

Nodes

The above description mentions message flows but does not mention nodes. The way that a message flow is divided into nodes has no effect on transactions. For operations on databases, any number of nodes can make updates to the main transaction and to any number of auxiliary transactions without restriction.

Entirely Uncoordinated Transactions

When all database updates are done within auxiliary transactions, set the **Coordinated Transaction** attribute of the message flow to no to affect all table references outside the main transaction. This means that you do not have to specify the attribute on each database operation.

Configuring global coordination with DB2 using a 32-bit queue manager

To globally coordinate message flow transactions with updates in DB2 databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transactions, see "Configuring databases for global coordination of transactions" on page 100.

To configure your broker environment for global coordination using a 32-bit queue manager as the transaction manager:

1. Decide whether the broker will connect to databases using TCP/IP or using shared memory.

   For more information about TCP/IP connections, see the example in the section about message SQL1224N in Resolving problems when using databases.

   To enable shared memory:

   a. Stop the broker by running the following command, where *broker* is the name of your broker:

      ```
      mqsistop broker
      ```

   b. Run the following command to ensure that the broker is run in an environment with the extended memory variable exported:

      ```
      export EXTSHM=ON
      ```

   c. Restart the broker by running the following command, where *broker* is the name of your broker:

      ```
      mqsistart broker
      ```

   d. On the DB2 server, ensure that shared memory support is turned on. For more information, see "Configuring databases for global coordination of transactions" on page 100.

2. 2. Create the symbolic links required for your platform, queue manager, and DB2 version combination. You must be logged in as root.

   - AIX On AIX:
     - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 5.3:

       ```
       ln -s <DB2_installation_directory>/lib/libdb2.a /var/mqm/exits/libdb2.a
       ```

     - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 6.0:

       ```
       ln -s <DB2_installation_directory>/lib/libdb2.a /var/mqm/exits/libdb2.a
       ln -s <DB2_installation_directory>/lib64/libdb2.a /var/mqm/exits64/libdb2.a
       ```

     - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 5.3:

       ```
       ln -s <DB2_installation_directory>/lib32/libdb2.a /var/mqm/exits/libdb2.a
       ```

     - If you have DB2 Version 9 performing coordination using WebSphere MQVersion 6.0:

       ```
       ln -s <DB2_installation_directory>/lib32/libdb2.a /var/mqm/exits/libdb2.a
       ln -s <DB2_installation_directory>/lib64/libdb2.a /var/mqm/exits64/libdb2.a
       ```

   - HP-UX On HP-UX:
     - If you have DB2 Version 8 performing coordination using WebSphere MQVersion 5.3:

       ```
       ln -s <DB2_installation_directory>/lib/libdb2.sl /var/mqm/exits/libdb2.sl
       ```

     - If you have DB2 Version 8 performing coordination using WebSphere MQVersion 6.0:

       ```
       ln -s <DB2_installation_directory>/lib/libdb2.sl /var/mqm/exits/libdb2.sl
       ln -s <DB2_installation_directory>/lib64/libdb2.sl /var/mqm/exits64/libdb2.sl
       ```

     - If you have DB2 Version 9 performing coordination using WebSphere MQVersion 5.3:

       ```
       ln -s <DB2_installation_directory>/lib32/libdb2.sl /var/mqm/exits/libdb2.sl
       ```

- If you have DB2 Version 9 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib32/libdb2.sl /var/mqm/exits/libdb2.sl
ln -s <DB2_installation_directory>/lib64/libdb2.sl /var/mqm/exits64/libdb2.sl
```

- Solaris On Solaris:
  - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 5.3:

```
ln -s <DB2_installation_directory>/lib/libdb2.so /var/mqm/exits/libdb2.so
```

  - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib/libdb2.so /var/mqm/exits/libdb2.so
ln -s <DB2_installation_directory>/lib64/libdb2.so /var/mqm/exits64/libdb2.so
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 5.3:

```
ln -s <DB2_installation_directory>/lib32/libdb2.so /var/mqm/exits/libdb2.so
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib32/libdb2.so /var/mqm/exits/libdb2.so
ln -s <DB2_installation_directory>/lib64/libdb2.so /var/mqm/exits64/libdb2.so
```

- Linux On Linux (x86 platform):
  - If you have DB2 Version 8 or DB2 Version 9 performing coordination using WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib/libdb2.so /var/mqm/exits/libdb2.so
```

3. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   Linux UNIX On Linux (x86 platform) and UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

```
XAResourceManager:
Name=DB2
SwitchFile=install_dir/sample/xatm/db2swit
XAOpenString=db=MyDataSource,uid=MyUserId,pwd=MyPassword,toc=t
XACloseString=
ThreadOfControl=THREAD
```

   c. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:
      - *MyDataSource* is the name of the data source to which you want to connect.
      - *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker

command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.

- *MyPassword* is the password that is associated with the user name.

d. Accept the default values for all the other lines in the stanza. For example, on AIX:

```
XAResourceManager:
Name=DB2
SwitchFile=/opt/mqsi/sample/xatm/db2swit
XAOpenString=db=MYDB,uid=wbrkuid,pwd=wbrkpw,toc=t
XACloseString=
ThreadOfControl=THREAD
```

Windows On Windows:

a. From the Start menu, open the graphical administration tool for your version of WebSphere MQ:

- WebSphere MQ Version 6: WebSphere MQ Explorer

b. Open the queue manager's Properties dialog box, then open **XA resource managers** (Version 6) page.

c. In the **SwitchFile** field, enter the full path to the switch file, as shown in the following example where *install_dir* is the location in which the broker is installed:

```
install_dir\sample\xatm\db2swit.dll
```

d. In the **XAOpenString** field, paste the following string:

```
db=MyDataSource,uid=MyUserId,pwd=MyPassword,toc=t
```

e. In the **XAOpenString** field, replace the values with values that are appropriate for your configuration:

- *MyDataSource* is the name of the data source to which you want to connect.
- *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
- *MyPassword* is the password that is associated with the user name.

For example:

```
db=MYDB,uid=wbrkuid,pwd=wbrkpw,toc=t
```

f. Accept the default values for all the other fields on the page.

4. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

```
endmqm queue_manager_name
strmqm queue_manager_name
```

When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is

the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

DB2 is now configured for global coordination with a 32-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring global coordination with DB2 using a 64-bit queue manager

To globally coordinate message flow transactions with updates in DB2 databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transactions, see "Configuring databases for global coordination of transactions" on page 100.

All WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit. 64-bit queue managers can coordinate transactions only in 64-bit mode. If the broker uses a 64-bit queue manager, you can globally coordinate message flows that are deployed to either 64-bit or 32-bit execution groups, but if you are using 32-bit execution groups you must define the data source name of the user database in both odbc.ini and odbc64.ini. If the broker uses a 64-bit queue manager or has a 64-bit execution group, the databases to which the broker connects must be 64-bit too.

To configure your broker environment for global coordination using a 64-bit queue manager as the transaction manager:

1. Decide whether the broker will connect to databases using TCP/IP or using shared memory.

   For more information about TCP/IP connections, see the example in the section about message SQL1224N in Resolving problems when using databases.

   To enable shared memory:

   a. Stop the broker by running the following command, where *broker* is the name of your broker:

      ```
      mqsistop broker
      ```

   b. Run the following command to ensure that the broker is run in an environment with the extended memory variable exported:

      ```
      export EXTSHM=ON
      ```

   c. Restart the broker by running the following command, where *broker* is the name of your broker:

      ```
      mqsistart broker
      ```

   d. On the DB2 server, ensure that shared memory support is turned on. For more information, see "Configuring databases for global coordination of transactions" on page 100.

2. 2. Create the symbolic links required for your platform, queue manager, and DB2 version combination. You must be logged in as root.

   - AIX On AIX:
     - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 5.3:

       ```
       ln -s <DB2_installation_directory>/lib/libdb2.a /var/mqm/exits/libdb2.a
       ```

- If you have DB2 Version 8 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib/libdb2.a /var/mqm/exits/libdb2.a
ln -s <DB2_installation_directory>/lib64/libdb2.a /var/mqm/exits64/libdb2.a
```

- If you have DB2 Version 9 performing coordination using WebSphere MQ Version 5.3:

```
ln -s <DB2_installation_directory>/lib32/libdb2.a /var/mqm/exits/libdb2.a
```

- If you have DB2 Version 9 performing coordination using WebSphere MQVersion 6.0:

```
ln -s <DB2_installation_directory>/lib32/libdb2.a /var/mqm/exits/libdb2.a
ln -s <DB2_installation_directory>/lib64/libdb2.a /var/mqm/exits64/libdb2.a
```

- HP-UX On HP-UX:
  - If you have DB2 Version 8 performing coordination using WebSphere MQVersion 5.3:

```
ln -s <DB2_installation_directory>/lib/libdb2.sl /var/mqm/exits/libdb2.sl
```

  - If you have DB2 Version 8 performing coordination using WebSphere MQVersion 6.0:

```
ln -s <DB2_installation_directory>/lib/libdb2.sl /var/mqm/exits/libdb2.sl
ln -s <DB2_installation_directory>/lib64/libdb2.sl /var/mqm/exits64/libdb2.sl
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQVersion 5.3:

```
ln -s <DB2_installation_directory>/lib32/libdb2.sl /var/mqm/exits/libdb2.sl
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib32/libdb2.sl /var/mqm/exits/libdb2.sl
ln -s <DB2_installation_directory>/lib64/libdb2.sl /var/mqm/exits64/libdb2.sl
```

- Solaris On Solaris:
  - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 5.3:

```
ln -s <DB2_installation_directory>/lib/libdb2.so /var/mqm/exits/libdb2.so
```

  - If you have DB2 Version 8 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib/libdb2.so /var/mqm/exits/libdb2.so
ln -s <DB2_installation_directory>/lib64/libdb2.so /var/mqm/exits64/libdb2.so
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 5.3:

```
ln -s <DB2_installation_directory>/lib32/libdb2.so /var/mqm/exits/libdb2.so
```

  - If you have DB2 Version 9 performing coordination using WebSphere MQ Version 6.0:

```
ln -s <DB2_installation_directory>/lib32/libdb2.so /var/mqm/exits/libdb2.so
ln -s <DB2_installation_directory>/lib64/libdb2.so /var/mqm/exits64/libdb2.so
```

3. Follow the instructions appropriate to your execution groups:
   - "32-bit execution groups"
   - "64-bit execution groups" on page 229

32-bit execution groups

To configure the broker's queue manager to coordinate message flows that are deployed to a 32-bit execution group:

1. UNIX On UNIX only, create the following symbolic links to specify the location of the ODBC database drivers and switch file that are supplied with WebSphere Message Broker:

   ```
   ln –s install_dir/sample/xatm/db2swit /var/mqm/exits/db2swit
   ln –s install_dir/sample/xatm/db2swit64 /var/mqm/exits64/db2swit
   ```

   Where:

   install_dir is the location in which WebSphere Message Broker is installed.

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   UNIX On UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

      ```
      XAResourceManager:
      Name=DB2
      SwitchFile=db2swit
      XAOpenString=db=MyDataSource,uid=MyUserId,pwd=MyPassword,toc=t
      XACloseString=
      ThreadOfControl=THREAD
      ```

      The switch file is supplied by WebSphere Message Broker.

   c. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:

      - *MyDataSource* is the name of the data source to which you want to connect.
      - *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
      - *MyPassword* is the password that is associated with the user name.

   d. Accept the default values for all the other lines in the stanza. For example:

      ```
      XAResourceManager:
      Name=DB2
      SwitchFile=db2swit
      XAOpenString=db=MYDB,uid=wbrkuid,pwd=wbrkpw,toc=t
      XACloseString=
      ThreadOfControl=THREAD
      ```

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

```
endmqm queue_manager_name
strmqm queue_manager_name
```

When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

DB2 is now configured for global coordination with a 64-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

64-bit execution groups

To configure the broker's queue manager to coordinate message flows that are deployed to a 64-bit execution group:

1. UNIX On UNIX only, create the following symbolic links to specify the location of the ODBC database drivers and switch file that are supplied with WebSphere Message Broker:

   ```
   ln –s install_dir/sample/xatm/db2swit64 /var/mqm/exits64/db2swit
   ln -s install_dir/sample/xatm/db2swit /var/mqm/exits/db2swit
   ```

   Where:

   install_dir is the location in which WebSphere Message Broker is installed.

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   UNIX On UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

      ```
      XAResourceManager:
      Name=DB2
      SwitchFile=db2swit
      XAOpenString=db=MyDataSource,uid=MyUserId,pwd=MyPassword,toc=t
      XACloseString=
      ThreadOfControl=THREAD
      ```

      The switch file is supplied by WebSphere Message Broker.

   c. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:

      - *MyDataSource* is the name of the data source to which you want to connect.
      - *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker

command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.

- *MyPassword* is the password that is associated with the user name.

d. Accept the default values for all the other lines in the stanza. For example:

```
XAResourceManager:
Name=DB2
SwitchFile=db2swit
XAOpenString=db=MYDB,uid=wbrkuid,pwd=wbrkpw,toc=t
XACloseString=
ThreadOfControl=THREAD
```

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

   ```
   endmqm queue_manager_name
   strmqm queue_manager_name
   ```

   When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

DB2 is now configured for global coordination with a 64-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring global coordination with Oracle using a 32-bit queue manager

To globally coordinate message flow transactions with updates in Oracle databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transaction, see "Configuring databases for global coordination of transactions" on page 100.

How to configure the broker environment when the broker uses a 32-bit queue manager.

All WebSphere MQ Version 5.3 queue managers and all WebSphere MQ Version 6 queue managers on 32-bit platforms are 32-bit. 32-bit queue managers can coordinate transactions only in 32-bit mode and can coordinate only message flows that are deployed to 32-bit execution groups.

To configure your broker environment for global coordination using a 32-bit queue manager as the transaction manager:

1. Linux UNIX On Linux (x86 platform) and UNIX only, create the following symbolic links to specify the location of the ODBC database drivers that are supplied with WebSphere Message Broker:

   AIX On AIX:

   ```
   ln -s install_dir/merant/lib/libUKicu20.a /var/mqm/exits/libUKicu20.a
   ln -s Oracle_install_dir/lib32/libclntsh.a /var/mqm/exits/libclntsh.a
   ln -s Oracle_install_dir/lib32/libclntsh.a /usr/lib/libclntsh.a
   ```

HP-UX On HP-UX:

```
ln -s install_dir/merant/lib/libUKicu20.sl /var/mqm/exits/libUKicu20.sl
ln -s Oracle_install_dir/lib32/libclntsh.sl /var/mqm/exits/libclntsh.sl
ln -s Oracle_install_dir/lib32/libclntsh.sl /usr/lib/libclntsh.sl
```

Linux Solaris On Linux (x86 platform) and Solaris (SPARC platform):

```
ln -s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
ln -s Oracle_install_dir/lib32/libclntsh.so /var/mqm/exits/libclntsh.so
ln -s Oracle_install_dir/lib32/libclntsh.so /usr/lib/libclntsh.so
```

Where:

- *install_dir* is the location in which WebSphere Message Broker is installed.
- *Oracle_install_dir* is the location in which Oracle is installed, which is the same value as $ORACLE_HOME.

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   Linux UNIX **On Linux (x86 platform) and UNIX:**

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

```
XAResourceManager:
Name=OracleXA
SwitchFile=SwitchFilePath
XAOpenString=ORACLE_XA+SQLNET=MyServerName+HostName=MyHostName+PortNumber=
MyPortNumber+Sid=MySID+ACC=P/MyUserId/MyPassword+sestm=
100+threads=TRUE+DataSource=MyDataSourceName+DB=MyDataSourceName+K=2+
XACloseString=
ThreadOfControl=THREAD
```

   c. On the **SwitchFile** line of the stanza, replace *SwitchFilePath* with the full path to the switch file for your operating system. The following table shows the file path of the switch file for each operating system, where *install_dir* is the location in which the broker is installed:

Operating system	Switch file path
AIX	*install_dir*/merant/lib/UKor8dtc20.so
HP-UX	*install_dir*/merant/lib/UKor8dtc20.sl
Linux (x86 platform)	*install_dir*/merant/lib/UKor8dtc20.so
Solaris (SPARC platform)	*install_dir*/merant/lib/UKor8dtc20.so

   The switch file is supplied by WebSphere Message Broker.

   d. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:

   - *MyServerName* is the name of the Oracle server.
   - *MyHostName* is the name of the TCP/IP host that hosts the Oracle database.
   - *MyPortNumber* is the TCP/IP port on which the Oracle database is listening.
   - *MySID* is the Oracle System Identifier (SID) of the database.

- *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
- *MyPassword* is the password that is associated with the user name.
- *MyDataSourceName* is the ODBC data source name for the database.

e. Accept the default values for all the other lines in the stanza. For example, on AIX:

```
XAResourceManager:
Name=OracleXA
SwitchFile=/opt/mqsi/merant/lib/UKor8dtc20.so
XAOpenString=ORACLE_XA+SQLNET=diaz+HostName=diaz.hursley.ibm.com+PortNumber=1521+Sid=
diaz+ACC=P/wbrkuid/wbrkpw+sestm=100+threads=
TRUE+DataSource=MYDB+DB=MYDB+K=2+
XACloseString=
ThreadOfControl=THREAD
```

Windows **On Windows:**

a. From the Start menu, open the graphical administration tool for your version of WebSphere MQ:
   - WebSphere MQ Version 5.3: WebSphere MQ Services
   - WebSphere MQ Version 6: WebSphere MQ Explorer

b. Open the queue manager's Properties dialog box, then open the **Resources** (Version 5.3) or **XA resource managers** (Version 6) page.

c. In the **SwitchFile** field, enter the full path to the switch file, as shown in the following example where *install_dir* is the location in which the broker is installed:

```
install_dir\bin\UKor8dtc20.dll
```

d. In the **XAOpenString** field, paste the following string:

```
ORACLE_XA+SQLNET=MyServerName+HostName=MyHostName+PortNumber=MyPortNumber+Sid=
MySID+ACC=P/MyUserId/MyPassword+sestm=100+threads=TRUE+DataSource=
MyDataSourceName+DB=MyDataSourceName+K=2+
```

e. In the **XAOpenString** field, replace the values with values that are appropriate for your configuration:
   - *MyServerName* is the name of the Oracle server.
   - *MyHostName* is the name of the TCP/IP host that hosts the Oracle database.
   - *MyPortNumber* is the TCP/IP port on which the Oracle database is listening.
   - *MySID* is the Oracle System Identifier (SID) of the database.
   - *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name

is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.

- *MyPassword* is the password that is associated with the user name.
- *MyDataSourceName* is the ODBC data source name for the database.

For example:

```
ORACLE_XA+SQLNET=diaz+HostName=diaz.hursley.ibm.com+PortNumber=1521+Sid=diaz+ACC=
P/wbrkuid/wbrkpw+sestm=100+threads=T
RUE+DataSource=MYDB+DB=MYDB+K=2+
```

f. Accept the default values for all the other fields on the page.

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

   ```
   endmqm queue_manager_name
   strmqm queue_manager_name
   ```

   When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

Oracle is now configured for global coordination with a 32-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring global coordination with Oracle using a 64-bit queue manager

To globally coordinate message flow transactions with updates in Oracle databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transactions.

This topic describes how to configure the broker environment when the broker uses a 64-bit queue manager.

All WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit. 64-bit queue managers can coordinate transactions only in 64-bit mode. If the broker uses a 64-bit queue manager, you can globally coordinate message flows that are deployed to either 64-bit or 32-bit execution groups, but if you are using 32-bit execution groups you must define the data source name of the user database in both odbc.ini and odbc64.ini. If the broker uses a 64-bit queue manager or has a 64-bit execution group, the databases to which the broker connects must be 64-bit too.

To configure your broker environment for global coordination using a 64-bit queue manager as the transaction manager:

1. On Linux (x86 platform) and UNIX only, create the following symbolic links to specify the location of the ODBC database drivers and switch file that are supplied with WebSphere Message Broker:

   On AIX:

```
ln -s install_dir/merant/lib/libUKicu20.a /var/mqm/exits/libUKicu20.a
ln -s install_dir/merant/lib/UKor8dtc20.so /var/mqm/exits/UKor8dtc20.so
ln -s Oracle_install_dir/lib32/libclntsh.a /var/mqm/exits/libclntsh.a
ln -s install_dir/DD64/lib/libUKicu20.a /var/mqm/exits64/libUKicu20.a
ln -s install_dir/DD64/lib/UKoradtc20.so /var/mqm/exits64/UKor8dtc20.so
ln -s install_dir/DD64/lib/UKora20.so /var/mqm/exits64/UKora20.so
```

On HP-UX (PA-RISC platform):

```
ln -s install_dir/merant/lib/libUKicu20.sl /var/mqm/exits/libUKicu20.sl
ln -s install_dir/merant/lib/UKor8dtc20.sl /var/mqm/exits/UKor8dtc20.sl
ln -s Oracle_install_dir/lib32/libclntsh.sl /var/mqm/exits/libclntsh.sl
ln -s install_dir/DD64/lib/libUKicu20.sl /var/mqm/exits64/libUKicu20.sl
ln -s install_dir/DD64/lib/UKoradtc20.sl /var/mqm/exits64/UKor8dtc20.sl
ln -s install_dir/DD64/lib/UKora20.sl /var/mqm/exits64/UKora20.sl
```

On HP-UX (Integrity platform):

```
ln -s install_dir/DD64/lib/libUKicu20.so /var/mqm/exits64/libUKicu20.so
ln -s install_dir/DD64/lib/UKoradtc20.so /var/mqm/exits64/UKor8dtc20.so
ln -s install_dir/DD64/lib/UKora20.so /var/mqm/exits64/UKora20.so
```

On Linux (x86 platform):

```
ln -s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
ln -s install_dir/merant/lib/UKor8dtc20.so /var/mqm/exits/UKor8dtc20.so
ln -s Oracle_install_dir/lib32/libclntsh.so /var/mqm/exits/libclntsh.so
```

On Solaris (SPARC platform):

```
ln -s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
ln -s install_dir/merant/lib/UKor8dtc20.so /var/mqm/exits/UKor8dtc20.so
ln -s Oracle_install_dir/lib32/libclntsh.so /var/mqm/exits/libclntsh.so
ln -s install_dir/DD64/lib/libUKicu20.so /var/mqm/exits64/libUKicu20.so
ln -s install_dir/DD64/lib/UKoradtc20.so /var/mqm/exits64/UKor8dtc20.so
ln -s install_dir/DD64/lib/UKora20.so /var/mqm/exits64/UKora20.so
```

On Solaris (x86-64 platform):

```
ln -s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
ln -s install_dir/merant/lib/UKoradtc20.so /var/mqm/exits/UKoradtc20.so
ln -s install_dir/merant/lib/UKora20.so /var/mqm/exits/UKora20.so
ln -s install_dir/DD64/lib/libUKicu20.so /var/mqm/exits64/libUKicu20.so
ln -s install_dir/DD64/lib/UKoradtc20.so /var/mqm/exits64/UKoradtc20.so
ln -s install_dir/DD64/lib/UKora20.so /var/mqm/exits64/UKora20.so
```

Where:

- *install_dir* is the location in which WebSphere Message Broker is installed.
- *Oracle_install_dir* is the location in which Oracle is installed, which is the same value as $ORACLE_HOME.

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   On Linux (x86 platform) and UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

```
XAResourceManager:
Name=OracleXA
SwitchFile=SwitchFileName
XAOpenString=ORACLE_XA+SQLNET=MyServerName+HostName=MyHostName+PortNumber=
```

```
MyPortNumber+Sid=MySID+ACC=P/MyUserId/MyPassword+sestm=
100+threads=TRUE+DataSource=MyDataSourceName+DB=MyDataSourceName+K=2+
XACloseString=
ThreadOfControl=THREAD
```

c. On the **SwitchFile** line of the stanza, replace *SwitchFileName* with the name of the switch file for your operating system. The following table shows the name of the switch file for each operating system:

Operating system	Switch file path
AIX	UKor8dtc20.so
HP-UX	UKor8dtc20.sl
Linux (x86 platform)	UKor8dtc20.so
Solaris (SPARC platform)	UKor8dtc20.so
Solaris (x86-64 platform)	UKoradtc20.so

The switch file is supplied by WebSphere Message Broker.

d. The switch file is supplied by WebSphere Message Broker and varies by operating system.

e. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:
   - *MyServerName* is the name of the Oracle server.
   - *MyHostName* is the name of the TCP/IP host that hosts the Oracle database.
   - *MyPortNumber* is the TCP/IP port on which the Oracle database is listening.
   - *MySID* is the Oracle System Identifier (SID) of the database.
   - *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
   - *MyPassword* is the password that is associated with the user name.
   - *MyDataSourceName* is the ODBC data source name for the database.

f. Accept the default values for all the other lines in the stanza. For example, on AIX:

```
XAResourceManager:
Name=OracleXA
SwitchFile=UKor8dtc20.so
XAOpenString=ORACLE_XA+SQLNET=diaz+HostName=diaz.hursley.ibm.com+PortNumber=1521+Sid=
diaz+ACC=P/wbrkuid/wbrkpw+sestm=100+threads=
TRUE+DataSource=MYDB+DB=MYDB+K=2+
XACloseString=
ThreadOfControl=THREAD
```

On Windows:

a. From the Start menu, open the WebSphere MQ Explorer graphical administration tool.

b. Open the queue manager's Properties dialog box, then open the **XA resource managers** page.

c. In the **SwitchFile** field, enter the name of the switch file, as shown in the following example:

```
UKor8dtc20.dll
```

d. In the **XAOpenString** field, paste the following string:

```
ORACLE_XA+SQLNET=MyServerName+HostName=MyHostName+PortNumber=MyPortNumber+Sid=MySID+ACC=
P/MyUserId/MyPassword+sestm=100+threads=TRUE+DataSource=MyDataSourceName+DB=
MyDataSourceName+K=2+
```

e. In the **XAOpenString** field, replace the values with values that are appropriate for your configuration:

- *MyServerName* is the name of the Oracle server.
- *MyHostName* is the name of the TCP/IP host that hosts the Oracle database.
- *MyPortNumber* is the TCP/IP port on which the Oracle database is listening.
- *MySID* is the Oracle System Identifier (SID) of the database.
- *MyUserId* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
- *MyPassword* is the password that is associated with the user name.
- *MyDataSourceName* is the ODBC data source name for the database.

For example:

```
ORACLE_XA+SQLNET=diaz+HostName=diaz.hursley.ibm.com+PortNumber=1521+Sid=diaz+ACC=
P/wbrkuid/wbrkpw+sestm=100+threads=
TRUE+DataSource=MYDB+DB=MYDB+K=2+
```

f. Accept the default values for all the other fields on the page.

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

```
endmqm queue_manager_name
strmqm queue_manager_name
```

   When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

Oracle is now configured for global coordination with a 64-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring global coordination with Sybase using a 32-bit queue manager

To globally coordinate message flow transactions with updates in Sybase databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transactions.

This topic describes how to configure the broker environment when the broker uses a 32-bit queue manager.

All WebSphere MQ Version 5.3 queue managers and all WebSphere MQ Version 6 queue managers on 32-bit platforms are 32-bit. 32-bit queue managers can coordinate transactions only in 32-bit mode and can coordinate only message flows that are deployed to 32-bit execution groups.

All WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit. 64-bit queue managers can coordinate transactions only in 64-bit mode. If the broker uses a 64-bit queue manager, you can globally coordinate message flows that are deployed to either 64-bit or 32-bit execution groups, but if you are using 32-bit execution groups you must define the data source name of the user database in both odbc.ini and odbc64.ini. If the broker uses a 64-bit queue manager or has a 64-bit execution group, the databases to which the broker connects must be 64-bit too.

To configure your broker environment for global coordination using a 32-bit queue manager as the transaction manager:

1. Linux (x86 platform) and UNIX only, create the following symbolic links to specify the location of the database drivers that are supplied with WebSphere Message Broker:

   On AIX:

   ```
   ln –s install_dir/merant/lib/libUKicu20.a /var/mqm/exits/libUKicu20.a
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

   On HP-UX:

   ```
   ln –s install_dir/merant/lib/libUKicu20.sl  /var/mqm/exits/libUKicu20.sl
   ln –s install_dir/merant/lib/UKase20.sl /var/mqm/exits/UKase20.sl
   ln –s install_dir/merant/lib/UKasedtc20.sl /var/mqm/exits/UKasedtc20.sl
   ```

   On Solaris (SPARC platform) and Linux (x86 platform):

   ```
   ln –s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   On Linux (x86 platform) and UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

   b. At the end of the qm.ini file, paste the following stanza:

```
XAResourceManager:
    Name=SYBASEXA
    SwitchFile=SwitchFileName
    XAOpenString=-NSYBASEDB -AMyServerName,MyPortNumber -Uuid -Ppwd -K2
    XACloseString=
    ThreadOfControl=THREAD
```

c. On the **SwitchFile** line of the stanza, replace *SwitchFilePath* with the full path to the switch file for your operating system. The following table shows the file path of the switch file for each operating system, where *install_dir* is the location in which the broker is installed:

Operating system	Switch file path
AIX	*install_dir*/merant/lib/UKasedtc20.so
HP-UX	*install_dir*/merant/lib/UKasedtc20.sl
Linux (x86 platform)	*install_dir*/merant/lib/UKasedtc20.so
Solaris (SPARC platform)	*install_dir*/merant/lib/UKasedtc20.so

The switch file is supplied by WebSphere Message Broker.

d. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:
   - *MyServerName* is the name of the TCP/IP host that hosts the Sybase ASE server.
   - *MyPortNumber* is the TCP/IP port on which the Sybase ASE server is listening.
   - *uid* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
   - *pwd* is the password that is associated with the user name.

e. Accept the default values for all the other lines in the stanza. For example, on AIX:

```
XAResourceManager:
    Name=SYBASEXA
    SwitchFile=/opt/mqsi/merant/lib/UKasedtc20.so
    XAOpenString=-NSYBASEDB -Adiaz,1521 -Uwbrkuid -Pwbrkpw -K2
    XACloseString=
    ThreadOfControl=THREAD
```

On Windows:

a. From the Start menu, open the graphical administration tool for your version of WebSphere MQ:
   - WebSphere MQ Version 5.3: WebSphere MQ Services
   - WebSphere MQ Version 6: WebSphere MQ Explorer

b. Open the queue manager's Properties dialog box, then open the **Resources** (Version 5.3) or **XA resource managers** (Version 6) page.

c. In the **SwitchFile** field, enter the full path to the switch file, as shown in the following example where *install_dir* is the location in which the broker is installed:

install_dir\bin\UKase20.dll

d. In the **XAOpenString** field, paste the following string:

   -NSYBASEDB -A*MyServerName*,*MyPortNumber* -WWinsock -U*uid* -P*pwd* -K2

e. In the **XAOpenString** field, replace the values with values that are appropriate for your configuration:

   - *install_dir* is the location in which the broker is installed.
   - *MyServerName* is the name of the TCP/IP host that hosts the Sybase ASE server.
   - *MyPortNumber* is the TCP/IP port on which the Sybase ASE server is listening.
   - *uid* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
   - *pwd* is the password that is associated with the user name.

   For example:

   -NSYBASEDB -Adiaz,1521 -WWinsock -Uwbrkuid -Pwbrkpw -K2

f. Accept the default values for all the other fields on the page.

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

   endmqm *queue_manager_name*
   strmqm *queue_manager_name*

   When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

Sybase is now configured for global coordination with a 32-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring global coordination with Sybase using a 64-bit queue manager

To globally coordinate message flow transactions with updates in Sybase databases, configure the broker environment.

Before you start:

- Ensure that the databases are configured for global coordination of transactions.

This topic describes how to configure the broker environment when the broker uses a 64-bit queue manager.

All WebSphere MQ Version 6 queue managers on 64-bit platforms are 64-bit. 64-bit queue managers can coordinate transactions only in 64-bit mode. If the broker uses a 64-bit queue manager, you can globally coordinate message flows that are deployed to either 64-bit or 32-bit execution groups, but if you are using 32-bit execution groups you must define the data source name of the user database in both odbc.ini and odbc64.ini. If the broker uses a 64-bit queue manager or has a 64-bit execution group, the databases to which the broker connects must be 64-bit too.

To configure your broker environment for global coordination using a 64-bit queue manager as the transaction manager:

1. Linux (x86 platform) and UNIX only, create the following symbolic links to specify the location of the ODBC database drivers and switch file that are supplied with WebSphere Message Broker:

   On AIX:

   ```
   ln –s install_dir/DD64/lib/libUKicu20.a /var/mqm/exits64/libUKicu20.a
   ln –s install_dir/DD64/lib/UKase20.so /var/mqm/exits64/UKase20.so
   ln –s install_dir/DD64/lib/UKasedtc20.so /var/mqm/exits64/UKasedtc20.so
   ln –s install_dir/merant/lib/libUKicu20.a /var/mqm/exits/libUKicu20.a
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

   On HP-UX:

   ```
   ln –s install_dir/DD64/lib/libUKicu20.sl /var/mqm/exits64/libUKicu20.sl
   ln –s install_dir/DD64/lib/UKase20.sl /var/mqm/exits64/UKase20.sl
   ln –s install_dir/DD64/lib/UKasedtc20.sl /var/mqm/exits64/UKasedtc20.sl
   ln –s install_dir/merant/lib/libUKicu20.sl  /var/mqm/exits/libUKicu20.sl
   ln –s install_dir/merant/lib/UKase20.sl /var/mqm/exits/UKase20.sl
   ln –s install_dir/merant/lib/UKasedtc20.sl /var/mqm/exits/UKasedtc20.sl
   ```

   On Linux (x86 platform):

   ```
   ln –s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

   On Solaris (SPARC platform):

   ```
   ln –s install_dir/DD64/lib/libUKicu20.so /var/mqm/exits64/libUKicu20.so
   ln –s install_dir/DD64/lib/UKase20.so /var/mqm/exits64/UKase20.so
   ln –s install_dir/DD64/lib/UKasedtc20.so /var/mqm/exits64/UKasedtc20.so
   ln –s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

   On Solaris (x86-64 platform):

   ```
   ln –s install_dir/DD64/lib/libUKicu20.so /var/mqm/exits64/libUKicu20.so
   ln –s install_dir/DD64/lib/UKase20.so /var/mqm/exits64/UKase20.so
   ln –s install_dir/DD64/lib/UKasedtc20.so /var/mqm/exits64/UKasedtc20.so
   ln –s install_dir/merant/lib/libUKicu20.so /var/mqm/exits/libUKicu20.so
   ln –s install_dir/merant/lib/UKase20.so /var/mqm/exits/UKase20.so
   ln –s install_dir/merant/lib/UKasedtc20.so /var/mqm/exits/UKasedtc20.so
   ```

2. Configure the broker's queue manager with XA resource manager information for each database that is involved in the transaction that the queue manager will globally coordinate. If the message flows reference message dictionaries or contain Publication nodes, you must use the same method to define XA resource manager information for the broker database as well as for the user databases.

   On Linux (x86 platform) and UNIX:

   a. Open the queue manager's qm.ini file in a text editor. The qm.ini file is located at /var/mqm/qmgrs/*queue_manager_name*/qm.ini, where *queue_manager_name* is the name of the broker that is associated with the queue manager.

b. At the end of the qm.ini file, paste the following stanza:

```
XAResourceManager:
    Name=SYBASEXA
    SwitchFile=SwitchFileName
    XAOpenString=-NSYBASEDB -AMyServerName,MyPortNumber -Uuid -Ppwd -K2
    XACloseString=
    ThreadOfControl=THREAD
```

c. On the **SwitchFile** line of the stanza, replace *SwitchFileName* with the name of the switch file for your operating system. The following table shows the name of the switch file for each operating system:

Operating system	Switch file path
AIX	UKasedtc20.so
HP-UX	UKasedtc20.sl
Linux (x86 platform)	UKasedtc20.so
Solaris (SPARC platform)	UKasedtc20.so
Solaris (x86-64 platform)	UKasedtc20.so

The switch file is supplied by WebSphere Message Broker.

d. On the **XAOpenString** line, replace the following values with values that are appropriate for your configuration:
   - *MyServerName* is the name of the TCP/IP host that hosts the Sybase ASE server.
   - *MyPortNumber* is the TCP/IP port on which the Sybase ASE server is listening.
   - *uid* must be the user name that the broker uses to connect to the database. The user name that the broker uses can be defined in a number of ways. If you use the **-u** parameter on the mqsicreatebroker command when you create the broker, this user name is used to connect to the database, unless the mqsisetdbparms command has been used to associate a specific user name and password with a specific data source name (DSN). If you use neither the **-u** parameter on the mqsicreatebroker command nor the mqsisetdbparms command, the data source user name is the same as the broker's service user name, which you define with the **-i** parameter on the mqsicreatebroker command.
   - *pwd* is the password that is associated with the user name.

e. Accept the default values for all the other lines in the stanza. For example, on AIX:

```
XAResourceManager:
    Name=SYBASEXA
    SwitchFile=UKasedtc20.so
    XAOpenString=-NSYBASEDB -Adiaz,1521 -Uwbrkuid -Pwbrkpw -K2
    XACloseString=
    ThreadOfControl=THREAD
```

3. Stop then restart the queue manager to apply the changes because qm.ini is read only when the queue manager starts.

   To stop then restart the queue manager, enter the following commands, where *queue_manager_name* is the name of the queue manager:

```
endmqm queue_manager_name
strmqm queue_manager_name
```

   When the queue manager restarts, check the queue manager's log for any warnings that are associated with the restart. The log files are located in /var/mqm/qmgrs/*queue_manager_name*/errors, where *queue_manager_name* is

the name of the queue manager that you restarted. When the queue manager restarts successfully, the changes that you made to qm.ini are applied.

Sybase is now configured for global coordination with a 64-bit queue manager coordinating transactions.

Next, you can deploy globally coordinated message flows to the broker.

Configuring the workbench

The following topics show you how to configure aspects of the workbench.

- "Changing workbench preferences"
- "Changing Broker Administration preferences" on page 243
- "Configuring CVS to run with the Message Brokers Toolkit" on page 243

A minimum display resolution of at least 1024 x 768 is required for some dialog boxes, such as the Preferences dialog box.

Changing workbench preferences

The workbench has a large number of preferences that you can change to suit your requirements. Some of these are specific to the product plug-ins that you have installed within the workbench, including those for WebSphere Message Broker. Others control more general options, such as the colors and fonts in which information is displayed.

To access the workbench preferences:

1. Select **Window** → **Preferences**.
2. Click the plus sign associated with **Workbench**, typically the first entry in the left pane. An expanded list of options appears, Select the aspect of the workbench that you want to modify. These options might be of interest:

   Startup and shutdown
   Switch on, or off, the prompt at toolkit startup that asks you to confirm the workspace location. Typically you switch this prompt off, so that it does not appear, but you can force it to appear next time you start the workbench if you want to specify a different location.

   Here you can also choose to display, or not display, the dialog that asks you to confirm shutdown of the workbench.

   Colors and fonts
   Change the default fonts and colors that appear in the workbench.

   Perspectives
   On this dialog, your choices include the option to open a new perspective in a new window.
3. When you have made your changes, click **OK** to close the Preferences dialog.

Below the Workbench category in the Preference dialog are items that refer specifically to WebSphere Message Broker resources, such as message flows. Review the following topics for information about setting preferences and other values that are specific to your use of these resources:

- Message flow preferences
- Changing ESQL preferences

- Configuring message set preferences
- Setting flow debug preferences
- Changing trace settings
- Enabling PDE runtime capabilities

Changing Broker Administration preferences

You can change the following Broker Administration preferences:

- Show empty projects in the Navigator views.
- Show ACL restricted objects in the Navigator views.
- Warn before deleting alerts.
- Prompt to perform a topology deploy after changes. You can change this to never deploy, always a delta deploy, or always a complete deploy.
- Prompt to perform a topics deploy after changes. You can change this to never deploy, always a delta deploy, or always a complete deploy.

To change Broker Administration preferences:

1. Switch to the **Broker Administration perspective**.
2. Click **Window** → **Preferences**.
3. Expand the **Broker Administration** category in the left pane.
4. Make your selections.
5. Click **OK**.

Configuring CVS to run with the Message Brokers Toolkit

Install CVS as a normal program by following the usual prompts. Not all versions of *CVSNT* are supported by Eclipse.

1. Configure CVS by carrying out the following tasks:
   a. Create a directory on your computer, for example, on Windows - c:\CVSRepository.
   b. Start the *CVSNT* control panel. Select `Start->Programs->CVSNT` to see the icon on the desktop.
   c. Stop both the `CVS Service` and the `CVS Lock Service`.
   d. Select the `Repositories` tag, click **Add** and create a new repository. Note that no entry appears on the screen the first time that you do this.
   e. Use the `...` button on the next window to select the directory that you created in step 1a and click **OK**. Note that when CVS has finished formatting its repository the backslash in the directory name is changed to a forward slash.
   f. Select the `Service Status` tab and restart both the `CVS Service` and the `CVS Lock Service`.
2. Enable the CVS Revision tag to be populated in the Eclipse Version fields in the Message Brokers Toolkit. To do this on Windows:
   a. Select `Window->Preferences`
   b. Expand the `Team` section and click **CVS**
   c. Use the drop down in the **Default keyword substitution:** field and set the value to `ASCII with keyword expansion(-kkv)`
3. Add the WebSphere Message Broker file types to the Eclipse CVS configuration. To do this:

a. Select **File Content** in the `Team` section of the window you opened in step 2 on page 243
b. Click **Add** and add `msgflow` as an allowable file extension. Ensure that the value is set to ASCII.
c. Repeat the above procedure for the following file extensions that the broker uses:
   - `esql`
   - `mset`
   - `mxsd`

   If you use CVS to store other file types, for example, COBOL copybooks add the appropriate file types as well.
d. Click **OK** when you have finished.

Displaying selected projects in working sets

Before you start:

Read the information about working sets in the concept topic about Resources.

A *working set* is a logical collection of application projects, that you can use to limit the number of resources that are displayed in the Broker Development view. Creating and using a working set allows you to reduce the visual complexity of what is displayed in the Broker Development view, making it easier to manage and work with your application projects.

To create a new working set:

1. Click on the down arrow to the right of the **Active working set** field in the Broker development view. By default this field contains `<all resources>`. A list is displayed containing existing working sets (if there are any) and options for editing and deleting existing working sets, and for creating a new working set.
2. Click **New Working Set**. The New Working Set window is displayed.
3. Type the name that you want to give to your new working set in the **Working set name** field.
4. Select from the displayed list each of the application projects that you want to include in this working set. You can also include all of the projects that are dependent on your selected application projects, by selecting **Automatically include dependent projects in this working set**.
5. Click **Finish**.

The new working set and its associated resources are displayed in the Broker Development view.

In addition to creating new working sets, you can also select, edit, and delete existing working sets using the options in the Broker Development view menu.

Changing locales

You can change the locale for the system on which a runtime component is installed.

The way in which you do this depends on the operating system:
• "Changing your locale on UNIX and Linux systems" on page 245

- "Changing your locale on Windows" on page 247
- "Changing your locale on z/OS" on page 247

WebSphere Message Broker uses code page converters to support character sets from different environments. "Code page converters" on page 248 describes what a code page converter is, and how to generate new converters.

Changing your locale on UNIX and Linux systems

You can change your system locale on UNIX and Linux systems.

You can set environment variables to control the system locale. These can be defined in your environment to be system-wide, or on a per-session basis:

LC_ALL
Overrides all `LC_*` environment variables with the given value

LC_CTYPE
Character classification and case conversion

LC_COLLATE
Collation (sort) order

LC_TIME
Date and time formats

LC_NUMERIC
Non-monetary numeric formats

LC_MONETARY
Monetary formats

LC_MESSAGES
Formats of informative and diagnostic messages, and of interactive responses

LC_PAPER
Paper size

LC_NAME
Name formats

LC_ADDRESS
Address formats and location information

LC_TELEPHONE
Telephone number formats

LC_MEASUREMENT
Measurement units (Metric or Other)

LC_IDENTIFICATION
Metadata about the locale information

LANG
The default value. This is used when either LC_ALL is not set, or an applicable value for LC_* is not set

NLSPATH
Delimited list of paths to search for message catalogues

TZ Time zone

LC_MESSAGES and NLSPATH are the most important variables to the broker. These variables define the language and location of response messages that the broker uses. The broker profile file, mqsiprofile, sets NLSPATH. Either you, or your system must set LC_MESSAGES. The value set in LC_MESSAGES must be a value that the broker recognizes. LC_CTYPE is also important to the broker because it defines the character conversion that the broker performs when interacting with the local environment.

If you use common desktop environment (CDE), use this to set the locale instead of setting LANG and LC_ALL directly. The NLSPATH variable respects either method. Before setting the code page, check that it is one of the Supported code pages.

For example, to set WebSphere Message Broker to run in a UTF-8 environment set the following values in the profile:

```
LANG=en_US.utf-8
LC_ALL=en_US.utf-8
```

Where en_US sets the language, and utf-8 sets the code page.

You can use the executable locale to show your current locale. The command locale -a displays all the locales currently installed on the machine. Make sure that the locale you select for LANG and LC_ALL is in the list that locale -a returns. The values that locale uses and returns are case-sensitive, so copy them exactly when assigning them to an environment variable.

When you start a broker component, the locale of that component is inherited from the shell in which it is started. The broker component uses the LC_MESSAGES environment variable as the search path in the NLSPATH environment variable (LC_MESSAGES is set when variable LC_ALL is exported).

Messages are sent to the syslog in the code page set by this locale. If you have multiple brokers that write to this syslog, their messages are in the code page of the locale in which they were started, for example:

locale	syslog code page	ccsid
pt_BR	iso8859-1	819
Pt_BR	ibm-850	850
PT_BR	utf-8	1208

Set the locale of the user ID that runs the syslog daemon to one that is compatible with the locales of all brokers that write to the syslog on that system, for example, utf-8. You can do this by setting the default locale. On Solaris, set the LANG and LC_ALL variables in /etc/default/init. On AIX and Linux, these variables are in /etc/environment. This task is not required on HP-UX.

For full time zone support in the broker, set the TZ variable using Continent/City notation. For example set TZ to Europe/London to make London, England the time zone, or set it to America/New_York to make New York, America the time zone.

AIX If AIX Version 5.3 is installed on the computer on which you have created the broker, the TZ (timezone) environment variable might not work

correctly in all locales. To overcome this situation, see the latest information available in Techdoc AIX Version 5.3 timezone support (you must be connected to the Internet to access this document).

If you want to add a new locale, refer to the operating system documentation for information on how to complete that task. If the code page of the new locale is not supported by WebSphere Message Broker you must add it by "Generating a new code page converter" on page 248.

Changing your locale on Windows

You can change your system locale on Windows.

The product components are started as services on Windows and are therefore influenced by the system locale. The command line functions are influenced by the user's locale. WebSphere Message Broker on Windows has all its locale information installed by default. However, you might need to install additional locale packages if prompted to do so by Windows.

To change locale, you can do one of the following:

- Install a locale-specific operating system.
- Alter the system or user locale by selecting *Regional Settings* in the Control Panel.

Messages are sent to the Event Log in the code page set by the current locale.

You can use the `chcp` command to change the active console code page. Enter the command at a command prompt; if you enter `chcp` without a parameter, it displays the current setting. If you enter it with a code page, it changes to that code page.

For example, to check the current code page setting:

```
C:\>chcp
Active code page: 437
```

The current page is displayed (437 is US-ASCII). If you want to change this to GB18030, enter:

```
C:\>chcp 54936
Active code page: 54936
```

Before using a code page, search for `windows-`*`number`* where *`number`* is the active code page you want to use in the list of Supported code pages. If the code page is not in the list, either use a code page that is in the list, or generate a new code page converter.

Changing your locale on z/OS

You can change your system locale on z/OS.

If you want to change your system locale on z/OS, set the `LANG`, `LC_ALL`, and `NLSPATH` variables. See "Installation information - broker and User Name Server" on page 133 and "Installation information - Configuration Manager" on page 147 for further information.

The locale is set in the appropriate component profile (`BIPBPROF` for the broker, `BIPCPROF` for the Configuration Manager, `BIPUPROF` for the User Name Server) and you must run `BIPGEN` to create the component `ENVFILE`.

You can use the UNIX System Services (USS) executable `locale` to show your current locale. The command `locale -a` displays all the locales currently installed on the machine. Refer to the operating system documentation for information about adding new locales. If you add a new locale after you have installed WebSphere Message Broker, install that locale's message catalogs from the original install media.

You can set WebSphere Message Broker to operate with a specific code page. Set the code page after a period in the LANG and LC_ALL variable. This example sets the locale to `En_us` and the code page to `IBM-1140` (EBCDIC En_us with euro):

```
LANG=En_us.IBM-1140
LC_ALL=En_us.IBM-1140
```

Make sure that the selected code page is one of the Supported code pages. If the code page is not in the list, either use a code page that is in the list, or generate a new code page converter.

Code page converters

WebSphere Message Broker performs string operations in Universal Character Set coded in 2 octets (UCS-2). If incoming strings are not encoded in UCS-2, they must be converted to UCS-2. The broker uses international components for Unicode (ICU) code page converters to do this. The Unicode Consortium has further information on Unicode.

A code page converter is a mapping from the byte sequence in one code page to a serialized representation of UCS-2, known as UCS Transformation Format 16 bit form (UTF-16). A code page converter allows the broker to create a UCS-2 representation of an incoming string.

An example of the use of code page converter is:

- A message comes in on a queue from z/OS, with the MQ CCSID field set to 1047 (LATIN-1 Open Systems without euro). The broker looks up ibm-1047 and uses the resulting converter to create a UCS-2 representation for internal use.

WebSphere Message Broker currently supports the code pages listed in Supported code pages. If you need support for an additional code page, or if you require a different variant of a code page, you can extend the broker to support this code page.

Generating a new code page converter

Before you start:

- Read "Code page converters," which provides information about what a code page converter is, and about the code pages that WebSphere Message Broker supports.

If you need to support a code page that is not in the default set of code pages that WebSphere Message Broker supports, generate a new code page converter:

1. Create or find a mapping data file with the file extension .ucm for the converter that you require. You can download .ucm files from the ICU Character set mapping files archive. These mapping data files are available and can be modified without restriction. An example mapping data file is ibm-1284_P100-1996.ucm.
2. Rename the .ucm to a file name with the format `ibm-`*`number`*`.ucm` where *number* is a number that you choose to identify the code page. Make sure that this

number is not already used in one of the Supported code pages. For example, you could rename ibm-1284_P100-1996.ucm to ibm-1284.ucm.

3. Go to ICU downloads and download the binary distribution for your system. An exact match is not important as long as the binary files are compatible. If you have problems building the converter, see the ICU user guide.
4. Extract the files from the binary distribution archive into a temporary directory.
5. Copy the library and binary files to a directory within the environment PATH and LIBPATH. (Alternatively, copy the library and binary files to directory that is not temporary and modify the environment PATH and LIBPATH to include this directory.)
6. One of the extracted files is makeconv.exe; use this makeconv tool to convert the mapping data file (.ucm files) into a binary converter file (.cnv file), by entering the following command:

   ```
   makeconv -p ICUDATA mapping_file.ucm
   ```

   where *mapping_file.ucm* is the mapping data file that you are using.

   The name of the binary converter file that makeconv produces is:

   ```
   icudt32<platform-suffix>_<mapping_file>.cnv
   ```

   where:

   - <*platform-suffix*> is one of the following values:
     - l for little-endian ASCII platforms
     - b for big-endian ASCII platforms
     - e for EBCDIC platforms
   - <*mapping_file*> is the name of the mapping data file that was converted.

   To make the .cnv file for ibm-1284.ucm, use the following command:

   ```
   makeconv -p ICUDATA ibm-1284.ucm
   ```
7. Copy the file with the file extension .cnv for the code page that you need, into a directory that WebSphere Message Broker can access; for example, on UNIX: /var/mqsi/converters.
8. Associate the broker with the code page converter by entering the name of the directory where the converter is stored:
   - To create a new broker that is associated with the converter, include the **-c** parameter on the mqsicreatebroker command.
   - To alter an existing broker to recognize the converter, include the **-c** parameter on the mqsichangebroker command.
   - To affect all the products and the broker command-line tools that are using ICU, add the *directory* to the **ICU_DATA** environment variable. If you have already used either the mqsicreatebroker command or the mqsichangebroker command to specify the code page converter to be used, the broker ignores the **ICU_DATA** value.

   If you are using a converter that matches one of the built-in converters that are provided with Version 6.0, and that converter is the local code page for the broker, do not use the mqsicreatebroker command with the **-c** parameter to set the converter path. Use the **ICU_DATA** environment variable instead.

Using converters from a previous level of the product

If you have applications that need a code page that is not in the default set of code pages that WebSphere Message Broker Version 6.0 supports, you can use a code page from an earlier version of WebSphere Message Broker.

Before you start:

- Read "Code page converters" on page 248, which provides information about what a code page converter is, and about the code pages that WebSphere Message Broker supports.

The changes in converters between the previous level of the broker and WebSphere Message Broker Version 6.0 are significant, so the set of converters from the previous level has been included with WebSphere Message Broker Version 6.0.

To use one of these converters, take the following steps:

1. Extract the list of WebSphere Business Integration Message Broker Version 5.0 code page converters from your installation directory to a temporary directory:
   - On Windows: `extract install_dir\sample\converters\mqsiconverters-v5.zip"`
   - On Linux: `extract install_dir/sample/converters/mqsiconverters-v5.tar.bz2`
   - On UNIX: `extract install_dir/sample/converters/mqsiconverters-v5.tar.gz`

   where *install_dir* is the home directory of your WebSphere Message Broker installation.
2. Copy the .cnv file for the required code page to a directory that is accessible by the broker; for example, on UNIX systems /var/mqsi/converters, and on Windows systems C:\Documents and Settings\All Users\Application Data\ibm\mqsi\converters. To make sure that the copied file does not conflict with an existing converter, give the file a unique name. To ensure that the file does not cause a conflict of filenames, do not use a number that is already used in one of the supported code pages. If the converter is to be used by ESQL, the converter must be of the form `ibm-<ccsid>`, because converters are referenced through their numeric CCSID, not their name.
3. Associate the broker with the code page converter by entering the name of the directory where you have stored the converter:
   - To create a new broker that is associated with a converter, include the **-c** parameter on the mqsicreatebroker command.
   - To alter an existing broker to recognize the converter, include the **-c** parameter on the mqsichangebroker command.

     ```
     mqsichangebroker -c directory
     ```
   - To affect all the products and the broker command-line tools using international components for Unicode (ICU), add the directory to the **ICU_DATA** environment variable.

   If you have already used either the mqsicreatebroker command or the mqsichangebroker command to specify the code page converter to be used, the broker ignores the **ICU_DATA** value.

   Copy the entire set of converters (*.cnv) and aliases (*.icu) to reproduce the behavior of the previous level of the product.

   If you are using a converter that matches one of the built-in converters that are provided with Version 6.0, and that converter is the local code page for the broker, do not use the mqsicreatebroker command with the **-c** parameter to set the converter path Use the **ICU_DATA** environment variable instead.

Part 3. Administering the broker domain

Administering the broker domain

Administering the broker domain includes the tasks that you operate frequently to activate and run your broker domain. These are listed below:

- "Connecting to and disconnecting from the broker domain"
- "Starting and stopping message flows" on page 256
- "Starting and stopping a broker" on page 257
- "Starting and stopping a Configuration Manager" on page 258
- "Starting and stopping the User Name Server" on page 260
- "Starting a WebSphere MQ queue manager as a Windows service" on page 261
- "Stopping a WebSphere MQ queue manager when you stop a component" on page 262
- "Viewing broker domain log information" on page 263
- "Refreshing broker domain log information" on page 264
- "Filtering broker domain log information" on page 264
- "Saving broker domain log information" on page 266
- "Clearing broker domain log information" on page 266
- "Changing Event Log editor preferences" on page 268
- "Backing up resources" on page 268

These tasks can be performed using one, or more, of the administrative techniques available with WebSphere Message Broker:

- The Message Brokers Toolkit
- The WebSphere Message Broker commands
- The Configuration Manager Proxy Java API

For each task, the administrative techniques that can be used are identified.

Connecting to and disconnecting from the broker domain

Before you start:

You must complete the following task:

- "Creating a domain connection" on page 189

You can connect to, and disconnect from, the broker domain by either using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy, see Connecting to the Configuration Manager using the Configuration Manager Proxy.

Use a domain connection to connect to the broker domain in the workbench.

The following steps show you how to connect to the broker domain and how to disconnect from the broker domain.

1. To connect to the broker domain:
   a. Switch to the Broker Administration perspective.

b. In the Domains view, right-click the broker domain to which you want to connect, and click **Connect**. This starts the domain connection to the Configuration Manager.

   When connected, the workbench status line is changed (for example *WBRK_QM@localhost:1414* is connected). The Broker Topology and Topics are populated, and the broker domain and broker topology icons change to reflect the connected state.

   On successful connection, the Configuration Manager name is shown in the Domains view in the form `ConfigurationManagerName on QMgrName@Hostname:PortNumber`.

   Note: If you click **Cancel** while the connection is being attempted, the connection that is in progress stops and the domain returns to its initial unconnected state.

2. To disconnect from the broker domain:
   a. Switch to the Broker Administration perspective.
   b. In the Domains view, right click the broker domain from which you want to disconnect, and click **Disconnect**. The connection to the Configuration Manager is broken.

      When disconnected, the workbench status line is changed (for example *WBRK_QM@localhost:1414* is *not* connected). All brokers and topics are removed from the domains navigator tree, and the broker domain and broker topology icons change to reflect the disconnected state.

Connecting to and disconnecting from the broker domain on z/OS

How to connect to, and disconnect from, the broker domain on z/OS.

Before you start:

You must complete the following tasks:

- "Creating a Configuration Manager on z/OS" on page 146.
- Create and start a listener for the Configuration Manager. For details on how to create and start a listener, follow the instructions for listeners in the topic: "Starting the WebSphere MQ channels and listeners" on page 163.

Ensure that your Message Brokers Toolkit machine and user ID have the appropriate authorization on the z/OS Configuration Manager.

In SDSF, grant access to your user ID.

1. For this to work on all machines, enter:

   ```
   '/F <started task name> CA U=<userID>,A=YES,P=YES,X=F'
   ```

   or to grant access to your user ID for a specific machine, enter:

   ```
   '/F <started task name> CA U=<userID>,A=YES,M=<machine name>,P=YES,X=F'
   ```

2. Verify the previous step by entering:

   ```
   /F <configmgrname>,LA
   ```

This topic shows you how to:

- Create a domain connection in the workbench using the Create a Domain Connection wizard.
- Enter a set of parameters to create a .configmgr file.

- Use the parameters contained within the .configmgr file to connect to the Configuration Manager, where you can view and edit your broker domain.

To create a domain connection:

1. Switch to the Broker Administration perspective.
2. In the Domains view, right-click the default configuration manager.
3. Click **New → Domain** to open the Create a Domain Connection wizard.
4. In the Create a Domain Connection wizard, enter:
   a. The value for the **Queue Manager Name** that the Configuration Manager is using. This property is mandatory.
   b. The **Host** name or IP address of the machine on which the Configuration Manager is running (the default is `localhost`). This property is mandatory.
   c. The TCP **Port** on which the WebSphere MQ queue manager is listening (the default is `1414`). This property must be a valid positive number.
   d. Optional: The **Class** of the Security Exit required to connect to the WebSphere MQ queue manager. This property must be a valid Java class name, but you can leave this field empty if it does not apply to your domain connection. See "Using security exits" on page 35.
   e. Optional: The **JAR File Location** for the Security Exit required to connect to the WebSphere MQ queue manager. Click **Browse** to find the file location. You can leave this field empty if it does not apply to your domain connection.

      Note: The **JAR File Location** is required if a Security Exit **Class** is entered.
   f. Optional: The **Cipher Suite**, **Distinguished Names**, **CRL Name List**, **Key Store**, and **Trust Store** parameters are required when enabling SSL. See "Implementing SSL authentication" on page 23. The **Cipher Suite** field displays available cipher suites. Click **More** to configure Custom SSL Cipher Suites in the Broker Administration Preferences window. If a **Cipher Suite** is not specified, all other fields in the SSL section are unavailable.

      You can configure several domain connections in your workspace. Each domain connection has to address a different Configuration Manager, which needs to have a different WebSphere MQ **Queue Manager Name**, **Host** name, or TCP **Port** number. An error message is displayed in the Create a Domain Connection wizard if you try to create a second broker domain using the same **Queue Manager Name**, **Host** name, and **Port** number.
5. Click **Next** to begin the domain connection to the Configuration Manager.
6. If you click **Cancel**, the Create a Domain Connection wizard closes, forcing disconnection from the domain.
7. After the domain connection has been made, enter:
   a. The name of your **Server Project**. The Server Project is the container for your domain connection. If you have not already created a server project, you can specify the name of a new project here. The server project is created with the domain connection.
   b. The **Connection name**. The Connection name is the name you give to the `.configmgr` file that contains the parameters to connect to the Configuration Manager.
8. Click **Finish** to create the domain connection.

   The new domain connection is added to the Broker Administration Navigator view, under Domain Connections. The server project holds the .configmgr domain connection file.

The view of the broker domain is displayed in the Domains view.

Starting and stopping message flows

You can start and stop a message flow by either using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy, see Navigating broker domains using the Configuration Manager Proxy.

From the workbench you can start and stop:

- All message flows in all execution groups, assigned to a specific broker.
- All message flows in a specific execution group.
- A single message flow.

1. To start a message flow:
   a. Switch to the Broker Administration perspective.
   b. In the Domains view, expand your broker domain to locate your message flow:
      - To start all message flows in all execution groups for a broker, right-click the broker and click **Start Message Flows**.
      - To start all message flows in a specific execution group, right click the execution group and click **Start Message Flows**.
      - To start a single message flow, right-click the message flow and click **Start**.

   The Configuration Manager sends a message to the broker to start the specified message flows.

   A BIP0892I information message is displayed to show that the Configuration Manager has received the request.Verify the results of the deployment by opening the Event Log.

   There might be a short delay for the Configuration Manager to respond.

   The alert `Message Flow is not running` is removed from the Alert Viewer.
2. To stop a message flow:
   a. Switch to the Broker Administration perspective.
   b. In the Domains view, expand your broker domain to locate your message flow:
      - To stop all message flows in all execution groups for a broker, right-click the broker and click **Stop Message Flows**.
      - To stop all message flows in a specific execution group, right click the execution group and click **Stop Message Flows**.
      - To stop a single message flow, right-click the message flow, and click **Stop**.
   c. Open the Event Log for the broker domain. A BIP0892I information message is displayed to show that the Configuration Manager has received the request.

   There might be a short delay for the Configuration Manager to respond.

   The alert `Message Flow is not running` is added to the Alert Viewer.

Starting and stopping a broker

Run the appropriate command to start or stop a broker.

Before you start:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537.
- On Linux, UNIX, and Windows systems, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment.

To start and stop a broker, use the mqsistart and mqsistop commands from the command line.

Follow the link for the appropriate platform.

- "Starting and stopping a broker on Linux and UNIX systems"
- "Starting and stopping a broker on Windows"
- "Starting and stopping a broker on z/OS" on page 258

Starting and stopping a broker on Linux and UNIX systems

Run the appropriate command to start or stop a broker.

1. Run `'./install_dir/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. To start a broker, enter the following command on the command line:

   ```
   mqsistart WBRK_BROKER
   ```

   Substitute your own broker name for WBRK_BROKER. The broker and its associated queue manager are started. Check the system log to ensure that the broker has initialized successfully, and that all the verification checks have completed without error.
3. To stop a broker, enter the following command on the command line:

   ```
   mqsistop WBRK_BROKER
   ```

   Substitute your own broker name for WBRK_BROKER.

   You can also request that the broker's queue manager is stopped by this command. Refer to "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping a broker on Windows

Run the appropriate command to start or stop a broker.

1. Run the *install_dir*`/bin/mqsiprofile` command to set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. To start a broker, enter the following command on the command line:

   ```
   mqsistart WBRK_BROKER
   ```

   Substitute your own broker name for WBRK_BROKER.

   You can also request that the broker's queue manager is started as a Windows service. Refer to "Starting a WebSphere MQ queue manager as a Windows service" on page 261.

   The broker and its associated queue manager are started. The command initiates the startup of the broker's Windows service.

Check the Application Log in the Event Viewer to ensure that the broker has initialized successfully, and that all the verification checks have completed without error.

3. To stop a broker, enter the following command on the command line:

   ```
   mqsistop WBRK_BROKER
   ```

   Substitute your own broker name for WBRK_BROKER.

   You can also request that the broker's queue manager is stopped by this command. Refer to "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping a broker on z/OS

Run the appropriate command to start or stop a broker.

1. From SDSF, start the component by using the command `/S <broker name>`. If `MQP1BRK` is the name of the broker, this command produces, for example, the following output:

   ```
   +BIP9141I MQP1BRK 0 The component was started
   ```

   If you have problems starting the broker, run the following command:

   ```
   /S <broker name>,STRTP=MAN
   ```

   This command checks the resources associated with the broker are available (for example, the database and the tables that the broker requires) and starts the administration task. The execution groups are not started by this command.

2. To stop a broker, run the following command:

   ```
   /P <broker name>
   ```

Starting and stopping a Configuration Manager

Run the appropriate command to start or stop a Configuration Manager.

Before you start:

- Ensure that your user ID has the correct authorizations to perform the task; refer to "Security requirements for administrative tasks" on page 537.
- On Linux, UNIX, and Windows systems, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment.

To start and stop a Configuration Manager, use the mqsistart and mqsistop commands from the command line.

Follow the link for the appropriate platform.

- "Starting and stopping a Configuration Manager on Linux and UNIX systems"
- "Starting and stopping a Configuration Manager on Windows" on page 259
- "Starting and stopping a Configuration Manager on z/OS" on page 259

Starting and stopping a Configuration Manager on Linux and UNIX systems

Run the appropriate command to start or stop a Configuration Manager.

Use the mqsistart and mqsistop commands from the command line.

1. Run '*./install_dir*/bin/mqsiprofile' to source the mqsiprofile script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. To start aConfiguration Manager, enter the following command on the command line:

   ```
   mqsistart CMGR01
   ```

   Substitute your own Configuration Manager name for CMGR01. The Configuration Manager and its associated queue manager are started.

   Check the system log to ensure that the Configuration Manager has initialized successfully, and that all the verification checks have completed without error.
3. To stop a Configuration Manager, enter the following command on the command line:

   ```
   mqsistop CMGR01
   ```

   Substitute your own Configuration Manager name for CMGR01.

   You can also request that the Configuration Manager's queue manager is stopped by this command. Refer to "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping a Configuration Manager on Windows

Run the appropriate command to start or stop a Configuration Manager.

Use the mqsistart and mqsistop commands from the command line.

1. Run the *install_dir*/bin/mqsiprofile command to set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. To start a Configuration Manager, enter the following command on the command line:

   ```
   mqsistart CMGR01
   ```

   Substitute your own Configuration Manager name for CMGR01. If you do not specify a name, the default of configmgr is used. The Configuration Manager and its associated queue manager are started. The command initiates the startup of the Configuration Manager's Windows service.

   Check the Application Log in the Event Viewer to ensure that the Configuration Manager has initialized successfully, and that all the verification checks have completed without error.

   You can also request that the queue manager associated with the Configuration Manager is started as a Windows service. See "Starting a WebSphere MQ queue manager as a Windows service" on page 261.
3. To stop a Configuration Manager, enter the following command on the command line:

   ```
   mqsistop CMGR01
   ```

   Substitute your own Configuration Manager name for CMGR01. If you do not specify a name, the default name configmgr is used.

   You can also request that the queue manager associated with this Configuration Manager is stopped by this command. See "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping a Configuration Manager on z/OS

Run the appropriate command to start or stop a Configuration Manager.

1. From SDSF, start the component by using the command /S CMGR01. This command produces the following output:

```
+BIP9141I CMGR01 0 The component was started
```

Substitute your own Configuration Manager name for CMGR01. The Configuration Manager is started.

Check the log to ensure that the Configuration Manager has initialized successfully, and that all the verification checks have completed without error.

2. To stop a Configuration Manager, run the following command:

   ```
   /P CMGR01
   ```

   Substitute your own Configuration Manager name for CMGR01.

Starting and stopping the User Name Server

Before you start:

- Ensure that your user ID has the correct authorizations to perform the task. Refer to "Security requirements for administrative tasks" on page 537.
- On Windows, UNIX systems, and Linux, you must set up your command-line environment before performing this task, by running the product profile or console; refer to Setting up a command environment.

To start and stop a User Name Server use the **mqsistart** and **mqsistop** commands from the command line.

Follow the link for the appropriate platform.

- "Starting and stopping the User Name Server on Linux and UNIX systems"
- "Starting and stopping the User Name Server on Windows"
- "Starting and stopping the User Name Server on z/OS" on page 261

Starting and stopping the User Name Server on Linux and UNIX systems

1. Run `'. <install_dir>/bin/mqsiprofile'` to source the `mqsiprofile` script and set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.
2. To start a User Name Server enter the following command on the command line:

   ```
   mqsistart UserNameServer
   ```

   The User Name Server and its associated queue manager are started. Check the syslog to ensure that the User Name Server has initialized successfully.
3. To stop a User Name Server enter the following command on the command line:

   ```
   mqsistop UserNameServer
   ```

   You can also request that the User Name Server's queue manager is stopped by this command. Refer to "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping the User Name Server on Windows

The following steps show you how to start and stop a User Name Server.

1. Run the `<install_dir>/bin/mqsiprofile` command to set up the environment for a single targeted runtime. You must do this before you can run any of the WebSphere Message Broker commands.

2. To start a User Name Server:
   a. Enter the following command on the command line:

      ```
      mqsistart usernameserver
      ```

      The User Name Server and its associated queue manager are started. The command initiates the startup of the User Name Server's Windows service. Check the Application Log of the Windows Event Viewer to ensure that the User Name Server has initialized successfully.

      You can also request that the User Name Server's queue manager is started as a Windows service. Refer to "Starting a WebSphere MQ queue manager as a Windows service."
3. To stop a User Name Server enter the following command on the command line:

   ```
   mqsistop usernameserver
   ```

   You can also request that the User Name Server's queue manager is stopped by this command. Refer to "Stopping a WebSphere MQ queue manager when you stop a component" on page 262.

Starting and stopping the User Name Server on z/OS

The following steps show you how to start and stop a User Name Server.

1. From SDSF, start the component by using the command `/S <User Name Server name>`. If `MQP1UNS` is the name of theUser Name Server, this command produces, for example, the following output:

```
+BIP9141I  MQP1UNS 0 The component was started
```

2. To stop a User Name Server, use the command:

   ```
   /P <User Name Server name>
   ```

Starting a WebSphere MQ queue manager as a Windows service

Before you start:

You must complete the following task:

- Stop the queue manager for the WebSphere Message Broker component, using the endmqm command. If you prefer, you can use WebSphere MQ Version 5 Services or WebSphere MQ Version 6 Explorer.

When you start a WebSphere Message Broker component (broker, Configuration Manager, or User Name Server), the "mqsistart command" on page 469 starts the associated queue manager if it is not already running. When you start any of these components on Windows, it starts as a service on Windows, but the associated queue manager does not. You can change the properties of the queue manager service to set the startup type to automatic to enable the queue manager to run as a Windows service.

This change ensures that the operation of the queue manager is independent of the logged-on status of the user that starts theWebSphere Message Broker component.

To start a WebSphere MQ Version 5 queue manager as a Windows service:

1. Click **Start** → **Programs** → **IBM** → **IBM WebSphere MQ** → **WebSphere MQ Services**.
2. Right-click the queue manager and select **Properties**, and the **General** tab.

3. Change the **Startup Type** to *Automatic*. This setting ensures that the queue manager is started whenever the WebSphere MQ Service (a Windows service) is started.
4. (Optional) Change the properties of the WebSphere MQ Services service by updating its **Startup Type** to *Automatic* using the Control Panel. This setting starts WebSphere MQ Services when Windows itself starts and isolates the operation of the WebSphere MQ Services service from any logged on user.
5. Restart the queue manager for the WebSphere Message Broker component using the strmqm command or WebSphere MQ Services. The changes to the queue manager's startup type take effect when you restart Windows.
6. Start the component using the "mqsistart command" on page 469.

To start a WebSphere MQ Version 6 queue manager as a Windows service:

1. Click **Start** → **Programs** → **IBM WebSphere MQ** → **WebSphere MQ Explorer**.
2. In the left pane, right-click the queue manager and select **Properties**. The Properties dialog opens. The General properties are displayed.
3. Find the Startup property and set it to *Automatic*.
4. Click **OK**. The Properties dialog closes and the change is applied.
5. Restart the queue manager for the WebSphere Message Broker component using the strmqm command or WebSphere MQ Explorer. The changes to the queue manager's startup type take effect when you restart Windows.
6. Start the component using the "mqsistart command" on page 469.

Stopping a WebSphere MQ queue manager when you stop a component

Before you start:

You must complete the following task:

- If you are using a single queue manager to support more than one WebSphere Message Broker component (a single broker can also be defined on the same queue manager as a Configuration Manager, or the User Name Server, or both), you are recommended to specify the -q flag only on the final stop command, having stopped the other components first. The -q flag initiates a queue manager termination regardless of any other component currently using that queue manager.

If you are preparing to stop a broker, Configuration Manager or User Name Server, you can stop the component's WebSphere MQ queue manager at the same time.

You can specify a -q parameter on the **mqsistop** command to initiate a controlled shutdown of the queue manager for a WebSphere Message Broker component.

To stop a WebSphere MQ queue manager enter the following command on the command line:

```
mqsistop WBRK_BROKER  -q
```

where:

`WBRK_BROKER` is the name of the component.

-q stops the WebSphere MQ queue manager associated with the component.

The command cannot complete until shutdown of the queue manager has completed.

Viewing broker domain log information

You can view broker domain log information by either using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.LogProxy.

Broker domain log information is written to the Event Log editor in the workbench.

The Event Log contains information about events that occur within your broker domain. These events can be information, errors, or warnings and relate to your own actions. To view events for a particular broker, look for the name of the broker in the Source column.

Each event contains the following information:

- Message: The event number.
- Source: Where the event has come from (within the broker domain).
- TimeStamp: The date and time that the event occurred. TimeStamps are taken from the computer that is hosting the Configuration Manager.
- Details: What has caused the event and what action is needed to rectify it.

The following steps show how to view broker domain log information.

1. Switch to the Broker Administration perspective.
2. In the Domains view, expand the broker domain with which you want to work, to reveal the Event Log.
3. Double-click the Event Log. All broker domain log information specific to the broker domain with which you are working is displayed in the Event Log editor.

   If the broker domain is not connected, you are prompted to connect to the broker domain before the Event Log is opened.

   The Event Log editor has two panes called Logs and Details. The top half of the view lists all the events, in date and time order. The bottom half of the view shows the details of a specific selected event. You can maximize and minimize each pane, and toggle between them.
4. Click the event that you want to view in more detail from the top half of the Event Log view. The details of this event can then be viewed in the bottom half of the view.

   When you filter information, as described in “Filtering broker domain log information” on page 264, a note appears next to the view label to indicate that a filter has been applied.

Refreshing broker domain log information

Messages about events that occur in the broker domain are created in the Event Log editor.

To refresh the Event Log editor with new messages:

1. Switch to the **Broker Administration perspective**.
2. In the **Domains** view, expand the appropriate domain to display its components.
3. Double-click on **Event Log** to launch the Event Log editor in the editor area.
4. Right-click in the **Logs** pane and click **Revert** from the pop-up menu. **Revert** does not remove or overwrite existing messages in the Event Log editor or the configuration repository.

Filtering broker domain log information

Broker domain log information is written to the Event Log editor in the workbench. The Event Log contains information about events that occur in a broker domain. For each event, the Event log records the following details:

- Event type (whether the event is information, an error or a warning)
- Event source (what caused the event, and where it originates within the broker domain, for example the configuration manager, and specified message brokers
- Event timestamp (the date and time when the event occurred)

You can filter on the type, the source and the timestamp of the message, to restrict the number of log entries that are displayed in the Event Log editor. You can also filter events, event by event, to view a particular set of events in the Event log editor. The filter settings you define are kept for your next session. A note also appears next to the view label to indicate that a filter has been applied.

To filter entries, use the Filter Event Log dialog:

1. Switch to the Broker Administration perspective.
2. In the Domains view, open the Event Log for the appropriate broker domain.
3. From the Event Log editor menu, click **Event Log editor> Filter Log ....** This action opens the Filter Log dialog.

   The Filter Log dialog has the following controls:

   - A check box for each of the three message types (information, error or warning)
   - A check box for each of the possible message sources for all known entries so far
   - Under the source check boxes, a **Select All** button to select all sources and a **Deselect All** button to deselect all sources
   - A non-editable drop-down list containing each possible timestamp of all known entries so far
   - A table of check box items for each log entry, with a vertical scroll bar to access additional entries
   - Under the table, a **Select All** button to select all events, and a **Deselect All** button to deselect all events from this table
   - A **Restore Defaults** button

In the default view of the Log Filter, all message type check boxes are selected, indicating that messages of all three types are displayed. All message source check boxes are also selected by default, indicating that messages of all sources are displayed. The timestamp is the one for the oldest known event so far. All events are selected in the table.

To restore the default settings, click **Restore Defaults** (the defaults are: all types selected, all sources selected, timestamp set to oldest event one, all events selected).

To discard all changes, click **Cancel**.

To save the current filter settings, click **OK**. This applies the settings to the opened editor (event filtering is based on the new settings, and the editor is refreshed).

Using the Event Log Filter, you can filter broker domain log information in the following ways:

- Filter by message type, so that the log only displays messages of a particular type:
  a. Clear the check boxes for all three event types.
  b. Check the check box of the event type that you want to view (you can view more than one type by selecting the appropriate check boxes). All events with the selected types are selected in the filter dialog table of entries.
  c. Click OK to activate the filter. All events with the selected types are displayed in the editor.
- Filter by message source, so that the log only displays messages from one source:
  a. Deselect all sources, click the **Deselect All** button under the source check boxes, or clear the check boxes for all sources.
  b. Check the check box of the event source that you want to view (you can view more than one source by selecting the appropriate check boxes). You can also view all sources click by clicking the **Select All** button under the source check boxes. All events with the selected sources are selected in the filter dialog table of entries.
  c. Click **OK** to activate the filter. All events with the selected sources are displayed in the editor.
- Filter by timestamp, so that the log hides messages generated before a specified timestamp:
  a. Open the **Hide Events generated before** drop-down list by clicking the down arrow. Select the timestamp you want to filter on. All events generated before this timestamp are deselected in the filter dialog table of entries.
  b. Click **OK** to activate the filter. All events generated before the reference timestamp are hidden in the editor. All other events are displayed.

You can combine filtering options (type, source, time stamp). The combinations you select are identified in the table (entries are automatically ticked or non-ticked to indicate the choices you make). The editor is also updated based on the events tables which combines all filtering options. Ticked entries are displayed, non-ticked entries are hidden. For incoming new events, the filtering options based on type, source, timestamp are applied.

Saving broker domain log information

Broker domain log information is written to the Event Log Editor in the workbench.

Event Log information is deleted automatically from the Configuration Manager after 72 hours.

To save broker domain log information:

1. Switch to the Broker Administration perspective.
2. Open the Event Log for the appropriate broker domain.
3. Right-click in the Event Log view and click **Save Log As...**.
4. You are prompted to save the log information to an appropriate directory.

   By default the log is saved as log.txt. However, you can change the name of this text file.

   The file can also be saved using XML format, with `.xml` file extension.

Each message recorded in the event log is written to the text file with the same information that is detailed in the event log itself.

To view the log, open the log.txt file in an appropriate text editor.

Clearing broker domain log information

You can clear broker domain log information by either using the Message Brokers Toolkit or by using the Configuration Manager Proxy Java API. This topic describes how to use the Message Brokers Toolkit. For information about how to use the Configuration Manager Proxy (CMP), see Developing applications using the CMP and Class com.ibm.broker.config.proxy.LogProxy.

To clear all the broker domain log information from the Event Log:

1. Switch to the Broker Administration perspective.
2. Open the Event Log for the appropriate broker domain.
3. In the Event Log editor menu, click **Event Log Editor → Clear Log ...**.

   If you have set user preference to *warn before deleting events*, a prompt asks you to confirm deletion. Click **OK**.

   If you have not set user preferences to *warn before deleting events*, the event log is cleared automatically.

   When you clear the event log, all recorded events that are in view are deleted from the repository.

Changing the location of the work path

The work path directory is the location in which a component stores internal data, such as installation logs, component details, and trace output. The shared-classes directory is also located in the work path directory and is used for deployed Java code. If the work path directory does not have enough capacity, redirect the directory to another file system that has enough capacity.

The work path is fixed at installation time so that WebSphere Message Broker can always find the information that it needs, and always knows where to store new information.

If you need to change the location (for example, if you do not have enough capacity on the automatically-designated file system), do not change the path to the directory; instead, redirect the old work path directory to a new location.

Changing the location of the work path on Windows systems

When you change the location of the work path, you mount the new partition at the location of the old work path directory.

To change the location of the work path on Windows:

1. Shut down all WebSphere Message Broker services and processes.
2. Create a new partition on the system. The new partition can be on the same drive as the old work path, or on a different drive.
3. Locate the work path directory for your installation on the local system by running the following command:

   ```
   echo $MQSI_WORKPATH$
   ```
4. Copy the contents of the work path directory to the new partition.
5. Delete the contents of the old work path directory.
6. Open the Computer Management dialog: click **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Computer Management** The Computer Management dialog opens.
7. In the left-hand pane of the Computer Management dialog, click **Disk Management**. The new partition that you added and any existing partitions are listed in the right-hand pane.
8. Right-click the new partition, then click **Change Drive Letter and Paths...**. The Change Drive Letter and Paths dialog opens.
9. Click **Add...**. The Add Drive Letter or Path dialog opens.
10. Ensure that **Mount in the following empty NTFS folder** is selected, then browse to the old work path location.
11. Click **OK**, then click **OK** again.

Any files that WebSphere Message Broker creates in the work path location are stored on the new partition.

Changing the location of the work path on Linux and UNIX systems

When you change the location of the work path, you can either mount the new partition at the location of the old work path directory, or you can replace the old work path directory with a soft link that points to the new work path directory.

To change the location of the work path on UNIX and Linux:

1. Shut down all WebSphere Message Broker services and processes.
2. Create a new directory on a suitable file system.
3. Locate the work path directory for your installation on the local system by running the following command:

   ```
   echo $MQSI_WORKPATH$
   ```
4. Copy the contents of the work path directory to the new partition.
5. Delete the contents of the old work path directory.

6. Perform one of the following tasks so that the WebSphere Message Broker installation uses the new work path location:
   - Use the mount command to mount the new work path directory at the location of the old work path directory.
   - Delete the old work path directory and replace it with a soft link. Give the soft link the same name as the old work path directory and point the link to the new work path directory.

Any files that WebSphere Message Broker creates in the work path location are stored in the new location.

Changing Event Log editor preferences

You can change the following preferences for the Event Log editor:

- Choose not to display a warning before deleting log events. The default is to display a warning.
- Change the color for each type of event (Warning, Information, and Error). You can choose from a palette of basic colors or define custom colors. The default color for all events is black.
- Define the style and size of the font used for event details. The default is Tahoma, regular, 8 point.

To change preferences:

1. Switch to the **Broker Administration perspective**.
2. Click **Window>Preferences**.
3. Expand the **Broker Administration** category in the left pane.
4. Click **Event Log Editor** within the expanded **Broker Administration** category to open the Event Log editor preferences page.
5. Make your selections.
6. Click **OK**.

Backing up resources

Brokers rely on a database manager to maintain and control their configuration data. Brokers, the Configuration Manager, and the User Name Server rely on WebSphere MQ to transport and guarantee messages between components. You must establish a backup process that includes these sources of information to preserve the integrity and consistency of your broker domain.

It is important that you maintain regular backups of your broker domain and associated databases. You should refer to the information supplied with the database you are using for details of the relevant database backup procedures.

Consult your database administrator and agree upon the:

- Frequency of backups
- Quiesce backup points to take

Depending upon your workflow, this can be hourly or daily or weekly.

You should aim to always be in a position to recover to a specific point in time, whatever happens. For example, take a backup of the broker domain and quiesce of the broker databases before installing a new application.

The following topics tell you how to back up and restore brokers, the Configuration Manager and the Message Brokers Toolkit workspace:

- "Backing up the broker domain on distributed systems"
- "Backing up the broker domain on z/OS" on page 270
- "Backing up the Message Brokers Toolkit workspace" on page 271

Backing up the broker domain on distributed systems

These steps tell you how to back up a broker domain so that it can be restored for migration purposes or in the event of an unrecoverable failure. The backup and restoration of a broker needs to extend to every broker that is deployed to by the Configuration Manager. For more information about carrying out these steps, see the links at the end of this topic.

To back up the components:

1. Stop each broker.
2. Stop the Configuration Manager.
3. Back up the Configuration Manager data repository using the **mqsibackupconfigmgr** command.
4. Back up each broker database.

   For example, for a DB2 broker database use the Backup wizard in the DB2 Control Center, or a command similar to:

   ```
   DB2 BACKUP DATABASE <broker db> TO "<backup directory>"
   ```
5. Back up the system work path.

   The `work path` is platform specific:

   - On Windows the directory is:

     ```
     C:\Documents and Settings\All Users\Application Data\IBM\MQSI
     ```
   - On the other distributed platforms the directory is:

     ```
     /var/mqsi
     ```

   and any broker-specific work paths. These paths are the ones specified by the **-w** flag on the mqsicreatebroker command.

To restore the components:

1. **Stop and remove the existing components in the Configuration Manager domain.**
   a. Disconnect from the domain on the Message Brokers Toolkit.
   b. Stop each broker.
   c. Stop the Configuration Manager.
   d. Delete each broker using the **mqsideletebroker** command, specifying the **-w** parameter, which is an optional parameter on Windows and UNIX platforms that deletes from the work path all files related to these brokers.
   e. Delete the Configuration Manager using the **mqsideleteconfigmgr** command, specifying the **-w** and **-n** parameters. The **-n** parameter deletes all data in the configuration repository.
2. **Recreate the components.**
   a. Create the Configuration Manager.
   b. Create each broker.
3. **Restore the components.**
   a. Restore any work paths.

b. If you are restoring a Configuration Manager that was backed up on z/OS, restore the Configuration Manager repository using the mqsirestoreconfigmgr command.

   Replace the previously backed-up `service.properties` file

c. Restore each broker database.

   For example, for a DB2 broker database use the Restore wizard in the DB2 Control Center, or a command similar to:

   ```
   DB2 RESTORE DATABASE <broker db> FROM "<backup directory>" TAKEN AT <datetime>
   ```

d. Start the Configuration Manager.

e. Start each broker.

f. Connect to the Configuration Manager on the Message Brokers Toolkit. This re-imports the broker topology, excluding execution groups and flows, from the Configuration Manager.

g. Deploy the topology configuration on the Message Brokers Toolkit. This causes the Configuration Manager to give the UUIDs to the brokers. Note that if you are working on a platform other than Windows, this step is unnecessary.

Backing up the broker domain on z/OS

The following instructions describe how to back up a broker domain so that it can be restored for migration purposes or in the event of an unrecoverable failure. You should back up, and plan for restoration, on every system on which there is a broker or other broker domain component. For more information about carrying out these steps, see the links at the end of this topic.

Backing up components

To back up the components:

1. Stop each broker.
2. Note the BrokerUUID value from the following file: <broker directory>/registry/<broker name>/CurrentVersion/BrokerUUID.
3. Stop the Configuration Manager.
4. If you plan to restore the Configuration Manager data repository on distributed systems, take a copy of the file:

   ```
   <data directory>/components/<Configuration Manager name>/<directory name>/service.properties
   ```

   The `<data directory>` is platform specific:

   - On Windows the directory is:

     ```
     C:\Documents and Settings\All Users\Application Data\IBM\MQSI
     ```

   - On the other distributed platforms the directory is:

     ```
     /var/mqsi
     ```

   This needs to be kept with the `.zip` file produced by the **mqsibackupconfigmgr** command, and must be copied to the equivalent place in the restored Configuration Manager data repository after running the **mqsirestoreconfigmgr** command.
5. Back up the Configuration Manager data repository using the **mqsibackupconfigmgr** command, or JCL job `BIPBUCM`.
6. Back up each broker database using the JCL job BIPBUDB.

Restoring components

1. **Stop and remove the existing components in the Configuration Manager domain.**

a. Disconnect from the domain in the Message Brokers Toolkit.
b. Stop each broker.
c. Stop the Configuration Manager.
d. Delete each broker.
e. Delete the Configuration Manager.

2. **Recreate the components.**
   a. Create the Configuration Manager repository.
   b. Create each broker.
3. **Restore the components.**
   a. Restore the Configuration Manager repository using the **mqsirestoreconfigmgr** command, or JCL job `BIPRSCM`.
   b. Restore each broker database using the JCL job BIPRSDB.
   c. Set the BrokerUUID by editing the following file: <broker directory>/registry/<broker name>/CurrentVersion/BrokerUUID.
   d. Start the Configuration Manager.
   e. Start each broker.
   f. Connect to the Configuration Manager in the Message Brokers Toolkit. This re-imports the broker topology, excluding execution groups and flows, from the Configuration Manager.
   g. Deploy the topology configuration in the Message Brokers Toolkit. This causes the Configuration Manager to give the UUIDs to the brokers.

Backing up the Message Brokers Toolkit workspace

The Message Brokers Toolkit workspace contains your personal settings and data, such as message flow and message set resources.

- Windows On Windows, the default workspace directory is created at C:\Documents and Settings*user*\IBM\wmbt6.0\workspace, where *user* is the user name with which you are logged on.
- Linux On Linux, the default workspace directory is created at /home/*user*/IBM/wmqi6.0/workspace, where *user* is the user name with which you are logged on.

You can have multiple workspaces in different locations and you can also have references to projects that are in other locations, therefore consider all of these locations when you back up your resources.

The workspace directory contains a directory called .metadata, which contains your personal settings and preferences for the Message Brokers Toolkit. If the .metadata directory gets corrupted, you lose these settings and the Message Brokers Toolkit reverts to the default layout and preferences; if you have not backed up the .metadata directory, you must manually set any preferences again and import any projects, such as message flow projects, that were displayed in the Broker Development view. To back up the .metadata directory, just take a copy of the directory.

In the workspace, a directory exists for each project (message flow project, message set project, or server project) that you have created in the Message Brokers Toolkit. These directories contain your data, which must be backed up.

Use one of the following methods to back up the data in your workspace:

- Export the projects from within the Message Brokers Toolkit. You can export the projects directly as a compressed file. For instructions, see Exporting in the Eclipse Workbench User Guide.
- Copy the project directories from the workspace directory to another location.
- When you add resources to a broker archive (bar) file that is ready for deployment, select the **Include source files** check box which adds the message flow and message set source files, as well as the compiled files, to the bar file. Take copies of the bar file to back up its contents.

To restore the resources, copy the directories back into your workspace directory and import the projects. For instructions, see Importing in the Eclipse Workbench User Guide.

Part 4. Reference

Databases

For copies of the sample ODBC definition files that are supplied with WebSphere Message Broker, see the following topics:

- "odbc.ini sample file"
- "odbc64.ini sample file" on page 279

odbc.ini sample file

Purpose

Configure the odbc.ini file when defining an ODBC connection to a database from a broker or from a 32-bit application. Follow the instructions in "Connecting to a database from Linux and UNIX systems" on page 89.

AIX

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect
5.0 Oracle Wire Protocol
SYBASEDB=DataDirect 5.0 Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0 SQL Server Wire Protocol
INFORMIXDB=IBM
Informix ODBC Driver

[WBRKBKDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.a
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.a
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your_install_directory>/merant/lib/UKor820.so
Description=DataDirect 5.0  Oracle
EnableDescribeParam=1
OptimizePrepare=1
ServerName=<Your Oracle host>
WorkArounds=536870912
ProcedureRetResults=1
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<Your Server Name>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
```

```
Address=<Your SQLServer Host>,<Your SQLServer server port>
Database=<Your Database Name>
AnsiNPW=Yes
QuoteId=No

# Informix stanza
[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.so
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.so
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

HP-UX

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect
5.0 Oracle Wire Protocol
SYBASEDB=DataDirect 5.0 Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0 SQL Server Wire Protocol
INFORMIXDB=IBM
Informix ODBC Driver

[WBRKBKDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.sl
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.sl
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your install directory>/DD64/lib/UKora20.sl
Description=DataDirect 5.0 Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
ProcedureRetResults=1
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
WorkArounds=536870912
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.sl
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.sl
Description=DataDirect 5.0 SQL Server Wire Protocol
```

```
Address=<Your SQLServer host>,<Your SQLServer server port>
AnsiNPW=Yes
Database=<Your Database Name>
QuoteId=No

[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.sl
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.sl
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

Linux (x86 platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect
5.0 Oracle Wire Protocol
SYBASEDB=DataDirect 5.0 Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0 SQL Server Wire Protocol
INFORMIXDB=IBM
Informix ODBC Driver

[WBRKBKDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your_install_directory>/merant/lib/UKor820.so
Description=DataDirect 5.0 Oracle
EnableDescribeParam=1
OptimizePrepare=1
ServerName=<Your Oracle Host>
WorkArounds=536870912
ProcedureRetResults=1
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQLServer host>,<Your SQLServer server port>
Database=<Your Database Name>
AnsiNPW=Yes
QuoteId=No
```

```
[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.so
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.so
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

Solaris (SPARC platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect
5.0 Oracle Wire Protocol
SYBASEDB=DataDirect 5.0 Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0 SQL Server Wire Protocol
INFORMIXDB=IBM
Informix ODBC Driver

[WBRKBKDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your_install_directory>/merant/lib/UKor820.so
Description=DataDirect 5.0 Oracle
EnableDescribeParam=1
ProcedureRetResults=1
ServerName=<Your Oracle Host>
WorkArounds=536870912
OptimizePrepare=1
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQLServer host>,<Your SQLServer server port>
AnsiNPW=Yes
Database=<Your Database Name>
QuoteId=No

[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.so
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>
```

```
[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.so
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

Solaris (x86-64 platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect
5.0 Oracle Wire Protocol
SYBASEDB=DataDirect 5.0 Sybase Wire Protocol

[WBRKBKDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=<Your_DB2_installation_directory>/lib/libdb2.so
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your_install_directory>/merant/lib/UKora20.so
Description=DataDirect 5.0 Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
ProcedureRetResults=1
ServerName=<Your Oracle Host>
WorkArounds=536870912
OptimizePrepare=1
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.so
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
```

odbc64.ini sample file

A copy of the sample 64-bit ODBC definition file that is supplied with WebSphere Message Broker.

Purpose

Configure the odbc64.ini file when you define an ODBC connection to a database from a 64-bit application. Follow the instructions in "Connecting to a database from Linux and UNIX systems: 64-bit considerations" on page 94.

AIX

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect 5.0  64-bit Oracle Wire Protocol
SYBASEDB=DataDirect 5.0  64-bit Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0  64-bit SQL Server Wire Protocol

[WBRKBKDB]
Driver=libdb2Wrapper64.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=libdb2Wrapper64.so
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your install directory>/DD64/lib/UKora20.so
Description=DataDirect 5.0 Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
WorkArounds=536870912
ProcedureRetResults=1
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your install directory>/DD64/lib/UKase20.so
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ApplicationsUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[SQLSERVERDB]
Driver=<Your install directory>/DD64/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQL Server host>,<Your SQL Server server port>
AnsiNPW=Yes
Database=<Your Database Name>
QuoteId=No

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your install directory>/DD64/lib/odbctrac.so
InstallDir=<Your install directory>/DD64
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

HP-UX (PA-RISC platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect 5.0  64-bit Oracle Wire Protocol
SYBASEDB=DataDirect 5.0  64-bit Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0  64-bit SQL Server Wire Protocol

[WBRKBKDB]
Driver=libdb2Wrapper64.sl
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=libdb2Wrapper64.sl
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your install directory>/DD64/lib/UKora20.sl
Description=DataDirect 5.0 Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
ProcedureRetResults=1
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
WorkArounds=536870912
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your_install_directory>/merant/lib/UKase20.sl
Description=DataDirect 5.0 Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your install directory>/DD64/lib/odbctrac.sl
InstallDir=<Your install directory>/DD64
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

HP-UX (Integrity platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect 5.0  64-bit Oracle Wire Protocol

[WBRKBKDB]
Driver=libdb2Wrapper.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=libdb2Wrapper.so
Description=MYDB DB2 ODBC Database
Database=MYDB
```

```
[ORACLEDB]
Driver=<Your install directory>/DD64/lib/UKora20.so
Description=DataDirect 5.0 Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
ProcedureRetResults=1
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
WorkArounds=536870912
ColumnSizeAsCharacter=1

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your install directory>/DD64/lib/odbctrac.sl
InstallDir=<Your install directory>/DD64
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

Solaris (SPARC platform)

```
[ODBC Data Sources]
WBRKBKDB=IBM DB2 ODBC Driver
MYDB=IBM DB2 ODBC Driver
ORACLEDB=DataDirect 5.0  64-bit Oracle Wire Protocol
SYBASEDB=DataDirect 5.0  64-bit Sybase Wire Protocol
SQLSERVERDB=DataDirect 5.0  64-bit SQL Server Wire Protocol

[WBRKBKDB]
Driver=libdb2Wrapper64.so
Description=WBRKBKDB DB2 ODBC Database
Database=WBRKBKDB

[MYDB]
Driver=libdb2Wrapper64.so
Description=MYDB DB2 ODBC Database
Database=MYDB

[ORACLEDB]
Driver=<Your install directory>/DD64/lib/UKor820.so
Description=DataDirect5.0Oracle Wire Protocol
HostName=<Your Oracle Server Machine Name>
PortNumber=<Port on which Oracle is listening on HostName>
SID=<Your Oracle SID>
CatalogOptions=0
ProcedureRetResults=1
EnableStaticCursorsForLongData=0
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
WorkArounds=536870912
ColumnSizeAsCharacter=1

[SYBASEDB]
Driver=<Your install directory>/DD64/lib/UKase20.so
Description=DataDirect5.0Sybase Wire Protocol
Database=<Your Database Name>
ServerName=<YourServerName>
ApplicationUsingThreads=1
EnableDescribeParam=1
OptimizePrepare=1
SelectMethod=0
NetworkAddress=<YourServerName>,<YourPortNumber>
SelectUserName=1
```

```
[SQLSERVERDB]
Driver=<Your_install_directory>/merant/lib/UKmsss20.so
Description=DataDirect 5.0 SQL Server Wire Protocol
Address=<Your SQLServer host>,<Your SQLServer server port>
AnsiNPW=Yes
Database=<Your Database Name>
QuoteId=No

[INFORMIXDB]
Driver=<Your Informix Client Directory>/lib/cli/iclit09b.so
Description=IBM Informix ODBC Driver
ServerName=<YourServerName>
Database=<Your Database Name>

[ODBC]
Trace=0
TraceFile=<A Directory with plenty of free space>/odbctrace.out
TraceDll=<Your_install_directory>/merant/lib/odbctrac.so
InstallDir=<Your_install_directory>/merant
UseCursorLib=0
IANAAppCodePage=4
UNICODE=UTF-8
```

Operations

Follow the links below for more information:
- "Broker properties"
- "Commands" on page 286
- "z/OS specific information" on page 480

Broker properties

The following table is a reference for the broker properties.

Property	Meaning
Queue Manager Name	The name of the WebSphere MQ queue manager being used by the broker. The name must be exactly the same name specified for this broker's queue manager on the **mqsicreatebroker** command.
Interbroker Host Name	Interbroker host name to use.
Interbroker Port Number	Interbroker port number to use.
Authentication Protocol Type	The authentication protocols that the broker supports. There are four authentication protocols: **P** Password in the clear **M** Mutual Challenge and response **S** Asymmetric SSL **R** Symmetric SSL
SSL Key Ring File Name	The filename (including path) to the SSL Key Ring file. This is required for authentication when using the Asymmetric and Symmetric (S and R) authentication protocols. The file name and path refer to the path accessible from the broker and not necessarily the tooling, if on different machines.
SSL Password File Name	The SSL key ring file is encrypted and requires a passphrase to decode it. This field is used to specify the filename containing the passphrase required. The file name and path refer to the path accessible from the broker and not necessarily the tooling, if on different machines.
SSL HTTP Listener	Use the "mqsicreateusernameserver command" on page 397 or "mqsichangeusernameserver command" on page 361 to enable the SSL HTTP Listener authentication options.

The following three properties:
- Temporary Topic Quality Of Protection
- Sys Topic Quality Of Protection
- ISys Topic Quality Of Protection

refer to the Message Protection feature (QoP) on the "mqsichangeproperties command" on page 343. See "Implementing quality of protection" on page 35 for details on setting these for temporary topics.

Commands

Details about all of the Message Brokers Toolkit commands, followed by the other commands grouped by function, provided by WebSphere Message Broker on distributed systems.

For information about the comparable commands on WebSphere Message Broker for z/OS, see "Summary of commands on Windows, z/OS, Linux, and UNIX systems" on page 288.

WebSphere Message Broker Toolkit commands

mqsiapplybaroverride	"mqsiapplybaroverride command" on page 297
mqsicreatebar	"mqsicreatebar command" on page 298
mqsicreatemsgdefs	"mqsicreatemsgdefs command" on page 300
mqsicreatemsgdefsfromwsdl	"mqsicreatemsgdefsfromwsdl command" on page 309
mqsimigratemfmaps	"mqsimigratemfmaps command" on page 311
mqsimigratemsgflows	"mqsimigratemsgflows command" on page 313
mqsimigratemsgsets	"mqsimigratemsgsets command" on page 314
mqsireadbar	"mqsireadbar command" on page 316

WebSphere Message Broker commands

Broker commands

mqsicreatebroker	"mqsicreatebroker command" on page 374
mqsichangebroker	"mqsichangebroker command" on page 319
mqsideletebroker	"mqsideletebroker command" on page 408
mqsicreateexecutiongroup	"mqsicreateexecutiongroup command" on page 394
mqsideleteexecutiongroup	"mqsideleteexecutiongroup command" on page 415
mqsireload	"mqsireload command" on page 451
mqsicbrreport	"mqsicbrreport command" on page 319

Database commands

mqsicreatedb	"mqsicreatedb command" on page 393
mqsichangedbimgr	"mqsichangedbimgr command" on page 333
mqsideletedb	"mqsideletedb command" on page 415
mqsisetdbparms	"mqsisetdbparms command" on page 464
mqsi_setupdatabase	"mqsi_setupdatabase command" on page 468

Configuration Manager commands

mqsicreateconfigmgr	"mqsicreateconfigmgr command" on page 384
mqsichangeconfigmgr	"mqsichangeconfigmgr command" on page 328
mqsideleteconfigmgr	"mqsideleteconfigmgr command" on page 410
mqsibackupconfigmgr	"mqsibackupconfigmgr command" on page 317

User Name Server commands

mqsireportflowuserexits "mqsireportflowuserexits command" on page 456

mqsisetsecurity "mqsisetsecurity command" on page 467

Summary of commands on Windows, z/OS, Linux, and UNIX systems

The following table summarizes the *runtime* commands available on Windows platforms, Linux, and UNIX systems and provides the z/OS equivalent, where it is available.

Command on Windows platforms, Linux, and UNIX systems	**z/OS equivalent: type**	**z/OS equivalent**	**z/OS References**
mqsibackupconfigmgr	Utility JCL	`BIPBUCM`	"Contents of the Configuration Manager PDSE" on page 494
mqsicbrreport	N/A.	-	-
mqsichangebroker	1. Console command: modify 2. Utility JCL	1. `changebroker` 2. `BIPCHBK`	1. "mqsichangebroker command" on page 319 2. "Contents of the broker PDSE" on page 491
mqsichangeconfigmgr	1. Console command: modify 2. Utility JCL	1. `changeconfigmgr` 2. `BIPCHCM`	1. "mqsichangeconfigmgr command" on page 328 2. "Contents of the Configuration Manager PDSE" on page 494
mqsichangedbimgr	N/A	-	-
mqsichangeflowstats	1. Console command: modify 2. Utility JCL	1. `changeflowstats` 2. `BIPCHMS`	1. "mqsichangeflowstats command" on page 334 2. "Contents of the broker PDSE" on page 491
mqsichangeflowuserexits	1. UNIX System Services command 2. Utility JCL	1. **mqsichangeflowuserexits** 2. BIPCHUE	1. "mqsichangeflowuserexits command" on page 339 2. "Contents of the broker PDSE" on page 491
mqsichangeproperties	Utility JCL	`BIPCHPR`	"Contents of the broker PDSE" on page 491
mqsichangetrace	console command: modify	`changetrace`	"mqsichangetrace command" on page 355
mqsichangeusernameserver	1. Console command: modify 2. Utility JCL	1. `changeusernameserver` 2. `BIPCHUN`	1. "mqsichangeusernameserver command" on page 361 2. "Contents of the User Name Server PDSE" on page 493
mqsiclearmqpubsub	Utility JCL	`BIPCLMP`	"Contents of the broker PDSE" on page 491

mqsicreateaclentry	1. Console command: modify 2. Utility JCL	1. `createaclentry` 2. `BIPCRACL`	1. "mqsicreateaclentry command" on page 366 2. "Contents of the Configuration Manager PDSE" on page 494
mqsicreatebroker	UNIX System Services command	"mqsicreatebroker command" on page 374	"mqsicreatebroker command" on page 374
mqsicreateconfigmgr	Utility JCL	`BIPCRCM`	"Contents of the Configuration Manager PDSE" on page 494
mqsicreateconfigurableservice	Utility JCL	`BIPJADPR`	"Contents of the broker PDSE" on page 491
mqsicreateexecutiongroup	Utility JCL	`BIPCREG`	"Contents of the Configuration Manager PDSE" on page 494
mqsicreateusernameserver	UNIX System Services command	"mqsicreateusernameserver command" on page 397	"mqsicreateusernameserver command" on page 397
mqsideleteaclentry	1. Console command: modify 2. Utility JCL	1. `deleteaclentry` 2. `BIPDLACL`	1. "mqsideleteaclentry command" on page 402 2. "Contents of the Configuration Manager PDSE" on page 494
mqsideletebroker	Utility JCL	`BIPDLBK`	"Contents of the broker PDSE" on page 491
mqsideleteconfigmgr	Utility JCL	`BIPDLCM`	"Contents of the Configuration Manager PDSE" on page 494
mqsideleteconfigurableservice	Utility JCL	`BIPJADPR`	"Contents of the broker PDSE" on page 491
mqsideleteexecutiongroup	Utility JCL	`BIPDLEG`	"Contents of the Configuration Manager PDSE" on page 494
mqsideleteusernameserver	Utility JCL	`BIPDLUN`	"Contents of the User Name Server PDSE" on page 493
mqsideploy	1. Console command: modify 2. Utility JCL	1. `deploy` 2. `BIPDPLY`	1. "mqsideploy command" on page 419 2. "Contents of the broker PDSE" on page 491
mqsiformatlog	Utility JCL	`BIPFMLG`	"Contents of the broker PDSE" on page 491
mqsijoinmqpubsub	Utility JCL	`BIPJNMP`	"Contents of the broker PDSE" on page 491
mqsilist	1. Console command: modify 2. Utility JCL	1. `list` 2. `BIPLIST`	1. "mqsilist (list resources) command" on page 431 2. "Contents of the Configuration Manager PDSE" on page 494

mqsilistaclentry	1. Console command: modify 2. Utility JCL	1. `listaclentry` 2. `BIPLIACL`	1. "mqsilistaclentry command" on page 433 2. "Contents of the Configuration Manager PDSE" on page 494
mqsilistmqpubsub	Utility JCL	`BIPLSMP`	"Contents of the broker PDSE" on page 491
mqsimigratecomponents	Utility JCL	`BIPMGCMP`	"mqsimigratecomponents command" on page 442
mqsireadlog	Utility JCL	`BIPRELG`	"Contents of the broker PDSE" on page 491
mqsireload	console command: modify	`reload`	"mqsireload command" on page 451
mqsireportflowstats	1. Console command: modify 2. Utility JCL	1. `reportflowstats` 2. `BIPRPMS`	1. "mqsireportflowstats command" on page 453 2. "Contents of the broker PDSE" on page 491
mqsireportflowuserexits	1. UNIX System Services command 2. Utility JCL	1. **mqsireportflowuserexits** 2. BIPRPUE	1. "mqsireportflowuserexits command" on page 456 2. "Contents of the broker PDSE" on page 491
mqsireportproperties	Utility JCL	`BIPRPPR`	"Contents of the broker PDSE" on page 491
mqsireporttrace	console command: modify	`reporttrace`	"mqsireporttrace command" on page 461
mqsirestoreconfigmgr	Utility JCL	`BIPRSCM`	"Contents of the Configuration Manager PDSE" on page 494
mqsisetdbparms	Utility JCL	`BIPSDBP`	"mqsisetdbparms command" on page 464
mqsisetsecurity	N/A	-	-
mqsistart	1. Console command: start 2. console command: modify	1. standard MVS start command 2. `startcomponent`	1. - 2. "mqsistart command" on page 469
mqsistartmsgflow	Utility JCL	`BIPSTMF`	"Contents of the Configuration Manager PDSE" on page 494
mqsistop	1. console command: stop 2. console command: modify	1. standard MVS stop command 2. `'p' stopcomponent`	1. - 2. "mqsistop command" on page 474
mqsistopmsgflow	Utility JCL	`BIPSPMF`	"Contents of the Configuration Manager PDSE" on page 494

Syntax diagrams: available types

The syntax for commands and ESQL statements and functions is presented in the form of a diagram. The diagram tells you what you can do with the command, statement, or function and indicates relationships between different options and, sometimes, different values of an option. There are two types of syntax diagrams: railroad diagrams and dotted decimal diagrams. Railroad diagrams are a visual format suitable for sighted users. Dotted decimal diagrams are text-based diagrams that are more helpful for blind or partially-sighted users.

To select which type of syntax diagram you use, click the appropriate button above the syntax diagram in the topic that you are viewing.

The following topics describe how to interpret each type of diagram:

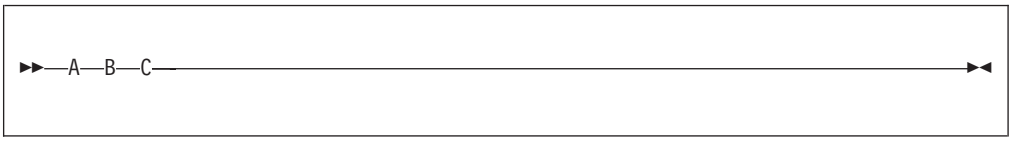
- "How to read railroad diagrams"
- "How to read dotted decimal diagrams" on page 293

How to read railroad diagrams

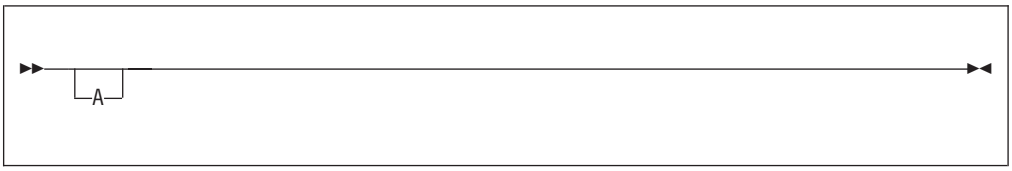
Each railroad diagram begins with a double right arrow and ends with a right and left arrow pair. Lines beginning with a single right arrow are continuation lines. You read a railroad diagram from left to right and from top to bottom, following the direction of the arrows.

The following examples show other conventions used in railroad diagrams.

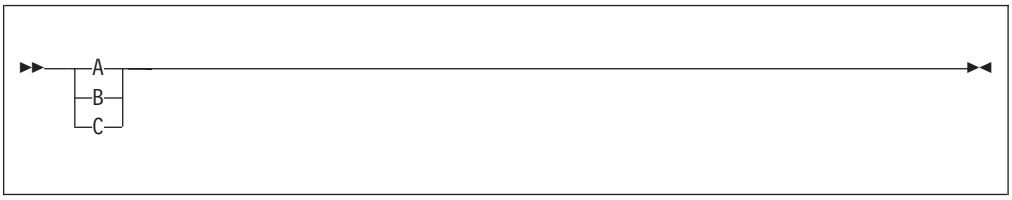
This example shows that you must specify values `A`, `B`, and `C`. Required values are shown on the main line of a railroad diagram:



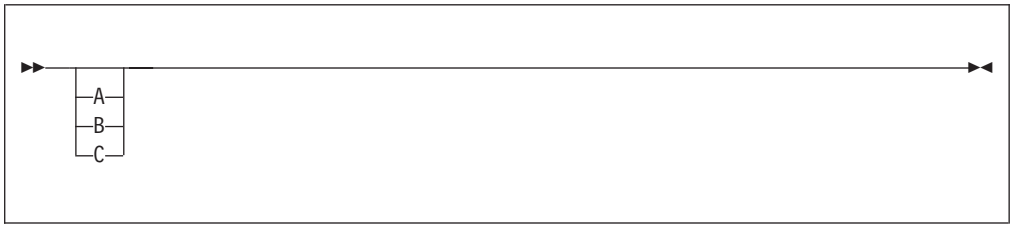
This shows that you can specify value `A`. Optional values are shown below the main line of a railroad diagram:



The next example specifies that values `A`, `B`, and `C` are options, one of which you must specify:



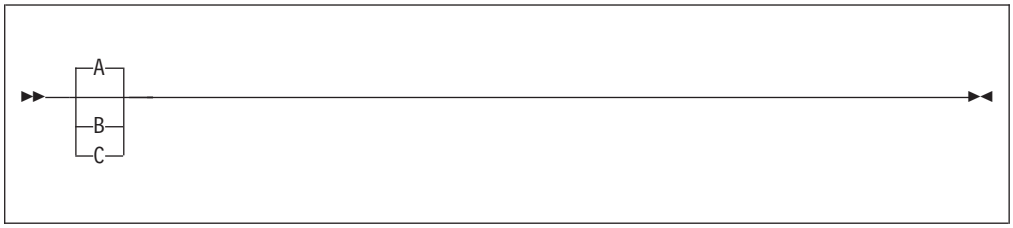
Values A, B, and C are options in this example, one of which you can specify:



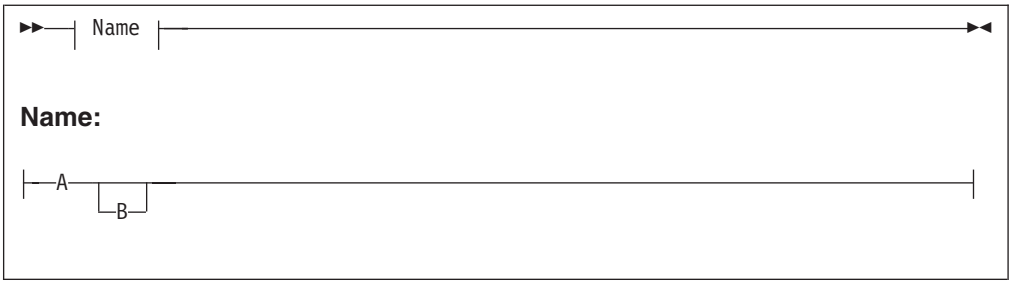
The next example shows that you can specify one or more of the values A, B, and C. Any required separator for multiple or repeated values (in this example, the comma (,)) is shown on the arrow:

In this example, you can specify value A multiple times. The separator in this example is optional:

Values A, B, and C are alternatives in the next example, one of which you can specify. If you specify none of the values shown, the default A (the value shown above the main line) is used:



The last example shows the use of a syntax fragment Name, which is shown separately from the main railroad diagram. This technique is used to simplify the diagram, or help fit it into the page of text. The fragment could be used multiple times in the railroad diagram:



Punctuation and uppercase values must be specified exactly as shown.

Lowercase values (for example, *name*) indicate where to type your own text in place of the *name* variable.

How to read dotted decimal diagrams

In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line, because they can be considered as a single compound syntax element.

Each line starts with a dotted decimal number, for example 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that your screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. For example, if you hear the lines 3.1 USERID, 3.1 SYSTEMID, you know that your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with the dotted decimal number 3 is followed by a series of syntax elements with the dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Characters such as commas that are used to separate a string of syntax elements are shown in the syntax just before the items that they separate. They can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line might also show another symbol giving information about the syntax elements; all these symbols are explained below. For example, the lines 5.1* ,, 5.1 LASTRUN, 5.1 DELETE mean that if you use more than one of the syntax elements LASTRUN and DELETE, they must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, this indicates a reference that is defined elsewhere. The string following the % is the name of a syntax fragment, rather than a literal. For example, the line 2.1 %OP1 means that, at this point, you must refer to the separate syntax fragment OP1. OP1, in the syntax from which this example was taken, gave a list of further options.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the escape character, which is a \ (backslash). For example, the * symbol can be used next to a dotted decimal number to mean that this syntax element can be repeated. If a

syntax element actually starts with the * symbol, for example a syntax element * FILE with the dotted decimal number 3, it is given in the format 3 * FILE. If the format is 3* FILE, this means that there is a syntax element FILE, which can be repeated. If the format is 3* * FILE, this means that there is a syntax element * FILE, which can be repeated.

The words and symbols used next to the dotted decimal numbers are as follows:

- **? means an optional syntax element.** If a dotted decimal number is followed by the ? symbol, this means that all the syntax elements with that dotted decimal number, and any subordinate syntax elements that they each have, are optional. If there is only one syntax element with that dotted decimal number, the ? symbol appears on the same line as the syntax element, for example 5? NOTIFY. If there is more than one syntax element with that dotted decimal number, the ? symbol appears on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, 5 UPDATE, you know that the syntax elements NOTIFY and UPDATE are optional; you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.
- **! means a default syntax element.** If a dotted decimal number is followed by the ! symbol, appended to the last digit of the dotted decimal number, this means that this syntax element is the default of all the elements with the same dotted decimal number. Only one of the syntax elements that share the same dotted decimal number can specify a !. For example, if you hear the lines 2? FILE, 2.1! (KEEP), 2.1 (DELETE), you know that (KEEP) is the default option for the FILE keyword. If you include the FILE keyword, but do not state your choice of option, the default option KEEP is applied. As well as the particular syntax element marked with the ! symbol, the default also applies to the next higher dotted decimal number. In the example above, the default applies to 2? FILE as well as to 2.1! (KEEP), meaning that, if you omit the word FILE, the default FILE(KEEP) is used. However, you might instead hear the lines 2? FILE, 2.1, 2.1.1! (KEEP), 2.1.1 (DELETE). As the default only applies to the next higher dotted decimal number, which in this case is 2.1, it does not apply to 2? FILE. In this case, if you omit the word FILE, nothing is used.
- *** means a syntax element that is optional and can be repeated.** If a dotted decimal number is followed by the * symbol, this means that this syntax element is optional, and can be repeated. For example, if you hear the line 5.1* data-area, you know that you can include more than one data area, or you can include none. If you hear the lines 3*, 3 HOST, 3 STATE, you know that you can include HOST, STATE, both, or nothing. If a dotted decimal number has an asterisk next to it, and there is only one item with that dotted decimal number, you can repeat that same item more than once. If a dotted decimal number has an asterisk next to it, and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the example above, you could write HOST STATE, but you could not write HOST HOST. The * symbol is equivalent to a loopback line in a railroad syntax diagram.
- **+ means a syntax element that must be included at least once, and can be repeated.** If a dotted decimal number is followed by the + symbol, this means that this syntax element must be included at least once, and can be repeated. For example, if you hear the line 6.1+ data-area, you know that you must include at least one data area, and you can include more than one. If you hear the lines 2+, 2 HOST, 2 STATE, you know that you must include HOST, STATE, or both. As for the + symbol, you can only repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loopback line in a railroad syntax diagram.

Characters allowed in commands

You must adhere to a few rules when you provide names or identifiers for the components and resources in your broker domain.

The character set that you can use to name brokers, Configuration Managers, execution groups, and message identifiers is as follows:

- Uppercase alphabetic characters A-Z
- Lowercase alphabetic characters a-z
- Numeric characters 0-9
- Any special characters supported by the underlying file system:
  - The following special characters are accepted on Windows platforms:

$	%	' (apostrophe)	" (quotation mark)
- (dash)	_ (underscore)	@	~ (tilde)
!	(	)	{
}	[	]	&
#	&	+	, (comma)
;	=	(space)	

  - The following special characters, with the exception of a space, are accepted on Linux and UNIX platforms:

. (dot)	%	- (dash)	_ (underscore)
@	~ (tilde)	!	{
}	[	]	&
#	, (comma)	=	(space)

In general, you can use characters **A** through **Z**, **a** through **z**, and **0** through **9**, plus any Unicode character with a decimal value greater than 127 (hexadecimal X'7F'), provided that your operating system can recognize the characters chosen.

If you expect to trace the operation of an execution group, restrict the name of the execution group to include only the valid alphabetic and numeric characters listed. The trace commands do not support the use of special characters for an execution group name.

For all other resources (User Name Server, message sets, message flows, and topics), any characters that are supported by the database configuration are supported.

On Windows platforms, broker names, Configuration Manager names, and fixed names (`UserNameServer`) are not case sensitive. For example, broker names `Broker1` and `BROKER1` refer to the same broker.

On Linux and UNIX systems, broker names and Configuration Manager names are case sensitive, and the examples above would refer to different brokers. You must use `UserNameServer` as shown.

On z/OS systems, you must enclose mixed-case names in quotation marks.

There are additional rules for naming message service folders within the MQRFH2 header.

Rules for using commands

Observe the following rules when using the WebSphere Message Broker commands on distributed systems. If you are using commands on z/OS, refer to the section on z/OS commands in “Commands” on page 286 .

- Each command must be issued on the system on which the resource it relates to is defined (or is to be created).
- Each command starts with a primary keyword (the executable command name) followed by one or more blanks.
- Following the primary keyword, flags (parameters) can occur in any order.
- Flags are shown in this book in the form `-t`, for example. In all cases, the character `/` can be substituted for the `-` character.
- If a flag has a corresponding value, its value must follow the flag to which it relates. A flag can be followed by its value directly or can be separated by any number of blanks.
- Flags can be concatenated if they do not have corresponding values, although the last flag in a concatenated group *can* have a value associated with it. For example, the command:

  ```
  mqsireadlog WBRK_BROKER -u -e default -o trace.xml -f
  ```

  could be entered as:

  ```
  mqsireadlog WBRK_BROKER -ufedefault -o trace.xml
  ```

  where the name of the execution group, `default`, relates to the `-e` flag. For clarity, all examples given in this documentation are shown with separate flags and with a space before any associated value.
- Repeated flags are not allowed.
- Strings that contain blanks or special characters must be enclosed in double quotation marks. For example:

  ```
  mqsireadlog "My Broker" -u -e default -o trace.xml -f
  ```

  Additionally, you can specify a null, or empty, string with a pair of double quotes with nothing between: `""`. For example:

  ```
  mqsichangeconfigmgr -s ""
  ```
- The case sensitivity of primary keywords and parameters depends on the underlying operating system. On Windows platforms keywords are not case sensitive; `mqsistart`, `mqsiSTART`, and `MQSISTART` are all acceptable. On UNIX platforms, you must use lower case; only `mqsistart` is acceptable.

All WebSphere Message Broker commands have dependencies on WebSphere MQ function. You must ensure that WebSphere MQ is available before issuing these commands.

Responses to commands

Responses are issued to the commands as messages. If a command is successful, it returns a return code of zero, and a message with the number `BIP8071I` (command successful).

Warning and error responses are listed in the command descriptions. If the command is unsuccessful and returns, for example, the message `BIP8083`, it has an exit code, in this case, of 83.

The following responses are returned by all the commands, and are not listed with each individual command:

- BIP8001 Unknown flag selected
- BIP8002 Selected flags incompatible
- BIP8003 Duplicate flag
- BIP8004 Invalid flags or arguments
- BIP8005 Flag or argument missing
- BIP8006 Mandatory flag missing
- BIP8007 Mandatory argument missing
- BIP8009 Program name not valid
- BIP8083 Invalid component name

WebSphere Message Broker workbench commands

This topic is a container for the commands that are part of the WebSphere Message Broker workbench.

These commands are available only on a machine that has the workbench installed.

See "Commands" on page 286 for a list of all the WebSphere Message Broker commands.

mqsiapplybaroverride command

Supported platforms:

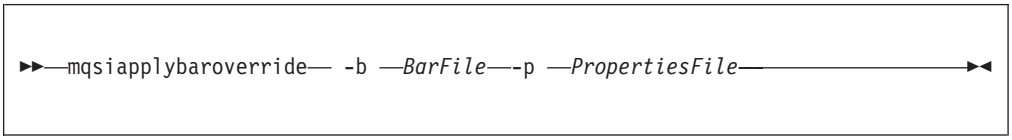
- Windows
- Linux (x86 platform)

Purpose:

With the mqsiapplybaroverride command, you can replace configurable values in the broker archive (bar) deployment descriptor with new values that you specify in a properties file.

Write scripts to create broker archive files and apply different override values in the broker deployment descriptor archive file using the mqsiapplybaroverride command, together with the mqsicreatebar command.

Syntax:



Parameters:

-b *BarFile*
(Required) The path to the broker archive file (in compressed format) to which the override values apply. The path can be absolute or relative to the executable command.

-p *PropertiesFile*
(Required) The path to the properties file (absolute, or relative to the executable command) that contains override values.

Authorization:

On Windows, the user ID used to invoke this command must have Administrator authority on the local system. On Linux, your user ID must have write access to the -data (workspace) and -b (bar file location) directories.

Responses:

Windows This command is supplied as a batch file. If you run the command in an automation system or from a script, use the Windows CALL command, to ensure that the correct ERRORLEVEL is returned:

```
...
CALL mqsiapplybaroverride
...
```

Examples:

Open the bar file myflow.bar and replace configurable values in its deployment descriptor (typically broker.xml) with those specified in the properties file mychanges.properties:

```
mqsiapplybaroverride -b myflow.bar -p mychanges.properties
```

For an example of the details that are contained in a properties file, see Editing configurable properties.

mqsicreatebar command

Supported platforms:

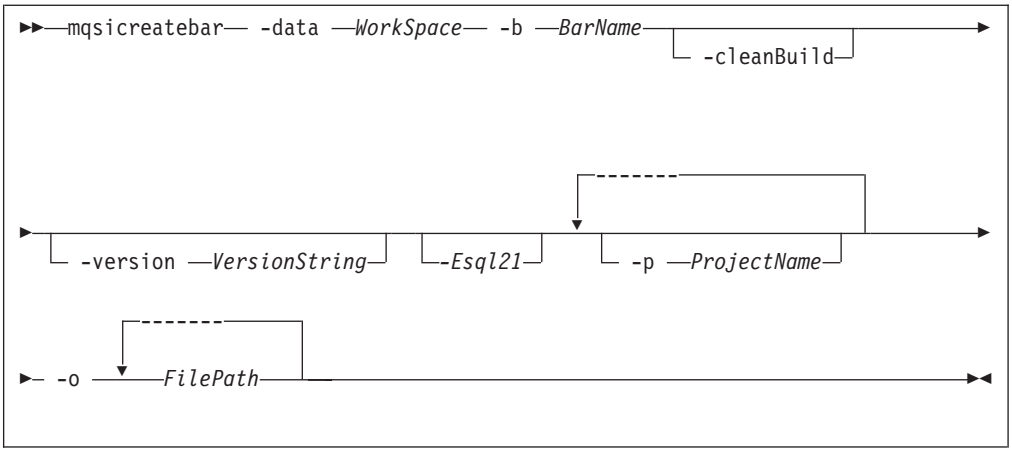
- Windows
- Linux (x86 platform)

Purpose:

The **mqsicreatebar** command provides a command line compiler that creates deployable broker archive files containing message flows and dictionaries.

Although you do not have to use a repository, if you do use a repository to store your message flows and dictionaries, you can write scripts to deploy the message flow applications using the **mqsicreatebar** command and the repository's command line tools.

Syntax:



Parameters:

-data *WorkSpace*
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-b *BarName*
(Required) The name of the bar (zip format) archive file where the result is stored. The bar is replaced if it already exists and the `META-INF/broker.xml` file is created.

-cleanBuild
(Optional) Refreshes the projects in the workspace and then invokes a clean build before new items are added to the broker archive.

Use the **-cleanBuild** parameter to refresh all the projects in the broker archive and invoke a clean build if amendments have been made to broker-archive resources using external tools.

-version *VersionString*
(Optional) Appends the _ (underscore) character and the value of *VersionString* to the names of the objects added to the bar, before the file extension.

-Esql21
(Optional) Compile ESQL for brokers at Version 2.1 of the product.

-p *ProjectName*
(Optional) Projects containing files to include in the bar file. You can specify multiple projects, which can include a message flow project, a message set project, or a message flow plug-in node project.

If a project that you specify is not currently part of your workspace, the command links the project to the workspace so that the files in the project can be included in the bar file. The command does not copy the files into your workspace directory.

If a project that you specify is part of your workspace but is currently closed, the command opens and builds the project so that the files in the project can be included in the bar file.

-o *FilePath*
(Required) The workspace relative path (including the project) of a `msgflow` or `messageSet.mset` file to add to the broker archive.

You can add more than one deployable file to this command by using the following format: -o *FilePath1 FilePath2 .... FilePath'n'*

Authorization:

On Windows, the user ID used to invoke this command must have Administrator authority on the local system. On Linux, the user ID must have write access to the **-data** (workspace) and **-b** (bar file location) directories.

Responses:

This command returns the following responses:

- BIP0956 Unable to start mqsicreatebar
- BIP0957 Incorrect arguments supplied to mqsicreatebar
- BIP0958 Nothing to do in mqsicreatebar
- BIP0959 Incorrect arguments supplied to mqsicreatebar (Project name)
- BIP0960 Incorrect arguments supplied to mqsicreatebar (Project directory)
- BIP0961 Error opening workspace in mqsicreatebar (Project could not be created)
- BIP0962 Error opening workspace in mqsicreatebar (Project could not be opened)
- BIP0963 Error saving file in mqsicreatebar
- BIP0964 Incorrect ″-o″ argument supplied to mqsicreatebar
- BIP0965 Error compiling files in mqsicreatebar

Examples:

You must run the command from the eclipse directory. The default location of the eclipse directory on Windows is C:\Program Files\IBM\MessageBrokersToolkit\6.0\eclipse.

The following example creates a bar file called `myflow.bar` in the workspace at C:\Workspace. The `Test.msgflow` message flow from the `TestFlowProject` is added to the bar file:

```
mqsicreatebar -data C:\Workspace -b myflow.bar -p TestFlowProject -o TestFlowProject\TestFlow\Test.msgflow
```

The following example creates a bar file called `mySet.bar` in the workspace at C:\Workspace. The `messageSet.mset` message set from the `TestSetProject` is added to the bar file:

```
mqsicreatebar -data C:\Workspace -b mySet.bar -o TestSetProject\TestSet\messageSet.mset
```

The following example creates a bar file called `mySet.bar` in the workspace at C:\Workspace. The `messageSet.mset` message set from the `TestSetProject` and `Test.msgflow` message flow from the `TestFlowProject` are added to the bar file:

```
mqsicreatebar -data C:\Workspace -b mySet.bar -o TestFlowProject\TestFlow\Test.msgflow
TestSetProject\TestSet\messageSet.mset
```

mqsicreatemsgdefs command

This command can be used to create message definition files.

Supported platforms:

- Windows
- Linux (x86 platform)

Purpose:

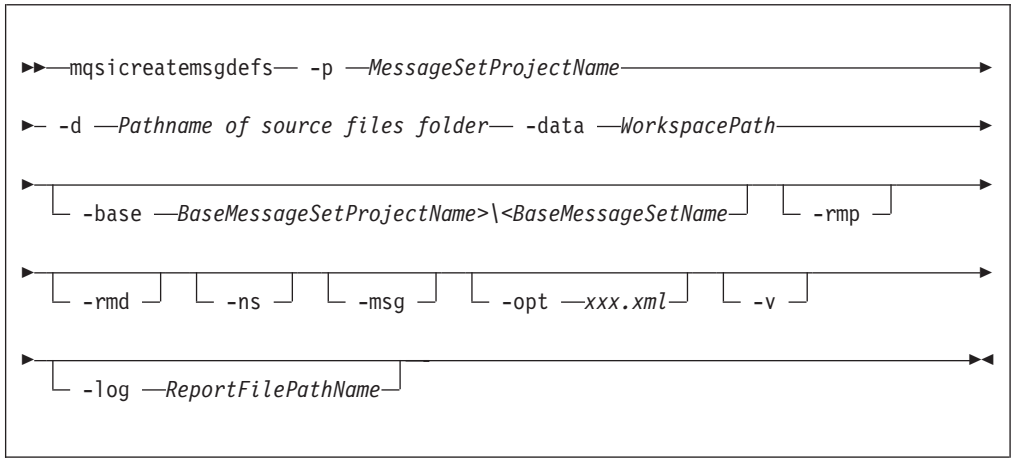
The **mqsicreatemsgdefs** command generates message definition files (*.mxsd), according to a set of import options that are specified in an option file. The generated files are placed in the specified message set folder.

The command takes as a parameter a directory where source files of various types, for example, C and COBOL source files, are located (in addition to various other parameters), and invokes the appropriate operation based on the extensions to the files.

Note:

1. Ensure that only the files that are required for the command to run exist in the directory and subdirectory structure that you specify. One of the actions that the mqsicreatemsgdefs command performs is to copy all the files in the directory and subdirectories into the workspace, before creating the message definition. This might include files that are not related to the message definitions that you are trying to create.
2. You must specify the **-data** *WorkspacePath* parameter to specify the target workspace.

Syntax:



Parameters:

-p *MessageSetProjectName*
(Required) The name of the message set project. If the project does not exist, a new message set project is created.

-d *Pathname of source files folder*
(Required) The absolute or relative path name of the directory of definition files (source files).

All relevant files that are located in any sub-folders under the source files folder are scanned and imported.

-data *WorkspacePath*
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-base
(Optional) If a new message set is to be created, this is the existing message set project and message set, on which it is based.

-rmp
(Optional) Replaces the existing project of the same name.

-rmd
(Optional) Replaces an existing message definition file of the same name.

Note:

1. If this flag is omitted, and a message definition file of the same name exists, you receive a warning.
2. The location of the generated message definition file in the message set is determined by the target namespace.

-ns
(Optional) If a new message set is to be created, the message set is enabled for namespace support.

-msg
(Optional) Creates messages from complex imported structures.

-opt *xxx.xml*
(Optional) The absolute or relative path name of the options file. The options file can be one of the following types:

- **C language** - "C options file for the mqsicreatemsgdefs command"
- **COBOL language** - "COBOL options file for the mqsicreatemsgdefs command" on page 304
- **XSD_NO_NS** - "XSD options file for the mqsicreatemsgdefs command" on page 306

If you do not specify an option, the default options file (`mqsicreatemsgdefs.xml`) is used; see "Default options file for the mqsicreatemsgdefs command" on page 307.

You can copy the default options file, and customize it, to create an options file for your environment.

-v (Optional) Verbose report.

-log *ReportFilePathname*
(Optional) Absolute or relative path name of the report file. If omitted, the report is written to the default log file (`mqsicreatemsgdefs.report.txt`) in the Eclipse current directory.

If you specify *-log* without the report file path name, or with a path name that is not valid, the command issues an error message and stops.

Examples:

The following example creates or uses the message set project `newproject` in the source file `c:\myproject\source` and replaces the existing message project and message definition files of the same name.

```
mqsicreatemsgdefs -p newproject -d c:\myproject\source -rmp -rmd
```

C options file for the mqsicreatemsgdefs command:

Specify the options for the mqsicreatemsgdefs command when you import a C header file.

The following table lists the elements in the C language section of the options file. The following restrictions apply:

- You must specify, in an XML file, a valid value for the options listed, unless otherwise specified. See "Default options file for the mqsicreatemsgdefs command" on page 307 for details of the syntax.
- Values of options are case-sensitive.
- If you do not specify the *-opt* parameter on the mqsicreatemsgdefs command, the default options file called mqsicreatemsgdefs.xml is used; see "Default options file for the mqsicreatemsgdefs command" on page 307.

For further information on using these options, see Importing from C.

<C> element	**Possible values**
COMPILER_NAME[1]	• Msvc (Default) • Icc • AIXgcc • AIXxlc • OS390
CODEPAGE	• SO8859-1 • Cp037 • Cp1252 (Default)
FLOATING_POINT_FORMAT	• IEEE Extended INTEL (Default) • IEEE Extended AIX • IEEE Extended OS/390 • IEEE Non-Extended • IBM 390 Hexadecimal
INCLUDE_PATH[2]	Absolute path names of other header files, or an empty string (this is the default value).
BYTE_ORDER	• Little Endian (Default) • Big Endian
ADDRESS_SIZE	• 32 (Default) • 64
SIZE_OF_LONG_DOUBLE	• 64 (Default) • 128 (Not supported)
PACK_LEVEL[1]	• 1 • 2 • 4 • 8 (Default) • 16
SIZE_OF_ENUM	• 1 • 2 • 4 • 5 (Default)

<C> element	Possible values
PRESERVE_CASE_IN_VARIABLE_NAMES	• True (Default) • False
STRING_ENCODING	• SPACE - Fixed-length strings (Default) • NULL - Null-terminated strings
STRING_PADDING_CHARACTER	• SPACE (Default) • NUL • 'c' • "c" • 0xYY • YY • U+xxxx
SCHEMA_TARGET_NAMESPACE_URI	A valid namespace URI, or empty (default)
MESSAGE_PREFIX	A string with which to prefix created messages, or empty. Default is `msg_`.
PRE_PROCESSING_OPTION	• none (default) • ale_idoc • file_idoc

Notes:

1. If COMPILER_NAME is set to AIXxlc, the value of PACK_LEVEL is not used.
2. In INCLUDE_PATH, separate paths by the system-dependent path separator character.

COBOL options file for the mqsicreatemsgdefs command:

Specify the options for the mqsicreatemsgdefs command when you import a COBOL copybook.

The following table lists the elements in the COBOL language section of the options file. The following restrictions apply:

- You must specify in an XML file a valid value for the options listed, unless otherwise specified. See "Default options file for the mqsicreatemsgdefs command" on page 307 for details of the syntax.
- Options values are case-sensitive.
- If you do not specify the *-opt* parameter on the mqsicreatemsgdefs command, the default options file (mqsicreatemsgdefs.xml) is used; see "Default options file for the mqsicreatemsgdefs command" on page 307.

For further information about using these options, see Importing from COBOL copybooks.

<COBOL> element	Possible values
PLATFORM_SELECTION	• 0 (Win32) (Default) • 1 (AIX) • 2 (z/OS)

<COBOL> element	Possible values
CODEPAGE	• ISO8859_1 (Default) • 037
FLOATING_POINT_FORMAT	• IEEE Non-Extended (Default) • IBM 390 Hexadecimal
ENDIAN	• Big • Little (Default)
EXT_DECIMAL_SIGN	• ASCII (Default) • EBCDIC • EBCDIC Custom
TRUNC	• STD (Default) • OPT • BIN
NSYMBOL	• DBCS (Default) • NATIONAL
QUOTE	• SINGLE • DOUBLE (Default)
CREATE_DEFAULT_VALUES FROM_INITIAL_VALUES	• True • False (Default)
CREATE_FACETS_FROM LEVEL_88_VALUE_CLAUSES	• True • False (Default)
PRESERVE_CASE_IN VARIABLE_NAMES	• True (Default) • False
CREATE_NULL_VALUES_FOR_FIELDS	• True • False (Default)
NULL_CHARACTER	• SPACE (Default) • NUL • 'c' • "c" • 0xYY • YY • U+xxxx
STRING_PADDING_CHARACTER	• SPACE (Default) • NUL • 'c' • "c" • 0xYY • YY • U+xxxx
SCHEMA_TARGET_NAMESPACE_URI	A valid namespace URI, or empty (default)
MESSAGE_PREFIX	A string with which to prefix created messages, or empty. Default is `msg_`.

XSD options file for the mqsicreatemsgdefs command:

Specify the options for the mqsicreatemsgdefs command when you import an XML Schema file.

The following tables list the elements in the XML Schema sections of the options file.

The first table applies to all message sets, but the second table applies only to message sets that do not support namespaces. The following restrictions apply:

- You must specify in an XML file a valid value for each of the options listed, unless otherwise specified.
- Options values are case-sensitive.
- If you do not specify the *-opt* parameter on the **mqsicreatemsgdefs** command, the default options file (`mqsicreatemsgdefs.xml`) is used; see "Default options file for the mqsicreatemsgdefs command" on page 307.

For further information about using these options, see Importing from XML Schema.

<XSD> element	Possible values
MSG	• elements (default) • types • both

<XSD_NO_NS> element	Possible values
IMPORT	• modify (default) • reject
REDEFINE	• modify (default) • reject • accept
LIST	• modify (default) • reject • accept
UNION	• modify (default) • reject • accept
ABSTRACT_CT	• modify (default) • reject • accept
ABSTRACT_ELEMENT	• modify (default) • reject • accept
XSD_PREFIX	• xsi (default) • <any other prefix>

<XSD_NO_NS> element	Possible values
URI_PREFIX_PAIRS **Note:** You can specify zero, or more URI_PREFIX_PAIRS elements.	Attribute pair • uri=<uri_value> • prefix=<prefix_value>

Default options file for the mqsicreatemsgdefs command:

Options for the mqsicreatemsgdefs command take default values if you do not specify an options file.

The following text lists the supplied default options file used with the mqsicreatemsgdefs command.

If you want to make any changes to the default file contents, the file is stored in the installation directory structure at *install_dir*\ibtoolkit\eclipse\plugins\com.ibm.etools.msg.importer.cmdline_*build_version*\mqsicreatemsgdefs.xml. For example, if you have installed into the default location on Windows, the file is stored at C:\Program Files\IBM\MessageBrokersToolkit\6.0\ibtoolkit\eclipse\plugins\com.ibm.etools.msg.importer.cmdline_*build_version*\mqsicreatemsgdefs.xml. *build_version* is the build version of the installed component, including any installed fix packs; for example 6.0.2.001.

```
<?xml version="1.0" encoding="UTF-8"?>

<OPTIONS>
<!-- Message Definition File Import Options -->

  <!-- Import Options for C -->
  <C>
    <!-- COMPILER_NAME = (Msvc|icc|AIXgcc|AIXxlc|OS390) -->
  <COMPILER_NAME>Msvc</COMPILER_NAME>

  <!-- CODEPAGE = (ISO8859-1|Cp037|Cp1252) -->
  <CODEPAGE>Cp1252</CODEPAGE>

  <!-- FLOATING_POINT_FORMAT = (IEEE Extended INTEL|
                    IEEE Extended AIX|IEEE Extended OS/390|
                    IEEE Non-Extended|IBM 390 Hexadecimal) -->
  <FLOATING_POINT_FORMAT>IEEE Extended INTEL</FLOATING_POINT_FORMAT>

  <!-- BYTE_ORDER = (Little Endian|Big Endian) -->
  <BYTE_ORDER>Little Endian</BYTE_ORDER>

  <!-- ADDRESS_SIZE = (32|64) -->
  <ADDRESS_SIZE>32</ADDRESS_SIZE>

  <!-- SIZE_OF_LONG_DOUBLE = (64|128) -->
  <SIZE_OF_LONG_DOUBLE>64</SIZE_OF_LONG_DOUBLE>

  <!-- PACK_LEVEL = (1|2|4|8|16) -->
  <PACK_LEVEL>8</PACK_LEVEL>

  <!-- SIZE_OF_ENUM = (1|2|4|5) -->
  <SIZE_OF_ENUM>5</SIZE_OF_ENUM>

  <!-- PRESERVE_CASE_IN_VARIABLE_NAMES = (true|false) -->
                  <PRESERVE_CASE_IN_VARIABLE_NAMES>true</PRESERVE_CASE_IN_
                   VARIABLE_NAMES>

                <!-- STRING ENCODING = SPACE | NULL) -->
                <!-- NOTE: SPACE = Fixed length strings, NULL = Null terminated strings -->
                <STRING_ENCODING>SPACE</STRING_ENCODING>
```

```
                <!-- STRING PADDING CHARACTER  = (SPACE|NUL|'c'|"c"|0xYY|YY|U+xxxx)-->
                <!-- Note: Only used for Fixed Length strings -->
                <STRING_PADDING_CHARACTER>SPACE</STRING_PADDING_CHARACTER>

         <!-- INCLUDE_PATH = absolute paths to other include files -->
                 <!--  Paths should be separated by the system-dependent path-
                 separator character. On UNIX systems, this character is
                 ':'; on Win32 systems it is ';'
                 -->
  <INCLUDE_PATH></INCLUDE_PATH>
 </C>

  <!-- Import Options for COBOL -->
  <COBOL>
  <!-- PLATFORM_SELECTION = (0:"Win32"|1:"AIX"|2:"z/OS") -->
  <PLATFORM_SELECTION>Win32</PLATFORM_SELECTION>

  <!-- CODEPAGE = (ISO8859_1|037) -->
  <CODEPAGE>ISO8859_1</CODEPAGE>

    <!-- FLOATING_POINT_FORMAT = (IEEE Non-Extended|
                      IBM 390 Hexadecimal) -->
  <FLOATING_POINT_FORMAT>IEEE Non-Extended</FLOATING_POINT_FORMAT>

  <!-- ENDIAN = (Big|Little) -->
  <ENDIAN>Little</ENDIAN>

  <!-- EXT_DECIMAL_SIGN = (ASCII|EBCDIC|EBCDIC Custom) -->
  <EXT_DECIMAL_SIGN>ASCII</EXT_DECIMAL_SIGN>

  <!-- TRUNC = (STD|OPT|BIN) -->
  <TRUNC>STD</TRUNC>

  <!-- NSYMBOL = (DBCS|NATIONAL) -->
  <NSYMBOL>DBCS</NSYMBOL>

  <!-- QUOTE = (SINGLE|DOUBLE) -->
  <QUOTE>DOUBLE</QUOTE>

  <!-- CREATE_DEFAULT_VALUES_FROM_INITIAL_VALUES = (true|false) -->
  <CREATE_DEFAULT_VALUES_FROM_INITIAL_VALUES>false</CREATE_DEFAULT_
        VALUES_FROM_INITIAL_VALUES>

  <!-- CREATE FACETS FROM LEVEL 88 VALUE CLAUSES = (true|false) -->
  <CREATE_FACETS_FROM_LEVEL_88_VALUE_CLAUSES>false</CREATE_FACETS_
                FROM_LEVEL_88_VALUE_CLAUSES>

  <!-- PRESERVE_CASE_IN_VARIABLE_NAMES = (true|false) -->
  <PRESERVE_CASE_IN_VARIABLE_NAMES>true</PRESERVE_CASE_IN_
             VARIABLE_NAMES>

  <!--  CREATE NULL VALUES FOR FIELDS = (true|false) -->
  <CREATE_NULL_VALUES_FOR_FIELDS>false</CREATE_NULL_VALUES_FOR_FIELDS>

  <!-- NULL CHARACTER  = (SPACE|NUL|'c'|"c"|0xYY|YY|U+xxxx)-->
  <NULL_CHARACTER>SPACE</NULL_CHARACTER>

  <!-- STRING PADDING CHARACTER  = (SPACE|NUL|'c'|"c"|0xYY|YY|U+xxxx)-->
  <!-- Note: Only used for Fixed Length strings -->
  <STRING_PADDING_CHARACTER>SPACE</STRING_PADDING_CHARACTER>
</COBOL>

<!-- Import Options for XML Schema -->
<!--  NOTE: these options only apply when importing into a message set
             that does NOT support namespaces -->
```

```
  <XSD_NO_NS>
   <!-- IMPORT = (modify|reject) -->
   <IMPORT>modify</IMPORT>

   <!-- REDEFINE = (modify|reject|accept) -->
   <REDEFINE>modify</REDEFINE>

   <!-- LIST = (modify|reject|accept) -->
   <LIST>modify</LIST>

   <!-- UNION = (modify|reject|accept) -->
   <UNION>modify</UNION>

   <!-- ABSTRACT_CT = (modify|reject|accept) -->
   <ABSTRACT_CT>modify</ABSTRACT_CT>

   <!-- ABSTRACT_ELEMENT = (modify|reject|accept) -->
    <ABSTRACT_ELEMENT>modify</ABSTRACT_ELEMENT>

  <!-- XSD_PREFIX = (xsi|... any other prefix) -->
  <XSD_PREFIX>xsi</XSD_PREFIX>

   <!-- This is where you list the additional uri/prefix pairs. -->
    <!-- URI prefix pairs can be listed as follows:  -->
  <!-- <URI_PREFIX_PAIRS uri="http://www.ibm.com" prefix="ibm" /> -->
  <!-- <URI_PREFIX_PAIRS uri="http://www.eclipse.org" prefix="eclipse"/> -->
   </XSD_NO_NS>
</OPTIONS>
```

mqsicreatemsgdefsfromwsdl command

Supported platforms:

- Windows
- Linux (x86 platform)

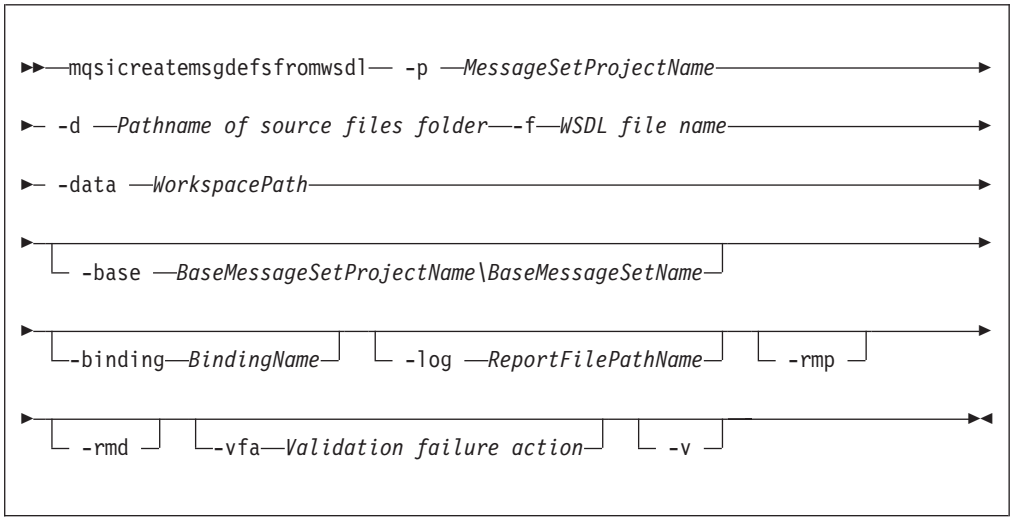
Purpose:

The mqsicreatemsgdefsfromwsdl command can be used to import a single WSDL definition. If the WSDL is split into multiple files then the file specified must contain the WSDL service definition or binding definition. The WS-I validator can be run automatically on the imported WSDL under the control of the -vfa flag.

Note:

1. Ensure that only the files that are required for the WSDL definition you are importing exist in the directory and subdirectory structure. One of the actions the mqsicreatemsgdefsfromwsdl command performs is to copy all the files in the directory and subdirectories into the workspace prior to creating the message definition. This could include any files not associated to that WSDL definition.
2. If the WSDL definition uses a relative path that includes files outside of the directory or subdirectory structure specified, these files must be imported into the workspace prior to running the command. Care must be taken to ensure that the relative paths are still valid after importing these files into the workspace
3. Message sets that are created will be namespace enabled.
4. Existing message sets must be namespace enabled and have an XML physical format.
5. If you are creating a new message set for run time parsing, you should base it on an existing message set which has an XML physical format.

Syntax:



Parameters:

-p *MessageSetProjectName*
(Required) The name of the message set project. If the project exists, it must be namespace-enabled. If the project does not exist, a new namespace-enabled project is created.

-base *BaseMessageSetProjectName\BaseMessageSetName*
(Optional) If a new message set is to be created, this is the existing message set project and message set on which it is based

-binding *BindingName*
(Optional) The name of a binding to be imported. This parameter is mandatory if the WSDL definition includes more than one binding, but optional if the WSDL definition includes a single binding

-d *Pathname of source files folder*
(Required) The absolute or relative path name of the directory where the top-level WSDL file is located. The top-level WSDL file may contain the entire WSDL definition, or it may be the top of a hierarchy of files, each of which may import further files via import elements. An import element specifies the location of the resource to import with a location attribute

The importer attempts to resolve all relative import locations relative to the specified directory; the importer also attempts to resolve any absolute import locations that it encounters. However, avoid using absolute import locations, because any further imports in the hierarchy must use absolute locations after the first time you specify an absolute location.

-data *WorkspacePath*
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-f *<WSDL file name>*
(Required) The file name of the top-level WSDL file to be imported.

Where a path is required to fully identify the filename, the path should be specified using the -d parameter.

-log *ReportFilePathName*
(Optional) Absolute or relative path name of the report file; if omitted, the report is written to the default log file and is named <Wsdl-file-name>.wsdl.report.txt. <Wsdl-file-name> is the name of the WSDL definition you are importing and it is placed in the directory from which the command is invoked.

-rmd
(Optional) Replaces an existing message definition file of the same name.

Note:

1. If this flag is omitted, and a message definition file of the same name exists, you receive a warning.
2. The location of the generated message definition file in the message set is determined by the target namespace.

-rmp
(Optional) Replaces the existing project of the same name.

-v (Optional) Verbose report.

-vfa
(Optional) Validation failure action. Specifies the required action if WS-I compliance checking detects a problem in the WSDL to be imported. The default is set to fail. Select from:

- fail: If the WSDL definition is not WS-I compliant, the import process will stop and errors will be written to the log file.
- warn: If the WSDL definition is not WS-I compliant, the import process will write warning errors to the log file.
- ignore: If the WSDL definition is not WS-I compliant, the import process ignores them and informational messages of how this WSDL definition is not compliant to the WS-I profile will be written to the logfile.

Examples:

In the following example, the WSDL document service.wsdl which exists in the directory wsdlfiles, is to be imported into the project myProject and overwrite the project if it exists.

```
mqsicreatemsgdefsfromwsdl  -p myProject -d .\wsdlfiles -f service.wsdl -rmd -data .\wsdlfilewspc
```

In the following example, the WSDL document service.wsdl which exists in the directory wsdlfiles, is to be imported to create a new message set project (newProj) based on an existing project (existingProj).

```
mqsicreatemsgdefsfromwsdl  -p newProj -base existingProj -d .\wsdlfiles -f service.wsdl -data .\wsdlfilewspc
```

mqsimigratemfmaps command

The mqsimigratemfmaps command migrates mapping definitions to Version 6.0.

Supported platforms:

- Windows
- Linux (x86 platform)

Purpose:

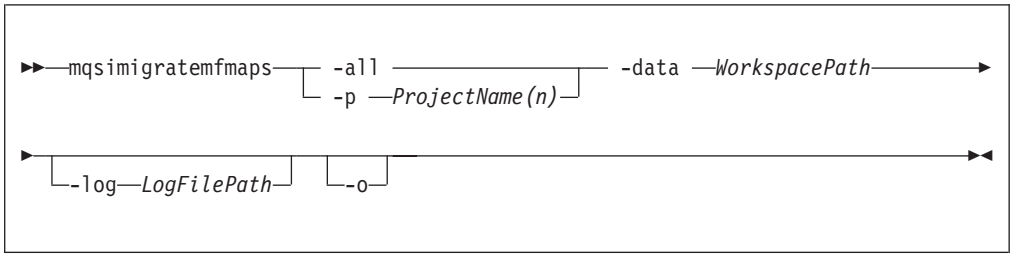
Use the mqsimigratemfmaps command to create new .msgmap files in the WebSphere Message Broker Version 6.0 format, based on existing .mfmap from WebSphere Business Integration Message Broker Version 5.0.

Notes:

1. The .mfmap files are left in the workspace, therefore you can run mapping migration again.
2. The .mfmap files are not included in builds and are not recognized as valid development resources. They are present in the workspace as simple text files and you can delete them at your own discretion. The Version 5.0 map editor is no longer available in Version 6.0; you can view the contents of the .mfmap files only with a text editor.
3. When the .mfmap files have been migrated, you can edit the .msgmap files in the mapping editor.

The command executable file is located in *install_dir*/eclipse/.

Syntax:



Parameters:

-all
(Required) All project names in the workspace are checked and migrated.

You must specify only one of all or p.

-p *ProjectName(n)*
(Required) The specific project name, or names, in the workspace to be checked and migrated.

You must specify only one of all or p.

-data *WorkspacePath*
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-log *Logfilepath*
(Optional) Alternative report file path.

If you do not specify an alternative path, this command generates a detailed migration log in the folder from which you ran the command. The log file has the default name of mqsimigratemfmaps.report.txt. If the file already exists, new information is appended to the existing content.

-o (Optional) Overwrite files that already exist.

Authorization:

No specific authority is required to invoke this command.

Examples:

The following example migrates the `sample` project in the c:\wmqi\test directory.

```
mqsimigratemfmaps -p sample -data c:\wmqi\test
```

The following example migrates all the mapping definitions that are defined in the project MyFlowProject. The migration process is recorded in the log file c:\temp\migration.log.

```
mqsimigratemfmaps -p MyFlowProject -data c:\mbtk\workspace -log c:\temp\migration.log
```

The following example migrates the mappings that you have defined in all the projects in the directory c:\mbtk\workspace. The **-log** parameter is not specified, therefore the log file mqsimigratemfmaps.report.txt is created in the directory from which the command is started.

```
mqsimigratemfmaps -all -data c:\mbtk\workspace
```

mqsimigratemsgflows command

Supported platforms:

- Windows
- Linux (x86 platform)

Purpose:

Use the **mqsimigratemsgflows** command to create new flows in the WebSphere Message Broker Version 6.0 format, based on existing exported flows from a WebSphere MQ Integrator Broker Version 2.1 Configuration Manager.

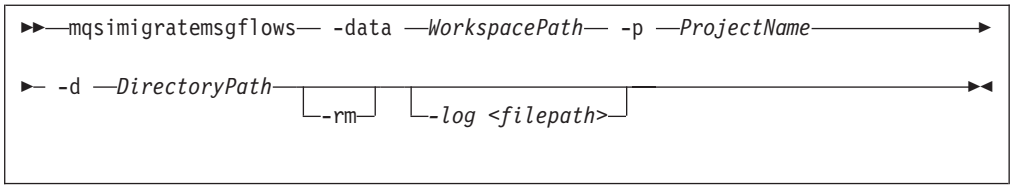
Note:

1. This command is for one way migration to the WebSphere Message Broker Version 6.0 Message Brokers Toolkit from the Version 2.1 release.
2. When you migrate from Version 5.0 to Version 6.0 you need load only the Version 5.0 `.msgflow` files into the Version 6.0 workspace and when you save the files they are saved in Version 6.0 format.
3. You can use this command to deploy exported user-defined node definitions from Version 2.1 to Version 6.0. To recreate the user-defined nodes in Version 6.0 you must manually redefine them.
4. Stop your Message Brokers Toolkit session before you invoke the command.
5. Specify the workspace location using the **-data** flag.

   If your path contains spaces, enclose the entire path name in double quotation marks.

On Windows operating systems the mqsimigratemsgflows.exe file is located in the <toolkit install>/eclipse directory. Similarly, on the Linux (x86 platform) operating system, the mqsimigratemsgflows file is located in the <toolkit install>/eclipse directory.

Syntax:



Parameters:

-data *WorkspacePath*
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-p *ProjectName*
(Required) The project name where the new flows are created. If the project already exists, the flows are added to this project. If the project does not exist, this command creates it.

-d *DirectoryPath*
(Required) The directory path where the exported flows can be found.

A relative path is interpreted from the current working directory. You can specify a full path. All nested directories are ignored.

The flow name becomes the name of the `.msgflow` file. You can change this name to meet the local file naming conventions.

Duplicate message flows are ignored; any error of this form is reported in the migration report file.

-rm
(Optional) Replace message flow projects if they already exist.

-log <filepath>
(Optional) Report file.

If you do not specify an alternative, this command generates a detailed migration log in the `<install_dir>/eclipse/` folder. The log-file has the default name of *"mqsimigratemsgflows.report.txt"*.

For further information on flow migration, see Migrating message flows from Version 2.1.

Authorization:

No specific authority is required to invoke this command.

Examples:

```
mqsimigratemsgflows -p sample -d c:\wmqi\test
```

mqsimigratemsgsets command

Supported platforms:

- Windows
- Linux (x86 platform)

Purpose:

The **mqsimigratemsgsets** command imports all the files with the extension *.mrp* in the directory specified by the **-d** parameter. Files with any other extension are ignored.

Note:

1. This command is for one way migration to the WebSphere Message Broker Version 6.0 Message Brokers Toolkit from the Version 2.1 release.
2. When you migrate from Version 5.0 to Version 6.0 you need load only the Version 5.0 message set projects into the Version 6.0 workspace and when you save the projects they are saved in Version 6.0 format.
3. Stop your Message Brokers Toolkit session before you invoke the command.
4. If you are importing a very large *.mrp* file, you might find that the **mqsimigratemsgsets** command ends with a Java OutOfMemoryException.

   If your **-d** directory contains several *.mrp* files, try running the command repeatedly, each time with the **-d** directory holding a single *.mrp* file.

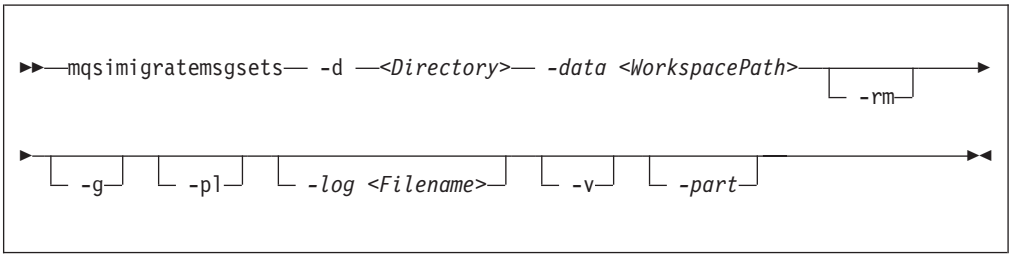
   Alternatively you can increase the amount of memory available using the **mqsimigratemsgsets** argument `-vmargs -Xmx<nnn>M`, where `<nnn>` is the number of megabytes of memory. For example:

   ```
   mqsimigratemsgsets ... -vmargs -Xmx256M
   ```

A report file with a default filename of `mqsimigratemsgsets.report.txt` is produced as a record of the command invocation. You can specify the *-log* parameter to override the default name and location for the report file; and the *-v* parameter to add additional information to the report file.

On Windows operating systems, the mqsimigratemsgflows.exe file is located in the <toolkit install>/eclipse directory. Similarly, on the Linux (x86 platform) operating system, the mqsimigratemsgflows file is located in the <toolkit install>/eclipse directory.

Syntax:



Parameters:

In most cases, you will need to use only the **-d** and **-data** parameters to specify the location of the .mrp files and the workspace.

-d <*Directory*>
(Required) The directory path, either absolute or relative, containing the *.mrp* files to import.

-data <*WorkspacePath*>
(Required) The path of the workspace in which your projects are created.

The workspace location is also the default location for projects. Relative paths are interpreted as being relative to the directory from which the command was started.

-rm
(Optional) Replace message set projects if they already exist. If the message set project already exists, a warning message is issued if this parameter is not specified and the *.mrp* file is ignored.

-g (Optional) Always create global elements and global complex types.

-pl
(Optional) For elements with prefixed identifiers, always create local elements even when referenced more than once. Only use this option if BIP0195 warning messages appear in the report file, and associated duplicate element errors appear in the task list after import.

-log <*FileName*>
(Optional) Name and location of the generated report file.

-v (Optional) Instructs the importer to produce a verbose report detailing exactly what was created.

-part
(Optional) Partition the message sets into multiple *.MXSD* files, if the message set is large enough to warrant partitioning.

For information on what this command creates, and other points that you need to be aware of, see Migrating Message Sets from Version 2.1.

Authorization:

No specific authority is required to invoke this command.

Examples:

```
mqsimigratemsgsets -d c:\wmqi\test -v
mqsimigratemsgsets –d c:\wmqi\test –v –pl
```

mqsireadbar command

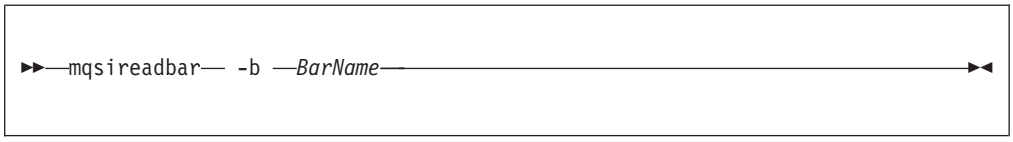
Supported platforms:

- Windows
- Linux (x86 platform)

Purpose:

The **mqsireadbar** command lists to the console the keywords defined for each deployable file within a deployable broker archive file.

Syntax:



Parameters:

-b *BarName*
(Required) The name of the bar archive file to be read. The bar file is in compressed format.

Authorization:

The user ID used to invoke this command must have the authority to read the bar file on the local system.

Responses:

This command returns the following responses:

- BIP2956 Unable to read broker archive file <file name>

Windows This command is supplied as a batch file. If you run the command in an automation system or from a script, use the Windows CALL command, to ensure that the correct ERRORLEVEL is returned:

```
...
CALL mqsireadbar
...
```

Examples:

The following example reads the file `my_bar_file.bar` and displays defined keywords within the given file to the console

```
mqsireadbar -b my_bar_file.bar
```

Runtime commands

This topic is a container for the runtime commands of WebSphere Message Broker.

These commands are available on a machine where any of the runtime components are installed

See "Commands" on page 286 for a list of all the WebSphere Message Broker commands.

mqsibackupconfigmgr command

Command to back up the Configuration Manager repository online and use the Configuration Manager Proxy to communicate with the Configuration Manager.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS using BIPBUCM; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

This command backs up the Configuration Manager repository online and uses the Configuration Manager Proxy to communicate with the Configuration Manager.

Usage notes:

- Before you run this command you must stop the Configuration Manager.

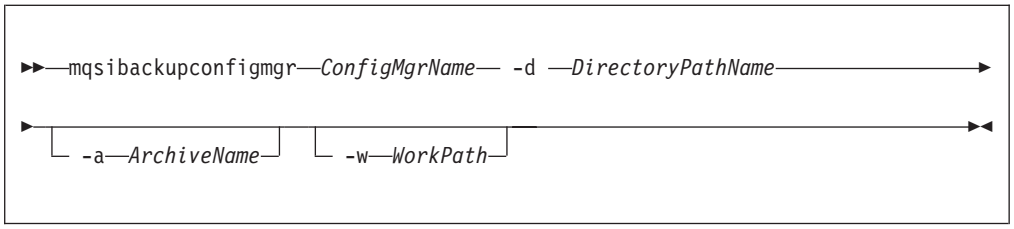
- If you plan to restore the Configuration Manager data repository on z/OS and the platform from which it was originally backed up was not z/OS, or the other way round, you must take a copy of the file:

```
<Configuration Manager directory>/components/<component name>/<directory name>/service.properties
```

  You must keep this file with the `.zip` file that is produced by the **mqsibackupconfigmgr** command. After you have run the **mqsirestoreconfigmgr** command, copy the file to the equivalent place in the restored Configuration Manager data repository.
- If you specified the -w (work path location) option on the mqsicreateconfigmgr command when you created the Configuration Manager, you must specify the -w (work path location) option on the mqsibackupconfigmgr command.

  If, however, you did not specify the -w option on the mqsicreateconfigmgr command, the Configuration Manager uses the default work path location; in which case, the -w option on the mqsibackupconfigmgr command is optional.

Syntax:



Parameters:

ConfigMgrName
(Required) The name of the Configuration Manager.

-d *DirectoryPathName*
(Required) The directory where the backup is placed. An error occurs if the directory does not exist.

-a *ArchiveName*
(Optional) Specifies the backup archive name; if you do not specify a name, the name takes the form: `<configMgrName>_<date>_<time>.zip`.

-w *WorkPath*
(See the Usage notes section above for information about when this option is required.) Specifies the path for the Configuration Manager repository. If the wrong work path location is specified, the following error message is returned:

```
BIP1077S when taking a backup on configmgr using the command - mqsibackupconfigmgr
```

Authorization:

The user ID used to invoke this command must have the authority to read, at least, the directory specified by %MQSI_WORKPATH%, and to write to the directory in which the backup is to be placed. In addition, for Linux and UNIX systems, the user ID must be a member of mqbrkrs.

Examples:

```
mqsibackupconfigmgr ConfigMgr -d c:\mqsitest\db –a archive1
```

mqsicbrreport command

Supported platforms:

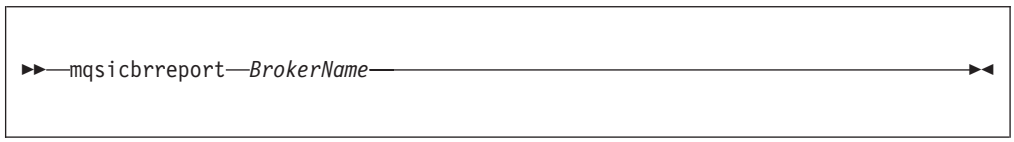
- Windows
- Linux and UNIX systems

Purpose:

Use the **mqsicbrreport** command to help identify applications that use a content-based routing filter. The program inspects a broker's subscriptions table, and reports any filters it finds that might cause incompatible behavior.

You must invoke on the system on which the program is running and you must be logged on as the service user ID for the broker.

Syntax:



Parameters:

BrokerName
(Required) The name of the broker to inspect. The output is written to stdout and you must review the report generated so that you can make any necessary changes to your programs.

Note: This utility only identifies and reports possible incompatibilities.

Authorization:

On Windows platforms, the user ID used to invoke this command must have **Administrator** authority on the local system.

On Linux and UNIX systems, the user ID used to invoke this command must be **root**. It must also be a member of the **mqbrkrs** group.

mqsichangebroker command

Use the mqsichangebroker command to change some of the configuration parameters of the broker.

Supported operating systems:

- Windows
- Linux and UNIX systems
- z/OS. Run this command either as a console command, or by customizing and submitting BIPCHBK; see "Contents of the broker PDSE" on page 491

Purpose:

You can modify the value of many, but not all, of the parameters that you set when you created the broker. For example, after you change a password, you must run the mqsichangebroker command. You can also use this command to set the UserExitPath property.

You must stop the broker before you can issue this command and restart the broker for the changes to take effect:

- On Windows, Linux, and UNIX systems, use the mqsistop and mqsistart commands to stop the broker.
- On z/OS, you must have started the original broker control process using the `/S` option. You must stop the broker components using the `/F broker, PC` option and start the broker components again using the `/S broker, SC` option.

See "mqsistop command" on page 474 and "mqsistart command" on page 469 for more information.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsichangebroker command - Windows, Linux and UNIX systems"
- "mqsichangebroker command - z/OS" on page 325

Authorization:

On Windows systems, the user ID used to invoke this command must have **Administrator** authority on the local system.

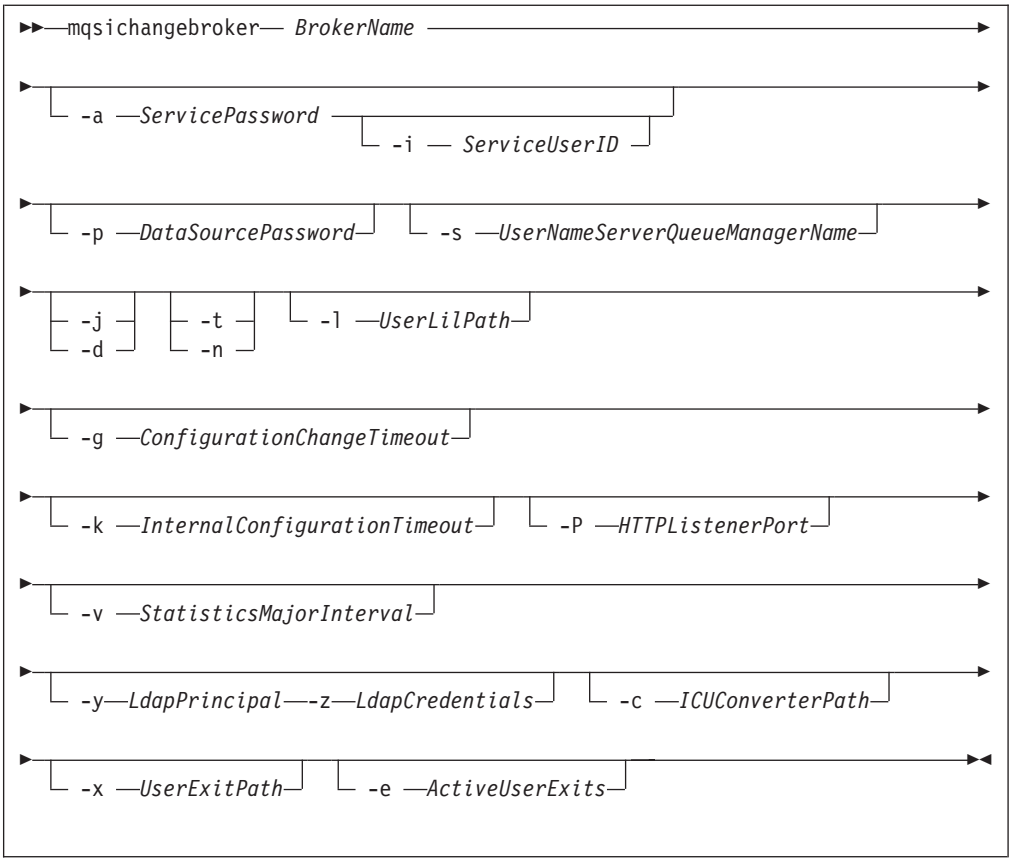
On Linux and UNIX systems, the user ID used to invoke this command must be a member of the **mqbrkrs** group.

On z/OS systems, the user ID used to invoke this command must be a member of a group that has READ and WRITE access to the component directory.

Using LDAP: Ensure that the registry is appropriately secured to prevent unauthorized access. The setting of *LdapPrincipal* and *LdapCredentials* options on **mqsichangebroker** is not required for correct operation of the broker. The password is not stored in clear text in the file system.

mqsichangebroker command - Windows, Linux and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required) This parameter must be the first parameter. Specify the name of the broker to modify.

-a *ServicePassword*
(Optional) The password for the *ServiceUserID*.

For compatibility with existing systems, you can specify `<password>`. However, if you do not specify a password with this parameter when you run the command, you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly. On Linux and UNIX systems, **-a** is required for compatibility with Windows systems, but is not used in relation to *ServiceUserID*. **-a** is used as a default only if **-p** is not specified. See the **-p** parameter description for further details.

If you have created your broker to use the *ServiceUserID* and *ServicePassword* for database access, ensure that you update both instances of the password on this command by specifying the **-p** *DataSourcePassword* parameter. Specify the **-p** *DataSourcePassword* parameter in the following circumstances:

- You omitted the **-u** *DataSourceUserID* and **-p** *DataSourcePassword* parameters.
- You included the **-u** *DataSourceUserID* and **-p** *DataSourcePassword* parameters, but provided the same user ID and password for the service user ID using **-a** *ServicePassword* and **-i** *ServiceUserID*.

To complete a password change successfully:

- Stop the broker.
- Change the password using the appropriate operating system function.

- Use the mqsichangebroker command to update all parameters that reference this same password.
- Restart the broker.

-i *ServiceUserID*
(Optional) The user ID under which the broker runs. You must also change the password (**-a**) if you change this value.

The user ID under which components run. You can specify the *ServiceUserID* in any valid user name syntax. On Windows systems, valid formats are:

- `domain\username`
- `\\server\username`
- `.\username`
- `username`

On Linux and UNIX systems, only the last format, `username`, is valid.
If you use the unqualified form for this user ID (`username`) on Windows systems, the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete.
The *ServiceUserID* that you specify must be a member of the **mqbrkrs** local group. On Windows systems, the ID can be a direct or indirect member of the group. The *ServiceUserID* must also be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the **-w** parameter).
On Windows systems, if you specify that the broker is to run as a WebSphere MQ trusted application (**-t** parameter), you must also add the service user ID to the **mqm** group. On Linux and UNIX systems, specify the *ServiceUserID* as `mqm` if you set the **-t** parameter.
The security requirements for the *ServiceUserID* are described in "Security requirements for Windows platforms" on page 539, and in "Security requirements for Linux and UNIX platforms" on page 538.

-p *DataSourcePassword*
(Optional) The password of the user ID with which the databases that contain broker tables and user data are to be accessed.

For compatibility with existing systems, you can still specify *password*. However, if you do not specify a password with this parameter when you run the command, you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

For DB2 on Linux and UNIX systems, you can specify **-p** as an empty string (two double quotation marks, ""). In this case, DB2 grants WebSphere Message Broker the privileges of the *ServiceUserID*, which results in a database connection as "already verified". If you specify an empty string for **-a** and **-p**, no passwords are stored by WebSphere Message Broker, creating the most secure configuration.

Ensure that you change all instances of the use of this password. If you have created (or changed) the broker to use the same user ID and password for its service user ID, as well as its database access, update both instances at the same time. (See the description of the **-a** parameter for further details.)

-s *UserNameServerQueueManagerName*
(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server.

To remove topic-based security, specify an empty string (two quotation marks, ″″).

-j (Optional) Publish/subscribe access is enabled for the broker. This parameter is valid only with the **-s** parameter.

-d (Optional) Publish/subscribe access is not enabled for the broker.

-t (Optional) The broker runs as a WebSphere MQ trusted application.

For more details about using WebSphere MQ trusted applications, see *WebSphere MQ Intercommunication*.

-n (Optional) The broker ceases to run as a WebSphere MQ trusted application.

-l *UserLilPath*
(Optional) A list of paths (directories) from which the broker loads LILs (loadable implementation libraries) for user-defined message processing nodes.

On Linux and UNIX systems, directory names are case sensitive, and you must include the names in single quotation marks if they contain mixed case characters.
Do not include environment variables in the path; the broker ignores them.

Create your own directory for storing your `.lil` or `.jar` files. Do not save them in the WebSphere Message Broker installation directory.
If you specify more than one additional directory, each directory must be separated by the default platform-specific path separator: semicolon (`;`) on Windows systems; colon (`:`) on Linux and UNIX systems.

-g *ConfigurationChangeTimeout*
(Optional) The maximum time (in seconds) that is allowed for a user configuration request to be processed. It defines the length of time taken within the broker to apply to an execution group a configuration change that you have initiated. For example, if you deploy a configuration from the workbench, the broker must respond to the Configuration Manager within this time.

A message flow cannot respond to a configuration change while it is processing an application message. An execution group that has been requested to change its configuration returns a negative response to the deployed configuration message if any one of its message flows does not finish processing an application message and apply the configuration change within this timeout.

Specify the value in seconds, in the range 10 to 3600. The default is 300.

For information about how to set the value for this timeout, see “Configuring timeouts” on page 172.

-k *InternalConfigurationTimeout*
(Optional) The maximum time (in seconds) that is allowed for an internal configuration change to be processed. For example, it defines the length of time taken within the broker to start an execution group.

The response time of each execution group differs according to system load and the load of its own processes. The value must reflect the longest response time that any execution group takes to respond. If the value is too low, the broker returns a negative response, and might issue error messages to the local error log.
Specify the value in seconds, in the range 10 to 3600. The default is 60.
For information about how to set the value for this timeout, see “Configuring timeouts” on page 172.

-P *HTTPListenerPort*
(Optional) Enter the number of the port on which the Web Services support is listening.

The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started; the default is 7080.

Ensure that the port that you specify has not been specified for any other purpose.

-v *StatisticsMajorInterval*
(Optional) The time interval (in minutes) at which WebSphere Message Broker statistics and accounting is told to output archive records. For internal accounting, the valid range is from 10 to 14400 minutes.

An interval of zero minutes indicates that the operating system has an external method of notification and is not using an internal timer within WebSphere Message Broker.

-y *LdapPrincipal*
(Optional, but mandatory when *LdapCredentials* is provided.) The user principal for access to an optional LDAP directory that holds the JNDI administered Initial Context for the JMS provider.

-z *LdapCredentials*
(Optional, but mandatory when *LdapPrincipal* is provided.) The user password for access to LDAP.

-c *ICUConverterPath*
(Optional) A delimited set of directories to search for additional code page converters. On Windows systems, the delimiter is a semicolon (;). On UNIX and Linux systems, the delimiter is a colon (:).

The code page converters must be either of the form icudt32_*codepagename*.cnv, or in an ICU data package called icudt32.dat.

Do not use this parameter to set the converter path if you are using a converter that matches one of the built-in converters that are provided with Version 6.0, and that converter is the local code page for the broker. Use the **ICU_DATA** environment variable instead.

-x *UserExitPath*
(Optional) The path that contains the location of all user exits to be loaded for 32-bit execution groups in this broker. This path is added to the system library search path (PATH,LIBPATH,LD_LIBRARY_PATH,SHLIBPATH) for the execution group process only.

-e *ActiveUserExits*
(Optional) Active user exits. By default, user exits are inactive. Adding a *userExit* name to this colon-separated list changes its default state to active for this broker. You can use the mqsichangeflowuserexits command to override the default state at the execution group or message flow level. If you specify a user exit name, and no library is found to provide that user exit when the execution group starts, a BIP2314 message is written to the system log, and the execution group fails to start.

To change other broker properties, first delete and re-create the broker, and then use the workbench to redeploy the broker's configuration. To change the user ID that is used for database access, see "Administering the broker domain" on page 253.

Examples:

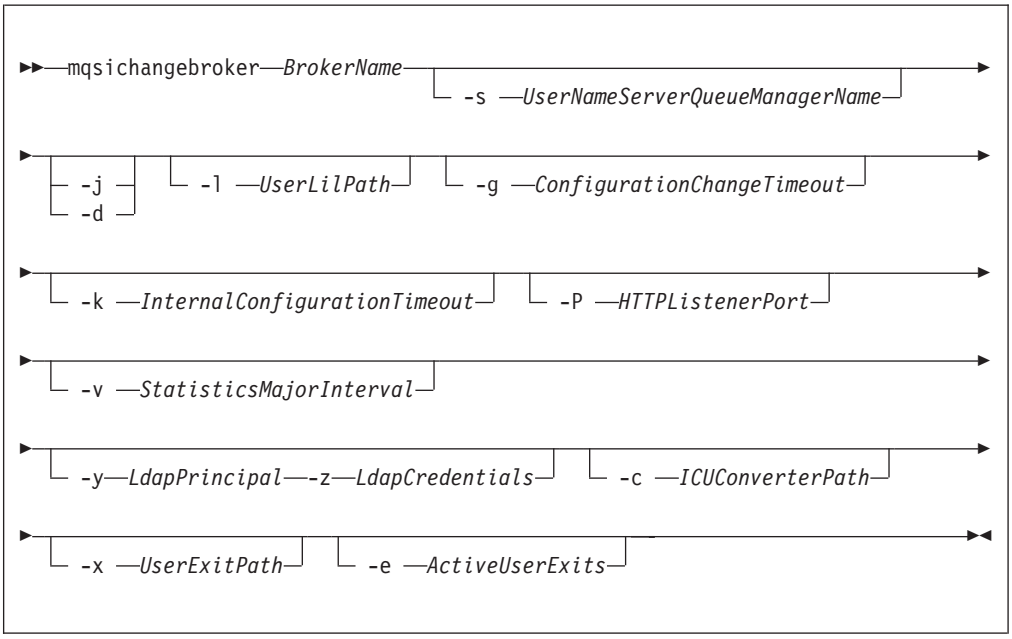
Windows, Linux, and UNIX systems:

```
mqsichangebroker WBRK_BROKER -s WBRK_UNS_QM
mqsichangebroker WBRK_BROKER -s ""
mqsichangebroker WBRK_BROKER -x /opt/3rdparty/wmbexit
```

mqsichangebroker command - z/OS:

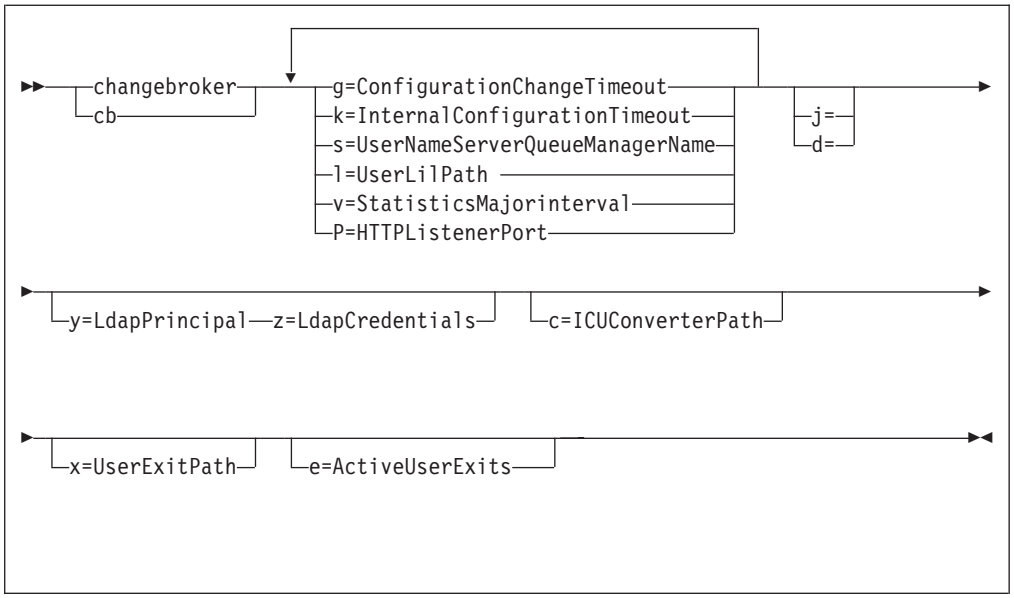
Syntax:

z/OS command - BIPCHBK:



z/OS console command:

Synonym: cb



Parameters:

BrokerName
(Required) This parameter must be the first parameter. Specify the name of the broker to modify.

This parameter is implied in the console form of the command.

-s *UserNameServerQueueManagerName*
(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server.

To remove topic-based security, specify an empty string (two quotation marks, ″″).

This name is case sensitive; enclose the names in single quotation marks if they are in mixed case.

-j (Optional) Publish/subscribe access is enabled for the broker. This parameter is valid only with the **-s** parameter.

-d (Optional) Publish/subscribe access is not enabled for the broker.

-l *UserLilPath*
(Optional) A list of paths (directories) from which the broker loads LILs (loadable implementation libraries) for user-defined message processing nodes.

This name is case sensitive; enclose the names in single quotation marks if they are in mixed case.
Do not include environment variables in this path; WebSphere Message Broker ignores them.

Create your own directory for storing your `.lil` or `.jar` files. Do not save them in the WebSphere Message Broker installation directory.
If you specify more than one additional directory, each directory must be separated by the default platform-specific path separator: semicolon (`;`) on Windows systems; colon (`:`) on Linux and UNIX systems.

-g *ConfigurationChangeTimeout*
(Optional) The maximum time (in seconds) that is allowed for a user configuration request to be processed. It defines the length of time taken

within the broker to apply to an execution group a configuration change that you have initiated. For example, if you deploy a configuration from the workbench, the broker must respond to the Configuration Manager within this time.

A message flow cannot respond to a configuration change while it is processing an application message. An execution group that has been requested to change its configuration returns a negative response to the deployed configuration message if any one of its message flows does not finish processing an application message and apply the configuration change within this timeout.

Specify the value in seconds, in the range 10 to 3600. The default is 300.

For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-k *InternalConfigurationTimeout*
(Optional) The maximum time (in seconds) that is allowed for an internal configuration change to be processed. For example, it defines the length of time taken within the broker to start an execution group.

The response time of each execution group differs according to system load and the load of its own processes. The value must reflect the longest response time that any execution group takes to respond. If the value is too low, the broker returns a negative response, and might issue error messages to the local error log.
Specify the value in seconds, in the range 10 to 3600. The default is 60.
For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-P *HTTPListenerPort*
(Optional) Enter the number of the port on which the Web Services support is listening.

The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started; the default is 7080.

Ensure that the port that you specify has not been specified for any other purpose.

-v *StatisticsMajorInterval*
(Optional) Specify the interval (in minutes) at which WebSphere Message Broker statistics and accounting is notified that archive records are to be output. The valid range is from 10 to 14400 minutes.

An interval of zero minutes indicates that the operating system has an external method of notification and is not using an internal timer within WebSphere Message Broker.

-y *LdapPrincipal*
(Optional, but mandatory when *LdapCredentials* is provided.) The user principal for access to an optional LDAP directory that holds the JNDI administered Initial Context for the JMS provider.

-z *LdapCredentials*
(Optional, but mandatory when *LdapPrincipal* is provided.) The user password for access to LDAP.

-c *ICUConverterPath*
(Optional) A delimited set of directories to search for additional code page converters; the delimiter is a period (.).

The code page converters must be either of the form icudt32_*codepagename*.cnv, or in an ICU data package called icudt32.dat.

Do not use this parameter to set the converter path if you are using a converter that matches one of the built-in converters that are provided with Version 6.0, and that converter is the local code page for the broker. Use the **ICU_DATA** environment variable instead.

-x *UserExitPath*
(Optional) The path that contains the location of all user exits to be loaded for 32-bit execution groups in this broker. This path is added to the system library search path (PATH,LIBPATH,LD_LIBRARY_PATH,SHLIBPATH) for the execution group process only.

-e *ActiveUserExits*
(Optional) Active user exits. By default, user exits are inactive. Adding a *userExit* name to this colon-separated list changes its default state to active for this broker. You can use the mqsichangeflowuserexits command to override the default state at the execution group or message flow level. If you specify a user exit name, and no library is found to provide that user exit when the execution group starts, a BIP2314 message is written to the system log, and the execution group fails to start.

To change other broker properties, first delete and re-create the broker, and then use the workbench to redeploy the broker's configuration. To change the user ID that is used for database access, see "Administering the broker domain" on page 253.

Examples:

z/OS:

```
F MQP1BRK,cb g=100,k=200
```

You must use a comma between each command option. The following command illustrates this requirement and uses both the **u** and **e** parameters:

```
/f MA05BRK,cb x='/u/test/wbi/MsgFlowTrackingUserExit/zOS',e='MqsiStrUserExit02:MqsiStrUserExit03'
```

mqsichangeconfigmgr command

The **mqsichangeconfigmgr** command changes some of the properties of the Configuration Manager.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPCHCM; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

You must stop the Configuration Manager before you can issue this command, and restart the Configuration Manager for the changes to take effect:

- On Windows, Linux, and UNIX systems, use the **mqsistop** and **mqsistart** commands.
- On z/OS, you must have started the original Configuration Manager control process using the /S option. You must stop the Configuration Manager

components using the /F Configuration Manager, PC option and start the Configuration Manager components again using the /F Configuration Manager, SC option.

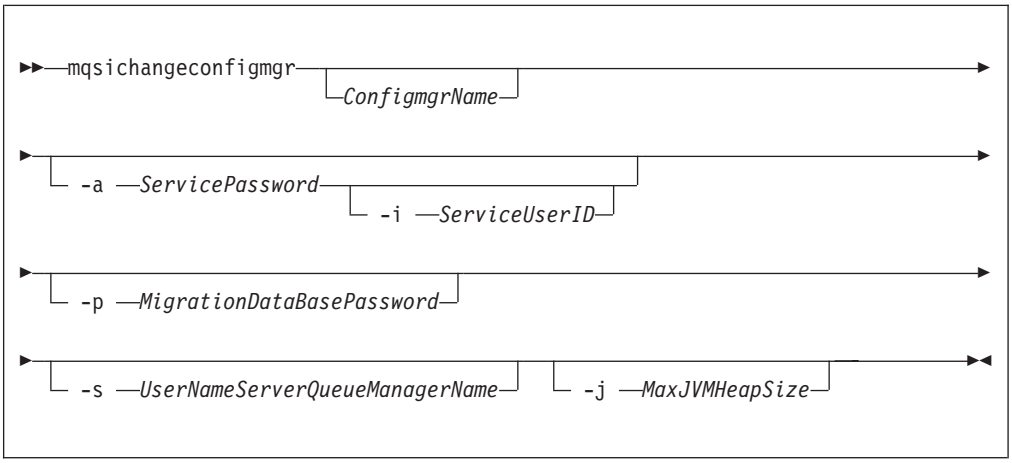
See “mqsistop command” on page 474 and “mqsistart command” on page 469 for more information.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- “mqsichangeconfigmgr command - Windows”
- “mqsichangeconfigmgr command - Linux and UNIX systems” on page 330
- “mqsichangeconfigmgr command - z/OS” on page 332

mqsichangeconfigmgr command - Windows:

Syntax:



Parameters:

ConfigmgrName
(Optional) The name, which is not case sensitive, of the Configuration Manager that you want to change.

The default name on Windows, if this parameter is not specified, is 'ConfigMgr'.

-i *ServiceUserID*
(Optional) The user ID under which the Windows system service runs. You can only change this value if you also change the password.

This can be specified in any valid user name syntax for the platform. If you use the unqualified form for this user ID (username) on Windows systems, the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete.

The ServiceUserID specified must be a member (either direct or indirect) of the local group **mqbrkrs**. The ServiceUserID must also be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the **mqsicreateconfigmgr -w** flag). This ID must also be a member (either direct or indirect) of the local group **mqm**.

The security requirements for the ServiceUserID are detailed in “Security requirements for Windows platforms” on page 539.

-a *ServicePassword*
(Optional) The password for the ServiceUserID.

If you created the Configuration Manager to use this user ID and password for database access as well (that is, you provided the same user ID and password for the service user ID using -a ServicePassword and -i ServiceUserID), ensure that you update all instances of the password on this command.

To complete a password change successfully, you must:

- Stop the Configuration Manager.
- Change the password using the appropriate operating system facilities.
- Use this command to update all parameters that reference this same password.
- Restart the Configuration Manager.

For compatibility with existing systems, you can still specify <password>. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-p *MigrationDataBasePassword*
(Optional) The password for the DB2 database that you are migrating.

Ensure that you change all instances of the use of this password. If you have created (or changed) the Configuration Manager to use the same user ID and password for its service user ID as well as its database access, you must update all instances at the same time. See the description of -a for further details.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If you want to remove topic security, specify an empty string (two double quotation marks, "").

-j *MaxJVMHeapSize*

(Optional) The maximum Java virtual machine (JVM) heap size, in megabytes. The smallest value that you can set is 64. If you do not set this parameter, the default size of 128 MB is used.

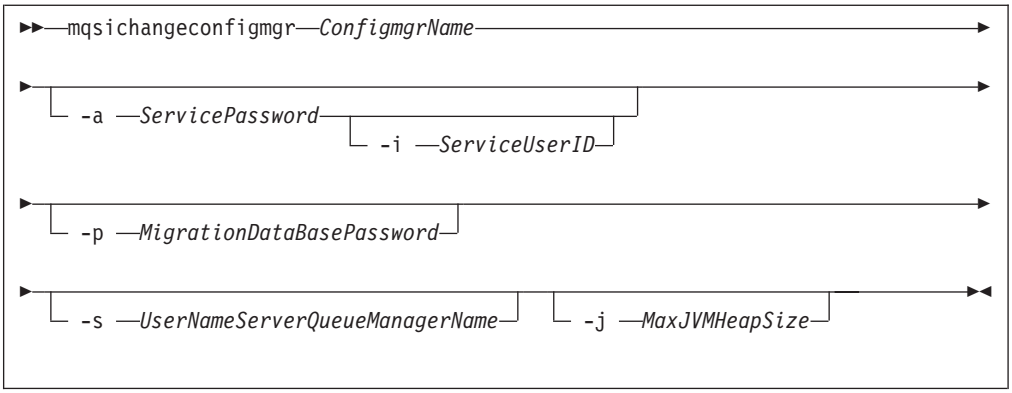
If you want to change other properties, you must delete and recreate the Configuration Manager. If you want to change the DataBaseUserID, see “Modifying access to the broker database” on page 181 for instructions.

Examples:

```
mqsichangeconfigmgr CMGR01 -i ADMIN
mqsichangeconfigmgr CMGR01 -s ""
```

mqsichangeconfigmgr command - Linux and UNIX systems:

Syntax:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager that you want to change.

This must be the first parameter specified and the name is case-sensitive.

-i *ServiceUserID*

(Optional) This can be specified in any valid user name syntax for the platform.

The `ServiceUserID` specified must be a member (either direct or indirect) of the local group **mqbrkrs**. The `ServiceUserID` must also be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the **mqsicreateconfigmgr -w** flag). This ID must also be a member (either direct or indirect) of the local group **mqm**.

The security requirements for the `ServiceUserID` are detailed in "Security requirements for Linux and UNIX platforms" on page 538.

-a *ServicePassword*
(Optional) The password for the `ServiceUserID`.

If you created the Configuration Manager to use this user ID and password for database access as well (that is, you provided the same user ID and password for the service user ID using `-a ServicePassword` and `-i ServiceUserID`), ensure that you update all instances of the password on this command.

To complete a password change successfully, you must:

- Stop the Configuration Manager.
- Change the password using the appropriate operating system facilities.
- Use this command to update all parameters that reference this same password.
- Restart the Configuration Manager.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-p *MigrationDataBasePassword*
(Optional) The password for the DB2 database that you are migrating.

Ensure that you change all instances of the use of this password. If you have created (or changed) the Configuration Manager to use the same user ID and

password for its service user ID as well as its database access, you must update all instances at the same time. See the description of `-a` for further details.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If you want to remove topic security, specify an empty string (two double quotation marks, `""`).

-j *MaxJVMHeapSize*

(Optional) The maximum Java virtual machine (JVM) heap size, in megabytes. The smallest value that you can set is 64. If you do not set this parameter, the default size of 128 MB is used.

If you want to change other properties, you must delete and recreate the Configuration Manager. If you want to change the `DataBaseUserID`, see "Modifying access to the broker database" on page 181 for instructions.

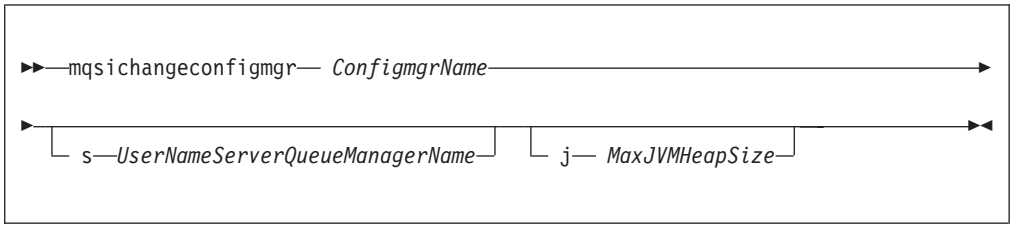
Examples:

```
mqsichangeconfigmgr CMGR01 -i ADMIN
mqsichangeconfigmgr CMGR01 -s ""
```

mqsichangeconfigmgr command - z/OS:

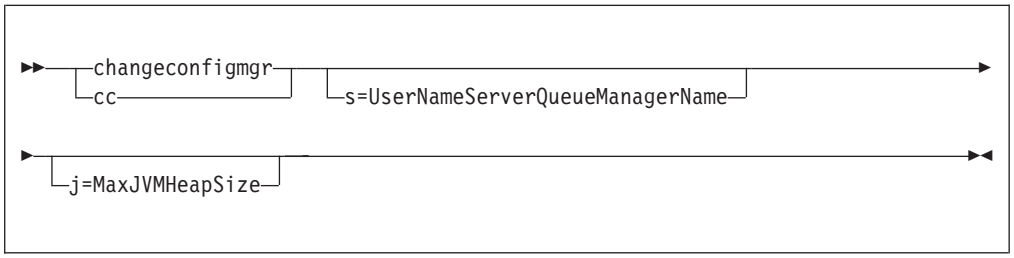
Syntax:

z/OS command - BIPCHCM:



z/OS console command:

Synonym: cc



Parameters:

ConfigmgrName

(Required) The name of the Configuration Manager that you want to change. This parameter is implied when using the console command.

This must be the first parameter specified and the name is case-sensitive.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If you want to remove topic security, specify an empty string (two double quotation marks, "").

-j *MaxJVMHeapSize*

(Optional) The maximum Java virtual machine (JVM) heap size, in megabytes. The smallest value that you can set is 64. If you do not set this parameter, the default size of 128 MB is used.

If you want to change other properties, you must delete and recreate the Configuration Manager. If you want to change the `DataBaseUserID`, see "Modifying access to the broker database" on page 181 for instructions.

Examples:

```
mqsichangeconfigmgr CMGR01 -s ""
```

mqsichangedbimgr command

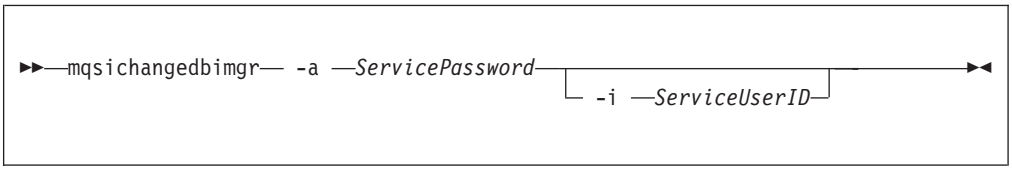
Supported platforms:

- Windows

Purpose:

The **mqsichangedbimgr** command updates the Windows service that runs the Derby Network Server, with a new user password, a new user ID, or both.

Syntax:



Parameters:

-a *ServicePassword*

(Required) The new password for the ServiceUserID. To complete a password change successfully, you must:

- Stop all the broker components using the **mqsistop** command.
- Change the password using the appropriate Windows facilities.
- Use the appropriate mqsichange commands to update all the components that reference this same ServiceUserID and password.
- Restart all the broker components using the **mqsistart** command.

-i *ServiceUserID*

(Optional) The user ID under which the default database runs. This can be specified in any valid username syntax. On Windows systems, these are:

- `domain\username`
- `\\server\username`
- `.\username`

- `username`

  If you use the unqualified form for this user ID (username) on Windows systems, the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete. The ServiceUserID specified must be a member of the local group **mqbrkrs**. On Windows systems, it can be a direct or indirect member of the group. The ServiceUserID must also be authorized to access the home directory (where WebSphere Message Broker has been installed). The security requirements for the ServiceUserID are detailed in "Security requirements for Windows platforms" on page 539.

Authorization:

The user ID used to invoke this command must have Administrator authority on the local system and be part of the **mqbrkrs** group.

Examples:

The following example changes the password used for the IBM WebSphere Message Broker `DatabaseInstanceMgr` service:

```
mqsichangedbimgr -a wbrkpw1
```

mqsichangeflowstats command

Supported Platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPCHMS; see "Contents of the broker PDSE" on page 491

Purpose:

Use the **mqsichangeflowstats** command to:

- Turn on or off accounting and statistics snapshot publication, or archive record output.
- Specify that the command is applied to a specific flow message flow, or all flows in an execution group, or all execution groups belonging to a broker.
- Modify the granularity of the data collected in addition to the standard message flow accounting and statistics. This extra data can include thread related data, node related data, node terminal related data, or a mixture of this data.

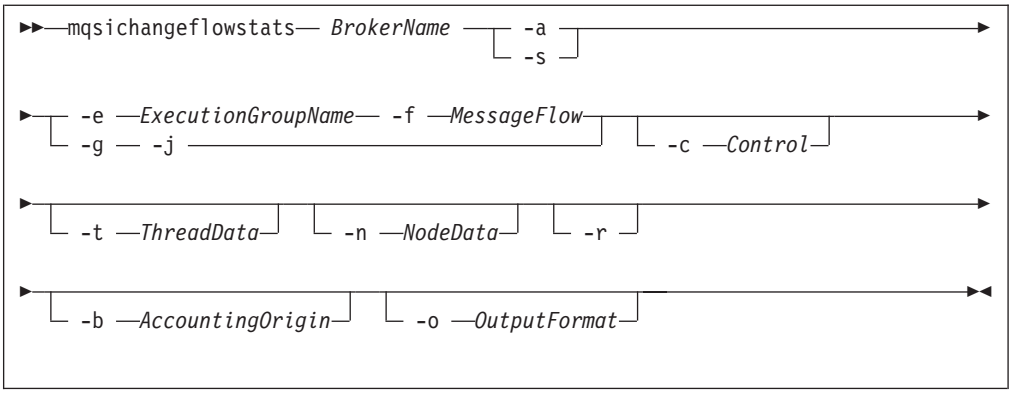
The options set using this command remain active until modified by a subsequent **mqsichangeflowstats** command.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsichangeflowstats command - Windows, Linux and UNIX systems"
- "mqsichangeflowstats command - z/OS" on page 337

mqsichangeflowstats command - Windows, Linux and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required) Specify the label of the broker for which accounting and statistics are to be changed.

-a (Required) Specify that the command modifies archive accounting and statistics collection.

You must specify either **-a** or **-s**. If you do not specify one of these arguments you receive a warning message.

-s (Required) Specify that the command modifies snapshot accounting and statistics collection.

You must specify either **-a** or **-s**. If you do not specify one of these arguments you receive a warning message.

-e *ExecutionGroupName*
(Required) Specify the name for the execution group, for which accounting and statistics options are to be changed.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-f *MessageFlow*
(Required) Specify the label for the message flow, for which accounting and statistics options are to be changed.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

-g (Required) Specifies that the command applies to **all** execution groups that belong to the broker.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-j (Required) Specifies that the command applies to **all** message flows that belong to the execution group.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

Note: If you set the **-g** option for all execution groups, you must use **-j** instead of **-f**.

-c *Control*
(Optional) Specify the string value that controls the level of the action to be applied to accounting and statistics collection for snapshot or archiving. Possible values are:

- active - turn on snapshot or archiving
- inactive - turn off snapshot or archiving.

-t *ThreadData*
(Optional) Specify a string value to modify the collection of thread statistics data for a message flow Possible values are:

- none - exclude thread related data from the statistics
- basic - include thread related data in the statistics

-n *NodeData*
(Optional) Specify a string value to modify the collection of node statistics data for a message flow. Possible values are:

- none - exclude node related data in the statistics
- basic - include node related statistics in the statistics
- advanced - include node related and terminal related data in the statistics

-r (Optional) This parameter applies only to archive data and specifies that archive data is to be reset.

This results in the clearing out of accounting and statistics data accumulated so far for this interval, and restarts collection from this point. All archive data for all flows in the execution group, or groups, is reset.

The archive interval timer is only reset if the **-v** option (*statistics archive interval*) of **mqsicreatebroker** or **mqsichangebroker** is non zero.

That is, the interval timer is set only if the internal interval notification mechanism is being used, and not an external method.

-b *AccountingOrigin*
(Optional) Specifies that the environment tree path *Broker.Accounting.Origin* is used to partition the collected statistics into distinct outputs. Possible values are:

- none - do not partition statistics according to accounting origin data
- basic - partition statistics according to accounting origin data

-o *OutputFormat*
(Optional) Specify the output destination for the statistics reports. Possible values are:

- usertrace - this is the default and writes ″bip″ messages to usertrace, which can be post processed in the normal way using the **mqsireadlog** and **mqsiformatlog** commands
- xml - the statistics reports are generated as XML documents and published by the broker running the message flow.

  The topic on which the data is published has the following structure:

  ```
  $SYS/Broker/<brokerName>/StatisticsAccounting/<recordType>
  /<executionGroupLabel>/<messageFlowLabel>
  ```

  where recordType is set to Snapshot or Archive, and broker, execution group, and message flow names are specified according to the subscriber's requirements.

Examples:

Turn on snapshot statistics for the message flow ″myFlow1″ in all execution groups of BrokerA and specify that the data is to be gathered by accounting origin:

```
mqsichangeflowstats BrokerA -s -g -j -b none
```

Turn off the collection of archive statistics for message flow ″MyFlow1″ in execution group ″EGRP2″ for BrokerA, and at the same time modify the granularity of data that is to be collected (when next activated) to include thread related data.

```
mqsichangeflowstats BrokerA -a -e "EGRP2" -f MyFlow1 -c inactive -t basic
```

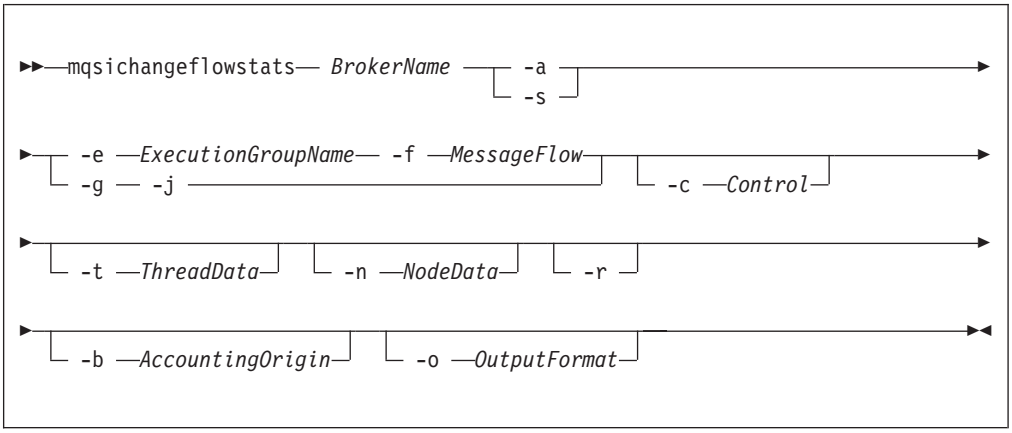
Turn off snapshot data for all message flows in all execution groups for Broker A.

```
mqsichangeflowstats BrokerA -s -g -j -c inactive
```

mqsichangeflowstats command - z/OS:

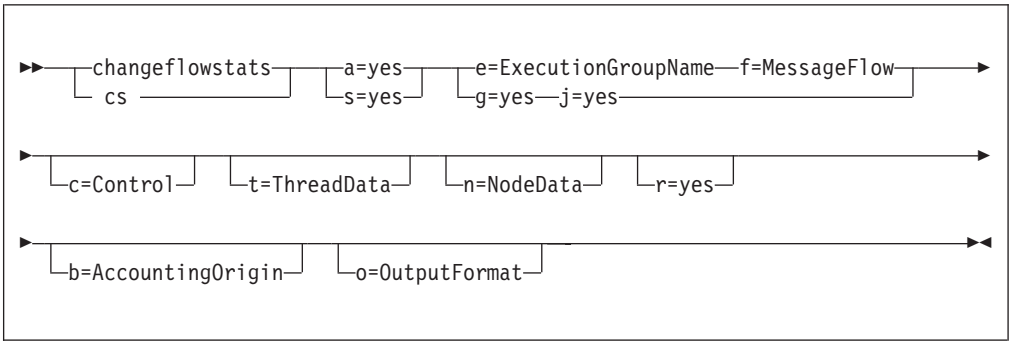
Syntax:

z/OS command - BIPCHMS:



z/OS console command:

Synonym: cs



Parameters:

BrokerName
(Required) Specify the label of the broker for which accounting and statistics are to be changed.

This parameter is implied on the console form of the command.

-a (Required) Specify that the command modifies archive accounting and statistics collection.

You must specify either **-a** or **-s**. If you do not specify one of these arguments you receive a warning message.

-s (Required) Specify that the command modifies snapshot accounting and statistics collection.

You must specify either **-a** or **-s**. If you do not specify one of these arguments you receive a warning message.

-e *ExecutionGroupName*
(Required) Specify the name for the execution group, for which accounting and statistics options are to be changed.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-f *MessageFlow*
(Required) Specify the label for the message flow, for which accounting and statistics options are to be changed.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

-g (Required) Specifies that the command applies to **all** execution groups that belong to the broker.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-j (Required) Specifies that the command applies to **all** message flows that belong to the execution group.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

Note: If you set the **-g** option for all execution groups, you must use **-j** instead of **-f**.

-c *Control*
(Optional) Specify the string value that controls the level of the action to be applied to accounting and statistics collection for snapshot or archiving. Possible values are:

- active - turn on snapshot or archiving
- inactive - turn off snapshot or archiving.

-t *ThreadData*
(Optional) Specify a string value to modify the collection of thread statistics data for a message flow Possible values are:

- none - exclude thread related data from the statistics
- basic - include thread related data in the statistics

-n *NodeData*
(Optional) Specify a string value to modify the collection of node statistics data for a message flow. Possible values are:

- none - exclude node related data in the statistics
- basic - include node related statistics in the statistics
- advanced - include node related and terminal related data in the statistics

-r (Optional) This parameter applies only to archive data and specifies that archive data is to be reset.

This results in the clearing out of accounting and statistics data accumulated so far for this interval, and restarts collection from this point. All archive data for all flows in the execution group, or groups, is reset.

The archive interval timer is only reset if the **-v** option (*statistics archive interval*) of **mqsicreatebroker** or **mqsichangebroker** is non zero.

That is, the interval timer is set only if the internal interval notification mechanism is being used, and not an external method.

-b *AccountingOrigin*
(Optional) Specifies that the environment tree path *Broker.Accounting.Origin* is used to partition the collected statistics into distinct outputs. Possible values are:

- none - do not partition statistics according to accounting origin data
- basic - partition statistics according to accounting origin data

-o *OutputFormat*
(Optional) Specify the output destination for the statistics reports. Possible values are:

- usertrace - this is the default and writes ″bip″ messages to usertrace, which can be post processed in the normal way using the **mqsireadlog** and **mqsiformatlog** commands
- xml - the statistics reports are generated as XML documents and published by the broker running the message flow.

  The topic on which the data is published has the following structure:

  ```
  $SYS/Broker/<brokerName>/StatisticsAccounting/<recordType>
  /<executionGroupLabel>/<messageFlowLabel>
  ```

  where recordType is set to Snapshot or Archive, and broker, execution group, and message flow names are specified according to the subscriber's requirements.
- smf - statistics reports are output as SMF type 117 records.

Examples:

Turn on snapshot statistics for the message flow ″myFlow1″ in all execution groups and specify that the data is to be gathered by accounting origin:

```
mqsichangeflowstats -s -g -j -b none
```

Turn off the collection of archive statistics for message flow ″MyFlow1″ in execution group ″EGRP2″ , and at the same time modify the granularity of data that is to be collected (when next activated) to include thread related data.

```
mqsichangeflowstats -a -e "EGRP2" -f MyFlow1 -c inactive -t basic
```

The following example uses the console form of the command. Turn on archive accounting for all the message flows in all the execution groups that belong to the broker and output the report as SMF records.

```
F VCP2BRK,CS A=YES,G=YES,J=YES,C=ACTIVE,O=SMF
```

mqsichangeflowuserexits command

Supported operating systems:

- Windows

- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting the BIPCHUE utility; see "Contents of the broker PDSE" on page 491

Purpose:

Use the **mqsichangeflowuserexits** command to set the list of active or inactive user exits. There is a list of active and a list of inactive user exits for each execution group and message flow. The effective state of user exits for a given flow is decided when the flow starts.

The order of precedence is message flow, execution group, and then broker default. The active list takes precedence over the inactive list in the message flow and execution group settings.

If the state for a given user exit is not set for the message flow, then its state is taken from the execution group setting. If its state is not set for the message flow or execution group, then it takes the default state which is implicitly inactive, or can be explicitly defined as active by the broker property *activeUserExits*, through the **mqsichangebroker** command.

If a particular user exit name is present in both the active and inactive lists for a message flow or execution group, then the active list takes precedence and the user exit is active for that level. Therefore, if you want to change a user exit from active to inactive you must specify it as part of the inactive list, by using the **-i** flag and also remove it from the active list by re-specifying the new active list by using the **-a** flag.

When multiple exits are active for a given flow, they are invoked in a defined order. Those exits in the message flow's active list are invoked first in the order that they were specified on the **-a** flag.

After those have been invoked, the exits in the execution group's active list (which were in neither the message flow's active nor inactive list) are invoked. These are invoked in the order that they were specified on the **-a** flag.

All user exits that are not mentioned in the execution group's or message flow's active or inactive list, but are in the broker's active list, are invoked in the order that they were specified when the broker property *activeUserExits* was set.

If any of the user exits specified in either the active or inactive list are not registered for the target execution group, the command fails with a BIP8858 error.

After successful command completion, if any user exits specified become invalid then, depending on which list the user exit appeared in, the following action is taken:

- If the user exit was specified in the message flow's active or inactive list, then the flow fails to start and a BIP2315 message is written to system log.
- If the user exit was specified in the execution group's active or inactive list, then the execution group fails to start and a BIP2314 message is written to system log.

This could happen for one of the following 3 reasons:

- The broker or execution group is re-started after you change the MQSI_USER_EXIT_PATH variable by removing the directory containing the user exit library.
- The broker or execution group is re-started after you change the *userExitPath* broker property by removing the directory containing the user exit library.
- The user exit library (or one of its dependencies) is removed or broker is unable to load it.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

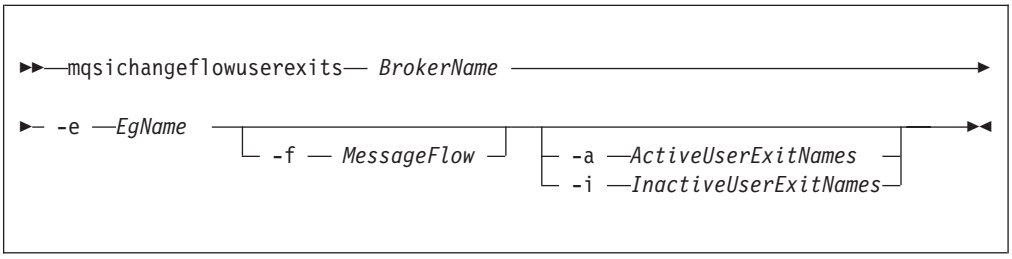
- "mqsichangeflowuserexits command - Windows, Linux, and UNIX systems"
- "mqsichangeflowuserexits command - z/OS" on page 342

Authorization:

On Windows, Linux and UNIX systems, the user ID that is used to invoke this command must have **mqbrkrs** group authority.

mqsichangeflowuserexits command - Windows, Linux, and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required). The name of the broker.

-e *EgName*
(Required). The name of the execution group.

-f *MessageFlow*
(Optional). The name of the message flow.

If you supply this value, the user exit is changed for that message flow; if you do not, the user exit is set at the execution group level.

-a *ActiveUserExitNames*
(Optional). A list of the names, separated by colons, of the active user exits. These are the names registered by the user exits when they were loaded. If any of the user exits listed are not registered for the target execution group, then the command fails with a BIP8858 error.

-i *InactiveUserExitNames*
(Optional). A list of the names, separated by colons, of the inactive user exits. These are the names registered by the user exits when they were loaded. If any of the user exits listed are not registered for the target execution group, then the command fails with a BIP8858 error.

Examples:

Setting active exits at flow level

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -a exit2
BIP8071I: Successful command completion.
```

Setting inactive exits at flow level

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -i exit1
BIP8071I: Successful command completion.
```

Setting active exits at execution group level

```
mqsichangeflowuserexits WBRK_BROKER -e default -a exit3,exit1
BIP8071I: Successful command completion.
```

Setting inactive exits at execution group level

```
mqsichangeflowuserexits WBRK_BROKER -e default -1 exit2
BIP8071I: Successful command completion.
```

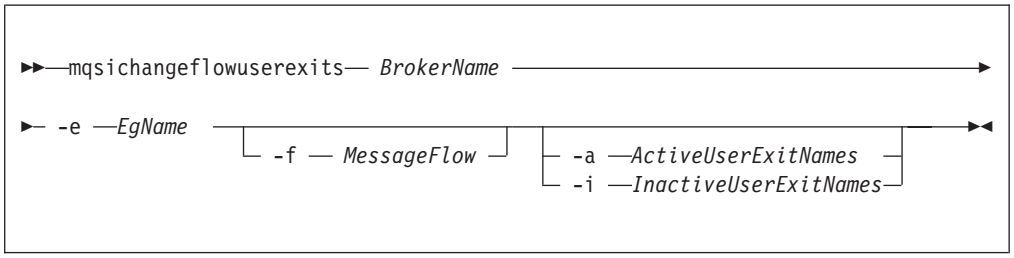
Changing exit1 to inactive and leaving exit2 active at flow level (A command had previously been issued with ″-a exit1:exit2″ to set them both active)

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -i exit1 -a exit2
BIP8071I: Successful command completion.
```

mqsichangeflowuserexits command - z/OS:

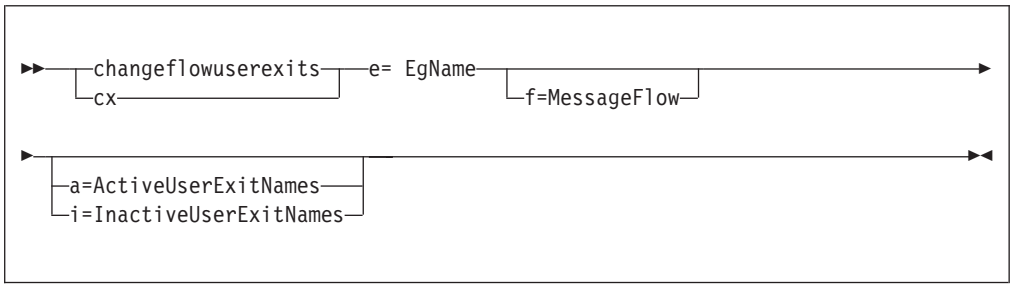
Syntax:

z/OS command - BIPCHUE:



z/OS console command:

Synonym: cx



Parameters:

BrokerName
(Required). The name of the broker.

-e *EgName*
(Required). The name of the execution group.

-f *MessageFlow*
(Optional). The name of the message flow.

If you supply this value, the user exit is changed for that message flow; if you do not, the user exit is set at the execution group level.

-a *ActiveUserExitNames*
(Optional). A list of the names, separated by colons, of the active user exits. These are the names registered by the user exits when they were loaded. If any of the user exits listed are not registered for the target execution group, then the command fails with a BIP8858 error.

-i *InactiveUserExitNames*
(Optional). A list of the names, separated by colons, of the inactive user exits. These are the names registered by the user exits when they were loaded. If any of the user exits listed are not registered for the target execution group, then the command fails with a BIP8858 error.

Examples:

Setting active exits at flow level

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -a exit2
BIP8071I: Successful command completion.
```

Setting inactive exits at flow level

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -i exit1
BIP8071I: Successful command completion.
```

Setting active exits at execution group level

```
mqsichangeflowuserexits WBRK_BROKER -e default -a exit3,exit1
BIP8071I: Successful command completion.
```

Setting inactive exits at execution group level

```
mqsichangeflowuserexits WBRK_BROKER -e default -1 exit2
BIP8071I: Successful command completion.
```

Changing exit1 to inactive and leaving exit2 active at flow level (A command had previously been issued with ″-a exit1:exit2″ to set them both active)

```
mqsichangeflowuserexits WBRK_BROKER -e default -f myFlow -i exit1 -a exit2
BIP8071I: Successful command completion.
```

mqsichangeproperties command

Use the mqsichangeproperties command to modify broker properties and properties of broker resources.

Supported platforms:

- Windows systems.
- Linux and UNIX systems.
- z/OS. Run this command by customizing and submitting the BIPCHPR utility; see “Contents of the broker PDSE” on page 491.

Purpose:

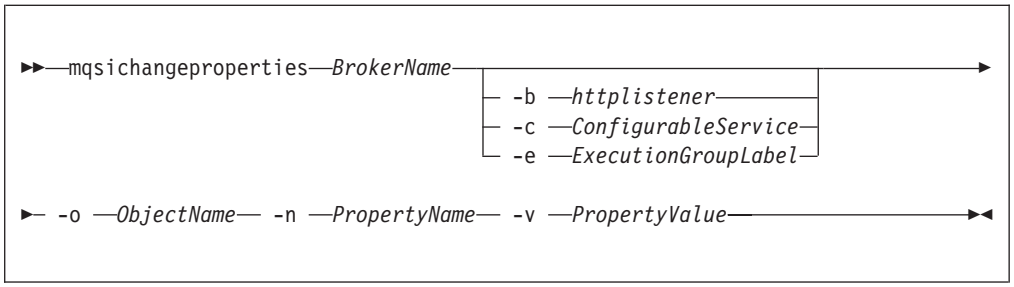
Use the mqsichangeproperties command to change properties that relate to inter-broker communications and the HTTP listener component, which includes the HTTP and HTTPS (SSL) support for the HTTPInput and HTTPReply nodes. You can also use the Configuration Manager Proxy API to change properties.

Use the mqsireportproperties command to view properties that are associated with a broker.

Usage notes:

- Before you run this command, ensure that the broker is running.
- If you change any value, stop and restart the broker for the change to take effect.
- The broker starts the HTTP listener when a message flow that includes HTTP nodes is started.

Syntax:



Parameters:

BrokerName
(Required) The name of the broker to modify. This parameter must be the first parameter.

-b *httplistener*
(Optional) The name of the component.

You must specify either **-b httplistener** or **-c *ConfigurableService***.

-c *ConfigurableService*
(Optional) The type of configurable service. The type is predefined; for example JMSProviders. You can define additional services of any defined type by using the mqsicreateconfigurableservice command.

You must specify either **-b httplistener** or **-c *ConfigurableService***.

-o *ObjectName*
(Required) The name of the object for which you want to change the properties.

For compatibility with previous versions, the ComIbmXmlParserFactory value is available for the **ObjectName**.

-n *PropertyName*
(Required) The name of the property to be changed. All property names start with a lowercase character.

-v *PropertyValue*
(Required) The value that is assigned to the property that is specified by the **-n**

parameter. You can specify more than one property name and corresponding value using commas as separators; for example, `-n Name1, Name2 -v Value1, Value2`. Provided that it is a valid value for the corresponding property, use `""` to specify an empty **PropertyValue** string.

-p *FileName*
(Optional) The location and name of the file from which the command reads property values. Use this parameter if you want to specify multiple property values, or those values have complex content that can be defined in a file, such as an XML file.

For detailed information about valid components, configurable services, object names, properties, and values, select the appropriate topic:

- "httplistener component parameter values" on page 346
- "Inter-broker communications parameter values (collectives)" on page 348
- "Inter-broker communications parameter values (clones)" on page 349
- "Real-time nodes parameter values" on page 349

Authorization

Windows On Windows systems, the user ID used to invoke this command must have **Administrator** authority on the local computer.

Linux UNIX On Linux and UNIX systems, the user ID used to invoke this command must be a member of the **mqbrkrs** group.

Additionally, the broker requires the following authority for the supported protocols:

PGM/IP
The broker requires:

- Linux UNIX **root** authority on Linux and UNIX systems
- Windows **Administrator** authority on Windows systems
- z/OS **root** authority (UNIX System Services only) on z/OS

PGM/UDP
The broker requires **User** authority on all supported platforms.

PTL The broker requires **User** authority on all supported platforms.

Examples:

Always enter the command on a single line; in some examples, a line break has been added to enhance readability.

Changes to components

The following examples specify the **-b** parameter to identify a particular broker component.

Enable the HTTPSConnector for the HTTP nodes deployed to the specified broker:

```
mqsichangeproperties TEST -b httplistener -o HTTPListener -n enableSSLConnector -v true
```

Change the default SSL protocol from SSLv3 to TLS for the HTTP nodes deployed to the specified broker:

```
| mqsichangeproperties TEST  -b httplistener -o HTTPSConnector -n sslProtocol -v TLS
```

Changes to properties associated with execution groups

The following examples include the **-e** parameter to specify the execution group to change.

Change the clientPingInterval to 200 for a cloned broker:

```
mqsichangeproperties TEST -e default -o DynamicSubscriptionEngine -n clientPingInterval -v 200
```

Enable multicast for a cloned broker:

```
mqsichangeproperties TEST -e default -o DynamicSubScriptionEngine -n multicastEnabled -v true
```

Changes to the BrokerRegistry object

Changes to configurable services

The following examples include the **-c** parameter to specify the type of configurable service to change.

| Change the location of the JAR files for the IBM WebSphere MQ JMS client:

```
| mqsichangeproperties WBRK6_DEFAULT_BROKER -c JMSProviders -o WebSphere_MQ
| -n jarsURL -v file://D:\SIBClient\Java
```

| **httplistener component parameter values:**

Select the objects and properties associated with HTTP nodes that you want to change.

To change these properties, you must specify the broker name and **-b httplistener**. The httplistener component defines properties for the broker that are used for all the HTTPInput and HTTPReply nodes that you deploy to that broker, including a single listener for all HTTP nodes.

Choose the **ObjectName** from the following options:
- HTTPListener for controlling the HTTPListener process
- HTTPConnector for controlling HTTP communication.
- HTTPSConnector for controlling HTTPS communication.

The following combinations are valid for the httplistener component:

-o HTTPListener

The following properties and values are valid:

httpDispatchThreads

The value is the number of threads that the broker dedicates to managing HTTP tunneling clients.

- Value type - integer
- Initial value -32

httpProtocolTimeout

The value is the number of milliseconds in the HTTP protocol timeout interval. You can change this value to update the amount of time a broker is to wait for the next event during any phase of the HTTP tunneling protocol. A value of 0 causes the broker to wait indefinitely.

- Value type - integer

- Initial value -10000

-n maxKeepAliveRequests

The value is the maximum number of HTTP requests that can be pipelined until the connection is closed by the server. Setting the attribute to 1 disables HTTP/1.0 keep-alive, as well as HTTP/1.1 keep-alive and pipelining. Setting the value to -1 allows an unlimited amount of pipelined or keep-alive HTTP requests.

- Value type - integer
- Initial value -100

-n maxThreads

The value is the maximum number of request processing threads to be created by this Connector. This value, therefore, determines the maximum number of simultaneous requests that can be handled.

- Value type - integer
- Initial value - 200

enableSSLConnector

A Boolean value which can be used to enable or disable the HTTPS (SSL) connector. You must set this value to TRUE to start the HTTP listener listening for inbound SSL connections.

- Value type - Boolean
- Initial value - FALSE

-o HTTPConnector

The following properties and values are valid:

address

For servers with more than one IP address, this value specifies which address is used for listening on the specified port. By default, this port is used on all IP addresses associated with the server. If specified, only one address can be used.

- Value type - string
- Initial value - null

port The TCP port number on which this HTTPConnector creates a server socket and awaits incoming connections.

- Value type - integer
- Initial value - 7080

-o HTTPSConnector

The properties listed for object name **HTTPConnector** are also valid for this object name. The following additional properties and values are valid:

algorithm

The certificate encoding algorithm to be used.

- Value type - string
- Initial value -
  - Solaris HP-UX SunX509 on Solaris and HPUX
  - AIX z/OS Linux Windows IbmX509 on other systems (AIX, z/OS, Linux, Windows)

clientAuth

Set to true if the SSL stack requires a valid certificate chain from the client before accepting a connection. A false value (which is the default) does not require a certificate chain unless the client requests a resource protected by a security constraint that uses CLIENT-CERT authentication.

- Value type - string
- Initial value - false

keystoreFile
The path to the keystore file where the server certificate, which is to be loaded, has been stored. By default, the HTTP listener expects a file called .keystore in the home directory of the user who started the broker.
- Value type - string
- Initial value - *default value* (described previously)

keystorePass
The password used to access the server certificate from the specified keystore file.
- Value type - string
- Initial value - changeit

keystoreType
The type of keystore file to be used for the server certificate.
- Value type - string
- Initial value - JKS

sslProtocol
The version of the SSL protocol to use.
- Value type - string
- Initial value - SSLv3

ciphers
A comma separated list of the encryption ciphers that can be used. If not specified (the default), then any available cipher can be used.
- Value type - string
- Initial value - null

The properties listed for object name **HTTPConnector** are also valid for this object name. The following additional properties and values are valid:The valid values for keystoreType, sslProtocol, and ciphers are JSSE-implementation specific, and these values are in the JSSE provider documentation.

See the "mqsichangeproperties command" on page 343 for examples of its use.

Inter-broker communications parameter values (collectives):

Select the properties and values that you want to change for inter-broker communications for brokers that you have configured in collectives.

To change these properties, you must specify the broker name and **-e** with the name of an execution group. You must also specify DynamicSubscriptionEngine for the **ObjectName**.

The following properties and values are valid for execution groups for brokers that you have configured in collectives:

-n brokerInputQueues
Specifies the maximum number of dispatch queues which are to be used when processing messages from an interbroker connection. Increasing the value might increase the rate at which messages can be transmitted across an interbroker connection:
- Value type - integer
- Initial value - 1

-n brokerInputQueueLength

Defines the maximum number of messages that can be stored in each input queue; the higher the value, the higher the number of input messages that can be stored in each input queue. Note that the higher the value of this property, the larger the amount of memory that the broker requires for each queue:

- Value type - integer
- Initial value - 99

See the "mqsichangeproperties command" on page 343 for examples of its use.

Inter-broker communications parameter values (clones):

Select the properties and values that you want to change for inter-broker communications for cloned brokers.

To change these properties, you must specify the broker name and **-e** with the name of an execution group. You must also specify DynamicSubscriptionEngine for the **ObjectName**.

The following properties and values are valid for execution groups for cloned brokers:

-n brokerPingInterval

The time in milliseconds between broker initiated ping messages on broker-broker connections. Ping messages ensure that the communications are still open between both sides of the connection, and are generated internally. If the value is 0, the broker does not initiate pings.

- Value type - integer
- Initial value - 5000

-n clientPingInterval

The time in milliseconds between broker initiated ping messages on broker-client connections. Ping messages ensure that the communications are still open between both sides of the connection, and are generated internally. If the value is 0, the broker does not initiate pings.

- Value type - integer
- Initial value - 30000

-n clonedPubSubBrokerList

The list of brokers in which *brokername* registers to be a clone.

- Value type - string
- Initial value - none

See the "mqsichangeproperties command" on page 343 for examples of its use.

Real-time nodes parameter values:

Select the properties and values associated with the Real-time nodes that you want to change.

To change these properties, you must specify the broker name and **-e** with the name of an execution group. You must also specify DynamicSubscriptionEngine for the **ObjectName**.

The following properties and values are valid for use with Real-timeInput and Real-timeOptimizedFlow nodes:

-n httpDispatchThreads

The number of threads that the broker dedicates to managing HTTP tunneling clients.

- Value type - integer
- Initial value -32

-n httpProtocolTimeout

The number of milliseconds in the HTTP protocol timeout interval. You can change this value to update the amount of time a broker is to wait for the next event during any phase of the HTTP tunneling protocol. A value of 0 causes the broker to wait indefinitely.

- Value type - integer
- Initial value -10000

-n enableClientDiscOnQueueOverflow

If true, and if after deleting all possible messages the maxClientQueueSize is still exceeded, the broker disconnects the client.

- Value type - Boolean
- Initial value - False

-n enableQopSecurity

Enables the level of quality of protection for messages.

By default, Quality of Protection is enabled if either the isysQopLevel or sysQopLevel value has been changed from the default value of none.

- Value type - string
- Initial value - none

-n interbrokerHost

The IP host name of the broker. A single broker configuration can be left to default as null.

```
mqsichangeproperties <broker> -o DynamicSubscriptionEngine -n interbrokerHost -v <IP host name>
```

- Value type - string
- Initial value - null

If you change the value, the broker must be stopped and restarted. Then you must redeploy the full topology.

-n interbrokerPort

The port number on which the Broker listens for incoming inter-broker connections. If you want to run more than one broker on the same machine, set the interbrokerPort property to a different value for each broker. For example:

```
mqsichangeproperties <broker> -o DynamicSubscriptionEngine -n interbrokerPort -v <port number>
```

If you do not set the interbrokerPort value before the topology is deployed, restart the broker.

- Value type - integer
- Initial value -1507

If you change the value, you must stop and restart the broker, and redeploy the topology.

-n isysQopLevel

Applies to the system and allows brokers only to publish and subscribe.

- Value type - string
- Initial value - none

-n jvmMaxHeapSize
The size of the Java Virtual Machine (JVM) heap size used with the JVMManager for your Java user-defined nodes.

This value must be in the range 16 777 216 to 8 589 934 592.
- Value type - integer
- Initial value - 134 217 728

-n maxBrokerQueueSize
The maximum number of bytes that the broker can queue for transmission to another broker. If the maximum is exceeded, the broker deletes all messages queued to that broker, except for the latest message, high-priority messages, and responses. If 0, the broker does not limit the number of bytes queued to another broker.
- Value type - integer
- Initial value - 1000000

-n maxClientQueueSize
The maximum number of bytes that the broker can queue for transmission to a client. If the maximum is exceeded, the broker deletes all messages queued to that client, except for the latest message, high-priority messages, and response messages. If 0, the broker does not limit the number of bytes queued to a client.
- Value type - integer
- Initial value - 100000

The value of this property must be greater than, or equal to, the maxMessageSize value.

-n maxConnections
The maximum number of concurrently-connected clients that the broker permits. If this limit is reached, the broker denies new connection requests from clients. If this value is less than 0, the number of clients is unlimited.
- Value type - integer
- Initial value - 100

-n maxHopCount
The maximum number of multibroker links over which a message is sent, to ensure that messages never loop in a multibroker network. Set this value large enough to ensure that messages can travel the entire multibroker network.
- Value type - integer
- Initial value - 20

-n maxMessageSize
The maximum allowed message size in bytes. If a message exceeding this maximum size is received from a client, that client is disconnected.
- Value type - integer
- Initial value - 100000

The value of this property must be less than, or equal to, the maxClientQueueSize value.

-n multicastAddressRangeMax
The highest IPv4 address that the broker can use for its multicast transmissions.

This address must be in the range 224.0.0.2 to 239.255.255.255.
- Value type - string
- Initial value - 239.255.255.255

-n multicastAddressRangeMin
The lowest IPv4 address that the broker can use for its multicast transmissions.

This address must be in the range 224.0.0.2 to 239.255.255.255.
- Value type - string
- Initial value - 224.0.0.2

-n multicastBackoffTimeMillis
The maximum time, in milliseconds, that a client listens for another's NACKs before sending its own NACK. This value can be in the range 0 to 1000.
- Value type - integer
- Initial value - 100

-n multicastDataPort
The UDP data port through which multicast packets are sent and received.
- Value type - integer
- Initial value - 34343

-n multicastEnabled
Indicates whether the topics that are defined in the multicastTopicsConfigFile are delivered multicast. If the value is true, the topics in the multicastTopicsConfigFile are delivered multicast.
- Value type - Boolean
- Initial value - false

-n multicastHeartbeatTimeoutSec
The time in seconds between the arrival of control packets at each client. If a control packet does not arrive within the number, defined as twice the value specified by this property, of seconds of the previous control packet's arrival an error can be suspected.
- Value type - integer
- Initial value - 20

-n multicastLimitTransRate
Use this property in conjunction with the multicastTransRateLimitKbps property to control network congestion. Valid values are:

Disabled
Multicast data is transmitted as fast as possible

Static The transmission rate is limited by the value specified in multicastTransRateLimitKbps

Dynamic
The transmission rate can vary throughout the process, but never exceeds the value specified in multicastTransRateLimitKbps
- Value type - string
- Initial value - Disabled

-n multicastMaxKeyAge
The maximum age, in minutes, of a topic encryption key before it must be redefined.
- Value type - string
- Initial value - 360

-n multicastMaxMemoryAllowedKBytes
The maximum memory consumption by client reception buffers, measured in kilobytes.
- Value type - integer

- Initial value - 262144

This parameter is available only if a Pragmatic General Multicast (PGM) protocol is selected.

-n multicastMCastSocketTTL
The maximum number of hops that a multicast packet can make between the client and the broker. This value is one more than the maximum number of routers that there can be between the client and the broker.

A value of 1 indicates that the packet reaches all local nodes, but cannot be relayed by routers. The maximum value is 255.
- Value type - integer
- Initial value - 1

-n multicastMinimalHistoryKBytes
The minimum size, in kilobytes, of a buffer that is allocated as an archive for all transmitted packets. This buffer is shared by all reliable topics, and can be used to recover lost packets. This value must be in the range 1000 to 1000000.
- Value type - integer
- Initial value - 60000

-n multicastMulticastInterface
The interface to use for multicast transmissions. You can specify a host name or an IP address. A value of None causes the network interface to be operating system dependent.
- Value type - string
- Initial value - None

If you have only one network card, the default value of none works because the operating system uses the localhost value. However, if you have more than one network card you **must** set this parameter to ensure that the correct card is used.

-n multicastNACKAccumulationTimeMillis
The time, in milliseconds, that NACKs are aggregated in the broker, before recovered packets are sent. This value must be in the range 50 to 1000.
- Value type - integer
- Initial value - 300

-n multicastNACKCheckPeriodMillis
The time, in milliseconds, between periodic checks of reception status and sequence gap detection for NACK building. This value must be in the range 10 through 1000.
- Value type - integer
- Initial value - 500

-n multicastOverlappingTopicBehavior
This property is used to control the behavior of the broker when a client requests a multicast subscription for a topic, that is part of a topic hierarchy containing topics, explicitly excluded for multicast. Valid values are:

Accept
A matching multicast subscription is accepted and all publications matching the topic, except those that are specifically excluded, are multicast.

Reject A multicast subscription to a topic with children that are not enabled for multicast is rejected by the broker.

Revert Subscriptions to a topic, or to children of that topic, that are not enabled for multicast result in unicast transmission.
- Value type - string
- Initial value - Accept

-n multicastPacketBuffers
The number of memory buffers that are created at startup for packet reception. Having a high number of buffers available improves the reception performance and minimizes packet loss at high delivery rates, at the price of increased memory utilization. Each buffer is 33 KB and this value can be in the range 1 to 5000.
- Value type - integer
- Initial value - 500

-n multicastPacketSizeBytes
The size, in bytes, of multicast packets. This value must be in the range 500 to 32000.
- Value type - integer
- Initial value - 7000

-n multicastProtocolType
The protocol type. Valid values are:
- PTL
- PGM/IP
- PGM/UDP
- Value type - string
- Initial value - PTL

-n multicastSocketBufferSizeKbytes
The size, in kilobytes, of the client's socket receiver buffer. Increasing it leads to lower loss rates. This value can be in the range 65 to 10000.
- Value type - integer
- Initial value - 3000

-n multicastTransRateLimitKbps
Limits the overall transmission rate in Kb (kilobits) per second.

This property is effective only if the **multicastLimitTransRate** property is not disabled. Set the value of this property to be no higher than the maximum data transmission rate of the system or the network, and in the range 10 through 1000000
- Value type - integer
- Initial value - 9500

-n nonDurableSubscriptionEvents
Indicates whether the user requires event messages when a non-durable subscriber is created or deleted. A true value causes an event publication to be created, false indicates that no event publications are made.
- Value type - Boolean
- Initial value - False

-n pingTimeoutMultiple
The number of consecutive clientPngIntervals or brokerPngIntervals without a response that the broker waits before disconnecting a client or broker.
- Value type - integer
- Initial value - 3

-n statsInterval

The number of milliseconds between statistics publications. If set to 0, statistics publications are not generated. You do not need to restart the broker after changing this property, however it can take the broker up to a minute to start producing statistics after the value is changed.

This value must be in the range 0 through 1000.

- Value type - integer
- Initial value - 0

This value refers to the publish/subscribe statistics interval only.

-n sysQopLevel

Applies to the system and allows brokers only to publish.

- Value type - string
- Initial value - none

See the "mqsichangeproperties command" on page 343 for examples of its use.

mqsichangetrace command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS - as a console command

Purpose:

Use the **mqsichangetrace** command to set the tracing characteristics for a component. This command is valid for:

- User trace. Specify the `-u` option.
- Service trace. Specify the `-t` option. You are recommended to use this option only if directed to do so by the action described in a `BIPxxxx` message, or by your IBM Support Center.

You can initiate, modify, or terminate user tracing for a broker, or initiate, modify, or terminate service tracing for a broker, a Configuration Manager, or the User Name Server (identified by component name). You cannot use this command to initiate service tracing for the workbench.

If you specify a broker, or any of its resources (execution group or message flow), you must have deployed them before you can start trace.

The output for service and user trace generated by these commands is written to trace files in the `log` subdirectory. When you have completed the work you want to trace, use mqsireadlog to retrieve the log as an XML format file. Use either mqsiformatlog (to produce a formatted file) or an XML browser to view the XML records.

When you set tracing on, you cause additional processing to be executed for every activity in the component you are tracing. You must expect to see some impact on performance when trace is active.

If you want to trace the command processes themselves, set the environment variables `MQSI_UTILITY_TRACE` and `MQSI_UTILITY_TRACESIZE` before you initiate trace.

Ensure that you reset these variables when tracing for the selected command is complete. If you do not do so, all subsequent commands are also traced, and their performance degraded.

You can also start and stop tracing activity for execution groups and message flows using the facilities of the workbench. See User trace for more information.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsichangetrace command - Windows, Linux, and UNIX systems"
- "mqsichangetrace command - z/OS" on page 358

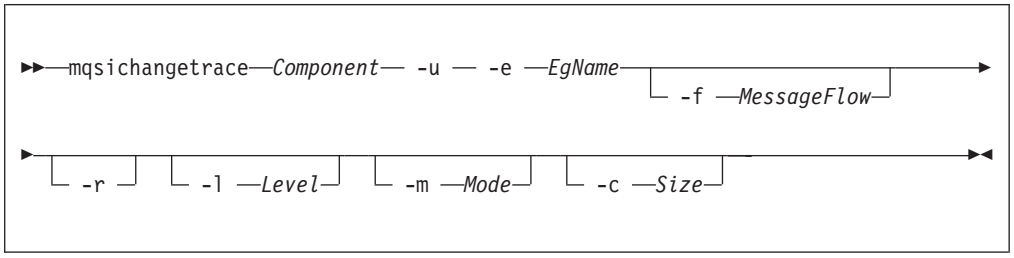
Authorization:

On Windows, Linux, and UNIX systems the user ID used to issue the command must have **mqbrkrs** authority.

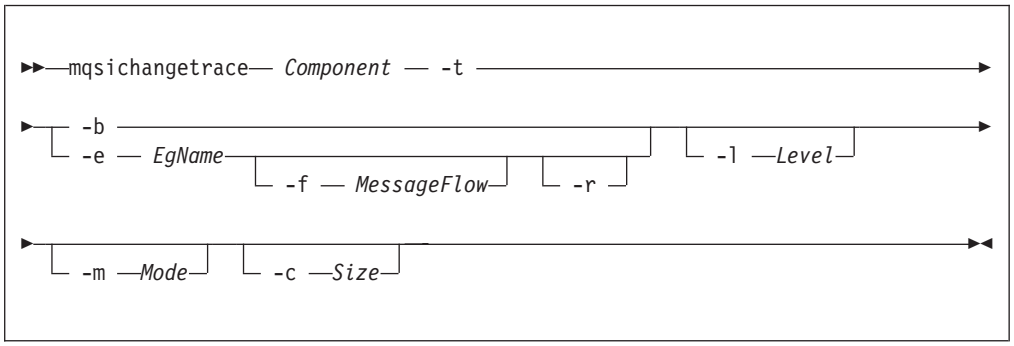
mqsichangetrace command - Windows, Linux, and UNIX systems:

Syntax:

User trace:



Service trace:



Parameters:

Component
(Required) This can either be the name of a broker, or of a Configuration Manager, or the fixed value, `UserNameServer` (all are case sensitive on UNIX systems and on Linux).

Key words `workbench` and `utility` are reserved and must not be used as a component name.

-u (Required for user trace only if the component is a broker)

Specifies that user trace options are to be modified. This option is only valid if you have specified a broker name as the component name.

-e *EgName*

(Required for user trace; optional for service trace)

Identifies the execution group for which trace options are to be modified (for example, started or stopped). This option is valid only for a broker.

-f *MessageFlow*

(Optional) Identifies the message flow for which trace options are to be modified. This option is only valid if you have specified an execution group (flag **-e**).

-r

(Optional) This option requests that the trace log is reset: that is, all current records are discarded. Use this option when you start a new trace to ensure that all records in the log are unique to the new trace.

This option is only valid if you have specified an execution group (flag **-e**).

-l *Level*

(Optional) Set the level of the trace. This must be one of:

- `normal`. This provides a basic level of trace information.
- `none`. This switches tracing off.
- `debug`. This provides a more comprehensive trace.

This is valid for all components and each component is created with a default value of `none`. If you do not specify this parameter, the current value is unchanged. Once you successfully change this value, it is persistent.

-m *Mode*

(Optional) Indicate the way trace information is to be buffered:

- `safe`. This mode causes trace entries to be written to file when they are generated.
- `fast`. This mode causes trace entries to be buffered, and only written to file in batches.

Each component starts with a default value of `safe`. If you do not specify this parameter, the current value is unchanged.

This parameter is valid only if the component you have specified is:

- A broker. If you change this value, it affects tracing for the execution group (if you have specified one), or for the agent component (if you have not specified an execution group).
- The User Name Server. If you change this value, it affects tracing for the entire component. This second option is valid only for service trace and, once you have successfully changed this value, it is persistent.

-c *Size*

(Optional) The size of the trace file in KB (kilobytes). If you do not specify this parameter, the current value is left unchanged. Each component starts with a default value of 4096 KB. Specify this option to reset the value. The maximum value you can specify depends on how you subsequently intend to read the log, using the mqsireadlog command:

- If you use this command with the **-f** option set, the log file is read directly from the file system. In this case, the maximum value that you can specify is 2097151, which allows a trace file up to 2 GB (gigabyte) to be created.
- If you use this command without setting the **-f** option, a WebSphere MQ message is sent to the broker to retrieve the log. In this case, do not allow the trace file to exceed 70 MB (megabytes). The maximum value that you can set is 70000.

On HP-UX, set the *size* value below 500 MB.

However you intend to retrieve the trace file, you might want to keep its size small, either by using a low value for this parameter or by using the reset (**-r**) option on this command to clear the trace log. The benefit of adopting this approach is that the formatting process (mqsiformatlog) is much faster and requires less resource to carry out its task.

This parameter is valid only if the component you have specified is:

- A broker. If you change this value, it affects tracing for the execution group (if you have specified one), or for the agent component (if you have not specified an execution group).
- The User Name Server. If you change this value, it affects tracing for the entire component. This second option is valid only for service trace.

Additional parameters exclusive to service trace:

Use these options only when directed to do so by your IBM Support Center or by a `BIPxxxx` message.

-t

(Required) Specifies that service trace options are to be modified.

-b

(Required) Specifies that service trace options for the `agent` subcomponent of the component specified are to be modified (for example, started or stopped). You can specify this flag only if **-t** is also specified.

Examples:

To collect and process a user trace for the default execution group use the command:

```
mqsichangetrace WBRK_BROKER -u -e default -l normal -c 5000
```

To collect and process a service trace for flow f1 in the default execution group use the command:

```
mqsichangetrace WBRK_BROKER -t -e default -m fast
```

To collect and process a service trace for an agent use the command:

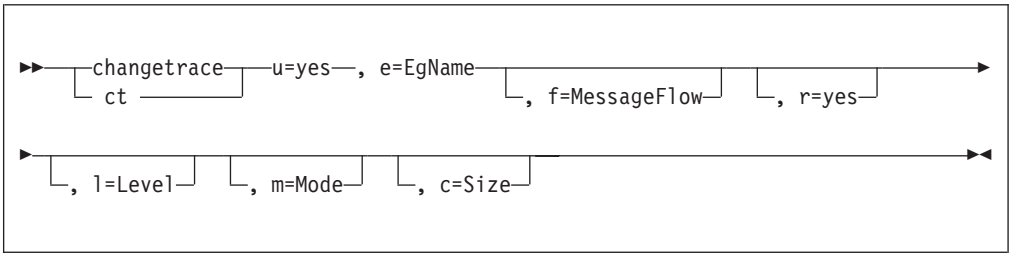
```
mqsichangetrace WBRK_BROKER -t -b -m -l normal
```

mqsichangetrace command - z/OS:

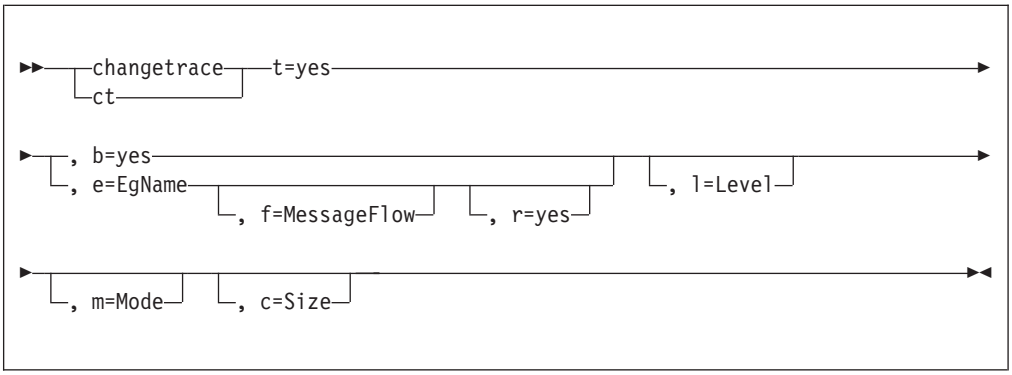
Syntax:

z/OS console command:

User trace



Service trace



Parameters:

-u (Required for user trace only if the component is a broker) .

Specifies that user trace options are to be modified. This option is only valid if you have issued this command against a broker, that is, not a Configuration Manager or User Name Server.

-e *EgName*
(Required for user trace; optional for service trace)

Identifies the execution group for which trace options are to be modified (for example, started or stopped). This option is valid only for a broker.

This name is case sensitive and you must include the names in single quotes if they contain mixed case characters.

-f *MessageFlow*

(Optional) Identifies the message flow for which trace options are to be modified. This option is only valid if you have specified an execution group (flag **-e**).

This name is case sensitive and you must include the names in single quotes if they contain mixed case characters.

-r

(Optional) This option requests that the trace log is reset: that is, all current records are discarded. Use this option when you start a new trace to ensure that all records in the log are unique to the new trace.

This option is only valid if you have specified an execution group (flag **-e**).

-l *Level*

(Optional) Set the level of the trace. This must be one of:

- `normal`. This provides a basic level of trace information.
- `none`. This switches tracing off.
- `debug`. This provides a more comprehensive trace.

This is valid for all components and each component is created with a default value of `none`. If you do not specify this parameter, the current value is unchanged. Once you successfully change this value, it is persistent.

-m *Mode*

(Optional) Indicate the way trace information is to be buffered:

- `safe`. This mode causes trace entries to be written to file when they are generated.
- `fast`. This mode causes trace entries to be buffered, and only written to file in batches.

Each component starts with a default value of `safe`. If you do not specify this parameter, the current value is unchanged.

This parameter is valid only if the component you have specified is:

- A broker. If you change this value, it affects tracing for the execution group (if you have specified one), or for the agent component (if you have not specified an execution group).
- The User Name Server. If you change this value, it affects tracing for the entire component. This second option is valid only for service trace and, once you have successfully changed this value, it is persistent.

-c *Size*

(Optional) The size of the trace file in KB (kilobytes). If you do not specify this parameter, the current value is left unchanged. Each component starts with a default value of 4096 KB. Specify this option to reset the value. The maximum value you can specify depends on how you subsequently intend to read the log, using the mqsireadlog command:

- If you use this command with the **-f** option set, the log file is read directly from the file system. In this case, the maximum value that you can specify is 2097151, which allows a trace file up to 2 GB (gigabyte) to be created.
- If you use this command without setting the **-f** option, a WebSphere MQ message is sent to the broker to retrieve the log. In this case, do not allow the trace file to exceed 70 MB (megabytes). The maximum value that you can set is 70000.

However you intend to retrieve the trace file, you might want to keep its size small, either by using a low value for this parameter or by using the reset (**-r**) option on this command to clear the trace log. The benefit of adopting this approach is that the formatting process (mqsiformatlog) is much faster and requires less resource to carry out its task.

This parameter is valid only if the component you have specified is:

- A broker. If you change this value, it affects tracing for the execution group (if you have specified one), or for the agent component (if you have not specified an execution group).
- The User Name Server. If you change this value, it affects tracing for the entire component. This second option is valid only for service trace.

Additional parameters exclusive to service trace:

Use these options only when directed to do so by your IBM Support Center or by a BIPxxxx message.

-t

(Required) Specifies that service trace options are to be modified.

-b

(Required) Specifies that service trace options for the agent subcomponent of the component specified are to be modified (for example, started or stopped). You can specify this flag only if **-t** is also specified.

Examples:

To collect and process a user trace for the default execution group use the command:

```
F MQP1BRK,ct U=YES, E='DEFAULT', L=NORMAL, C=5000
```

and in the PDSE member BIPRELG, set the option for **mqsireadlog** to

```
U= E=DEFAULT
```

To collect and process a service trace for flow f1 in the default execution group use the command:

```
F MQP1BRK,ct U=YES, E='DEFAULT', F='F1', M=FAST
```

and in the PDSE member BIPRELG, set the option for **mqsireadlog** to

```
T=, E=DEFAULT, F=F1
```

To collect and process a service trace for an agent use the command:

```
F MQP1BRK,ct T=YES, B=YES, M=FAST, L=DEBUG
```

and in the PDSE member BIPRELG, set the option for **mqsireadlog** to

```
T=, B=AGENT
```

mqsichangeusernameserver command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPCHUN; see "Contents of the User Name Server PDSE" on page 493

Purpose:

Use the **mqsichangeusernameserver** command on Windows platforms, Linux, and UNIX systems to change some of the properties of the User Name Server.

Use the **mqsichangeusernameserver** command on z/OS to change the refresh interval and authentication properties of the User Name Server

You must stop the User Name Server before you can issue this command and restart the User Name Server for the changes to take effect:

- On Windows, Linux, and UNIX systems, use the **mqsistop** and **mqsistart** commands.

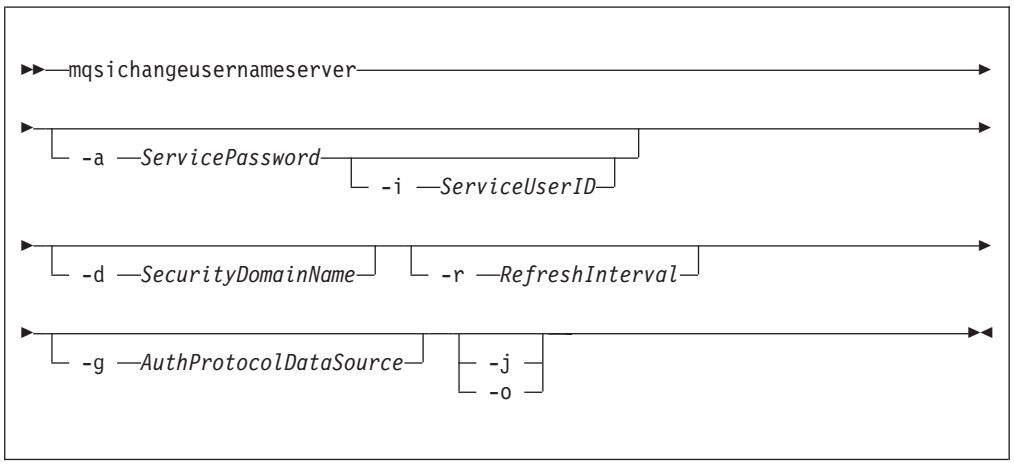
- On z/OS, you must have started the original User Name Server control process using the /S option. You must stop theUser Name Server components using the /F User Name Server, PC option and start the User Name Server components again using the /S User Name Server, SC option.

See “mqsistop command” on page 474 and “mqsistart command” on page 469 for more information.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- “mqsichangeusernameserver command - Windows”
- “mqsichangeusernameserver command - Linux and UNIX systems” on page 363
- “mqsichangeusernameserver command - z/OS” on page 364

mqsichangeusernameserver command - Windows:



Parameters:

-i *ServiceUserID*

(Optional) The user ID under which the broker runs. You can only change this value if you also change the password.

The security requirements for the ServiceUserID are detailed in “Security requirements for Windows platforms” on page 539.
ServiceUserID can be specified in any valid user name syntax. On Windows platforms, these are:

- domain\username
- \\server\username
- .\username
- username

If you use the unqualified form for this user ID (username), the operating system searches for the user ID throughout its domain, starting with the local system; this search might take some time to complete. The ServiceUserID specified must be:

- A direct or indirect member of the local group **mqbrkrs**.
- A direct or indirect member of the local group **mqm**
- Authorized to access the home directory (where WebSphere Message Broker has been installed).

- Authorized to access the working directory (if specified by the **mqsicreateusernameserver -w** flag)

-a *ServicePassword*
(Optional) The password for the `ServiceUserID`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-d *SecurityDomainName*
(Optional) The name of the Windows system security domain.

-r *RefreshInterval*
(Optional) The interval, in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name of the data source required by the authentication protocol.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

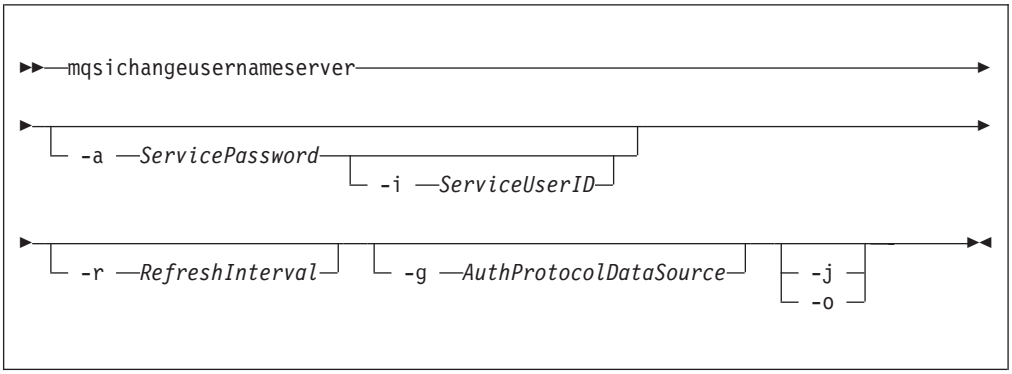
-o (Optional) Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

Examples:

```
mqsichangeusernameserver -r 2000
```

mqsichangeusernameserver command - Linux and UNIX systems:

Syntax:



Parameters:

-i *ServiceUserID*
(Optional) The user ID under which the broker runs. You can only change this value if you also change the password.

The security requirements for the `ServiceUserID` are detailed in "Security requirements for Linux and UNIX platforms" on page 538. The `ServiceUserID` specified must be:

- Specified in the form `username`.
- A direct or indirect member of the local group **mqbrkrs**.
- A direct or indirect member of the local group **mqm**
- Authorized to access the home directory (where WebSphere Message Broker has been installed).
- Authorized to access the working directory (if specified by the **mqsicreateusernameserver -w** flag)

-a *ServicePassword*
(Optional) The password for the `ServiceUserID`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

On Linux and UNIX systems, `-a` is required for Windows platforms compatibility but it is not used in relation to `ServiceUserID`.

-r *RefreshInterval*
(Optional) The interval, in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name of the data source required by the authentication protocol.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

-o (Optional) Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

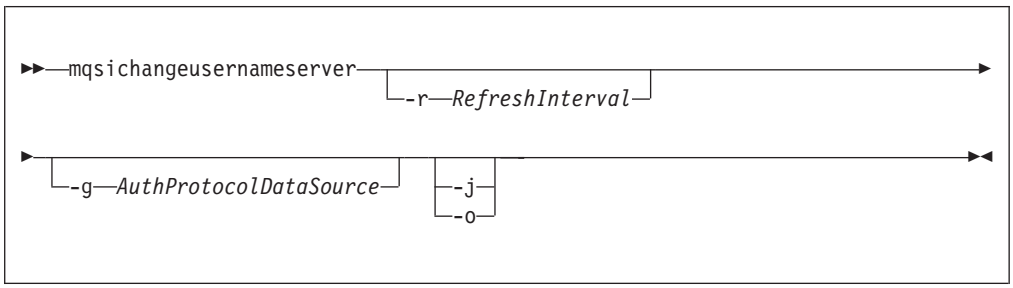
Examples:

```
mqsichangeusernameserver -r 2000
```

mqsichangeusernameserver command - z/OS:

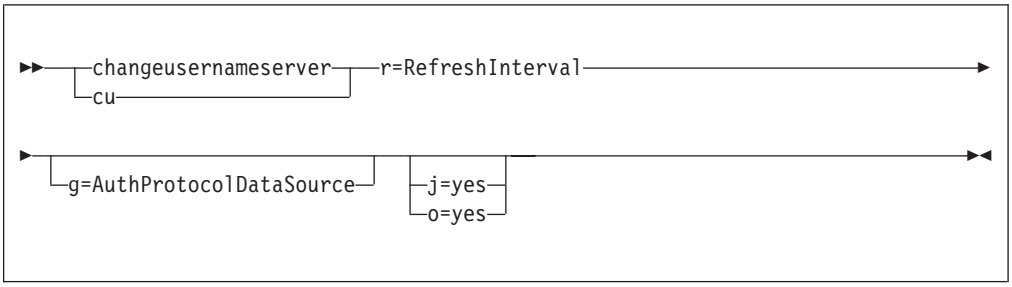
Syntax:

z/OS command - BIPCHUN:



z/OS console command:

Synonym: cu



Parameters:

-r *RefreshInterval*
(Required) The interval, in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name of the data source required by the authentication protocol.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

-o (Optional) Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

Examples:

```
F MQP1UNS ,cu R=2000
```

mqsiclearmqpubsub command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting the BIPCLMP utility; see "Contents of the broker PDSE" on page 491

Purpose:

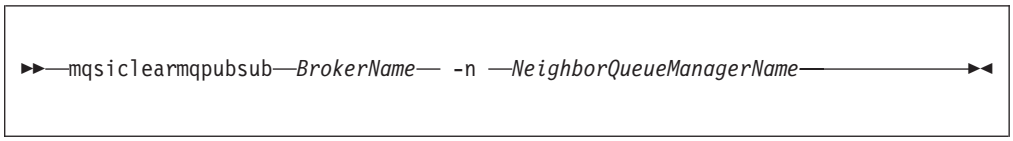
Use the **mqsiclearmqpubsub** command to remove an WebSphere MQ Publish/Subscribe broker as a neighbor of this WebSphere Message Broker broker.

This command removes knowledge of the WebSphere MQ Publish/Subscribe broker from the WebSphere Message Broker broker identified on this command. To complete this action you must also issue the WebSphere MQ Publish/Subscribe command **clrmqbrk** against the WebSphere MQ Publish/Subscribe broker. When both clear commands have completed, all publish/subscribe traffic between the two brokers ceases.

Use this command only if you are integrating this WebSphere Message Broker broker with an WebSphere MQ Publish/Subscribe broker network. Before you issue this command you must ensure that the WebSphere Message Broker broker is

ready to receive and process messages on queue SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS (that is, you must restart the broker after creating this queue.)

Syntax:



Parameters:

BrokerName
(Required) The name of the broker from which knowledge of an WebSphere MQ Publish/Subscribe neighbor broker is to be removed.

-n *NeighborQueueManagerName*
(Required) The name of the queue manager that hosts the WebSphere MQ Publish/Subscribe broker for which the association as a neighbor is being removed.

Authorization:

The user ID used to invoke this command must have `put` and `inq` authority to the queue SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS.

On Linux and UNIX systems, the user ID must be a member of the **mqbrkrs** group.

Examples:

```
mqsiclearmqpubsub WBRK_BROKER -n MQBroker1
```

mqsicreateaclentry command

Command to create or modify the Configuration Manager data relating to the group or user access control lists that you have defined.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPCRACL; see “Contents of the Configuration Manager PDSE” on page 494

Purpose:

Use the **mqsicreateaclentry** command to create or modify the Configuration Manager data relating to the group or user access control lists that you have defined.

If you create or modify an access control group you must stop and restart the Configuration Manager for the change to take effect.

On z/OS, you must define an OMVS segment for user IDs and groups, in order for a Configuration Manager to obtain user ID and group information from the External Security Manager (ESM) database.

This command does not check for the existence of the specified component so that you can set up the access control list first.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsicreateaclentry command - Windows"
- "mqsicreateaclentry command - Linux and UNIX systems" on page 369
- "mqsicreateaclentry command - z/OS" on page 371

Authorization:

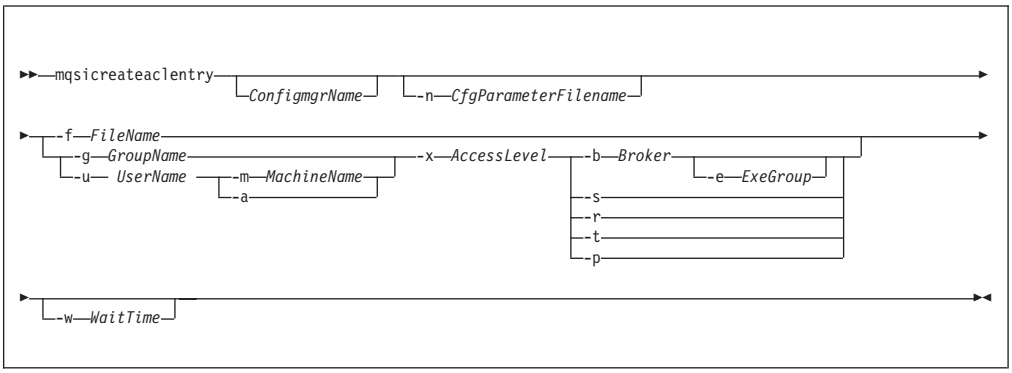
The user ID used to invoke this command must have full control permissions for the object being changed; see "ACL permissions" on page 537 for more information. In addition, for Linux and UNIX systems, the user ID must be a member of mqbrkrs.

When z/OS commands are run through the console, they effectively run as the Configuration Manager started-task ID. This means that the commands inherit a Full Control root ACL and you can carry out any operation.

If you submit a console command to the Configuration Manager you can change any ACL for that Configuration Manager.

mqsicreateaclentry command - Windows:

Syntax:



Parameters:

You must select:

- **-f**, or
- **-g** and **-x**, or **-u** and **-x**, and:
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

ConfigmgrName
(Optional) The name of the Configuration Manager to which the access control lists are to be added.

The default name, if this parameter is not specified, is 'ConfigMgr'.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

If you select **-u**, you must select either **a** or **m**

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

If you select **-u**, you must select either **a** or **m**

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

If you select **-u**, you must select either **a** or **m**

-x *AccessLevel*
(Optional) The required access level given for this group. This option can be any one of the following letters:

F Full control

D Deploy

E Edit

V View

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

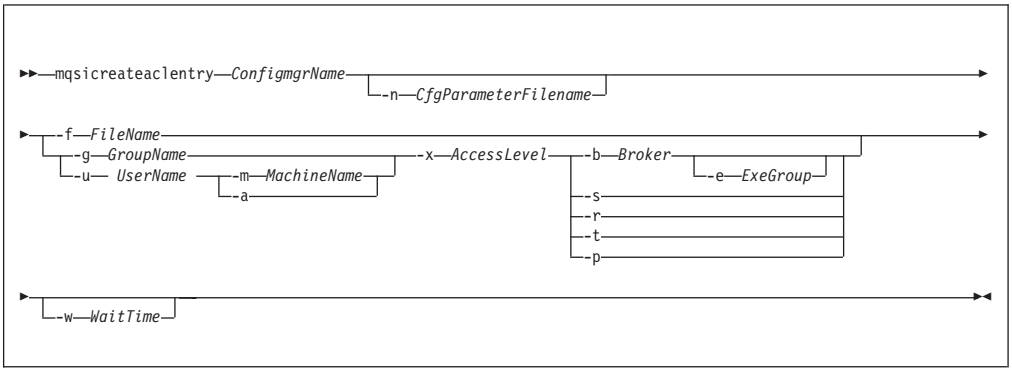
-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

```
mqsicreateaclentry CMGR01 -f c:\test\mylist
mqsicreateaclentry CMGR01 -g GROUPA -x F -b MYBROKER
```

mqsicreateaclentry command - Linux and UNIX systems:

Syntax:



Parameters:

You must select:

- **-f**, or
- **-g** and **-x**, or **-u** and **-x**, and:
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

ConfigmgrName
(Required) The name of the Configuration Manager to which the access control lists are to be added. This parameter must be the first parameter specified and its name is case-sensitive.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

If you select **-u**, you must select either **a** or **m**

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

If you select **-u**, you must select either **a** or **m**

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

If you select **-u**, you must select either **a** or **m**

-x *AccessLevel*
(Optional) The required access level given for this group. This option can be any one of the following letters:

F Full control

D Deploy

E Edit

V View

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

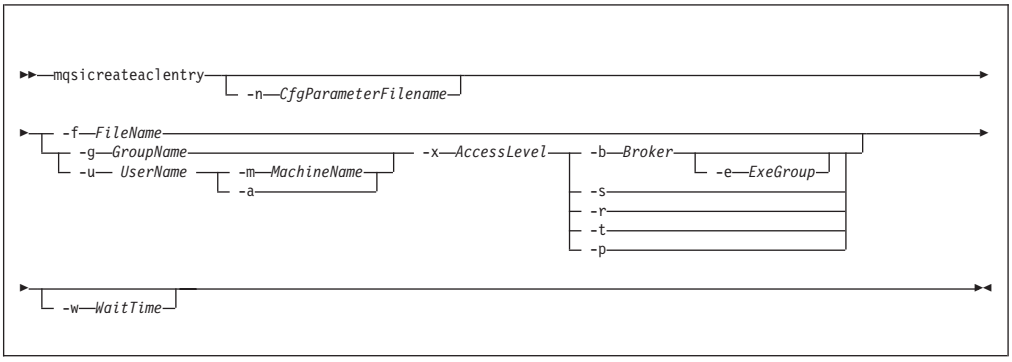
Examples:

```
mqsicreateaclentry CMGR01 -f c:\test\mylist
mqsicreateaclentry CMGR01 -g GROUPA -x F -b MYBROKER
```

mqsicreateaclentry command - z/OS:

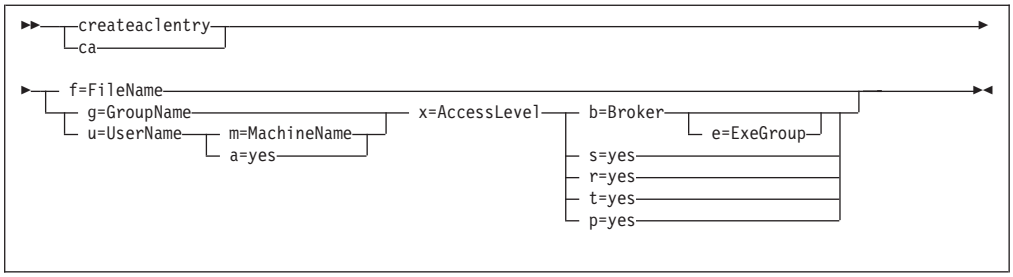
Syntax:

z/OS command - BIPCRACL:



z/OS console command:

Synonym: ca



Parameters:

You must select:

- **-f**, or
- **-g** and **-x**, or **-u** and **-x**, and:
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

ConfigmgrName
This parameter is implicit because you specify the component that you want to MODIFY.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

Remove the statement `encoding="UTF-8"` from the first line of the `.configmgr` file, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

If you select **-u**, you must select either **a** or **m**

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

If you select **-u**, you must select either **a** or **m**

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

-x *AccessLevel*
(Optional) The required access level given for this group. This option can be any one of the following letters:

F Full control

D Deploy

E Edit

V View

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

On z/OS you must use a comma between each command option. The following example shows the z/OS version of the example listed in “mqsicreateaclentry command - Windows” on page 367:

```
/f CMGR01,ca g='GROUPA' ,x='F' ,b='MYBROKER'
```

mqsicreatebroker command

Use the mqsicreatebroker command to create a broker.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPCRBK; see "Contents of the broker PDSE" on page 491

Purpose:

The mqsicreatebroker command:

1. Checks whether the specified queue manager already exists:
   - If it does not exist:
     - If you run the command on z/OS, mqsicreatebroker reports an error and fails.
     - If you run the command on another platform, it creates the queue manager and its default resources, including a dead letter queue (DLQ), SYSTEM.DEAD.LETTER.QUEUE. The security settings are the same as those of other broker-specific WebSphere MQ queues.

       The mqsideletebroker command does not delete the default DLQ (unless the queue manager is deleted).
   - If it does exist, the command does not create a DLQ. You must create one for the broker to write messages if errors occur when a message is processed by a message flow and you do not want the message to be returned to the message flow input node.
2. Starts the WebSphere MQ queue manager, except on z/OS, if the WebSphere MQ queue manager is not already running.

   If the queue manager is created on Windows by this command, it is not started as a service. The queue manager stops if you log off. You must, therefore, either remain logged on, or change the startup status of the queue manager service.

   If you lock your workstation, the WebSphere MQ queue manager does not stop.
3. Connects to the associated queue manager.
4. Creates the broker-specific WebSphere MQ queues, if they do not already exist.
5. Creates database tables for the broker, if they do not already exist, or adds rows specific to this broker to existing database tables.
6. Creates a record for the component in the broker registry.

If you use a WebSphere MQ queue manager you have created independently of the mqsicreatebroker command, you might want to define clusters, which simplifies your configuration in most cases.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsicreatebroker command - Windows, Linux, and UNIX systems" on page 376
- "mqsicreatebroker command - z/OS" on page 381

Authorization:

On Windows systems, the user ID used to start this command must have **Administrator** authority on the local system.

On Linux and UNIX systems, the user ID used to start this command must be a member of both the **mqbrkrs** group and the **mqm** group.

On z/OS systems, the user ID used to start this command must be a member of a group that has both READ and WRITE access to the component directory. The user ID must also have access to WebSphere MQ resources, and DB2.

Using LDAP: Ensure that the registry is appropriately secured to prevent unauthorized access. The setting of *LdapPrincipal* and *LdapCredentials* options on mqsicreatebroker is not required for correct operation of the broker. The password is not stored in clear text in the file system.

WebSphere MQ queues created:

- SYSTEM.BROKER.ADMIN.QUEUE
- SYSTEM.BROKER.CONTROL.QUEUE
- SYSTEM.BROKER.EXECUTIONGROUP.QUEUE
- SYSTEM.BROKER.EXECUTIONGROUP.REPLY
- SYSTEM.BROKER.INTERBROKER.QUEUE
- SYSTEM.BROKER.INTERBROKER.MODEL.QUEUE
- SYSTEM.BROKER.MODEL.QUEUE
- SYSTEM.BROKER.WS.INPUT
- SYSTEM.BROKER.WS.REPLY
- SYSTEM.BROKER.WS.ACK

Access authority is granted for the WebSphere Message Broker group **mqbrkrs** to all these queues. If the DLQ is enabled, it also has the same authority.

Database tables created:
The database tables that this command creates, or adds to, are described in Database contents.

Responses:

In some circumstances, you might see the following error message issued by DB2:

```
(51002)[IBM][CLI Driver][DB2/NT]SQL0805N
Package "NULLID.SQLLF000" was not found.  SQLSTATE=51002.
```

This error occurs when the bind to the database is not successful.

- On Windows platforms, binding is not needed for broker databases, but is required for user databases. If you create the database using the DB2 Control Center, the bind is completed for you. If you use the command interface, the bind is not completed for you. For example, to create or re-create a bind for the database `MYDB` enter the following commands at the command prompt:

  ```
  db2 connect to MYDB user db2admin using db2admin
  db2 bind X:\sqllib\bnd\@db2cli.lst grant public
  db2 connect reset
  ```

  where `X:` is the drive on which DB2 is installed.
- On Linux and UNIX platforms, binding is necessary for all databases. For example, to create binding for database `WBRKBKDB`, you must enter the following commands at the command prompt (where `<user_name>` is the user ID under which the database instance was created):

```
db2 connect to WBRKBKDB user db2admin using db2admin
db2 bind ~<user_name>/sqllib/bnd/@db2cli.lst grant public CLIPKG 5
db2 connect reset
```

If you do not use the default DB2 user ID and password (`db2admin`), you must replace the values in the `db2 connect` command with the correct values.

If you run the mqsicreatebroker command and it fails, resolve the problem that caused the failure:

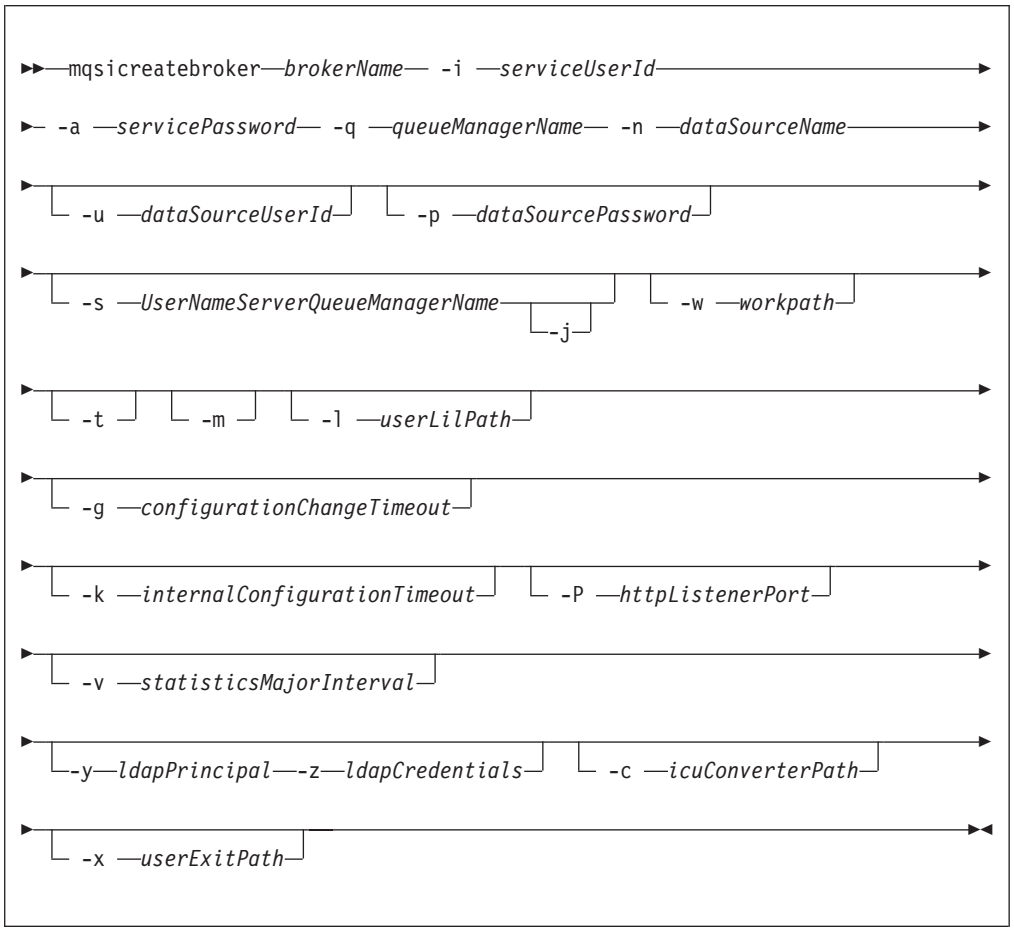
- Check responses, see "Responses" on page 375.
- Check the error logs, see Local error logs.
- Check the error messages in the error log, see Diagnostic messages.

When you run the same command again you might receive a series of messages indicating any items that cannot be created. Receiving these messages does not indicate a problem with the mqsicreatebroker command itself.

mqsicreatebroker command - Windows, Linux, and UNIX systems:

Command to create a WebSphere MQ queue manager.

Syntax:



Parameters:

brokerName
(Required) The name of the broker that you are creating. This parameter must be the first parameter. It is case sensitive on Linux and UNIX systems.

For restrictions on the character set that you can use, see "Characters allowed in commands" on page 295.

-i *serviceUserId*
(Required)

The user ID under which components run. You can specify the *ServiceUserID* in any valid user name syntax. On Windows systems, valid formats are:

- `domain\username`
- `\\server\username`
- `.\username`
- `username`

On Linux and UNIX systems, only the last format, `username`, is valid.
If you use the unqualified form for this user ID (`username`) on Windows systems, the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete.
The *ServiceUserID* that you specify must be a member of the **mqbrkrs** local group. On Windows systems, the ID can be a direct or indirect member of the group. The *ServiceUserID* must also be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the **-w** parameter).
On Windows systems, if you specify that the broker is to run as a WebSphere MQ trusted application (**-t** parameter), you must also add the service user ID to the **mqm** group. On Linux and UNIX systems, specify the *ServiceUserID* as `mqm` if you set the **-t** parameter.
The security requirements for the *ServiceUserID* are described in "Security requirements for Windows platforms" on page 539, and in "Security requirements for Linux and UNIX platforms" on page 538.

-a *servicePassword*
(Required) The password for the *serviceUserId*.

For compatibility with existing systems, you can specify `<password>`. However, if you do not specify a password with this parameter when you run the command, you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.
On Linux and UNIX systems, **-a** is required for compatibility with Windows systems, but is not used in relation to *ServiceUserID*. **-a** is used as a default only if **-p** is not specified. See the **-p** parameter description for further details.

-q *queueManagerName*
(Required) The name of the queue manager that is associated with this broker. Use the same name for your broker and the queue manager to simplify the organization and administration of your network. Queue manager names are limited to 48 characters in length, and they are case sensitive.

Each broker *must* have its own unique queue manager. A broker cannot share a queue manager with another broker.

If the queue manager does not already exist, it is created by this command. It is not created as the default queue manager; if you want this queue manager to be the default queue manager on this system, either create the queue manager before you issue this command, or change the settings of this queue manager to make it the default after it has been created. Use either the

WebSphere MQ Explorer, or the WebSphere MQ Services snap-in, depending on which version of WebSphere MQ you are using.

The queue manager attribute `MAXMSGLEN` (the maximum length of messages that can be put to queues) is updated to 100 MB. This attribute is updated regardless of whether the queue manager is created by this command.

For restrictions on the character set that you can use, see "Characters allowed in commands" on page 295.

-n *dataSourceName*
(Required) The ODBC data source name (DSN) of the database in which the broker tables are created. If you have not used the same name for both the DSN and the database, this parameter must specify the DSN, not the name of the database.

This database must already exist. You must create a System DSN ODBC connection for this DSN, if you have not already done so.

Linux If you have a DB2 database on Linux, enter the appropriate DB database alias name; an ODBC DSN is not required.

-u *dataSourceUserId*
(Optional) The user ID with which databases that contain broker tables and user data are to be accessed. If you do not specify this ID, it defaults to the value that is specified by the **-i** parameter.

This user ID must have authority to create tables within this database, and read from and write to those tables.

Windows On Windows systems, if your broker database exists in DB2, and this user ID is not known to DB2, it is created for you within DB2.

Linux UNIX On Linux and UNIX systems, the service user must have been granted the correct privilege before entering this command. If your database is SQL Server, you must create this user ID as a SQL Server login ID and give it the correct access before you create the broker.

If you have an application database in DB2 that was created by this user ID, or to which this user ID has appropriate read, write, or create authority, message flows that run in this broker can access and manipulate the application data that is held within it, without having to specify explicit schema names. For further details see:

- "Security requirements for Windows platforms" on page 539
- "Security requirements for Linux and UNIX platforms" on page 538

-p *dataSourcePassword*
(Optional) The password of the user ID with which databases that contain broker tables and user data are to be accessed. If you do not specify this parameter, it defaults to the *servicePassword* that is specified by the **-a** parameter.

For compatibility with existing systems, you can specify `<password>`. However, if you do not specify a password with this parameter when you run the command, you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

Linux UNIX For DB2 on Linux and UNIX systems, you can specify **-u** and **-p** as empty strings (two quotation marks ""). In this case, you are using the *serviceUserId* and its *servicePassword* for theDB2 connection and that stores the password. If you specify **-a** as an empty string as well as **-u** and **-p**,

WebSphere Message Broker stores no passwords; in this case the command prompts you to set a password and stores that.

-s *UserNameServerQueueManagerName*
(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server.

Specify this parameter if you require either authentication services or publish/subscribe access control. If you do not specify this parameter, the broker assumes that no User Name Server is defined. To enable publish/subscribe access control, specify the **-s** and **-j** parameters.

-j (Optional) If you require publish/subscribe access control, specify this parameter. You must also specify the **-s** parameter.

-w *workpath*
(Optional) The directory in which working files for this broker are stored. If you do not specify this parameter, files are stored in the default work path, which was specified when the product was installed. If you specify this parameter, you must create this directory before you start the broker. On Windows systems, this directory cannot be on a networked drive.

This directory is also used for trace records that are created when tracing is active. These records are written to a subdirectory, `log`, which you must create before you start the broker.

Error logs that are written by the broker when a process ends abnormally are stored in this directory. On Windows systems, use this parameter to specify a directory on a drive other than the one on which the product is installed.

The error log is unbounded and continues to grow. Check this directory periodically and clear out old error information.

You cannot change this parameter using the mqsichangebroker command. To specify or change the work path, delete and recreate the broker.

Specifying this parameter creates a separate working directory for the broker. This working directory is a subset of the default working directory structure that contains fewer subdirectories and no *common\profiles* subdirectory.

-t (Optional) The broker runs as a WebSphere MQ trusted application.

If you specify this parameter on Windows systems, add the `ServiceUserID` (identified by the **-i** parameter) to the **mqm** group.

If you specify this parameter on HP-UX and Solaris, specify the `ServiceUserID` as `mqm`.

For more details about using WebSphere MQ trusted applications, see *WebSphere MQ Intercommunication*.

-m (Optional) Migrate an existing WebSphere MQ Publish/Subscribe broker. If you specify this parameter, the queue manager that is identified by the **-q** parameter must be the queue manager that the WebSphere MQ Publish/Subscribe broker is using.

-l *userLilPath*
(Optional) A list of paths (directories) from which the broker loads LILs (loadable implementation libraries) for user-defined message processing nodes.

On Linux and UNIX systems, directory names are case sensitive, and you must include the names in single quotation marks if they contain mixed case characters.
Do not include environment variables in the path; the broker ignores them.

Create your own directory for storing your `.lil` or `.jar` files. Do not save them in the WebSphere Message Broker installation directory.
If you specify more than one directory, separate directories by a semicolon (**;**) on Windows systems, or a colon (**:**) on Linux and UNIX systems.

-g *configurationChangeTimeout*
(Optional) The maximum time (in seconds) that is allowed for a user configuration request to be processed. It defines the length of time taken within the broker to apply to an execution group a configuration change that you have initiated. For example, if you deploy a configuration from the workbench, the broker must respond to the Configuration Manager within this time.

A message flow cannot respond to a configuration change while it is processing an application message. An execution group that has been requested to change its configuration returns a negative response to the deployed configuration message if any one of its message flows does not finish processing an application message and apply the configuration change within this timeout.

Specify the value in seconds, in the range 10 to 3600. The default is 300.

For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-k *internalConfigurationTimeout*
(Optional) The maximum time (in seconds) that is allowed for an internal configuration change to be processed. For example, it defines the length of time taken within the broker to start an execution group.

The response time of each execution group differs according to system load and the load of its own processes. The value must reflect the longest response time that any execution group takes to respond. If the value is too low, the broker returns a negative response, and might issue error messages to the local error log.
Specify the value in seconds, in the range 10 to 3600. The default is 60.
For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-P *httpListenerPort*
(Optional) Enter the number of the port on which the Web Services support is listening.

The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started; the default is 7080.

Ensure that the port that you specify has not been specified for any other purpose.

-v *statisticsMajorInterval*
(Optional) Specify the interval (in minutes) at which WebSphere Message Broker statistics and accounting is notified that archive records are to be output. The valid range is from 10 to 14400 minutes.

An interval of zero minutes indicates that the operating system has an external method of notification and is not using an internal timer within WebSphere Message Broker.

-y *ldapPrincipal*
(Optional, but mandatory when *LdapCredentials* is provided.) The user principal for access to an optional LDAP directory that holds the JNDI administered Initial Context for the JMS provider.

-z *ldapCredentials*
(Optional, but mandatory when *LdapPrincipal* is provided.) The user password for access to LDAP.

-c *icuConverterPath*
(Optional) A delimited set of directories to search for additional code page converters. On Windows systems, the delimiter is a semicolon (;). On UNIX and Linux systems, the delimiter is a colon (:).

Do not use this parameter to set the converter path if you are using a converter that matches one of the built-in converters that are provided, and that converter is the local code page for the broker. Use the **ICU_DATA** environment variable instead.

-x *userExitPath*
(Optional) The path that contains the location of all user exits to be loaded for 32-bit execution groups in this broker. This path is added to the system library search path (PATH,LIBPATH,LD_LIBRARY_PATH,SHLIBPATH) for the execution group process only.

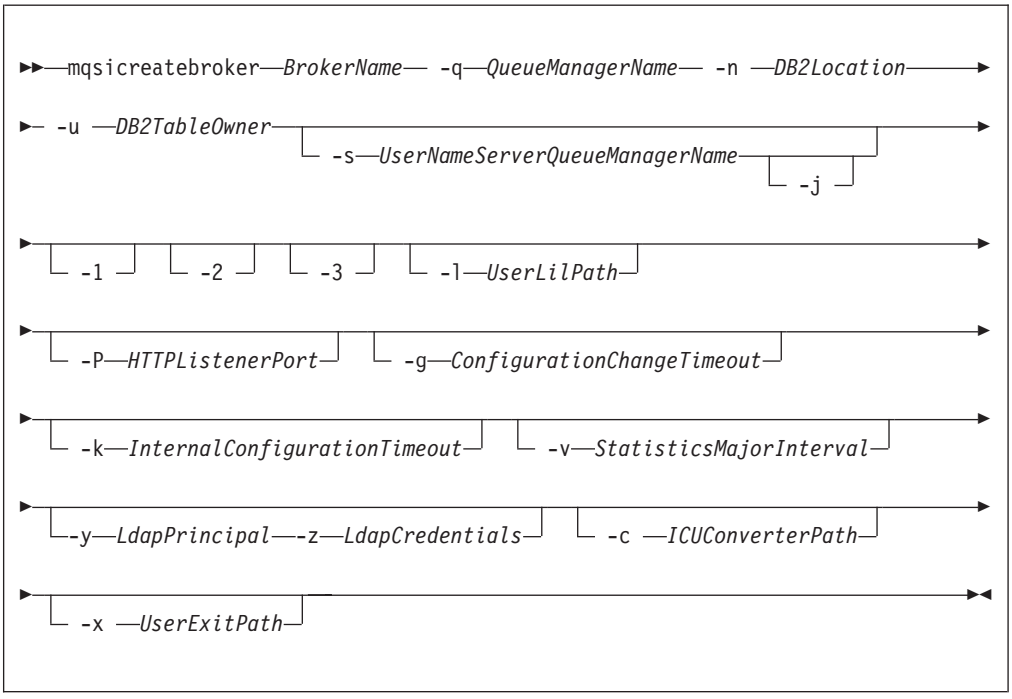
Examples:

```
mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw -q WBRK_QM -s WBRK_UNS_QM -n WBRKBKDB
mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw -q WBRK_QM -n WBRKBKDB -t
mqsicreatebroker WBRK_BROKER -i wbrkuid -a wbrkpw -q WBRK_QM -n WBRKBKDB -x /opt/3rdparty/wmbexits
```

mqsicreatebroker command - z/OS:

Syntax:

z/OS command - BIPCRBK:



Parameters:

BrokerName
(Required) The name of the broker that you are creating. This parameter must

be the first parameter, and if you create a broker with an uppercase name, the name must be specified in uppercase in the workbench.

For restrictions on the character set that you can use, see "Characters allowed in commands" on page 295.

-q *QueueManagerName*
(Required) The name of the queue manager that is associated with this broker. Use the same name for your broker and the queue manager to simplify the organization and administration of your network. Queue manager names are limited to 48 characters in length, and they are case sensitive.

Each broker *must* have its own unique queue manager. A broker cannot share a queue manager with another broker.

If the queue manager does not already exist, it is created by this command. It is not created as the default queue manager; if you want this queue manager to be the default queue manager on this system, either create the queue manager before you issue this command, or change the settings of this queue manager to make it the default after it has been created. Use either the WebSphere MQ Explorer, or the WebSphere MQ Services snap-in, depending on which version of WebSphere MQ you are using.

The queue manager attribute `MAXMSGLEN` (the maximum length of messages that can be put to queues) is updated to 100 MB. This attribute is updated regardless of whether the queue manager is created by this command.

For restrictions on the character set that you can use, see "Characters allowed in commands" on page 295.

-n *DB2Location*
(Required) The location of the database in which the broker tables are created.

-u *DB2TableOwner*
(Required) The user ID with which databases that contain broker tables and user data are to be accessed.

This user ID must have authority to create tables within this database, and read from and write to those tables.

If you have an application database in DB2 that was created by this user ID, or to which this user ID has appropriate read, write, or create authority, message flows that run in this broker can access and manipulate the application data that is held within it, without having to specify explicit schema names.

-s *UserNameServerQueueManagerName*
(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server.

Specify this parameter if you require either authentication services or publish/subscribe access control. If you do not specify this parameter, the broker assumes that no User Name Server is defined. To enable publish/subscribe access control, specify the **-s** and **-j** parameters.

-j (Optional) If you require publish/subscribe access control, specify this parameter. You must also specify the **-s** parameter.

-l *UserLilPath*
(Optional) A list of paths (directories) from which the broker loads LILs (loadable implementation libraries) for user-defined message processing nodes.

This name is case sensitive; enclose the names in single quotation marks if they are in mixed case.
Do not include environment variables in this path; WebSphere Message Broker ignores them.

You must create your own directory for storing your .lil or .jar files. Do not save these files in the WebSphere Message Broker install directory.

-P *HTTPListenerPort*
(Optional) Enter the number of the port on which the Web Services support is listening.

The broker starts this listener when a message flow that includes HTTP nodes or Web Services support is started; the default is 7080.

Ensure that the port that you specify has not been specified for any other purpose.

-g *ConfigurationChangeTimeout*
(Optional) The maximum time (in seconds) that is allowed for a user configuration request to be processed. It defines the length of time taken within the broker to apply to an execution group a configuration change that you have initiated. For example, if you deploy a configuration from the workbench, the broker must respond to the Configuration Manager within this time.

A message flow cannot respond to a configuration change while it is processing an application message. An execution group that has been requested to change its configuration returns a negative response to the deployed configuration message if any one of its message flows does not finish processing an application message and apply the configuration change within this timeout.

Specify the value in seconds, in the range 10 to 3600. The default is 300.

For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-k *InternalConfigurationTimeout*
(Optional) The maximum time (in seconds) that is allowed for an internal configuration change to be processed. For example, it defines the length of time taken within the broker to start an execution group.

The response time of each execution group differs according to system load and the load of its own processes. The value must reflect the longest response time that any execution group takes to respond. If the value is too low, the broker returns a negative response, and might issue error messages to the local error log.
Specify the value in seconds, in the range 10 to 3600. The default is 60.
For information about how to set the value for this timeout, see "Configuring timeouts" on page 172.

-v *StatisticsMajorInterval*
(Optional) Specify the interval (in minutes) at which WebSphere Message Broker statistics and accounting is notified that archive records are to be output. The valid range is from 10 to 14400 minutes.

An interval of zero minutes indicates that the operating system has an external method of notification and is not using an internal timer within WebSphere Message Broker.

-1 (Optional) The registry pass, which creates only the broker registry.

-2 (Optional) The WebSphere MQ pass, which creates only the broker WebSphere MQ queues.

-3 (Optional) The DB2 pass, which creates only the broker DB2 tables and indexes.

-y *LdapPrincipal*
(Optional, but mandatory when *LdapCredentials* is provided.) The user principal for access to an optional LDAP directory that holds the JNDI administered Initial Context for the JMS provider.

-z *LdapCredentials*
(Optional, but mandatory when *LdapPrincipal* is provided.) The user password for access to LDAP.

-c *ICUConverterPath*
(Optional) A delimited set of directories to search for additional code page converters.

The code page converters must be either of the form icudt32_*codepagename*.cnv, or in an ICU data package called icudt32.dat.

Do not use this parameter to set the converter path if you are using a converter that matches one of the built-in converters that are provided with Version 6.0, and that converter is the local code page for the broker. Use the **ICU_DATA** environment variable instead.

-x *UserExitPath*
(Optional) The path that contains the location of all user exits to be loaded for 32-bit execution groups in this broker. This path is added to the system library search path (PATH,LIBPATH,LD_LIBRARY_PATH,SHLIBPATH) for the execution group process only.

Examples:

To create an entire broker on z/OS:

```
mqsicreatebroker CSQ1BRK -q CSQ1 -u BRKUSER -n DBA0
```

To create only the DB2 tables and indexes on z/OS:

```
mqsicreatebroker CSQ1BRK -q CSQ1 -u BRKUSER -n DBA0 -2
```

mqsicreateconfigmgr command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPCRCM; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

This command completes the following actions:

- Creates a WebSphere MQ queue manager, except on z/OS, if one does not already exist.

Notes:

1. If a WebSphere MQ queue manager is created as a result of using the **mqsicreateconfigmgr** command, the default dead letter queue (DLQ)

provided by WebSphere MQ (SYSTEM.DEAD.LETTER.QUEUE) is automatically enabled. The security settings are the same as those of other broker-specific WebSphere MQ queues.

If you choose to create the queue manager separately, set up a dead-letter queue (DLQ); the DLQ is referenced by WebSphere Message Broker when errors occur processing messages in message flows.

If a message in either a user-defined message flow or in the publish/subscribe model cannot be processed, it is routed to this DLQ as a last resort. If you would prefer the message to be backed out onto the input queue, effectively halting the message flow until the problem is resolved, disable the DLQ.

The **mqsideleteconfigmgr** command does not delete this queue (unless the queue manager is deleted).

2. If you are using a WebSphere MQ queue manager that has been created independently of the **mqsicreateconfigmgr** command, you can define clusters if you choose. This option simplifies your configuration.

- Starts the WebSphere MQ queue manager, if it is not already running.
- Creates the WebSphere MQ queues and channel that are specific to the Configuration Manager, if they do not already exist.
- Creates database tables for the Configuration Manager in its internal repository. If you need to transfer data from the configuration repository of an earlier release, you can use the *db2DatabaseToMigrate*, *migrationDatabaseUserId*, and *migrationDatabasePassword* parameters.
- If you run this command using the -n parameter and then delete the Configuration Manager using mqsideleteconfigmgr, without specifying the -n parameter on that command, the new database containing the configuration repository is not deleted.

  If you run the **mqsicreateconfigmgr** command again in this situation, and specify the -n parameter, the parameter is ignored because the new database still exists.
- (Windows only) - installs a Windows service, under which the Configuration Manager runs.
- Creates a record for the component in the broker registry.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- “mqsicreateconfigmgr command - Windows” on page 386
- “mqsicreateconfigmgr command - Linux and UNIX systems” on page 388
- “mqsicreateconfigmgr command - z/OS” on page 389

Authorization:

This command changes security privileges for the ServiceUserID; the user ID used to invoke this command must be a member of the Windows **Administrators** group on this local system.

On UNIX systems, the user ID used to invoke this command must be a member of the mqbrkrs group.

On z/OS systems, the user ID used to invoke this command must be a member of a group that has READ and WRITE access to the component directory and access to WebSphere MQ.

WebSphere MQ queues created:

- SYSTEM.BROKER.CONFIG.QUEUE
- SYSTEM.BROKER.CONFIG.REPLY
- SYSTEM.BROKER.ADMIN.REPLY
- SYSTEM.BROKER.SECURITY.REPLY
- SYSTEM.BROKER.MODEL.QUEUE

Access authority is granted for the WebSphere Message Broker group **mqbrkrs** to all these queues. If the DLQ is enabled, it also has the same authority.

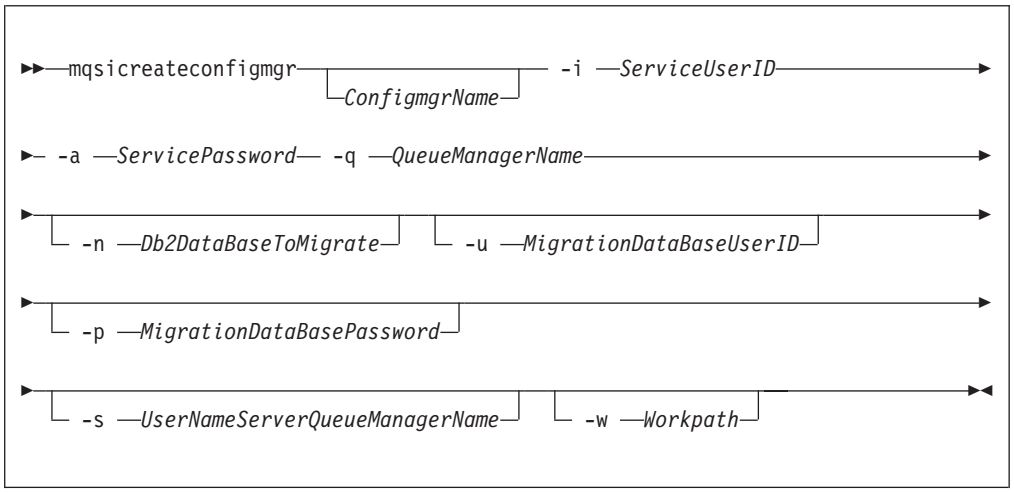
WebSphere MQ channels created:

- SYSTEM.BKR.CONFIG

Database tables created:
The database tables that this command creates are in a repository created by the Configuration Manager.

mqsicreateconfigmgr command - Windows:

Syntax:



Parameters:

ConfigmgrName
(Optional) The name of the Configuration Manager that you want to create.

The default name on Windows, if this parameter is not specified, is 'ConfigMgr'.

-i *ServiceUserID*
(Required) The user ID under which the service runs.

This can be specified in any valid user name syntax for the platform. If you use the unqualified form for this user ID (`username`) on Windows systems, the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete.

The ServiceUserID specified must be a member (either direct or indirect) of the local group **mqbrkrs**, and must be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the -w flag).

This user ID must also be a member (either direct or indirect) of the local group **mqm** or of the local Windows **Administrators** group.

The security requirements for the ServiceUserID are detailed in "Security requirements for Windows platforms" on page 539.

-a *ServicePassword*
(Required) The password for the ServiceUserID.

For compatibility with existing systems, you can still specify <password>. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-q *QueueManagerName*
(Required) The name of the queue manager associated with the Configuration Manager.

If the queue manager does not already exist, it is created by this command. It is not created as the default queue manager: if you want it to be the default queue manager on this system, create the queue manager before you issue this command.

The queue manager attribute MAXMSGL (maximum length of messages that can be put to queues) is updated to 100 MB. This update is done whether or not the queue manager is created by this command.

-n *Db2DatabaseToMigrate*
(Optional) The name of the database that you created at an earlier release to hold the configuration repository tables.

This database must already exist. You do not need to create an ODBC connection for this database, because access is provided by JDBC.

-u *MigrationDataBaseUserID*

(Optional) The user ID with which the configuration repository database (created at an earlier release) is to be accessed.

-p *MigrationDataBasePassword*

(Optional) The password of the user ID with which the configuration repository database (created at an earlier release) is to be accessed.

If not specified, this parameter defaults to the ServicePassword specified by -a.

For compatibility with existing systems, you can still specify <password>. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If this parameter is not specified, the Configuration Manager assumes that there is no User Name Server defined, and does not attempt to communicate with one.

-w *Workpath*

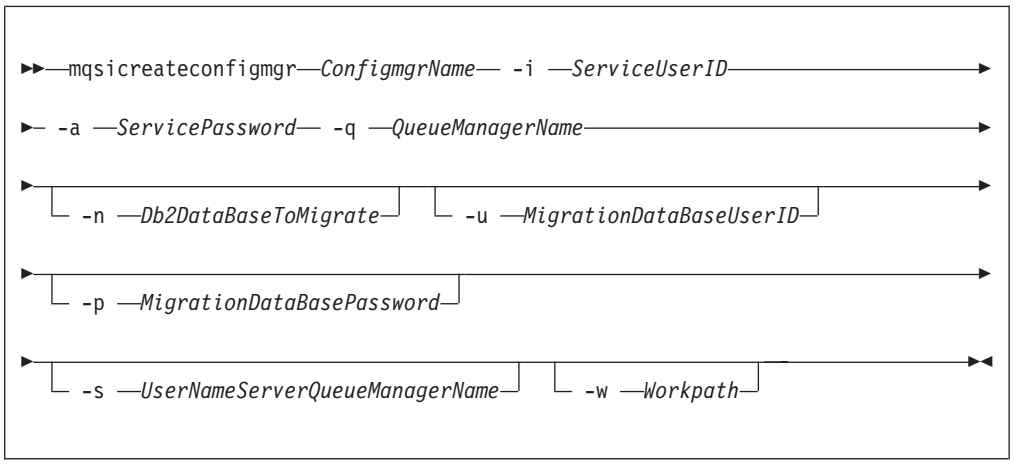
(Optional) The directory in which working files for the Configuration Manager are stored. If not specified, the default directory specified when the product was installed is used.

Examples:

```
mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_CONFIG_QM
```

mqsicreateconfigmgr command - Linux and UNIX systems:

Syntax:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager that you want to create.

This must be the first parameter specified and the name is case-sensitive.

-i *ServiceUserID*
(Required) The user ID under which the service runs.

(Optional) This can be specified in any valid user name syntax for the platform.

The `ServiceUserID` specified must be a member (either direct or indirect) of the local group **mqbrkrs**, and must be authorized to access the home directory (where WebSphere Message Broker has been installed), and the working directory (if specified by the `-w` flag).

This user ID must also be a member (either direct or indirect) of the local group **mqm**.

The security requirements for the `ServiceUserID` are detailed in "Security requirements for Linux and UNIX platforms" on page 538.

-a *ServicePassword*
(Required) The password for the `ServiceUserID`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-q *QueueManagerName*
(Required) The name of the queue manager associated with the Configuration Manager.

If the queue manager does not already exist, it is created by this command. It is not created as the default queue manager: if you want it to be the default queue manager on this system, create the queue manager before you issue this command.

The queue manager attribute `MAXMSGL` (maximum length of messages that can be put to queues) is updated to 100 MB. This update is done whether or not the queue manager is created by this command.

-n *Db2DatabaseToMigrate*
(Optional) The name of the database that you created at an earlier release to hold the configuration repository tables.

This database must already exist. You do not need to create an ODBC connection for this database, because access is provided by JDBC.

-u *MigrationDataBaseUserID*

(Optional) The user ID with which the configuration repository database (created at an earlier release) is to be accessed.

-p *MigrationDataBasePassword*

(Optional) The password of the user ID with which the configuration repository database (created at an earlier release) is to be accessed.

If not specified, this parameter defaults to the ServicePassword specified by `-a`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If this parameter is not specified, the Configuration Manager assumes that there is no User Name Server defined, and does not attempt to communicate with one.

-w *Workpath*

(Optional) The directory in which working files for the Configuration Manager are stored. If not specified, the default directory specified when the product was installed is used.

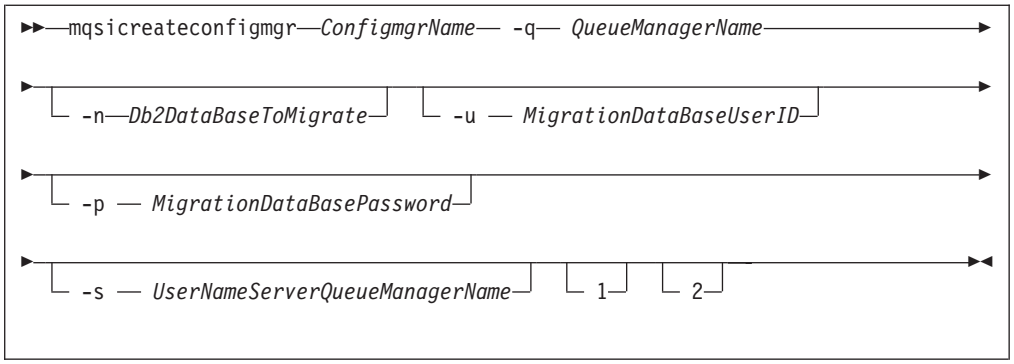
Examples:

```
mqsicreateconfigmgr CMGR01 -i wbrkuid -a wbrkpw -q WBRK_CONFIG_QM
```

mqsicreateconfigmgr command - z/OS:

Syntax:

z/OS command - BIPCRCM:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager that you want to create.

This must be the first parameter specified and the name is case-sensitive.

-q *QueueManagerName*
(Required) The name of the queue manager associated with the Configuration Manager.

If the queue manager does not already exist, it is created by this command. It is not created as the default queue manager: if you want it to be the default queue manager on this system, create the queue manager before you issue this command.

The queue manager attribute `MAXMSGL` (maximum length of messages that can be put to queues) is updated to 100 MB. This update is done whether or not the queue manager is created by this command.

-n *Db2DatabaseToMigrate*
(Optional) The name of the database that you created at an earlier release to hold the configuration repository tables.

This database must already exist. You do not need to create an ODBC connection for this database, because access is provided by JDBC.

-u *MigrationDataBaseUserID*

(Optional) The user ID with which the configuration repository database (created at an earlier release) is to be accessed.

-p *MigrationDataBasePassword*

(Optional) The password of the user ID with which the configuration repository database (created at an earlier release) is to be accessed.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-s *UserNameServerQueueManagerName*

(Optional) The name of the WebSphere MQ queue manager that is associated with the User Name Server. If this parameter is not specified, the Configuration Manager assumes that there is no User Name Server defined, and does not attempt to communicate with one.

-w *Workpath*

(Optional) The directory in which working files for the Configuration Manager are stored. If not specified, the default directory specified when the product was installed is used.

1 (Optional) The registry pass that creates only the Configuration Manager registry.

2 (Optional) The WebSphere MQ pass that creates only the Configuration Manager WebSphere MQ queues.

Note: This action can be performed only if the Configuration Manager registry exists.

Examples:

```
mqsicreateconfigmgr CMGR01   -q WBRK_CONFIG_QM -1
```

mqsicreateconfigurableservice command

Use the mqsicreateconfigurableservice command to create a new object name for a broker external resource, such as a JMS provider.

Supported platforms:

- Windows systems
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPJADPR; see "Contents of the broker PDSE" on page 491

Purpose:

Use this command to add a predefined IBM resource type.

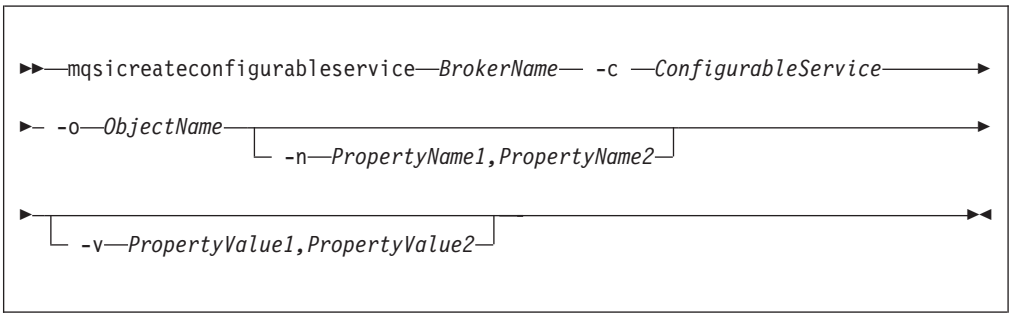
For configurable services that you add using the mqsicreateconfigurableservice command:

- Use the mqsireportproperties command to view the configurable services.
- Use the mqsichangeproperties command to modify the configurable services.
- Use the mqsideleteconfigurableservice command to delete configurable services.

Usage notes:

- Before you run this command, ensure that the broker is running.
- Stop and restart the broker before you use any new broker resources and properties.

Syntax:



Parameters:

BrokerName
(Required) The name of the broker to modify. This parameter must be the first parameter.

-c *ConfigurableService*
(Required) The type of external resource (configurable service). Use the mqsireportproperties command to view the list of valid values.

-o *ObjectName*
(Required) The name of the object whose properties you want to change.

If the **-c** parameter is set to JMSProviders, the expected object name is either an IBM-defined JMS provider name, or a user-defined JMS provider name.

-n *PropertyName*
(Optional) The name of the property that is being changed.

For a JMSProviders resource, valid property names are:

- jarsURL
- nativeLibs

-v *PropertyValue*
(Optional, but required if the **-n** parameter is specified) The value that is assigned to the property that is specified by the **-n** parameter. You can specify more than one property name and corresponding value using commas as separators; for example, `-n Name1,Name2 -v Value1,Value2`.

If you set the **-c** parameter to JMSProviders, and the **-n** parameter to jarsURL, the expected value is a URL that specifies the file location of the JMS provider JAR files, while omitting the file:// of the URL. If you do not specify the **-n** parameter, the default location for the JMS provider jar files is the broker's shared-classes directory.

If you set the **-c** parameter to JMSProviders, and the **-n** parameter to nativeLibs, the expected value is a file location of any JMS provider native libraries. If you do not specify the **-n** parameter, the default location for any JMS provider native libraries is the broker's LilPath.

Authorization:

The user ID must be a member of the mqbrkrs group.

Responses:

This command returns the following responses

- BIP8011 Unable to create configuration data
- BIP8012 Unable to connect to system components
- BIP8014 Component cannot be created
- BIP8073 Invalid broker name
- BIP8983 Configurable service already exists
- BIP8984 Configurable service was not found

Examples:

Add a JMS provider called MyProviderXYZ for broker WBRK6_DEFAULT_BROKER:

```
mqsicreateconfigurableservice WBRK6_DEFAULT_BROKER -c JMSProviders -o JMS_MyProviderXYZ
```

Add a JMS provider called ProviderABC for broker WBRK6_DEFAULT_BROKER with default values for the resource properties:

```
mqsicreateconfigurableservice WBRK6_DEFAULT_BROKER -c JMSProviders -o JMS_ProviderABC
```

Add a JMS provider called ProviderABC for broker WBRK6_DEFAULT_BROKER specifying a location for the provider's jar files, and a library path for the native libraries that are associated with those jar files:

```
mqsicreateconfigurableservice WBRK6_DEFAULT_BROKER -c JMSProviders -o JMS_ProviderABC
-n jarsURL,nativeLibs -v file://D:\ProviderABC\java,D:\ProviderABC\libs
```

mqsicreatedb command

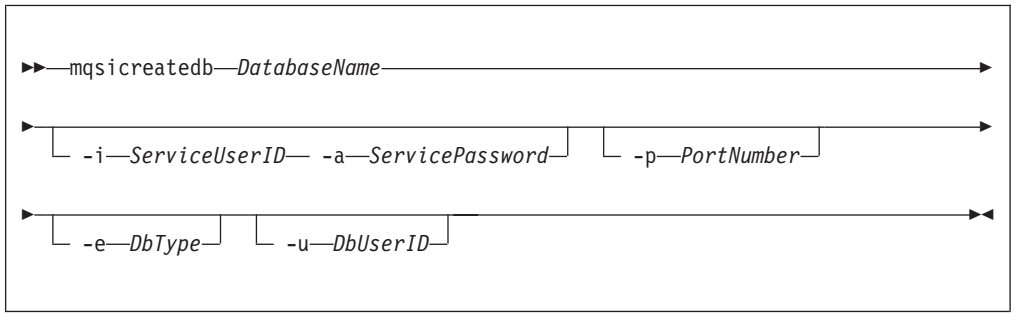
Supported platforms:

- Windows

Purpose:

The mqsicreatedb command creates a database and makes it accessible to the broker. The command: creates the database, creates an ODBC data source name, and if necessary, depending on the database type, creates and starts a Windows Service. The command creates at most a single instance of the Windows Service for each installation of a major product version. This command supports only the installed DB2 and Derby database engines.

Syntax:



Parameters:

DatabaseName
(Required) The name of the database you want to create. This must be the first parameter, and is case sensitive. Restrictions might be placed on the permissible length of the database name by the database engine. For restrictions on the character set that can be used, see "Characters allowed in commands" on page 295.

-i *ServiceUserID*
(Optional, Derby only) The user ID under which the DatabaseInstanceMgr service runs.

This can be specified in any valid username syntax:

- `domain\username`
- `\\server\username`
- `.\username`
- `username`

If you use the unqualified form for this user ID (username), the operating system searches for the user ID throughout its domain, starting with the local system. This search might take some time to complete.

The ServiceUserID specified must be a member of the local group mqbrkrs. The ID can be a direct or indirect member of the group. The ServiceUserID must also be authorized to access the home directory (where WebSphere Message Broker is installed).

This parameter is ignored if the database engine specified or defaulted for the command is DB2. A ServiceUserID is required for Derby, but only for the first invocation of this command. Subsequent invocations are associated with the existing Windows DatabaseInstanceMgr service that runs under the ServiceUserID specified on the earlier command

The security requirements for the ServiceUserID are detailed in "Security requirements for Windows platforms" on page 539.

-a *ServicePassword*
(Optional, Derby only) The password for the ServiceUserID. Specify this only if you specify ServiceUserID.

-p *PortNumber*
(Optional) The TCP/IP port number that this component will use on the local machine. If not specified, the default value 1527 is used.

-e *DbType*
(Optional) The database engine to be used to create and run the database. Currently supported values are DB2 and Derby. If you do not specify this option, and only one database engine is available, that engine is used. If both are available, the default engine is DB2.

-u *DbUserID*
(Optional, DB2 only) An additional user name that requires access to the database that is created by this command.

Authorization:

The user ID used to invoke this command must have Administrator authority on the local system and be part of the mqbrkrs group.

Examples:

The following example sets up a database with the name brokerdb on port 1600:

```
mqsicreatedb brokerdb -p 1600
```

The following example sets up a Derby database with the name derbydb, using port number 1527:

```
mqsicreatedb derbydb -i wbrkuid -a wbrkpw -e Derby -p 1527
```

mqsicreateexecutiongroup command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPCREG; see "Contents of the Configuration Manager PDSE" on page 494

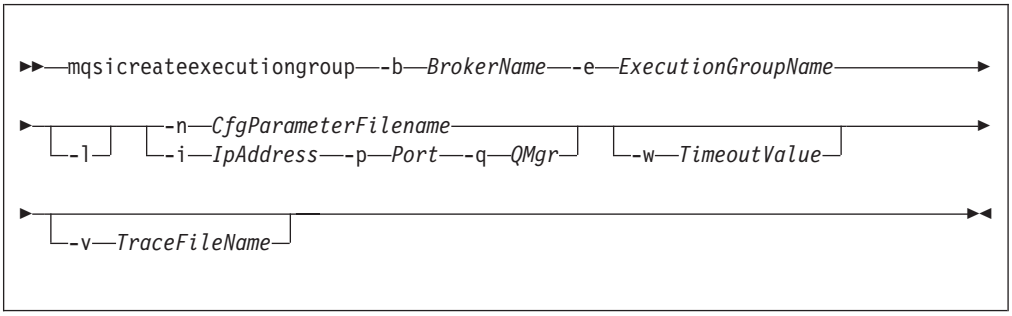
Purpose:

Use the **mqsicreateexecutiongroup** command to add a new execution group to a broker.

You must start the Configuration Manager before you can issue this command.

The broker must be defined in the Configuration Manager before this command can be used.

Syntax:



Parameters:

-b *BrokerName*
(Required) The name of the broker on which to create the execution group.

-e *ExecutionGroupName*
(Required) The name of the new execution group.

-l (Optional) Create a 64 bit execution group.

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you are using this file on z/OS you must remove the statement `encoding="UTF-8"` from the first line, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

Note: If you do not supply this parameter, you must supply the **-i**, **-p**, and **-q** parameters.

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

If you are using this parameter on z/OS and want to connect to the local host you must set the value to `""`.

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-w *TimeoutValue*
(Optional) This parameter is the time in seconds that the utility waits to ensure that the command completed; the default value is 60.

-v *TraceFileName*
(Optional) This parameter sends internal debug trace information to the specified file.

Authorization:

On Windows platforms, Linux, and UNIX systems, you need to be a member of the 'mqm' group and the command only succeeds if the user ID running the command has the correct authority defined in the Configuration Manager's access control list.

In order to create an execution group, full control authority is required over the broker object; see "ACL permissions" on page 537 for a list of permissions that can be defined in the Configuration Manager.

Responses:

This command returns the following responses:

0 (Success) States that the request completed successfully and the execution group has been created successfully in the Configuration Manager's repository. The next time the broker is deployed, the new execution group list is initialized on the broker.

2 (Failure) States that the execution group could not be created for any reason.

98 States that the Configuration Manager cannot be reached.

99 States that the supplied arguments to the utility are not valid.

Examples:

On the domain controlled by the Configuration Manager whose queue manager is called `QMGR` and is listening on `fred.abc.com:1414`, create an execution group called 'EG1' on broker 'BROKER'.

```
mqsicreateexecutiongroup -i fred.abc.com -p 1414 -q QMGR -b BROKER –e EG1
```

On the domain specified by the file `domain1.configmgr`, create an execution group called 'EG2' on broker 'BROKER'.

```
mqsicreateexecutiongroup –n domain1.configmgr –b BROKER –e EG2
```

On the domain specified by the file `domain2.configmgr`, create an execution group 'EG3' on broker 'FRED'. Wait five minutes for the Configuration Manager to respond and send output to `trace.txt`.

```
mqsicreateexecutiongroup –n domain2.configmgr –b FRED –e EG3 –w 300 –v trace.txt
```

mqsicreateusernameserver command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPCRUN; see "Contents of the User Name Server PDSE" on page 493

Purpose:

The **mqsicreateusernameserver** command:

- Creates a WebSphere MQ queue manager, except on z/OS, if one does not already exist.
  1. If a WebSphere MQ queue manager is created as a result of using the **mqsicreateusernameserver** command, the default DLQ provided by WebSphere MQ (SYSTEM.DEAD.LETTER.QUEUE) is automatically enabled. The security settings are the same as those of other broker-specific WebSphere MQ queues.

     If you choose to create the queue manager separately, set up a dead letter queue (DLQ). The DLQ is referenced by WebSphere Message Broker when errors occur processing messages in message flows.

     If a message in either a user-defined message flow or in the publish/subscribe model cannot be processed, it is routed to this DLQ as a last resort. If you would prefer the message to be backed out onto the input queue, effectively halting the message flow until the problem is resolved, disable the DLQ.

     The **mqsideleteusernameserver** command does not delete this queue (unless the queue manager is deleted).
  2.

     If you are using a WebSphere MQ queue manager that has been created independently of the **mqsicreateusernameserver** command, you can define clusters. This simplifies your configuration.
- Starts the WebSphere MQ queue manager, if this is not already running.

  If the queue manager is created by this command, it is not started as a Windows service; it stops if you log off. To avoid this happening, either remain logged on, or change the start up status of the queue manager service. (If you lock your workstation, the WebSphere MQ queue manager does not stop).
- Creates the User Name Server-specific WebSphere MQ queues, if these do not already exist.
- On Windows, installs a service under which the User Name Server runs.
- Creates a record for the component in the broker registry.

On z/OS, this command:

- Creates a WebSphere MQ queue manager, if one does not already exist.
- Creates the User Name Server-specific WebSphere MQ queues, if these do not already exist.
- Creates a record for the component in the broker registry.

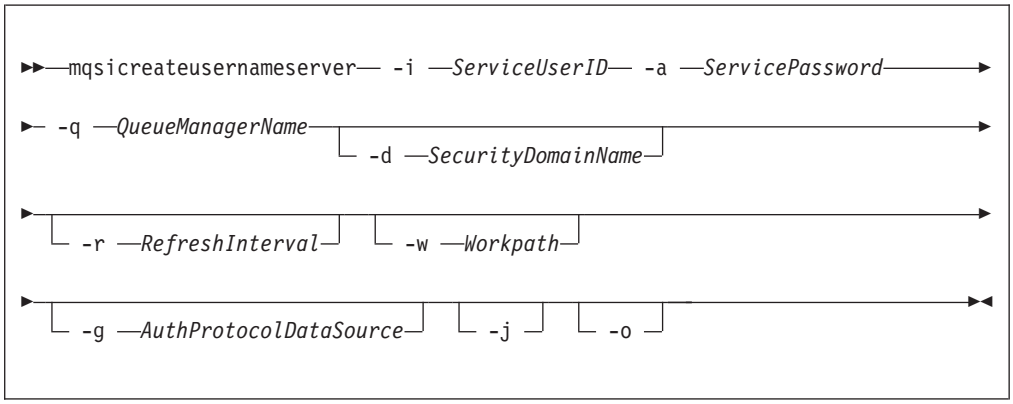
Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsicreateusernameserver command - Windows" on page 398

- "mqsicreateusernameserver command - Linux and UNIX systems" on page 399
- "mqsicreateusernameserver command - z/OS" on page 401

mqsicreateusernameserver command - Windows:

Syntax:



Parameters:

-i *ServiceUserID*
(Required) The user ID under which the broker runs.

The security requirements for the `ServiceUserID` are detailed in "Security requirements for Windows platforms" on page 539.
`ServiceUserID` can be specified in any valid user name syntax. On Windows platforms, these are:

- `domain\username`
- `\\server\username`
- `.\username`
- `username`

If you use the unqualified form for this user ID (`username`), the operating system searches for the user ID throughout its domain, starting with the local system; this search might take some time to complete. The `ServiceUserID` specified must be:

- A direct or indirect member of the local group **mqbrkrs**.
- A direct or indirect member of the local group **mqm**
- Authorized to access the home directory (where WebSphere Message Broker has been installed).

-a *ServicePassword*
(Required) The password for the `ServiceUserID`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-q *QueueManagerName*
(Required) The name of the queue manager associated with the User Name Server.

If the queue manager does not already exist, it is created by this command, however, it is not created as the default queue manager. If you want the queue manager to be the default queue manager on this system, you must create it before you issue this command.

The queue manager attribute `MAXMSGL` (maximum length of messages that can be put to queues) is updated to 100 MB. This is done whether or not the queue manager is created by this command.

-d *SecurityDomainName*
(Optional) The name of the Windows system security domain.

If this is not specified, it defaults to the system's local Windows system security domain. For more details about the implementation of security in WebSphere Message Broker, see "Setting up broker domain security" on page 16.

-r *RefreshInterval*
(Optional) The interval, specified in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes. If it is not specified, the User Name Server's default interval of 60 seconds is used.

-w *Workpath*
(Optional) The directory in which working files for the User Name Server are stored. If not specified, the default value specified when the product was installed is used.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name and location of the password file used to source any protocol related information. By default, the file is expected to be found in the home directory. If you store the file in a different location, specify the full path location with file name.

Two samples, `password.dat` and `pwgroup.dat`, are provided in the `examples/auth` directory under the product home directory.

(Optional) Use this parameter to specify the name of the data source required by the authentication protocol.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

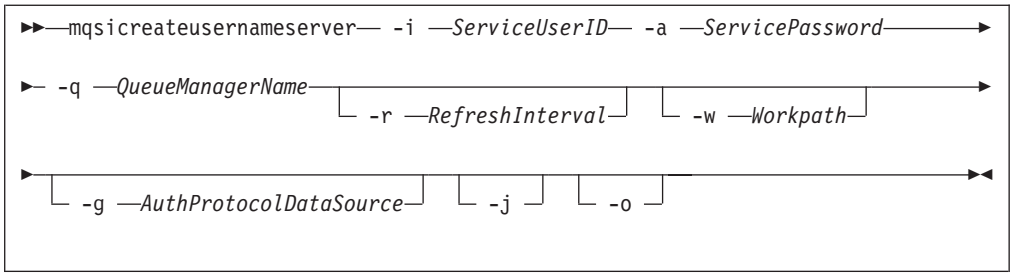
-o (Optional) Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

Examples:

```
mqsicreateusernameserver -i wbrkuid -a wbrkpw
   -q WBRK_QM -r 1000
```

mqsicreateusernameserver command - Linux and UNIX systems:

Syntax:



Parameters:

-i *ServiceUserID*
(Required) The user ID under which the broker runs.

The security requirements for the `ServiceUserID` are detailed in "Security requirements for Linux and UNIX platforms" on page 538. The `ServiceUserID` specified must be:

- Specified in the form `username`.
- A direct or indirect member of the local group **mqbrkrs**.
- A direct or indirect member of the local group **mqm**
- Authorized to access the home directory (where WebSphere Message Broker has been installed).

-a *ServicePassword*
(Required) The password for the `ServiceUserID`.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-q *QueueManagerName*
(Required) The name of the queue manager associated with the User Name Server.

If the queue manager does not already exist, it is created by this command, however, it is not created as the default queue manager. If you want the queue manager to be the default queue manager on this system, you must create it before you issue this command.

The queue manager attribute `MAXMSGL` (maximum length of messages that can be put to queues) is updated to 100 MB. This is done whether or not the queue manager is created by this command.

-r *RefreshInterval*
(Optional) The interval, specified in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes. If it is not specified, the User Name Server's default interval of 60 seconds is used.

-w *Workpath*
(Optional) The directory in which working files for the User Name Server are stored. If not specified, the default value specified when the product was installed is used.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name and location of the password file used to source any protocol related information. By default, the

file is expected to be found in the home directory. If you store the file in a different location, specify the full path location with file name.

Two samples, `password.dat` and `pwgroup.dat`, are provided in the `examples/auth` directory under the product home directory.

(Optional) Use this parameter to specify the name of the data source required by the authentication protocol.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

-o (Optional) Indicates that groups and group memberships are drawn from the operating system, rather than being defined in the data source for the authentication protocol.

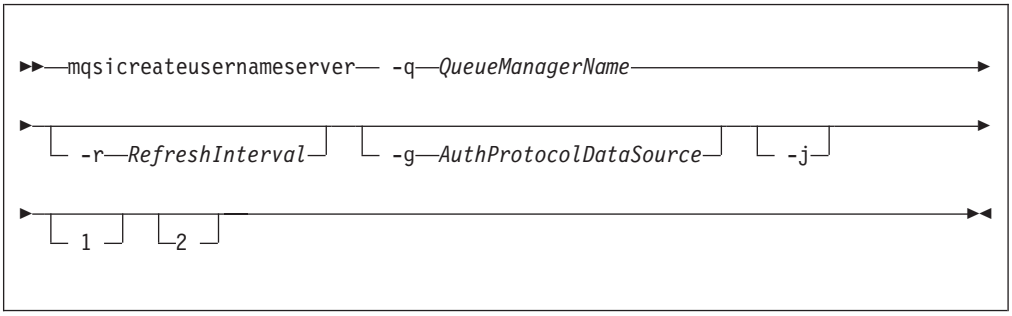
Examples:

```
mqsicreateusernameserver -i wbrkuid -a wbrkpw
   -q WBRK_QM -r 1000
```

mqsicreateusernameserver command - z/OS:

Syntax:

z/OS command - BIPCRUN:



Parameters:

-q *QueueManagerName*
(Required) The name of the queue manager associated with the User Name Server.

The queue manager attribute `MAXMSGL` (maximum length of messages that can be put to queues) is updated to 100 MB. This is done whether or not the queue manager is created by this command.

-r *RefreshInterval*
(Optional) The interval, specified in seconds, at which the User Name Server interrogates the security subsystem for changes to user or group attributes. If it is not specified, the User Name Server's default interval of 60 seconds is used.

-g *AuthProtocolDataSource*
(Optional) Use this parameter to specify the name and location of the password file used to source any protocol related information. By default, the file is expected to be found in the home directory. If you store the file in a different location, specify the full path location with file name.

Two samples, `password.dat` and `pwgroup.dat`, are provided in the `examples/auth` directory under the product home directory.

-j (Optional) Indicates that groups and group memberships are defined in the data source for the authentication protocol, rather than being drawn from the operating system.

1 (Optional) The registry pass, which creates only the User Name Server registry.

2 (Optional) The WebSphere MQ pass, which creates only the User Name Server WebSphere MQ queues.

Examples:

```
mqsicreateusernameserver -i wbrkuid -a wbrkpw
   -q WBRK_QM -r 1000
```

mqsideleteaclentry command

Command to delete a Configuration Manager access control list entry that you have defined.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPDLACL; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

Use the **mqsideleteaclentry** command to delete a Configuration Manager access control list entry that you have defined.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsideleteaclentry command - Windows"
- "mqsideleteaclentry command - Linux and UNIX systems" on page 404
- "mqsideleteaclentry command - z/OS" on page 406

Authorization:

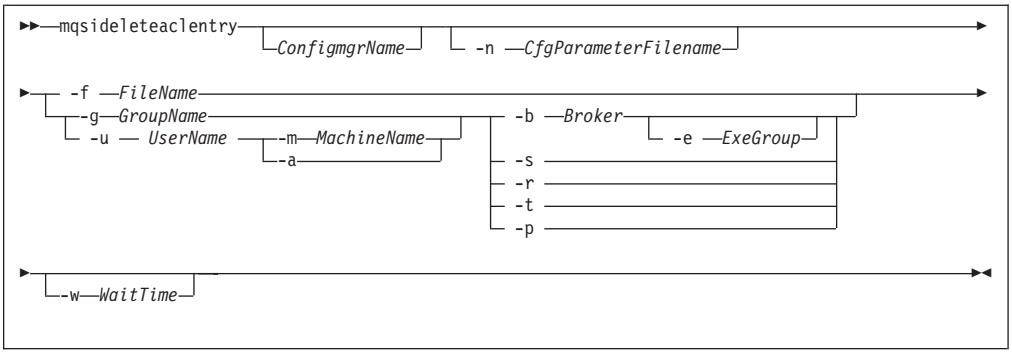
The user ID used to invoke this command must have full control permissions for the object being changed; see "ACL permissions" on page 537 for more information. In addition, for Linux and UNIX systems, the user ID must be a member of mqbrkrs.

When z/OS commands are run through the console, they effectively run as the Configuration Manager started-task ID. This means that the commands inherit a Full Control root ACL and you can carry out any operation.

If you submit a console command to the Configuration Manager you can change any ACL for that Configuration Manager.

mqsideleteaclentry command - Windows:

Syntax:



Parameters:

You must select:

- **-f**, or
  - **-u** and **-a**, or **-m**, or
  - **-g**, or
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

ConfigmgrName
(Optional) The name of the Configuration Manager from which the access control lists are to be deleted.

The default name, if this parameter is not specified, is 'ConfigMgr'.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the "allresources" resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

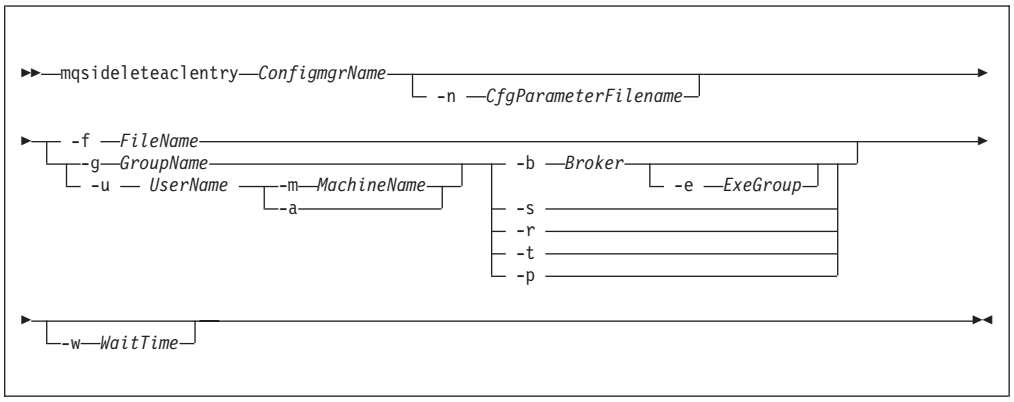
-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

```
mqsideleteaclentry CMGR01 -f c:\test\mylist
mqsideleteaclentry CMGR01 -g GROUPA -b MYBROKER
```

mqsideleteaclentry command - Linux and UNIX systems:

Syntax:



Parameters:

You must select:

- **-f**, or
  - **-u** and **-a**, or **-m**, or
  - **-g**, or
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

ConfigmgrName
(Required) The name of the Configuration Manager from which the access control lists are to be deleted. This parameter must be the first parameter specified and its name is case-sensitive.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

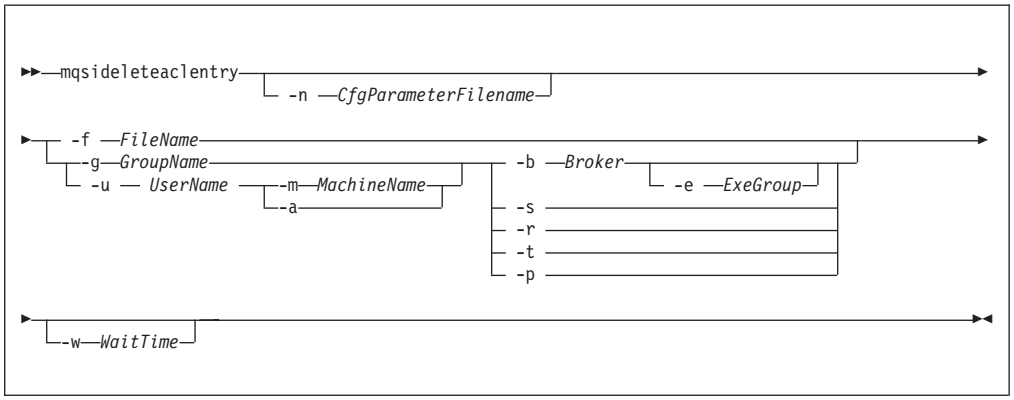
Examples:

```
mqsideleteaclentry CMGR01 -f c:\test\mylist
mqsideleteaclentry CMGR01 -g GROUPA -b MYBROKER
```

mqsideleteaclentry command - z/OS:

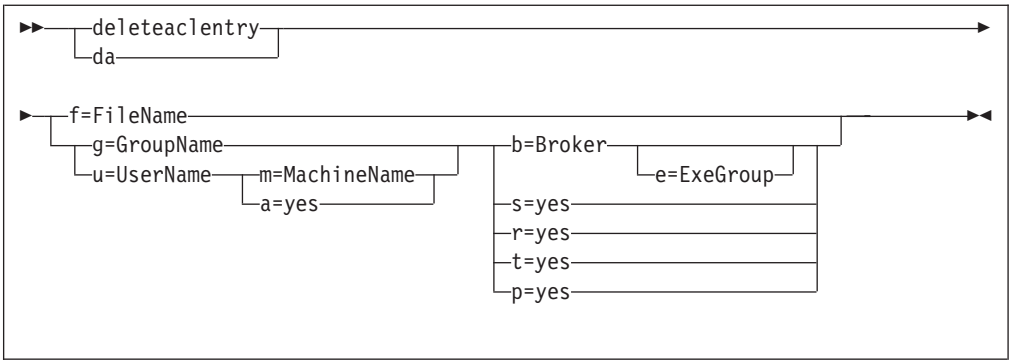
Syntax:

z/OS command - BIPDLACL:



z/OS console command:

Synonym: da



Parameters:

You must select:

- **-f**, or
  - **-u** and **-a**, or **-m**, or
  - **-g**, or
  - **-b**, or
  - **-s**, or
  - **-r**, or
  - **-t**, or
  - **-p**

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

Remove the statement `encoding="UTF-8"` from the first line of the `.configmgr` file, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-u and **-g** in this command refer to users and groups within the domain that the Configuration Manager uses for its security. This domain is, by default, the machine on which the Configuration Manager resides.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user name can be on any machine. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

```
mqsideleteaclentry CMGR01 -g GROUPA -b MYBROKER
```

For the z/OS console command you must use a comma between each command option. The following example shows the z/OS console version of the preceding example:

```
 /f CMGR01,da g='GROUPA' ,b='MYBROKER'
```

mqsideletebroker command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPDLBK; see “Contents of the broker PDSE” on page 491

Purpose:

Use the **mqsideletebroker** command to delete a named broker. The command also deletes the queues on the broker's local queue manager (created when the broker was created), and its data in the broker database. You can also specify that the queue manager is to be deleted.

Even though this command deletes all the data related to this broker from the broker database tables, it does not check if the tables are empty, and it does not delete the tables.

This command:

- On Windows platforms, stops the service that runs the broker.
- Stops and deletes the WebSphere MQ queue manager for the broker, if requested.
- Removes the broker's data from the database.
- Removes the record for the component in the broker registry.

If you delete a broker that has WebSphere MQ publish/subscribe broker neighbors, you must also invoke the runmqsc command **clrmqbrk** at each of these neighbors. You also need to specify the WebSphere Message Broker broker that you are deleting with this command.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

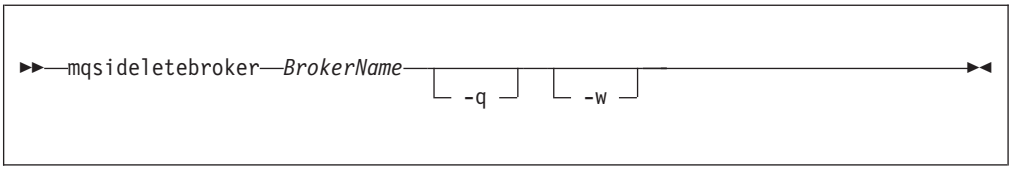
- "mqsideletebroker command - Windows, Linux and UNIX systems"
- "mqsideletebroker command - z/OS" on page 410

Usage notes:

If you run the command against a component that does not exist (for example, the component has already been deleted, or you have mistyped the component name), the command returns with a successful completion message. The command does not inform you that the component does not exist.

mqsideletebroker command - Windows, Linux and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required) The name of the broker that you want to delete. This must be the first parameter.

-q (Optional) Specifies that the broker's queue manager is deleted. (If this option is not specified, only the WebSphere Message Broker queues and broker's data are deleted.)

If the queue manager hosts another component (the Configuration Manager, or the User Name Server, or both in addition to this broker) that still exists, this command fails.

-w (Optional) Deletes all files related to this broker from the work path.

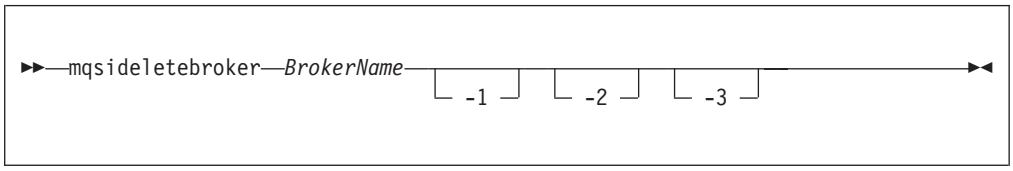
Examples:

```
mqsideletebroker WBRK_BROKER -q
```

mqsideletebroker command - z/OS:

Syntax:

z/OS command - BIPDLBK:



Parameters:

BrokerName
(Required) The name of the broker that you want to delete. This must be the first parameter.

-1 (Optional) Deletes only the broker registry.

-2 (Optional) Deletes only the broker WebSphere MQ queues.

-3 (Optional) Deletes only the broker DB2 tables and indexes.

Examples:

To delete the broker registry on z/OS for the broker CSQ1BRK, use the following command:

```
mqsideletebroker CSQ1BRK -1
```

mqsideleteconfigmgr command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPDLCM; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

This command:

- On the Windows platform, stops the service that runs the Configuration Manager.
- Stops and deletes the WebSphere MQ queue manager for the Configuration Manager, if requested.
- Removes the tables from the configuration repository, if requested.
- Removes the record for the component in the broker registry.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

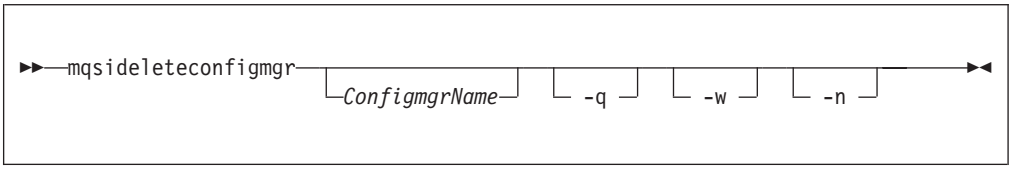
- "mqsideleteconfigmgr command - Windows"
- "mqsideleteconfigmgr command - Linux and UNIX systems" on page 412
- "mqsideleteconfigmgr command - z/OS" on page 413

Usage notes:

If you run the command against a component that does not exist (for example, the component has already been deleted, or you have mistyped the component name), the command returns with a successful completion message. The command does not inform you that the component does not exist.

mqsideleteconfigmgr command - Windows:

Syntax:



Parameters:

ConfigmgrName
(Optional) The name of the Configuration Manager that you want to delete.

The default name, if this parameter is not specified, is 'ConfigMgr'.

-q (Optional) Deletes the Configuration Manager's queue manager. (If this option is not specified, only the WebSphere Message Broker queues are deleted.)

If the queue manager hosts another component (a broker, or the User Name Server, or both) that still exists, this command fails.

-w (Optional) Deletes all files related to the Configuration Manager from the workpath.

-n
(Optional) Deletes the configuration repository.

Be very careful using this option. The configuration repository contains the configuration data for the whole broker domain, not just data internal to the Configuration Manager. Deleting this repository destroys all information pertinent to the broker domain, and requires you to recreate every resource within it to recover the broker domain.

If the configuration repository is not deleted as part of deleting the Configuration Manager, and the Configuration Manager is later recreated with the same name, it will continue to use the existing configuration repository.

If you do not specify –n to delete the configuration repository data, you can delete it manually later by locating the directory in which the configuration repository is stored and deleting the entire directory. This must be done with extreme caution as all domain information for the Configuration Manager is deleted.

To delete the configuration repository manually:

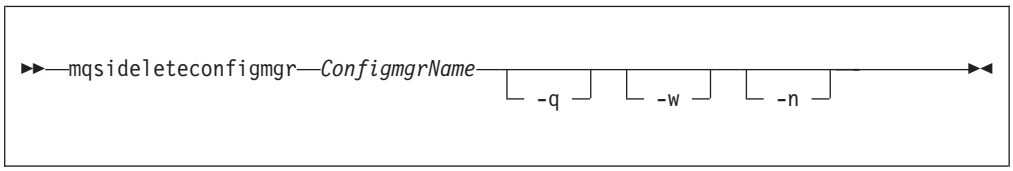
1. Locate the Configuration Manager's working directory. The default location is C:\Documents and Settings\All Users\Application Data\IBM\MQSI
2. Locate the components directory. Delete the directory with the same name as the Configuration Manager.

Examples:

```
mqsideleteconfigmgr CMGR01 -q
```

mqsideleteconfigmgr command - Linux and UNIX systems:

Syntax:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager that you want to delete.

This must be the first parameter specified and the name is case-sensitive.

-q (Optional) Deletes the Configuration Manager's queue manager. (If this option is not specified, only the WebSphere Message Broker queues are deleted.)

If the queue manager hosts another component (a broker, or the User Name Server, or both) that still exists, this command fails.

-w (Optional) Deletes all files related to the Configuration Manager from the workpath.

-n

(Optional) Deletes the configuration repository.

Be very careful using this option. The configuration repository contains the configuration data for the whole broker domain, not just data internal to the Configuration Manager. Deleting this repository destroys all information pertinent to the broker domain, and requires you to recreate every resource within it to recover the broker domain.

If the configuration repository is not deleted as part of deleting the Configuration Manager, and the Configuration Manager is later recreated with the same name, it will continue to use the existing configuration repository.

If you do not specify –n to delete the configuration repository data, you can delete it manually later by locating the directory in which the configuration repository is stored and deleting the entire directory. This must be done with extreme caution as all domain information for the Configuration Manager is deleted.

To delete the configuration repository manually:

1. Locate the Configuration Manager's working directory. The default location is/var/mqsi
2. Locate the components directory. Delete the directory with the same name as the Configuration Manager.

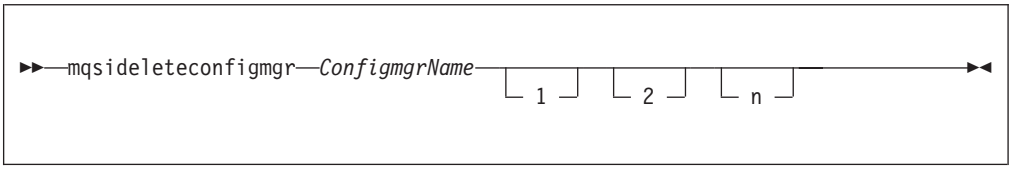
Examples:

```
mqsideleteconfigmgr CMGR01 -q
```

mqsideleteconfigmgr command - z/OS:

Syntax:

z/OS command - BIPDLCM:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager that you want to delete.

This must be the first parameter specified and the name is case-sensitive.

-n
(Optional) Deletes the configuration repository.

Be very careful using this option. The configuration repository contains the configuration data for the whole broker domain, not just data internal to the Configuration Manager. Deleting this repository destroys all information pertinent to the broker domain, and requires you to recreate every resource within it to recover the broker domain.

If the configuration repository is not deleted as part of deleting the Configuration Manager, and the Configuration Manager is later recreated with the same name, it will continue to use the existing configuration repository.

If you do not specify –n to delete the configuration repository data, you can delete it manually later by locating the directory in which the configuration repository is stored and deleting the entire directory. This must be done with extreme caution as all domain information for the Configuration Manager is deleted.

To delete the configuration repository manually:

1. Locate the Configuration Manager's working directory. The default location is ++COMPONENTDIRECTORY++
2. Locate the components directory. Delete the directory with the same name as the Configuration Manager.

1 (Optional) The registry pass that deletes only the Configuration Manager registry.

2 (Optional) The WebSphere MQ pass that deletes only the Configuration Manager WebSphere MQ queues.

Note: This can be performed only if the Configuration Manager registry exists.

Examples:

```
mqsideleteconfigmgr CMGR01 -q
```

mqsideleteconfigurableservice command

Use the mqsideleteconfigurableservice command to delete a configurable service, such as a JMS provider, that you have created by using the mqsicreateconfigurableservice command.

Supported platforms:

- Windows systems
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPJADPR; see "Contents of the broker PDSE" on page 491

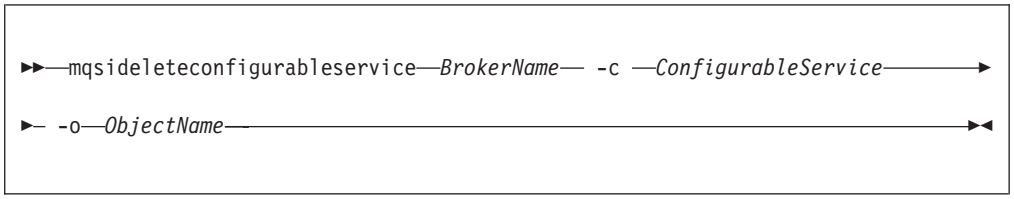
Purpose:

Use this command to delete a configurable service. Use the mqsireportproperties command to view the configurable services that are defined.

Usage notes:

- Before you run this command, ensure that the broker is running.
- After you have run this command, stop and restart the broker to ensure that deleted broker resources and properties are not being used.

Syntax:



Parameters:

BrokerName
(Required) The name of the broker to modify. This parameter must be the first parameter.

-c *ConfigurableService*
(Required) The type of configurable service, such as JMSProviders. Use the mqsireportproperties command to view the list of all defined services.

-o *ObjectName*
(Required) The name of the object for which you want to delete the properties. Use the mqsireportproperties command to view the list of properties that you can delete.

Authorization:

The user ID must be a member of the mqbrkrs group.

Responses:

This command returns the following responses

- BIP8012 Unable to connect to system components
- BIP8014 Component cannot be created
- BIP8073 Invalid broker name

- BIP8984 Configurable service was not found

Examples:

Delete a JMS provider configurable service called MyProviderXYZ for broker WBRK6_DEFAULT_BROKER:

```
mqsideleteconfigurableservice WBRK6_DEFAULT_BROKER -c JMSProviders -o JMS_MyProviderXYZ
```

mqsideletedb command

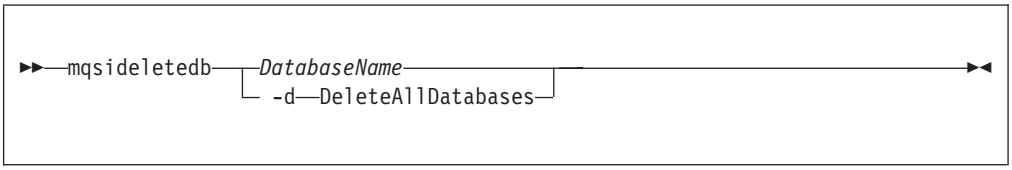
Supported platforms:

- Windows

Purpose:

The **mqsideletedb** removes a database that has been created by mqsicreatedb. This includes deleting the database and removing the ODBC data source name. If this is the last database managed by DatabaseInstanceMgr, the Derby Network Server and DatabaseInstanceMgr service are also stopped and removed.

Syntax:



Parameters:

DatabaseName
This must be the only parameter. Specify the name of the database that you want to delete. **Warning:** all the data stored in this database is permanently deleted.

-d DeleteAllDatabases
This must be the only parameter. Specify this option to delete all the databases that have been created by mqsicreatedb. **Warning:** all the data stored in **ALL** databases is permanently deleted.

Authorization:

The user ID used to invoke this command must have Administrator authority on the local system and be part of the mqbrkrs group.

Examples:

The following example deletes the database brokerdb:

```
mqsideletedb brokerdb
```

mqsideleteexecutiongroup command

Supported platforms:

- Windows
- Linux and UNIX systems

- z/OS. Run this command by customizing and submitting BIPDLEG; see "Contents of the Configuration Manager PDSE" on page 494

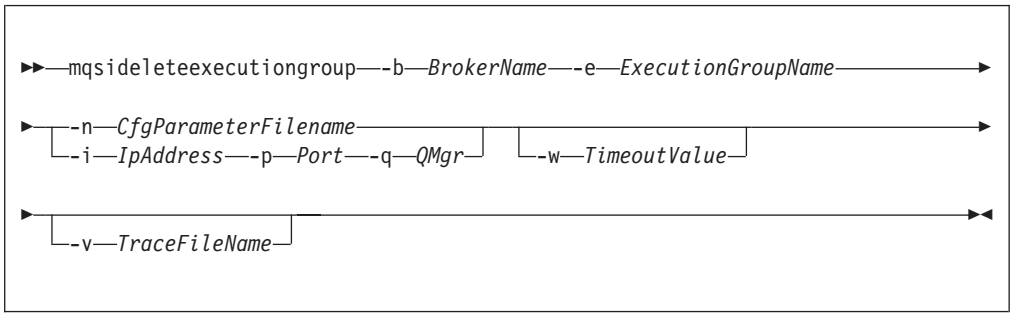
Purpose:

Use the **mqsideleteexecutiongroup** command to delete an execution group from a broker.

You must start the Configuration Manager before you can issue this command.

If you are deleting an execution group to which a deployment has previously been made, you must also start the broker before issuing this command.

Syntax:



Parameters:

-b *BrokerName*
(Required) The name of the broker on which the execution group resides.

-e *ExecutionGroupName*
(Required) The name of the execution group to delete.

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you are using this file on z/OS you must remove the statement `encoding="UTF-8"` from the first line, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

Note: If you do not supply this parameter, you must supply the **-i**, **-p**, and **-q** parameters.

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

If you are using this parameter on z/OS and want to connect to the local host you must set the value to "".

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-w *TimeoutValue*
(Optional) This parameter is the time in seconds that the utility waits to ensure that the command completed; the default value is 60.

-v *TraceFileName*
(Optional) This parameter sends internal debug trace information to the specified file.

Authorization:

On Windows platforms, Linux, and UNIX systems, you need to be a member of the 'mqm' group and the command only succeeds if the user ID running the command has the correct authority defined in the Configuration Manager's access control list.

In order to delete an execution group, full control authority is required over the broker object; see "ACL permissions" on page 537 for a list of permissions that can be defined in the Configuration Manager.

Responses:

This command returns the following responses:

0 (Success) States that the request completed successfully and the execution group has been deleted successfully. If the command was to delete an execution group to which a deployment has previously been made, this return code means that the broker has stopped and released all resources associated with that execution group, for example, message flows.

2 (Failure) States that the execution group could not be deleted for any reason.

98 States that the Configuration Manager cannot be reached.

99 States that the supplied arguments to the utility are not valid.

Examples:

On the domain controlled by the Configuration Manager whose queue manager is called QMGR and is listening on fred.abc.com:1414, delete an execution group called 'EG1' on broker 'BROKER'.

```
mqsideleteexecutiongroup -i fred.abc.com -p 1414 -q QMGR -b BROKER –e EG1
```

On the domain specified by the file domain1.configmgr, delete an execution group called 'EG2' on broker 'BROKER'.

```
mqsideleteexecutiongroup –n domain1.configmgr –b BROKER –e EG2
```

On the domain specified by the file `domain2.configmgr`, delete an execution group 'EG3' on broker 'FRED'. Wait five minutes for the Configuration Manager to tidy up any resources and send output to `trace.txt`.

```
mqsideleteexecutiongroup –n domain2.configmgr –b FRED –e EG3 –w 300 –v trace.txt
```

mqsideleteusernameserver command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPDLUN; see "Contents of the User Name Server PDSE" on page 493

Purpose:

This command:

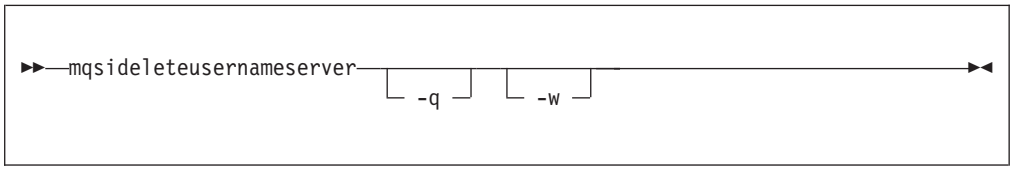
- Stops the service that runs the User Name Server.
- Stops and deletes the WebSphere MQ queue manager for the User Name Server, if requested.
- Removes the record for the component in the broker registry.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsideleteusernameserver command - Windows, Linux and UNIX systems"
- "mqsideleteusernameserver command - z/OS"

mqsideleteusernameserver command - Windows, Linux and UNIX systems:

Syntax:



Parameters:

-q (Optional) Deletes the User Name Server's queue manager when the User Name Server has been deleted. (If this option is not specified, only the WebSphere Message Broker queues are deleted.)

If the queue manager hosts another component (a broker, or the Configuration Manager, or both) that still exists, this command fails.

-w (Optional) Deletes all files related to the User Name Server from the work path.

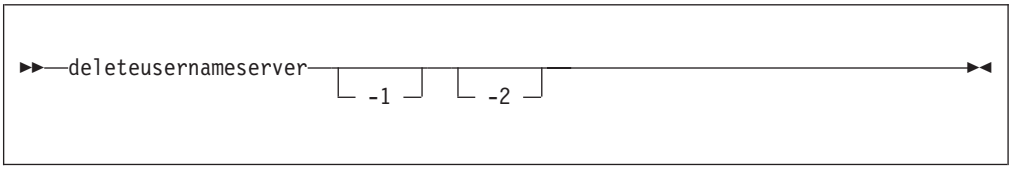
Examples:

```
mqsideleteusernameserver
```

mqsideleteusernameserver command - z/OS:

Syntax:

command - BIPDLUN:



Parameters:

-1 (Optional) Deletes only the User Name Server registry.

-2 (Optional) Deletes only the User Name Server WebSphere MQ queues.

Examples:

```
mqsideleteusernameserver
```

mqsideploy command

Use the mqsideploy command to make a deployment request to the Configuration Manager.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPDPLY; see "Contents of the Configuration Manager PDSE" on page 494.

Purpose:

This command allows you to make the various types of deployment requests from a batch command script, without the need for manual interaction.

The default operation is a delta or incremental deployment. Select **-m** to override the default operation.

mqsideploy does not require a Configuration Manager name parameter because all of the required connection details can be obtained from the **-n**, **-q**, **-i**, and **-p** parameters.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsideploy command - Windows, Linux, and UNIX systems" on page 420
- "mqsideploy command - z/OS" on page 424

Authorization:

In order to successfully deploy, the user ID issuing the command needs to have sufficient authority defined in the Configuration Manager. The permissions required are the same as the permission required to do the equivalent function in the Message Brokers Toolkit. For a list of permissions that can be defined in the Configuration Manager see "ACL permissions" on page 537.

UNIX If you are using UNIX, you must have mqbrkrs membership to run this command. If you do not have mqbrkrs membership, the command will fail with the following error message:

```
mqsideploy -i localhost -p 1414 -q qm2 -b brk2
BIP8081 An exception was caught while processing the command,
'Unable to format an ImbException message for output, ImbException message number is BIP2164'.
```

Responses:

This command returns the following responses:

0 (Success) The Configuration Manager issued the deployment request and all of the relevant brokers responded successfully before the timeout period expired.

2 (Failure) The Configuration Manager issued the deployment request and at least one broker responded negatively. See the messages issued from the utility (or the Configuration Manager's event log) for more information.

3 (Initiated) The Configuration Manager has replied, stating that deployment has started, but that no broker responses were received before the timeout occurred.

5 (Submitted) The deployment message was sent to the Configuration Manager, but that no response was received before the timeout occurred.

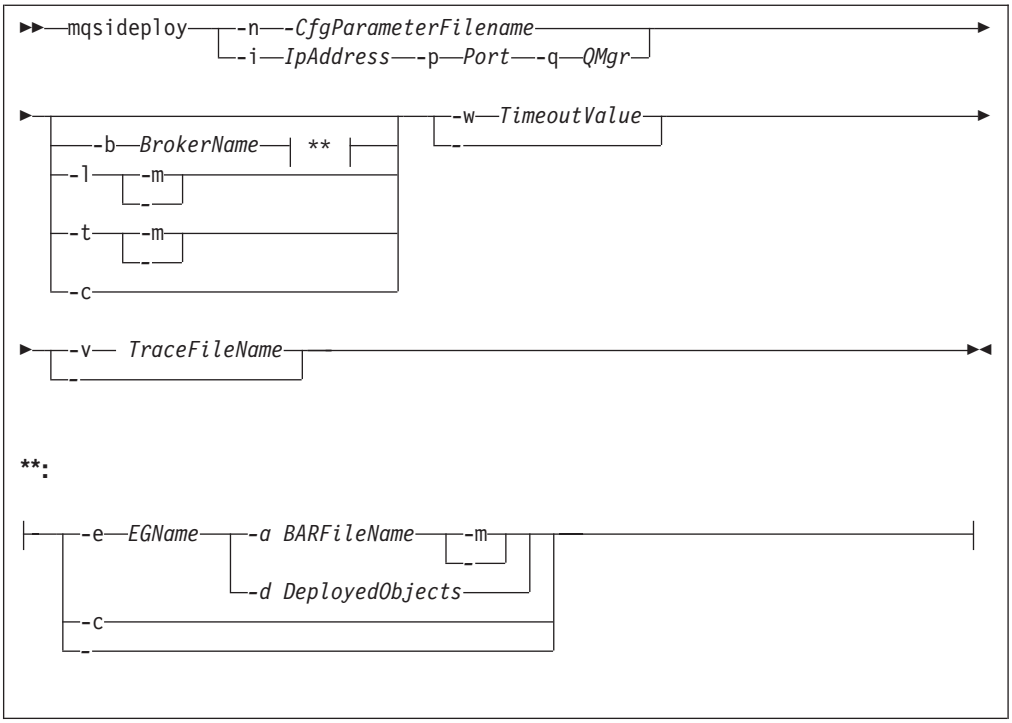
6 (SuccessSoFar) The Configuration Manager issued the deployment request and some, but not all, of the relevant brokers responded successfully before the timeout period expired; no brokers responded negatively.

98 The Configuration Manager cannot be reached.

99 The arguments supplied to the utility are not valid.

mqsideploy command - Windows, Linux, and UNIX systems:

Syntax:



Parameters:

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-b *BrokerName*
(Optional) This parameter specifies the name of the broker to which to deploy. If you specify either of the **-t** or **-l** parameters, the **-b** parameter is ignored because, when deploying topics or topology, all brokers in the domain are affected. Without the **-e** and **-a** parameters, a broker configuration deployment is initiated. If you do not specify the **-b** parameter, the command applies to all brokers in the domain.

-e *EGName*
(Optional) This parameter specifies the name of the execution group to which to deploy. You must specify **-b** and **-a** with this parameter.

-a *BARFileName*
(Optional) This parameter specifies the name of the bar (broker archive) file that is to be used for message flow or message set deployment. You must also specify the **-b** and **-e** parameters with this option.

-t (Optional) This parameter specifies deployment of all the topics configuration information.

- When used in conjunction with the **-m** parameter, the **-t** parameter causes the complete topics hierarchy to be deployed to all brokers in the domain.
- When used without the **-m** parameter, the **-t** parameter causes only changes to the topics hierarchy (since the last successful topics deployment) to be deployed to all brokers in the domain.

-l (Optional) This parameter specifies that the topology configuration should be deployed. Information is deployed to all brokers in the domain if the **-m** parameter is also set; otherwise, the information is deployed only to brokers with a changed topology configuration.

-c (Optional) This parameter instructs the Configuration Manager to stop waiting for responses to previously submitted deployment requests. If used with the **-b** parameter, the Configuration Manager stops waiting for outstanding deployment responses from the specified broker; without the **-b** parameter, the Configuration Manager stops waiting for responses to all outstanding deployment requests in the domain.

Specify the **-c** parameter with caution; it has the effect of canceling deployment requests. Use this option only if the affected brokers will respond to the outstanding requests. If a broker subsequently processes a deployment request that has been cancelled, the Configuration Manager ignores the response, and is therefore no longer synchronized with the broker.

-w *TimeoutValue*
(Optional) This parameter specifies the time in seconds that the command waits for the broker to reply before returning control to the command line or batch file. The mqsideploy command polls the Configuration Manager log records, looking for the results of the deployment request that has just been sent. The relevant log records contain information indicating whether the deployment was successful. The *timeoutValue* is the number of seconds that the command waits before timing out.

You can set this parameter to a value in the range 1 - 2 145 336 164. If you do not provide a *timeoutValue* value, or you set a value less than 1 or greater than 2 145 336 164 is specified, an error is returned.

Set this parameter to a value greater than the sum of the configuration timeouts that you specified for the broker, the *ConfigurationChangeTimeout* and the *InternalConfigurationTimeout* parameters, if you want to ensure that a response is received within the *timeoutValue* period. If you set a smaller value, the response returned might indicate that the state of the deploy request is unknown.

-d *DeployedObjects*
(Optional) This parameter describes the set of objects that you want to remove from the execution group. You can specify multiple files to deploy by separating the filenames with a colon (:).

You can specify objects of all types, but if you specify an ambiguous object name (for example, ″top″, when both ″top.dictionary″ and ″top.cmf″ are deployed to the same execution group), the entire command fails with the message BIP1089. In these circumstances, you must specify the fully qualified name of the objects to remove; for example, ″top.dictionary:top.cmf″.

-v *TraceFileName*
(Optional) This parameter sends the internal Configuration Manager Proxy trace to the specified file.

-m
(Optional) This parameter specifies deployment of complete information:

- For a *bar file deployment*, **-m** removes all currently-deployed message flows and message sets from the execution group as part of the deployment. If **-m** is not set, the contents of the bar file are deployed in addition to what is already deployed to the execution group. Any deployed objects with the same name as an item inside the bar file are replaced by the version inside the bar file.
- For a *topology configuration deployment*, **-m** deploys complete inter-broker configuration information to all brokers. If **-m** is not set, only changed inter-broker configuration is deployed to brokers whose inter-broker configuration has changed.
- For a *broker configuration deployment* this parameter is not valid.
- For a *topic tree deployment*, **-m** deploys the entire topic tree to all brokers. If **-m** is not set, only changes to the topic tree are deployed to all brokers.
- For a *remove message flow or remove message set operation*, the **-m** parameter is ignored.

Examples:

Deploy publish/subscribe neighbors using a connection file whose parameters are described in the file `cm1.configmgr`, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -n cm1.configmgr -m -w 600
```

Deploy publish/subscribe neighbors using the **i**, **p**, and **q** parameters to connect to the Configuration Manager, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -i localhost -p 1414 -q QMNAME -m -w 600
```

Note that you can use the **i**, **p**, and **q** parameters in the following examples instead of the **-n** parameter.

Deploy a topics hierarchy using a connection file whose parameters are described in the file `cm1.configmgr`, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -n cm1.configmgr -t -m -w 600
```

Deploy a bar file using a connection file whose parameters are described in the file `cm1.configmgr`, to the specified broker, allow 10 minutes for the broker to reply, and remove all currently-deployed message flows and message sets from the execution group as part of the deployment:

```
mqsideploy -n cm1.configmgr -b broker1 -e default -a mybar.bar -m -w 600
```

Deploy a broker configuration using a connection file whose parameters are described in the file `cm1.configmgr`, to the specified broker, and allow 15 minutes for the broker to reply:

```
mqsideploy -n cm1.configmgr -b broker1 -w 900
```

Attempt to remove the message flow `top` and the dictionary `bar` from the execution group `default` on broker `b1`, using a connection file whose parameters are described in the file `cm1.configmgr`. (If there are no other objects called `top` and `bar` deployed to the execution group, you can shorten the value of the **-d** parameter to `top:bar`.)

```
mqsideploy –n cm1.configmgr –b B1 –e default –d top.cmf:bar.dictionary
```

Cancel a deployment using a connection file whose parameters are described in the file `cm1.configmgr`, and allow 15 minutes for the broker to reply. In this example the Configuration Manager stops waiting for all outstanding deployment requests in the domain.

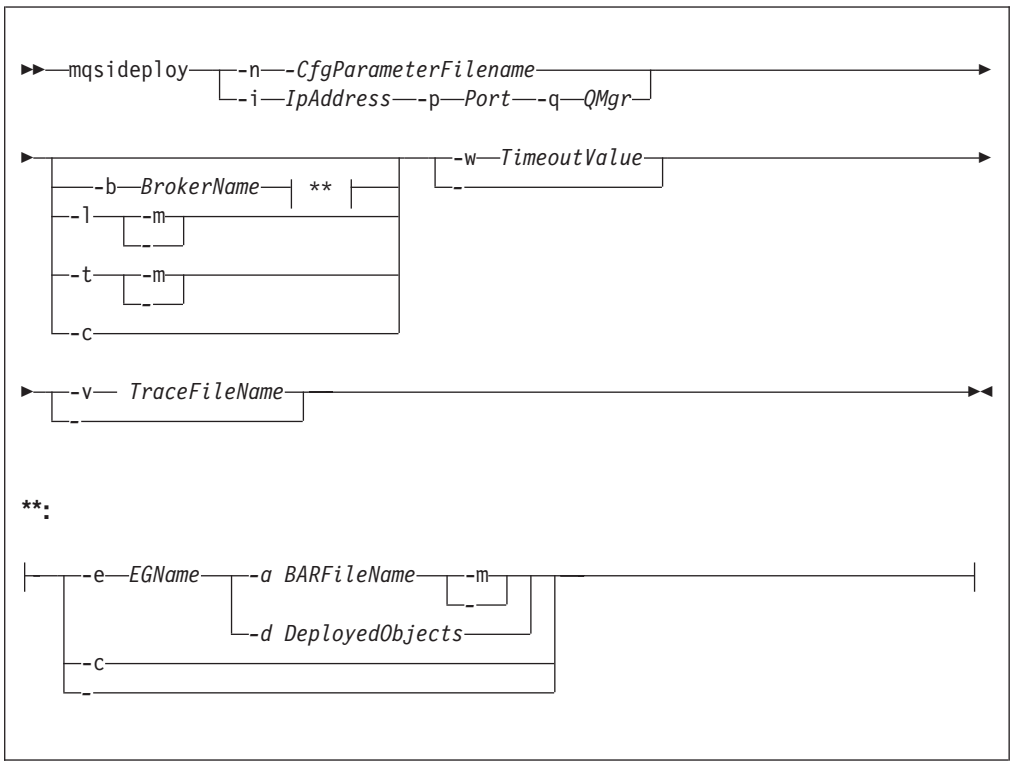
```
mqsideploy -n cm1.configmgr -c -w 900
```

mqsideploy command - z/OS:

BIPDPLY is used to run **mqsideploy**, and on z/OS the command does this from JAVA bindings; see "Usage note" on page 427.

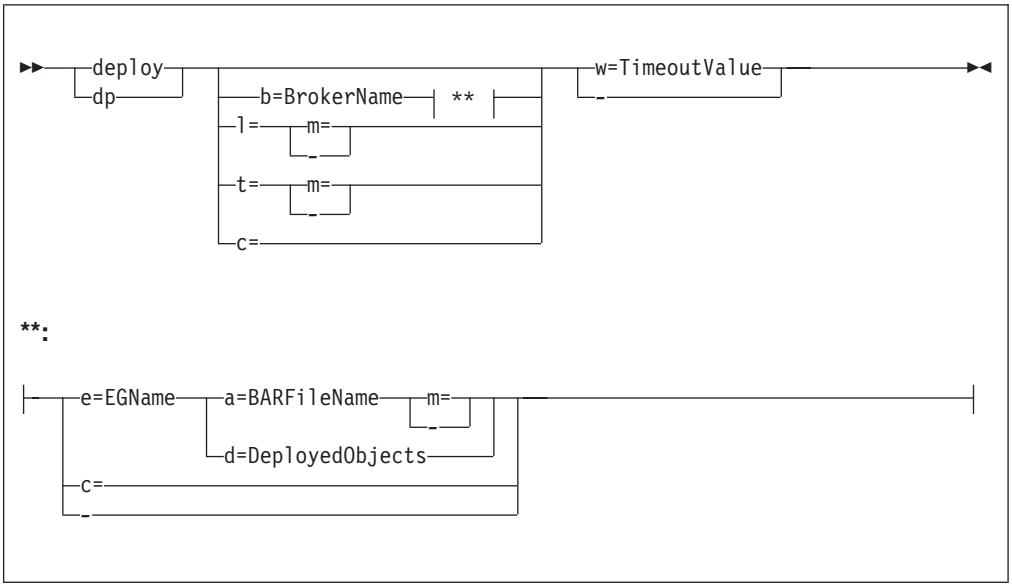
Syntax:

z/OS command - BIPDPLY:



z/OS console command:

Synonym: dp



Parameters:

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

Remove the statement `encoding="UTF-8"` from the first line of the `.configmgr` file, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

To connect to the local host, set the value to a space (" ").

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-b *Brokername*
(Optional) This parameter specifies the name of the broker to which to deploy. If you specify either of the **-t** or **-l** parameters, the **-b** parameter is ignored because, when deploying topics or topology, all brokers in the domain are affected. Without the **-e** and **-a** parameters, a broker configuration deployment is initiated. If you do not specify the **-b** parameter, the command applies to all brokers in the domain.

Specify the **-c** parameter to cancel deployment to a specific broker.

-e *EGName*
(Optional) This parameter specifies the name of the execution group to which to deploy. You must specify **-b** and **-a** with this parameter.

-a *BARFileName*
(Optional) This parameter specifies the name of the bar (broker archive) file that is to be used for message flow or message set deployment. You must also specify the **-b** and **-e** parameters with this option.

The bar file must be in the file system. The bar file can be anywhere in the file system, as long as the user ID of the person or Configuration Manager that is running the command can access the file and read it.

-t (Optional) This parameter specifies deployment of all the topics configuration information.

- When used in conjunction with the **-m** parameter, the **-t** parameter causes the complete topics hierarchy to be deployed to all brokers in the domain.
- When used without the **-m** parameter, the **-t** parameter causes only changes to the topics hierarchy (since the last successful topics deployment) to be deployed to all brokers in the domain.

-l (Optional) This parameter specifies that the topology configuration should be deployed. Information is deployed to all brokers in the domain if the **-m** parameter is also set; otherwise, the information is deployed only to brokers with a changed topology configuration.

-c (Optional) This parameter instructs the Configuration Manager to stop waiting for responses to previously submitted deployment requests. If used with the **-b** parameter, the Configuration Manager stops waiting for outstanding deployment responses from the specified broker; without the **-b** parameter, the Configuration Manager stops waiting for responses to all outstanding deployment requests in the domain.

Specify the **-c** parameter with caution; it has the effect of canceling deployment requests. Use this option only if the affected brokers will respond to the outstanding requests. If a broker subsequently processes a deployment request that has been cancelled, the Configuration Manager ignores the response, and is therefore no longer synchronized with the broker.

-w *TimeoutValue*
(Optional) This parameter specifies the time in seconds that the command waits for the broker to reply before returning control to the command line or batch file. The mqsideploy command polls the Configuration Manager log records, looking for the results of the deployment request that has just been sent. The relevant log records contain information indicating whether the deployment was successful. The *timeoutValue* is the number of seconds that the command waits before timing out.

You can set this parameter to a value in the range 1 - 2 145 336 164. If you do not provide a *timeoutValue* value, or you set a value less than 1 or greater than 2 145 336 164 is specified, an error is returned.

Set this parameter to a value greater than the sum of the configuration timeouts that you specified for the broker, the *ConfigurationChangeTimeout* and the *InternalConfigurationTimeout* parameters, if you want to ensure that a response is received within the *timeoutValue* period. If you set a smaller value, the response returned might indicate that the state of the deploy request is unknown.

-d *DeployedObjects*

(Optional) This parameter describes the set of objects that you want to remove from the execution group. You can specify multiple files to deploy by separating the filenames with a colon (:).

You can specify objects of all types, but if you specify an ambiguous object name (for example, ″top″, when both ″top.dictionary″ and ″top.cmf″ are deployed to the same execution group), the entire command fails with the message BIP1089. In these circumstances, you must specify the fully qualified name of the objects to remove; for example, ″top.dictionary:top.cmf″.

-v *TraceFileName*

(Optional) This parameter sends the internal Configuration Manager Proxy trace to the specified file.

-m

(Optional) This parameter specifies deployment of complete information:

- For a *bar file deployment*, **-m** removes all currently-deployed message flows and message sets from the execution group as part of the deployment. If **-m** is not set, the contents of the bar file are deployed in addition to what is already deployed to the execution group. Any deployed objects with the same name as an item inside the bar file are replaced by the version inside the bar file.
- For a *topology configuration deployment*, **-m** deploys complete inter-broker configuration information to all brokers. If **-m** is not set, only changed inter-broker configuration is deployed to brokers whose inter-broker configuration has changed.
- For a *broker configuration deployment* this parameter is not valid.
- For a *topic tree deployment*, **-m** deploys the entire topic tree to all brokers. If **-m** is not set, only changes to the topic tree are deployed to all brokers.
- For a *remove message flow or remove message set operation*, the **-m** parameter is ignored.

Usage note:

If you enter:

```
mqsideploy -i cm_name -p port -q cm_qm -l  -m
```

the command attempts to run the **mqsideploy** command using WebSphere MQ Java client code, which is not allowed on z/OS. Connecting to the local Configuration Manager with the parameters **-i** and **-p** forces the command into a local mode, and the following error occurs:

```
BIP1046E: Unable to connect with the Configuration Manager's queue manager
```

Depending on the version of WebSphere MQ that you are using, the reported reason codes differ:

- On WebSphere MQ V5.3.1, you receive:

  ```
  2012 0x000007dc MQRC_ENVIRONMENT_ERROR
  ```

- On WebSphere MQ V6.0, you receive:

  ```
  2298 0x000008fa MQRC_FUNCTION_NOT_SUPPORTED
  ```

Examples:

Deploy publish/subscribe neighbors using a connection file whose parameters are described in the file `cm1.configmgr`, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -n cm1.configmgr -m -w 600
```

Deploy publish/subscribe neighbors using the **i**, **p**, and **q** parameters to connect to the Configuration Manager, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -i localhost -p 1414 -q QMNAME -m -w 600
```

Note that you can use the **i**, **p**, and **q** parameters in the following examples instead of the **-n** parameter.

Deploy a topics hierarchy using a connection file whose parameters are described in the file `cm1.configmgr`, allow 10 minutes for the broker to reply, and deploy complete inter-broker configuration information:

```
mqsideploy -n cm1.configmgr -t -m -w 600
```

Deploy a bar file using a connection file whose parameters are described in the file `cm1.configmgr`, to the specified broker, allow 10 minutes for the broker to reply, and remove all currently-deployed message flows and message sets from the execution group as part of the deployment:

```
mqsideploy -n cm1.configmgr -b broker1 -e default -a mybar.bar -m -w 600
```

Deploy a broker configuration using a connection file whose parameters are described in the file `cm1.configmgr`, to the specified broker, and allow 15 minutes for the broker to reply:

```
mqsideploy -n cm1.configmgr -b broker1 -w 900
```

Attempt to remove the message flow `top` and the dictionary `bar` from the execution group `default` on broker `b1`, using a connection file whose parameters are described in the file `cm1.configmgr`. (If there are no other objects called `top` and `bar` deployed to the execution group, you can shorten the value of the **-d** parameter to `top:bar`).

```
mqsideploy –n cm1.configmgr –b B1 –e default –d top.cmf:bar.dictionary
```

Cancel a deployment using a connection file whose parameters are described in the file `cm1.configmgr`, and allow 15 minutes for the broker to reply. In this example, the Configuration Manager stops waiting for all outstanding deployment requests in the domain.

```
mqsideploy -n cm1.configmgr -c -w 900
```

mqsiformatlog command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPFMLG; see "Contents of the broker PDSE" on page 491

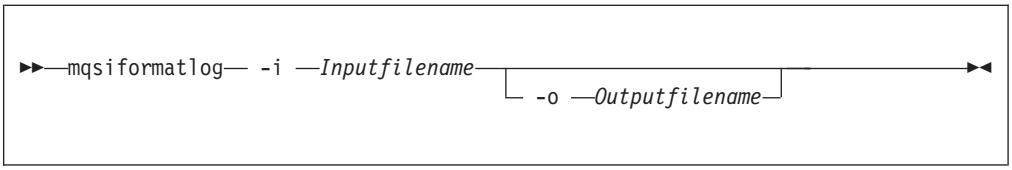
Purpose:

Use the **mqsiformatlog** command to process the XML log created by **mqsireadlog**. The command retrieves and formats any messages that the XML log contains into a form suitable for the locale of the user invoking the command.

This command interprets an input log file that has been created on any system in a platform-independent code page, `utf-8`. Use it to produce formatted output from input log files transferred from other systems to the system on which you issue the command. If you use this facility, ensure that you use a file transfer program that does not convert the data (for example, by specifying a binary transfer option).

You can direct the output to a file, or to the command shell.

Syntax:



Parameters:

-i *Inputfilename*
(Required) The filename of the XML log file that is to be formatted. This file is created by the **mqsireadlog** command; it is encoded in `utf-8`.

-o *Outputfilename*
(Optional) The filename of the file into which the formatted log output is to be written. If this is not specified, the formatted log data is written to stdout.

Output written by this command (to file or stdout) is written in a code page suitable for the current user locale.

Authorization:

The user ID used to invoke this command must have read access to the input file, and write access to the output file.

On Linux and UNIX systems, the user ID must be a member of the **mqbrkrs** group.

Examples:

```
mqsiformatlog -i trace.xml -o formattrace.log
```

The following extract illustrates the output generated by this command:

```
Timestamps are formatted in local time, local time is GMT.
.
.
.
2003-02-12 12:57:21.895999    388  UserTrace   BIP2638E:
MQPUT to queue 'SYSTEM.BROKER.EXECUTIONGROUP.REPLY' on queue manager
'WBRK_QM': MQCC=0, MQRC=0; node ConfigurationMessageFlow.outputNode'.
The node 'ConfigurationMessageFlow.outputNode' attempted
to write a message to the specified queue 'SYSTEM.BROKER.EXECUTIONGROUP.REPLY'
connected to queue manager 'WBRK_QM'.
The MQCC was 0 and the MQRC was 0.
No user action required.

2003-02-12 12:57:21.895999    388  UserTrace   BIP2622I:
```

```
Message successfully output by output node 'ConfigurationMessageFlow.outputNode'
to queue 'SYSTEM.BROKER.EXECUTIONGROUP.REPLY' on queue manager
'WBRK_QM'. The WebSphere MQ output node ConfigurationMessageFlow.outputNode'
successfully wrote an output message to the specified queue
SYSTEM.BROKER.EXECUTIONGROUP.REPLY connected to queue manager WBRK_QM.
No user action required.
.
.
.
Threads encountered in this trace:  335  388
```

mqsijoinmqpubsub command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPJNMP; see "Contents of the broker PDSE" on page 491

Purpose:

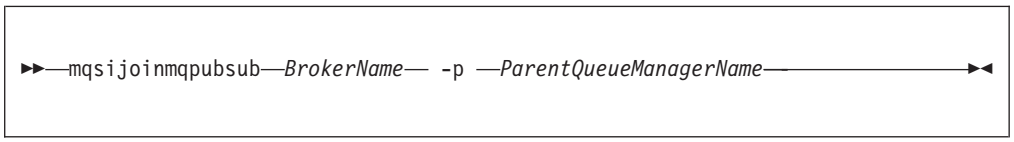
Use the **mqsijoinmqpubsub** command to join this WebSphere Message Broker broker to an WebSphere MQ Publish/Subscribe broker network. The command identifies a specific WebSphere MQ Publish/Subscribe broker to be the parent of the WebSphere Message Broker broker.

This is an asynchronous command. Successful completion of this command indicates that the WebSphere Message Broker broker has accepted the request, not that the required action has completed.

Use the **mqsilistmqpubsub** command to monitor the status of the asynchronous actions that result from this command.

Use this command only if you are integrating this WebSphere Message Broker broker with an WebSphere MQ Publish/Subscribe broker network. Before you issue this command, ensure that the WebSphere Message Broker broker is ready to receive and process messages on queue SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS (that is, you must have restarted the broker after creating this queue).

Syntax:



Parameters:

BrokerName
(Required) The name of the broker that is to be joined to an WebSphere MQ Publish/Subscribe broker.

-p *ParentQueueManagerName*
(Required) The name of the queue manager that hosts the WebSphere MQ Publish/Subscribe broker to which this WebSphere Message Broker broker is to be joined.

Authorization:

The user ID used to invoke this command must have `put` and `inq` authority to the queue SYSTEM.BROKER.INTER.BROKER.COMMUNICATIONS.

On Linux and UNIX systems, the user ID must be a member of the **mqbrkrs** group.

Examples:

```
mqsijoinmqpubsub WBRK_BROKER -p MQBroker1
```

mqsilist (list resources) command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPLIST; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

On Windows platforms, Linux, and UNIX systems, use the **mqsilist** command to list all the components installed on the system, all the execution groups defined to a specific broker, or all the message flows contained in a named execution group on a specific broker.

On Windows platforms, Linux, and UNIX systems, the output is directed to stdout.

From a z/OS console, use the **list** command to list all the execution groups defined to a specific broker, or all the message flows contained in a named execution group on a specific broker.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsilist (list resources) command - Windows, Linux and UNIX systems"
- "mqsilist (list resources) command - z/OS" on page 432

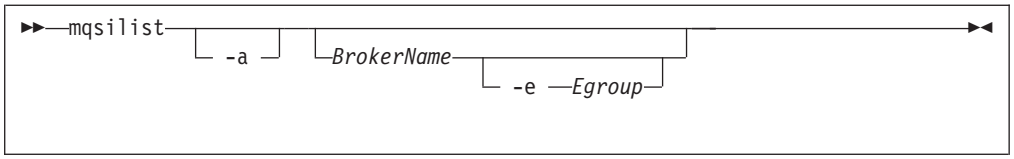
Authorization:

On Linux and UNIX systems, the user ID must be a member of the **mqbrkrs** group.

On Windows platforms, if you have specified a broker name and the `-e` flag, the user ID used to invoke this command must have **mqbrkrs** group membership.

mqsilist (list resources) command - Windows, Linux and UNIX systems:

Syntax:



If you do not specify any parameters when you issue this command, a list of components and queue manager names is displayed for each component created on this system, in the form:

```
BIP8099I: Broker: brokername - queuemanagername
BIP8099I: ConfigMgr: configmgrname - queuemanagername
BIP8099I: UserNameServer: UserNameServer - queuemanagername
BIP8071I: Successful command completion
```

Parameters:

-a (Optional) List all the components installed on the system.

If you use this option on brokers from a previous release of the product, you obtain the following message:

```
BIP8221I: <Component>: <ComponentName> (<Version>) - <Queue Manager>
```

BrokerName
(Optional) The name of the broker for which you want to list resources. This must be a deployed broker. A list of execution groups configured on this broker and the process ID (pid) of each is displayed.

-e *Egroup*
(Optional) Selects an execution group within a broker. Specify the label of the execution group for which you want to list message flows. The command returns a list of message flows assigned to the specified execution group within the broker.

The broker specified must be active for any message flow information to be returned.

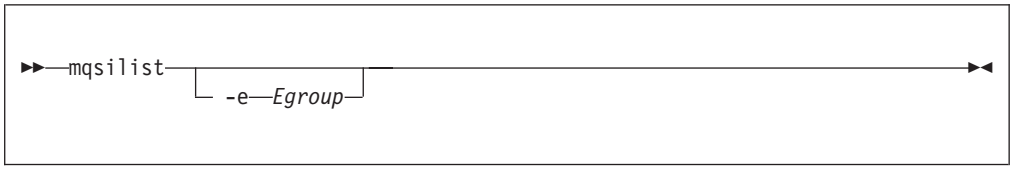
Examples:

```
mqsilist WBRK_BROKER -e DefaultEG
mqsilist DatabaseInstanceMgr
```

mqsilist (list resources) command - z/OS:

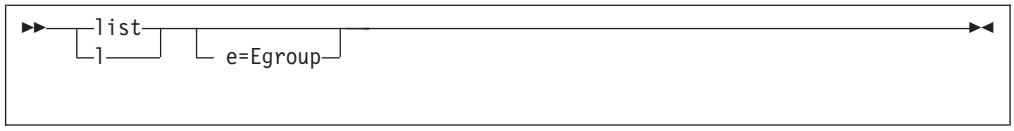
Syntax:

z/OS command - BIPLIST:



z/OS console command:

Synonym: l



If you do not specify any parameters when you issue this command, a list of the execution groups is displayed.

Parameters:

-e *Egroup*
(Optional) Selects an execution group within a broker. Specify the label of the execution group for which you want to list message flows. The command returns a list of message flows assigned to the specified execution group within the broker.

The broker specified must be active for any message flow information to be returned.

Examples:

You issue the **list** command only against a broker task name. For example:

```
F MQP1BRK,list
```

The output is the list of execution groups and process IDs in the form:

```
BIP8130I: Execution Group: <name> -<process ID>
BIP8071I: Successful command completion
```

If you specify an execution group, for example:

```
F MQP1BRK, list e='exgrp1'
```

the output is a list of message flows in the form:

```
BIP8131I: Messageflow: <MessageFlowName>
BIP8071I: Successful command completion
```

mqsilistaclentry command

Command to view or list the user groups, users, objects, or access control lists that you have defined.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPLIACL; see “Contents of the Configuration Manager PDSE” on page 494

Purpose:

Use the **mqsilistaclentry** command to view or list the currently defined:

- User groups
- Users
- Objects
- Access control lists

If you do not specify any parameters, all the groups, users, and objects are listed.

If you specify *GroupName*, only those access control lists relating to that group are listed.

If you specify *UserName*, only those access control lists relating to that specific user are listed, including any access control lists to which they belong.

If you specify *Broker*, only those groups, users, or access control lists relating to that broker are listed.

The output from this command is a description of the access rights that match the criteria specified in the command line arguments; each line takes the following form:

```
<principal> - <principaltype> - <accesstype> - <objectname> - <objecttype>
```

where

- <principal> is the name of the user or group for which a policy has been defined.
- <principaltype> is USER if the principal refers to a user, or GROUP if the principal refers to a group.
- <accesstype> describes the type of authority that has been granted, and can be one of:

  V View access

  F Full control

  D Deploy access

  E Editor access
- <objectname> applies only to execution groups and brokers, and describes the name of the object that has had a policy defined.
- <objecttype> describes the type of object that has had a policy defined, and can be one of:

  Broker
  A broker

  ConfigManagerProxy
  Configuration Manager Proxy

  ExecutionGroup
  An execution group

  PubSubTopology
  The topology

  Subscription
  The list of active subscriptions

  TopicRoot
  The root topic

For example:

```
wrkgrp\ali  -  USER   -  F  -  EXE  -  BROKER\default
```

means that user ″ali″ in domain ″wrkgrp″ has been granted full control over the execution group default in broker ″BROKER″.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsilistaclentry command - Windows"
- "mqsilistaclentry command - Linux and UNIX systems" on page 436
- "mqsilistaclentry command - z/OS" on page 438

Authorization:

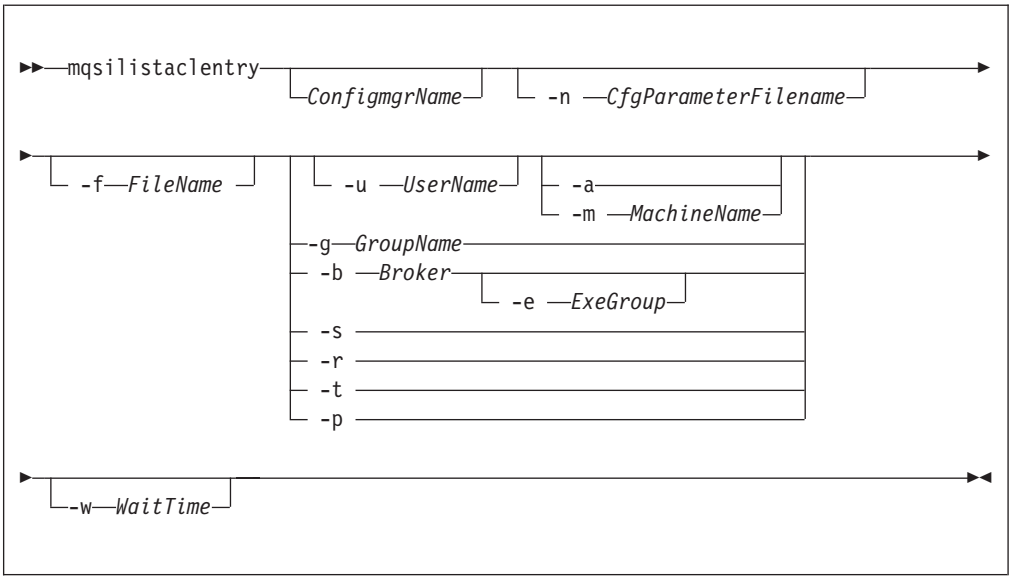
The user ID used to invoke this command must have full control permissions for the object being changed; see "ACL permissions" on page 537 for more information. In addition, for Linux and UNIX systems, the user ID must be a member of mqbrkrs.

When z/OS commands are run through the console, they effectively run as the Configuration Manager started-task ID. This means that the commands inherit a Full Control root ACL and you can carry out any operation.

If you submit a console command to the Configuration Manager you can change any ACL for that Configuration Manager.

mqsilistaclentry command - Windows:

Syntax:



Parameters:

ConfigmgrName
(Optional) The name of the Configuration Manager for which the access control lists are to be displayed.

The default name, if this parameter is not specified, is 'ConfigMgr'.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user may connect to all machines. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

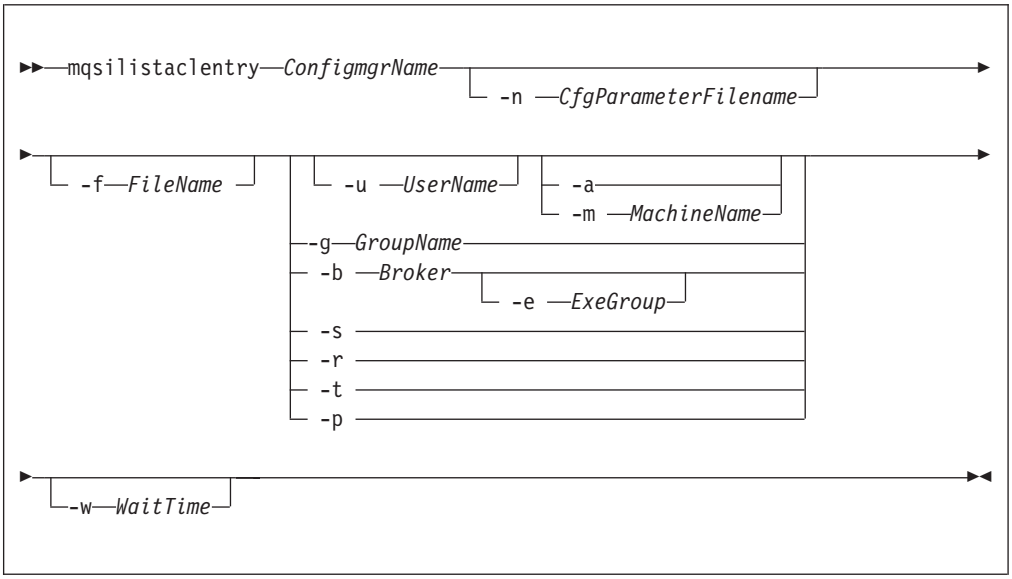
-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

```
mqsilistaclentry CMGR01 -b BROKER01
mqsilistaclentry CMGR01 -e BROKER01\ExeGrp01
mqsilistaclentry CMGR01 -g GROUPA
```

mqsilistaclentry command - Linux and UNIX systems:

Syntax:



Parameters:

ConfigmgrName
(Required) The name of the Configuration Manager for which the access control lists are to be displayed. This parameter must be the first parameter specified and its name is case-sensitive.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user may connect to all machines. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

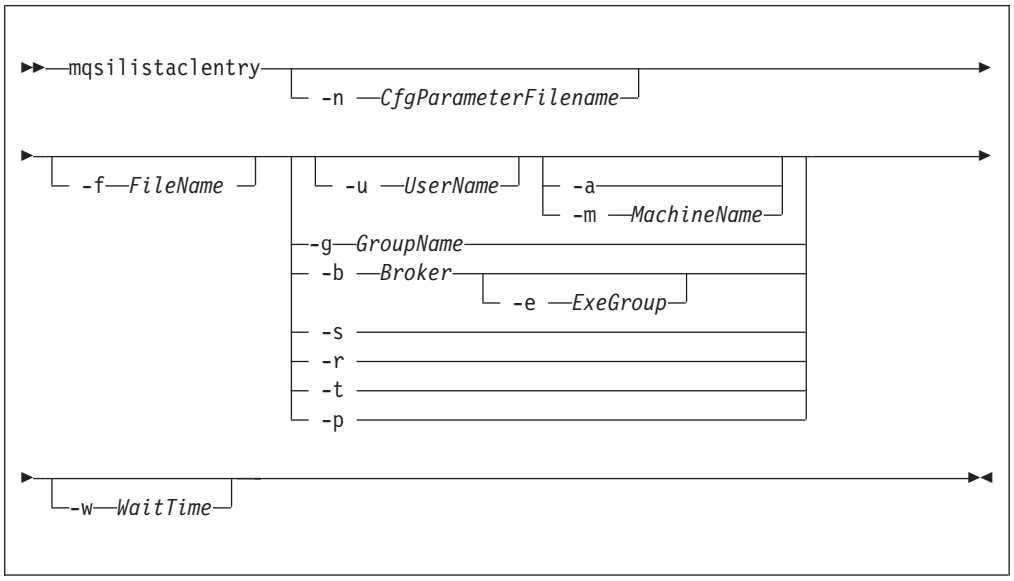
Examples:

```
mqsilistaclentry CMGR01 -b BROKER01
mqsilistaclentry CMGR01 -e BROKER01\ExeGrp01
mqsilistaclentry CMGR01 -g GROUPA
```

mqsilistaclentry command - z/OS:

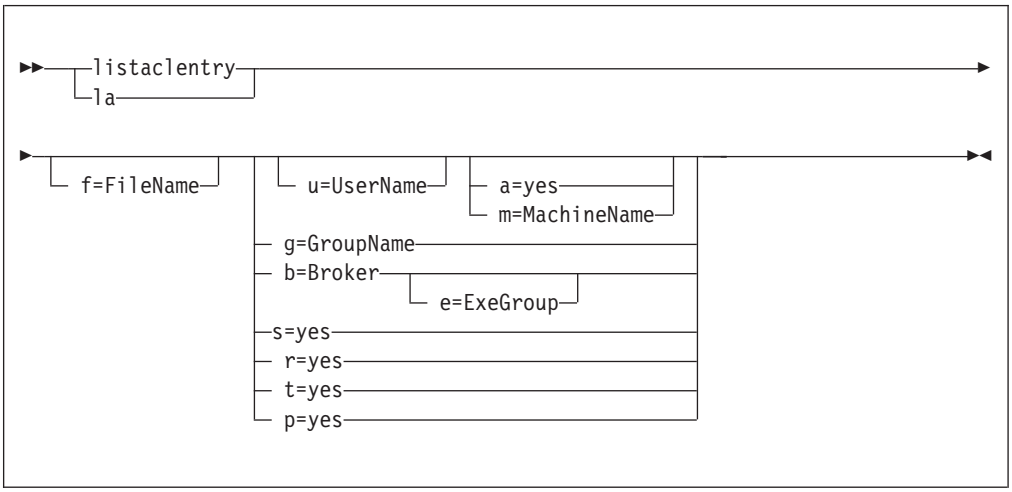
Syntax:

z/OS command - BIPLIACL:



z/OS console command:

Synonym: la



Parameters:

ConfigmgrName
This parameter is implicit because you specify the component that you want to MODIFY.

-n *CfgParameterFilename*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

Remove the statement `encoding="UTF-8"` from the first line of the `.configmgr` file, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

-f *FileName*
(Optional) The file from which to import the configuration. The output of the **mqsilistaclentry** command, with output generated using the **-f** option, is the correct format.

-g *GroupName*
(Optional) The local group to which this entry refers. For this reason, the name must adhere to the standard platform convention for group names.

To add a domain group, grant authority to a local group and then add the domain group, or groups, that you want to authorize into that local group. Any members of those domain groups obtain the permissions of the local group indirectly.

-u *UserName*
(Optional) The user name to which this entry refers, for example, TEST\ANOTHER.

-m *MachineName*
(Optional) The name of the machine from which a specified user can connect. This option can not be used with **-a**.

-a (Optional) The specified user may connect to all machines. This option can not be used with **-m**.

-b *Broker*
(Optional) The object is a broker object, and its name is specified as a parameter.

-e *ExeGroup*
(Optional) The object is an execution group and its name is specified as a parameter of the form Broker\ExeGroup. You must specify the **b** flag if you specify this flag.

-s *Subscription*
(Optional) The object is a subscription object, and its name is specified as a parameter.

-r (Optional) The object refers to the root topic.

-t (Optional) The object refers to the main topology.

-p (Optional) The object refers to the ″allresources″ resource type. The authority that the principal has for this object applies to all objects, including the mqsicreateaclentry, mqsideleteaclentry, and mqsilistaclentry commands themselves.

-w *WaitTime*
(Optional) The time in seconds that the command waits for a response from the Configuration Manager. If you do not supply a value, the command waits for 30 seconds.

Examples:

```
mqsilistaclentry CMGR01 -g GROUPA
```

For the console form of the command on z/OS you must use a comma between each command option. The following example shows the console version of the preceding example:

```
/f CMGR01,la g='GROUPA'
```

mqsilistmqpubsub command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPLSMP; see “Contents of the broker PDSE” on page 491

Purpose:

Use the **mqsilistmqpubsub** command to display the status of the WebSphere MQ Publish/Subscribe neighbor brokers to the specified WebSphere Message Broker broker.

This command indicates the status of the activity started by a previous join request (see "mqsijoinmqpubsub command" on page 430). The command reports on the status of each neighbor broker, which can be:

Active Broker status is active if the join request has completed successfully.

Inactive
Broker status is inactive if the join has been initiated, but has not completed.

This command also shows the streams that are recognized by both the WebSphere Message Broker broker and its neighbor (on which messages can be published and distributed between the brokers). Stream information is provided only for neighbors with *active* status.

Use this command only if you are integrating with, or migrating from, an WebSphere MQ Publish/Subscribe broker network.

The output generated by this command is directed to stdout.

Syntax:

Parameters:

BrokerName
(Required) The name of the broker for which you want a list of neighbors.

Authorization:

On Linux and UNIX systems, the user ID must be a member of the **mqbrkrs** group.

On Windows platforms, no authorization is required.

Examples:

If there are no WebSphere MQ Publish/Subscribe brokers, and no **mqsijoinmqpubsub** command has been issued, this command returns the following message:

```
BIP8088I: There are no WebSphere MQ Publish/Subscribe neighbors
```

If an **mqsijoinmqpubsub** command has been issued, one of two response messages is displayed:

- For every broker that is an inactive neighbor of WBRK_BROKER (that is, a request has been made, using the mqsijoinmqpubsub or strmqbrk command, to add the broker to the network, but negotiations for common streams are still in progress), the following message is displayed:

  ```
  BIP8089I: WebSphere MQ Publish/Subscribe neighbor <brokername> is inactive.
  ```

- For every broker that is an active neighbor of WBRK_BROKER (that is, the two brokers are exchanging publications and subscriptions for each of the common streams), the following message is displayed:

```
BIP8090I: WebSphere MQ Publish/Subscribe neighbor <brokername> is active.
```

Additional messages are displayed for active brokers to indicate the common streams for which publications and subscriptions are exchanged, in the following form:

```
BIP8091I:   Common stream  streamname
```

For example,

```
mqsilistmqpubsub WBRK_BROKER
```

might return the following responses:

```
BIP8090I: MQSeries Publish/Subscribe neighbor MQPS_BROKER_1 is active.
BIP8091I:    Common stream SYSTEM.BROKER.DEFAULT.STREAM.
BIP8091I:    Common stream STREAM0.
BIP8090I: MQSeries Publish/Subscribe neighbor MQPS_BROKER_2 is active.
BIP8091I:    Common stream SYSTEM.BROKER.DEFAULT.STREAM.
BIP8091I:    Common stream STREAM150.
BIP8089I: MQSeries Publish/Subscribe neighbor MQPS_BROKER_3 is inactive.
```

In this example, the WebSphere Message Broker broker has three WebSphere MQ Publish/Subscribe neighbors. Two of these neighbors are active and have been successfully joined to the WebSphere Message Broker broker. The third is inactive and is in the process of being joined.

The list of streams that are common to the WebSphere Message Broker broker and the two active WebSphere MQ Publish/Subscribe brokers are included in the response. For MQPS_BROKER_1, the streams SYSTEM.BROKER.DEFAULT.STREAM and STREAM0 are common. For MQPS_BROKER_2, the streams SYSTEM.BROKER.DEFAULT.STREAM and STREAM150 are common.

If a neighbor is inactive for a long period of time, it is likely that the communication link between the two brokers has been broken. Ensure that the WebSphere MQ connections between the two brokers (channels and transmission queues) are running, and that the WebSphere Message Broker and WebSphere MQ Publish/Subscribe brokers are both active.

mqsimigratecomponents command

Migrate a component from a previously installed version of the product to another version on the same computer to prepare it for participation in the broker domain of the target version.

Supported platforms:

- Windows.
- Linux and UNIX systems.
- z/OS. Run this command by customizing and submitting BIPMGCMP.

Purpose:

Migrate components to WebSphere Message Broker Version 6.0 from Version 2.1 or from Version 5.0.

- For Version 2.1 of the product, Version 2.1 CSD02 (2.1.0.3) is the earliest release of the product that is supported.
- For Version 5.0 of the product, Version 5.0.0.4 (Fix Pack 4) is the earliest release of the product that is supported.

You can also use this command to return a component from a later version to an earlier one to reverse the effects of forward migration.

You must run this command from whichever version of the installed product is the later, regardless of whether it is the source version or the target version.

You must have an installation of the product at the required version, with the required component code installed, to issue this command successfully.

Before you start migration, stop any active debug sessions in the Message Brokers Toolkitor the Version 2.1 Control Center. You cannot migrate message flows that are being debugged.

Specify appropriate options on this command to perform one of the following actions:

- Check on a component, without making any changes, to ensure that the component is suitable for the required migration (**-c**).
- Move a component to a different version, in full or part (**-s** and **-t**).
- Undo a failed migration step (**-u**).
- Verify that a move has been successful (**-v**).

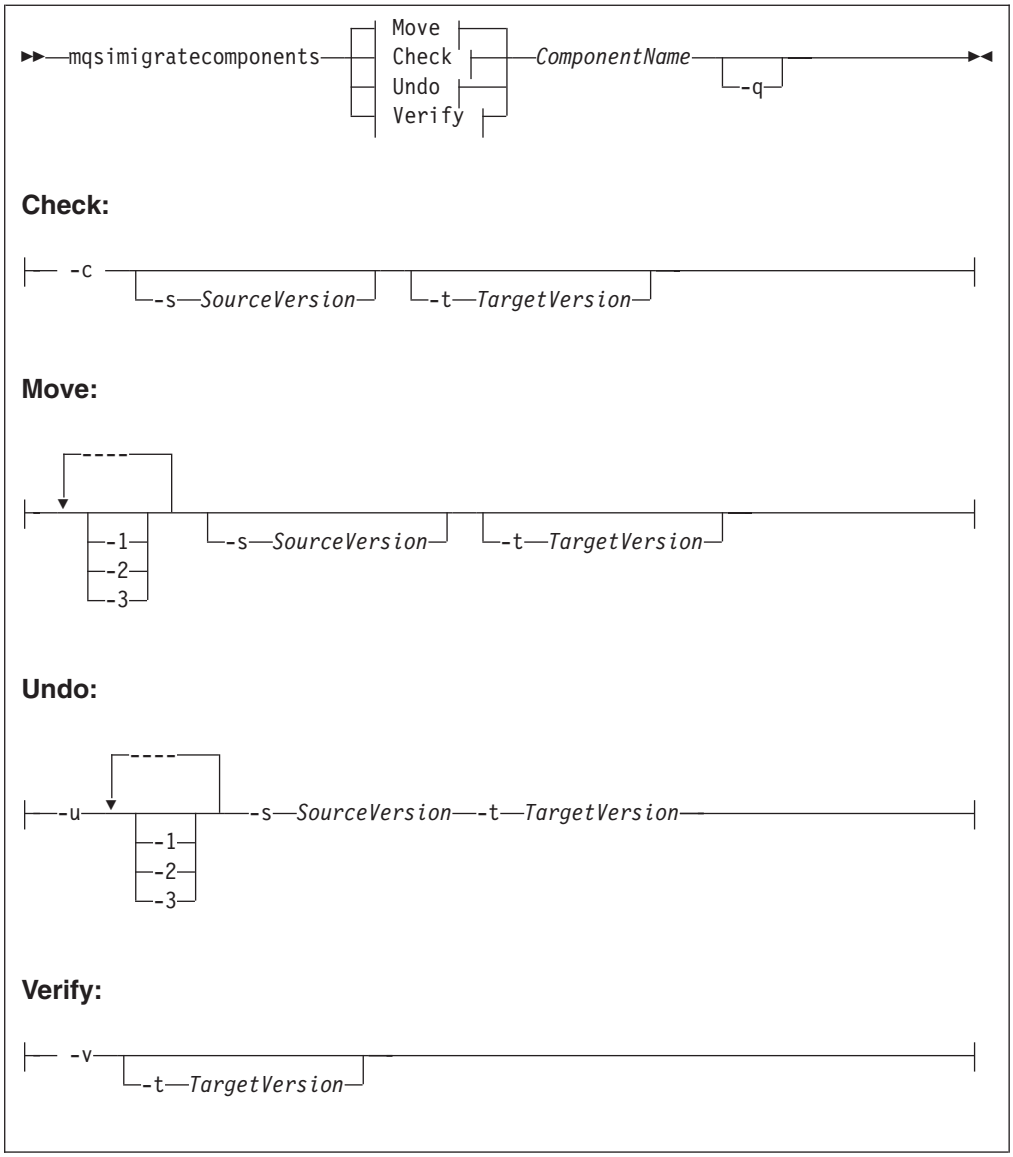
If you are using the mqsimigratecomponents command to migrate a broker that uses Sybase for its broker database, you must modify the database by performing the following actions:

1. Log on to ISQL using a system administrator account.
2. Issue the following series of commands:

```
1> use master
2> go
1> sp_dboption "BROKER1","ddl in tran",TRUE
2> go
Database option 'ddl in tran' turned ON for database 'BROKER1'.
Run the CHECKPOINT command in the database that was changed.
(return status = 0)
1> use BROKER1
2> go
1> checkpoint
2> go
```

   where *BROKER1* is the name of the Sybase broker database.

Syntax:



Parameters:

-c (Optional) Check a specified component before migration, to ensure that:

- The auto-detected version of the broker matches any version specified on the command line.
- 64-bit execution groups are not supported if you are migrating from Version 6.0 to a previous release.
- The database tables to be copied from a previous release do not contain any rows that are incorrectly indexed.

You can check a running component. The check does not affect the component, apart from a slight impact on performance. On Linux and UNIX systems, you must migrate the ODBC configuration file (the file in which you have defined the data sources, for example .odbc.ini) before you run the check, because the checking command must be able to access the broker database.

The check command either succeeds or fails, and prints a message about whether the migration will succeed, but no modifications are made during the process.

-v (Optional) Check a specified component after migration, to ensure that:

- The correct database tables and queues exist for the specified version.
- The registry is in the correct format for the specified version.

-q (Optional) Print fewer status messages during the operation.

-1 (Optional) Do only registry and file system work.

- When you migrate to Version 6.0, use the **-1** parameter before the **-2** or **-3** parameters.
- When migrating backwards to a previous version, use the **-2** or **-3** parameters before the **-1** parameter.

-2 (Optional) Do only WebSphere MQ work.

-3 (Optional) Do only database work.

If a broker that you are migrating shares a database schema with another broker, warning message BIP8678 is issued and the check fails. In this case, all the brokers that share a database schema must be migrated together.

1. Stop all the brokers that share the database schema.
2. Migrate the first broker. This action migrates the database tables for all brokers, as well as the file system and registry, and WebSphere MQ definitions for that broker only; for example:

   ```
   mqsimigratecomponents FIRSTBROKER -t 6.0.0.1
   ```

3. Migrate the file system and registry, and WebSphere MQ parts of each of the other brokers; the database part has already been migrated. Use the **-1** and **-2** parameters to do this, either in one step or two steps:
   - In one step:

     ```
     mqsimigratecomponents BROKERB -1 -2
     ```

   - In two steps:

     ```
     mqsimigratecomponents BROKERB -1
     mqsimigratecomponents BROKERB -2
     ```

-u (Optional) Undo a failed migration step; you must also specify at least one of -1, -2, or -3. Use this option only when migration has failed, and also failed to auto-recover (a failure during split migration being one example).

-s *SourceVersion*

(Optional) The previous version of the component.

- If not specified, this value is detected automatically.
- When you perform split migration to Version 6.0, the **-s** parameter is mandatory after you run the mqsimigratecomponents command with the **-1** parameter, as shown in the split migration example.
- See “Purpose” on page 442 for the restrictions to the version numbers of the product that are supported.

-t *TargetVersion*

(Optional) The destination version of the component.

- If not specified, this value is assumed to be the current version.
- When you perform split migration from Version 6.0 to a previous version, the **-t** parameter is mandatory, as shown in the split migration example.
- See “Purpose” on page 442 for the restrictions to the version numbers of the product that are supported.

ComponentName

(Required) The name of the component to migrate.

Authorization:

The mqsimigratecomponents command updates your registry and file system, WebSphere MQ definitions, and database definitions. If the user who is issuing the command does not have the authority to perform all of these steps, the command can be run one part at a time. Different users can run the part for which they are authorized in order to achieve the overall result. This approach is referred to as *split migration*, and is performed using the **-1**, **-2**, and **-3** parameters.

If you run single-step migration, your user ID must have the ability to:

- Write to the registry and the file system for the product
- Modify databases associated with the component
- Modify queue definitions

If you run split migration, your user ID must always have the ability to read from the registry for the product, and also have specific authorization for each step to succeed:

- **-1** requires the ability to write to the registry and the file system for the product
- **-2** requires the ability to modify queue definitions
- **-3** requires the ability to modify databases associated with the component

Responses:

This command can produce a large number of possible responses, depending on the results of the various operations. This command differs from other commands in the way it produces messages: they are displayed as generated, rather than being reported in a batch at the end of the program. When you migrate database tables, z/OS produces more output than distributed systems. Use the **-q** parameter to reduce the number of messages displayed.

Examples:

The following example checks for migration of BROKER1 from Version 2.1 to Version 6.0:

```
mqsimigratecomponents –c BROKER1
BIP8849I: Broker 'BROKER1' (Version 2.1) with Queue Manager 'brkqm1' and Data Source 'brkdb1' specified for migration.
BIP8791I: Duplicate rows check started.
BIP8794I: Table BRMINFO has no duplicated rows.
BIP8794I: Table BRMRTDDEPINFO has no duplicated rows.
BIP8794I: Table BROKERRESOURCES has no duplicated rows.
BIP8794I: Table BRMRTDINFO has no duplicated rows.
BIP8794I: Table BRMWFDINFO has no duplicated rows.
BIP8792I: Duplicate rows check passed.
BIP8791I: Duplicate rows check started.
BIP8800W: No invalid topic syntax was detected in table BSUBSCRIPTIONS.
BIP8800W: No invalid topic syntax was detected in table BPUBLISHERS.
BIP8800W: No invalid topic syntax was detected in table BRETAINEDPUBS.
BIP8797I: Topic syntax check succeded
BIP8680I: Pre-migration check succeeded.
BIP8071I: Successful command completion.
```

The following example does automatic migration of BROKER1 from Version 2.1 to Version 6.0:

```
mqsimigratecomponents BROKER1
BIP8849I: Broker 'BROKER1' (Version 2.1) with Queue Manager 'BROKER1' and Data Source 'BROKERDB' specified for migration.
BIP8755I: Copied value 'QueueManagerName' into the new location
BIP8755I: Copied value 'DataSourceName' into the new location
```

```
BIP8755I: Copied value 'DataSourceUserId' into the new location
BIP8755I: Copied value 'DataSourcePassword' into the new location
BIP8755I: Copied value 'LilPath' into the new location
BIP8755I: Copied value 'ConfigurationTimeout' into the new location
BIP8755I: Copied value 'ConfigurationDelayTimeout' into the new location
BIP8755I: Copied value 'MigrationNeeded' into the new location
BIP8755I: Copied value 'MQTrustedQueueManager' into the new location
BIP8755I: Copied value 'UserNameServerQueueManagerName' into the new location
BIP8755I: Copied value 'BrokerUUID' into the new location
BIP8755I: Copied value 'AdminAgentPID' into the new location
BIP8763I: Deleted value 'QueueManagerName' from the old location
BIP8763I: Deleted value 'DataSourceName' from the old location
BIP8763I: Deleted value 'DataSourceUserId' from the old location
BIP8763I: Deleted value 'DataSourcePassword' from the old location
BIP8763I: Deleted value 'LilPath' from the old location
BIP8763I: Deleted value 'ConfigurationTimeout' from the old location
BIP8763I: Deleted value 'ConfigurationDelayTimeout' from the old location
BIP8763I: Deleted value 'MigrationNeeded' from the old location
BIP8763I: Deleted value 'MQTrustedQueueManager' from the old location
BIP8763I: Deleted value 'UserNameServerQueueManagerName' from the old location
BIP8763I: Deleted value 'BrokerUUID' from the old location
BIP8763I: Deleted value 'AdminAgentPID' from the old location
BIP8768I: Finished registry migration for component 'BROKER1'.
BIP8654I: Moving filesystem artefacts from '' to 'C:\Documents and Settings\AllUsers\Application Data\IBM\MQSI'
BIP8670I: Database migration started
BIP8663I: Creating temporary new tables
BIP8664I: Migrating from existing tables to temporary new tables
BIP8665I: Dropping existing tables
BIP8666I: Creating new tables
BIP8667I: Copying all rows from temporary new tables to new tables
BIP8668I: Dropping temporary new tables
BIP8669I: Database migration successful
BIP8785I: Starting WebSphere MQ queue migration for component 'BROKER1'.
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.AGGR.REQUEST'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.AGGR.CONTROL'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.AGGR.REPLY'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.AGGR.TIMEOUT'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.AGGR.UNKNOWN'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.TIMEOUT.QUEUE'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.INTERBROKER.MODEL.QUEUE'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.WS.INPUT'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.WS.REPLY'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.WS.ACK'
The setmqaut command completed successfully.
BIP8786I: Created WebSphere MQ queue 'SYSTEM.BROKER.IPC.QUEUE'
BIP8787I: Cleared WebSphere MQ queue 'SYSTEM.BROKER.ADMIN.QUEUE'
BIP8787I: Cleared WebSphere MQ queue 'SYSTEM.BROKER.EXECUTIONGROUP.QUEUE'
BIP8787I: Cleared WebSphere MQ queue 'SYSTEM.BROKER.EXECUTIONGROUP.REPLY'
BIP8787I: Cleared WebSphere MQ queue 'SYSTEM.BROKER.IPC.QUEUE'
BIP8789I: Finished WebSphere MQ queue migration for component 'BROKER1'.
BIP8071I: Successful command completion.
```

The following example shows a split migration from Version 2.1 to Version 6.0:

```
mqsimigratecomponents BROKER -1
mqsimigratecomponents BROKER -s 2.1.0.8 -2
mqsimigratecomponents BROKER -s 2.1.0.8 -3
```

The following example shows a split migration from Version 6.0 to Version 2.1:

```
mqsimigratecomponents BROKER -t 2.1.0.8 -2
mqsimigratecomponents BROKER -t 2.1.0.8 -3
mqsimigratecomponents BROKER -t 2.1.0.8 -1
```

mqsireadlog command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPRELG; see "Contents of the broker PDSE" on page 491

Purpose:

Use the mqsireadlog command to retrieve the trace log for the specified component. This command is valid for:

User trace
Specify the `-u` option.

Service trace
Specify the `-t` option. You are recommended to use this option only if directed to do so by the action described in a `BIPxxxx` message, or by your IBM Support Center.

You can specify the output to be directed to file, or to stdout. The trace records returned by this command are in XML format and can be browsed with an XML browser. If you direct output to file, the data is written in code page `utf-8`. The file is therefore platform-independent, and can be transferred to other systems for browsing or formatting using the mqsiformatlog command.

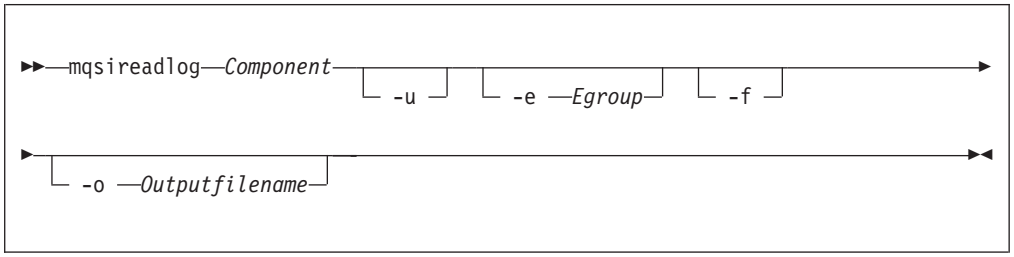
On HP-UX you are recommended to set the `size` parameter of the mqsichangetrace command to be less than 500 MB. Note that the size of the XML generated files is often half as much again as the original trace file, and setting the value of the `size` parameter to be greater than 500 MB can cause problems.

If you transfer this file to another system, ensure that you use a file transfer program that does not convert the data (for example, by specifying a binary transfer option).

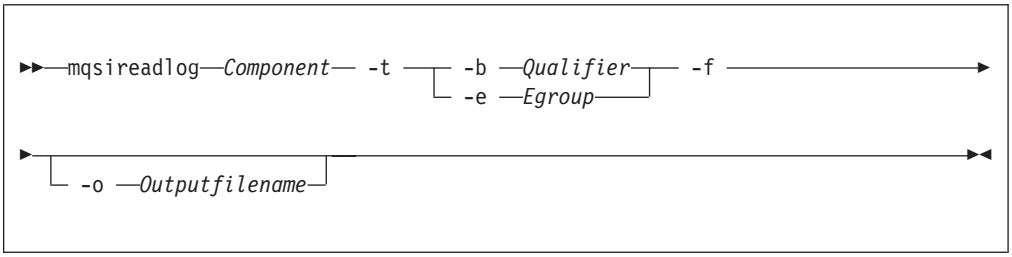
If you specify a broker, or any of its resources (execution group or message flow) you must have deployed them before you can start trace and read the log files.

Syntax:

User trace:



Service trace:



Parameters:

Component
(Required) The name of the component for which the log is to be read. This can be either a broker name or Configuration Manager name, or the fixed values , `UserNameServer`, `workbench`, or `utility` (all are case sensitive on Linux and UNIX systems and on z/OS).

-u (Optional) Read the log contents from the user trace log. This is valid **only** if you select the `broker` component.

-e *Egroup*
(Optional) The label of the execution group for which log information is to be read.

-o *Outputfilename*
(Optional) The name of the file into which to write the log data. If you specify a full pathname, the file is created in the directory specified. If you specify just the filename, the file is created in the current working directory. The contents of the file are written in code page `utf-8`, which is platform-independent and preserves data such as DBCS characters.

You must specify a file name if you want to format the log using the mqsiformatlog command. If you do not specify a filename, the contents of the log are written to stdout. You are recommended to use a file extension of `.xml`.

-f (Optional for User trace; required for Service trace). Read the log file directly from the file system. If you do not specify this option, the command sends an XML message to the component to request the log contents. If you have specified `-t` (service trace), you must specify this flag as well. Further details are given in "Additional parameters exclusive to service trace."

If you specify this option, stop tracing (using mqsichangetrace) before you use the mqsireadlog command. If the log file is in use when you issue this command with this flag specified, partial XML records might be returned. You can reduce the risk of this happening by specifying `-m safe` on the mqsichangetrace command. If the component being traced has itself stopped, you do not then need to issue a mqsichangetrace command.

If you do not stop tracing before you issue this command, check the contents of the log file created and remove any partial records from the end using a text editor before using the mqsiformatlog command, as partial records cannot be read by the format command.

Additional parameters exclusive to service trace:

Use these options only when directed to do so by your IBM Support Center or by a `BIPxxxx` message.

-t (Required) Read the log contents from the service trace log.

-b *Qualifier*
(Required) Read the contents of the log for the broker `agent`, Configuration Manager `agent`, or User Name Server `agent`, or for the specified command utility program. This option is valid only if you have specified `-t` (service trace).

The following table shows the valid combinations of `qualifier` and `component` for service trace.

This option is generally used to trace the commands themselves. If you want to trace a particular command, run that command with environment variable MQSI_UTILITY_TRACE set to `debug` or `normal` before you issue this command to read the trace output generated.

Enter these values exactly as shown.

The `agent` trace is initiated when you specify the `-b` flag on the mqsichangetrace command. Do this only when directed to do so by a WebSphere Message Broker error message or when instructed to do so by your IBM Support Center.

The `service` trace is initiated when you specify the `-b` flag on the mqsichangetrace command. The format of the command is:

```
mqsireadlog <brokername> -t -b service -f -o service.xml
```

Do this only when directed to do so by a WebSphere Message Broker error message or when instructed to do so by your IBM Support Center.

-f (Required) Read the log file directly from the file system. When used with service trace, this flag has the same characteristics as when used with user trace. It remains optional if the `-e` flag is specified. You must specify this option if you specify the `-b` flag.

Qualifier	Component= <broker_name>	Component= ConfigMgr_name	Component= UserNameServer	Component= workbench	Component= utility
mqsichangebroker	x				
mqsichangeconfigmgr		x			
mqsichangetrace	x	x	x		
mqsichangeusernameserver			x		
mqsiclearmqpubsub	x				
mqsicreateaclentry					x
mqsicreatebroker	x				
mqsicreateconfigmgr		x			
mqsicreateusernameserver			x		
mqsideleteaclentry					x
mqsideletebroker	x				
mqsideleteconfigmgr		x			
mqsideleteusernameserver			x		
mqsiformatlog[1]					x
mqsijoinmqpubsub		x			
mqsilist[2]		x			x
mqsilist	x				

Qualifier	Component= <broker_name>	Component= ConfigMgr_name	Component= UserNameServer	Component= workbench	Component= utility
mqsilistaclentry					x
mqsireadlog	x	x	x		x
mqsireporttrace		x		x	
mqsistart	x	x	x		
mqsistop	x	x	x		
agent	x	x	x		
service	x	x	x		
workbench				x	
httplistener	x				

Notes:

1. Because this command does not have a component parameter, trace information is recorded in, and retrieved from, the *utility* component trace files. For further details see the mqsichangetrace command.
2. If this command is invoked without a component, trace information is recorded in, and retrieved from, the *utility* trace files in addition to component specific files. For further details see the mqsichangetrace command.

Authorization:

On UNIX platforms, the user ID must be a member of the **mqbrkrs** group. If the `-f` flag is specified, the user ID used to invoke this command must also have access to the trace file.

On Windows platforms, if the `-f` flag is specified, the user ID used to invoke this command must have access to the trace file. If the `-f` flag is not specified, the user ID used to issue the command must have **mqbrkrs** authority.

Examples:

User trace for broker `WBRK_BROKER`:

```
mqsireadlog WBRK_BROKER -u -e default -o trace.xml
```

Service trace for component `ConfigMgr`:

```
mqsireadlog ConfigMgr -t -b agent -f -o trace.xml
```

Service trace for utility **mqsiformatlog**:

```
mqsireadlog utility -t -b agent -f -o trace.xml
```

You can format the log file (`trace.xml` in the above examples) using the command **mqsiformatlog**, or view it using an XML editor or viewer.

mqsireload command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS - as a console command

Purpose:

Use the **mqsireload** command to request the broker to stop and restart execution groups.

When you issue this command, a message is sent to the broker, which stops and restarts all its execution groups. You can specify a single execution group to be reloaded, but you are recommended to use the default form of this command to reload all execution groups.

Because an execution group does not stop until all message flows within it terminates, the ability of the broker to reload quickly depends on the processing time for the longest running message flow. This affects the performance of this command, and you are recommended to review any long-running message flows.

If you have included a user-defined node or parser within a message flow on the broker, these are deleted by this command, and the relevant termination functions called. When message flows are restarted, the resources used by user-defined nodes and parsers are re-accessed and reacquired. However, you are recommended to ensure that user-defined nodes and parsers provide their own mechanism to reload persistent state and data dynamically, and do not rely on the use of this command.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsireload command - Windows, Linux, and UNIX systems"
- "mqsireload command - z/OS" on page 453

Authorization:

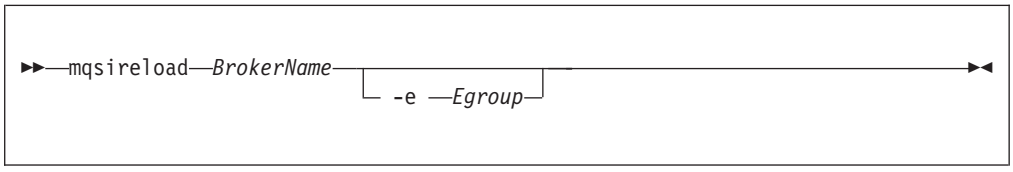
On Windows, Linux, and UNIX systems the user ID used to issue the command must be a member of the group **mqbrkrs**.

Responses:

No additional responses are returned.

mqsireload command - Windows, Linux, and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required) The name of the broker to which the reload request is sent.

-e *Egroup*
(Optional) The name of the execution group that is to be reloaded. If this parameter is not specified, all execution groups on the specified broker are stopped and restarted.

Examples:

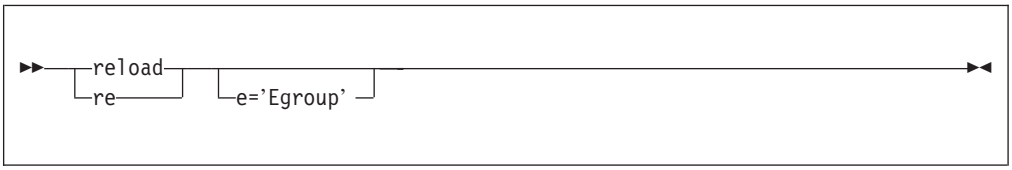
```
mqsireload broker1
```

mqsireload command - z/OS:

Syntax:

z/OS console command:

Synonym: re



Parameters:

e= *Egroup*
(Optional) The name of the execution group that is to be reloaded. If this parameter is not specified, all execution groups on the specified broker are stopped and restarted.

Examples:

```
F MQP1BRK,re e='EgName'
```

mqsireportflowstats command

Supported Platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPRPMS; see "Contents of the broker PDSE" on page 491

Purpose:

Use the **mqsireportflowstats** command to display the current options for accounting and statistics that have been set using the **mqsichangeflowstats** command.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

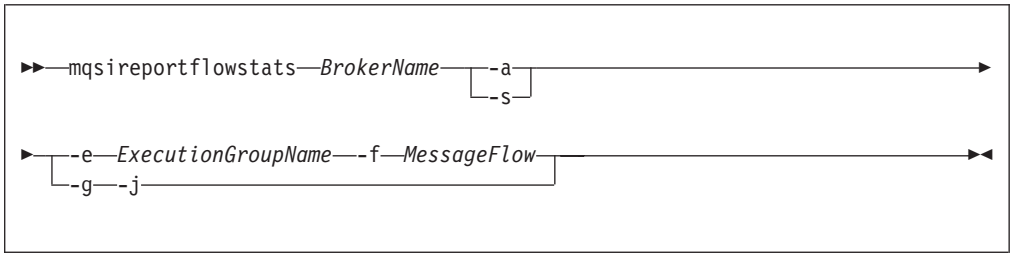
- "mqsireportflowstats command - Windows, Linux and UNIX systems"
- "mqsireportflowstats command - z/OS" on page 455

Authorization:

On Windows, Linux, and UNIX systems, the user ID used to issue the command must have mqbrkrs authority.

mqsireportflowstats command - Windows, Linux and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required) Specify the label of the broker for which the previously stored accounting and statistics options are to be reported.

-a (Required) Specify that the command reports the stored settings for the archive accounting and statistics collection.

You must specify **-a** or **-s**, or both arguments. If you do not specify at least one of these arguments you receive a warning message.

-s (Required) Specify that the command reports the stored settings for the snapshot accounting and statistics collection.

You must specify **-a** or **-s**, or both arguments. If you do not specify at least one of these arguments you receive a warning message.

-e *ExecutionGroupName*
(Required) Specify the name for the execution group, for which accounting and statistics options are to be reported.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-f *MessageFlow*
(Required) Specify the label for the message flow, for which accounting and statistics options are to be reported.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

-g (Required) Specifies that the command applies to **all** execution groups that belong to the broker.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-j (Required) Specifies that the command applies to **all** message flows that belong to the execution group.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

Note: If you set the **-g** option for all execution groups, you must use **-j** instead of **-f**.

Examples:

Request a report for message flow ″MyFlow1″ in the execution group ″default″ for broker ″BrokerA″ for both archive and snapshot statistics collection:

```
mqsireportflowstats BrokerA -s -a -e default -f MyFlow1
```

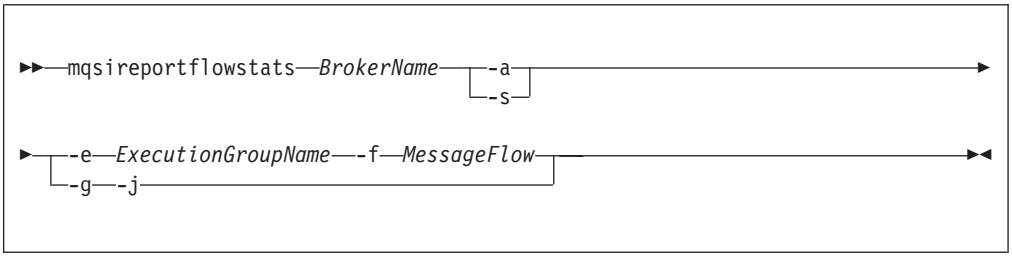
Request a report of the snapshot options that are currently stored for all message flows in all execution groups for broker ″BrokerA″ :

```
mqsireportflowstats BrokerA -s -g -j
```

mqsireportflowstats command - z/OS:

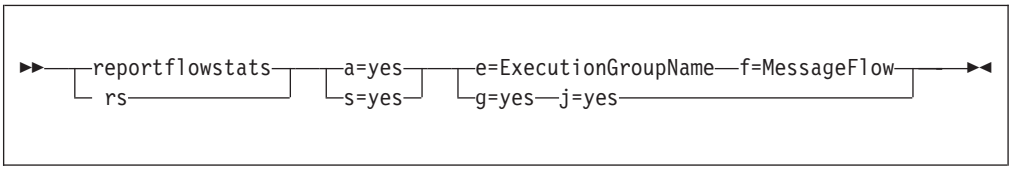
Syntax:

z/OS command - BIPRPMS:



z/OS console command:

Synonym: rs



Parameters:

BrokerName
(Required) Specify the label of the broker for which the previously stored accounting and statistics options are to be reported.

-a (Required) Specify that the command reports the stored settings for the archive accounting and statistics collection.

You must specify **-a** or **-s**, or both arguments. If you do not specify at least one of these arguments you receive a warning message.

-s (Required) Specify that the command reports the stored settings for the snapshot accounting and statistics collection.

You must specify **-a** or **-s**, or both arguments. If you do not specify at least one of these arguments you receive a warning message.

-e *ExecutionGroupName*
(Required) Specify the name for the execution group, for which accounting and statistics options are to be reported.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-f *MessageFlow*
(Required) Specify the label for the message flow, for which accounting and statistics options are to be reported.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

-g (Required) Specifies that the command applies to **all** execution groups that belong to the broker.

You must specify either **-e** or **-g**. If you do not specify one of these arguments you receive a warning message.

-j (Required) Specifies that the command applies to **all** message flows that belong to the execution group.

You must specify either **-f** or **-j**. If you do not specify one of these arguments you receive a warning message.

Note: If you set the **-g** option for all execution groups, you must use **-j** instead of **-f**.

Examples:

Request a report for message flow ″MyFlow1″ in the execution group ″default″ for both archive and snapshot statistics collection:

```
mqsireportflowstats  -s -a -e default -f MyFlow1
```

Request a report of the snapshot options that are currently stored for all message flows in all execution groups:

```
mqsireportflowstats -s -g -j
```

mqsireportflowuserexits command

Supported operating systems:

- Windows
- Linux and UNIX systems
- z/OS. Run this command in one of two ways - as a console command, or by customizing and submitting BIPRPUE; see “Contents of the broker PDSE” on page 491

Purpose:

Use the **mqsireportflowuserexits** command to report the list of active and inactive user exits for a given message flow.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

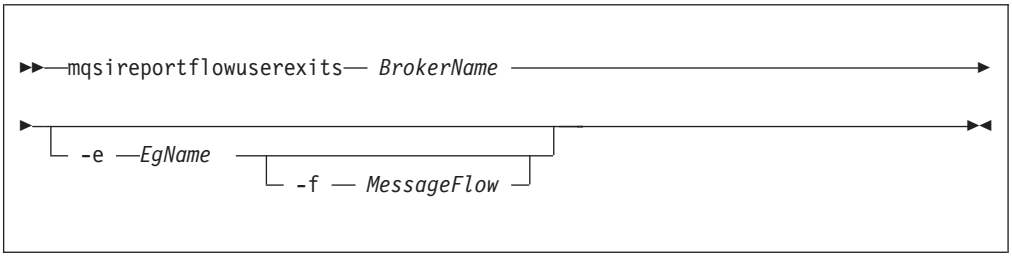
- “mqsireportflowuserexits command - Windows, Linux, and UNIX systems”
- “mqsireportflowuserexits command - z/OS” on page 457

Authorization:

On Windows, Linux, and UNIX systems, the user ID that is used to invoke this command must have **mqbrkrs** group authority.

mqsireportflowuserexits command - Windows, Linux, and UNIX systems:

Syntax:



Parameters:

BrokerName
(Required). The name of the broker.

-e *EgName*
(Optional). The name of the execution group.

-f *MessageFlow*
(Optional). The name of the message flow.

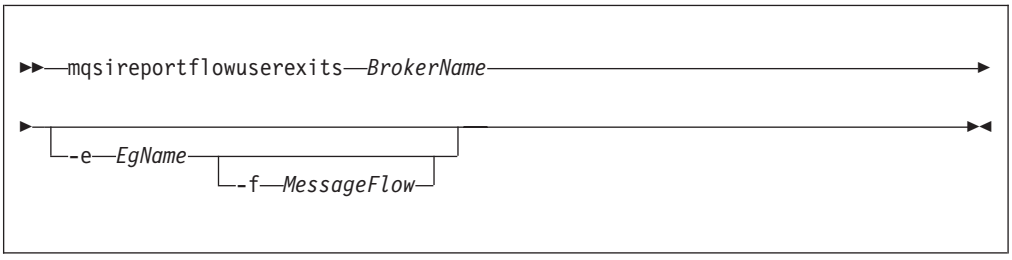
Examples:

```
mqsireportflowuserexits WBRK_BROKER -e default -f MYFLOW
BIP8859 User Exits active for broker MYBROKER: exit1, exit2
BIP8854 User Exits active for Execution Group default: exit1,exit3
BIP8855 User Exits inactive for Execution Group default: exit2
BIP8856 User Exits active for Message Flow MYFLOW: exit2
BIP8857 User Exits inactive for Message Flow MYFLOW: exit1
```

mqsireportflowuserexits command - z/OS:

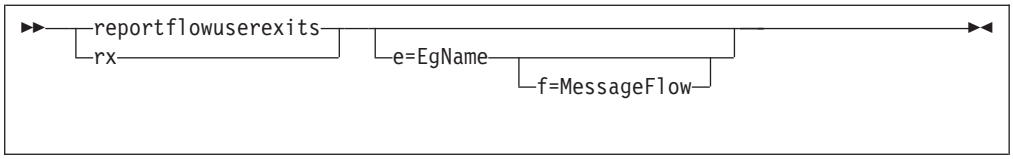
Syntax:

z/OS command - BIPRPUE:



z/OS console command:

Synonym: rx



Parameters:

BrokerName
(Required). The name of the broker.

-e *EgName*
(Optional). The name of the execution group.

-f *MessageFlow*
(Optional). The name of the message flow.

Examples:

```
mqsireportflowuserexits WBRK_BROKER -e default -f MYFLOW
BIP8859 User Exits active for broker MYBROKER: exit1, exit2
BIP8854 User Exits active for Execution Group default: exit1,exit3
BIP8855 User Exits inactive for Execution Group default: exit2
BIP8856 User Exits active for Message Flow MYFLOW: exit2
BIP8857 User Exits inactive for Message Flow MYFLOW: exit1
```

mqsireportproperties command

Use the mqsireportproperties command to display properties that relate to a broker or its associated configurable services.

Supported platforms:

- Windows systems.
- Linux and UNIX systems.
- z/OS. Run this command by customizing and submitting BIPRPPR; see "Contents of the broker PDSE" on page 491.

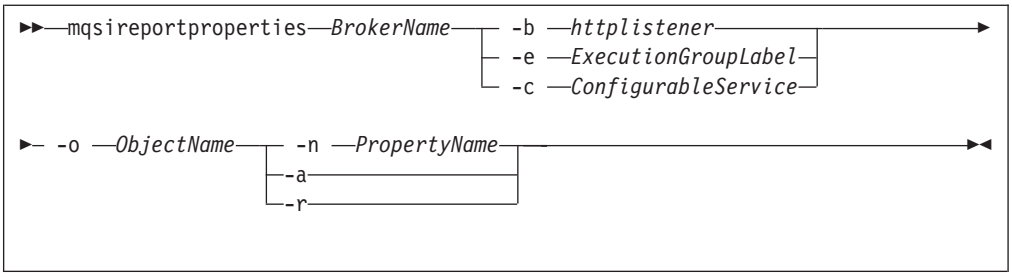
Purpose:

Use the mqsireportproperties command to examine the values of properties that are set using the mqsichangeproperties command, or created using the mqsicreateconfigurableservice command.

Usage notes:

- Before you run this command, ensure that the broker is running.
- If you use the mqsichangeproperties command to change any value, stop and restart the broker for the change to take effect.

Syntax:



Parameters:

BrokerName
(Required) The name of the broker.

-b *httplistener*
(Optional) The name of the component.

You must specify either **-b httplistener** or **-c** ***ConfigurableService***.

-c *ConfigurableService*
(Optional) The type of the configurable service, such as JMSProviders. Specify a value of `AllTypes` to report on all configurable service types.

You must specify either **-b httplistener** or **-c** ***ConfigurableService***.

-e *ExecutionGroupLabel*
(Optional) The label of the execution group for which a report is required.

-o *ObjectName*
(Required) The name of the object whose properties you want to read.

Set *ObjectName* to match other parameters:

- Specify the name of a configurable service, predefined or user-defined, of a type that you have specified with **-c**; for example, **-c JMSProviders** with WebSphere_MQ.
- Specify a communications object for the httplistener component that you have specified with **-b**; one of HTTPListener, HTTPConnector, or HTTPSConnector. Values are defined for all HTTP nodes that you have deployed to the broker.
- Specify DynamicSubscriptionEngine for inter-broker communications properties for the execution group that you have specified with **-e**. These properties apply to brokers that you have configured in collectives, or cloned.
- Specify DynamicSubscriptionEngine for all Real-time nodes that you have deployed to the execution group that you have specified with **-e**.

Specify a value of `AllReportableEntityNames` to return a list of all valid object names. If you run the mqsireportproperties command on the command line without any properties, the `AllReportableEntityNames` is used.

-n *PropertyName*
(Optional) Display only the named property.

You must select only one option from **-n**, **-a**, and **-r**.

-a (Optional) Indicates that all property values of the object are displayed, and does not recurse into properties that have child values.

-r (Optional) Indicates that all property values of the object are displayed and, additionally, displays the child values for all properties that have child values.

-p *FileName*
(Optional) The location and name of the file to which the command writes all selected properties. If you do not specify **-n**, the property values, but not the property names, are written.

For more information about objects, properties, and values, and valid combinations of these parameters, see "mqsichangeproperties command" on page 343.

For the *httplistener* component, the mqsireportproperties command does not report those properties that have not been explicitly set with the mqsichangeproperties command, even if those properties have a default setting.

For example, the default HTTPSConnector port that is used (unless it has been changed) is 7083. However, this value is not reported by mqsireportproperties unless it has been changed from this default with mqsichangeproperties. To see the default values for all properties that mqsireportproperties can report on, see the topic for mqsichangeproperties.

Authorization:

No specific authority is required to invoke this command.

Examples:

Enter the command on a single line; a line break has been added in some examples to enhance readability.

Changes to properties associated with components

The following examples include the **-b** parameter to specify the component to view.

Display all the current HTTPListener settings associated with HTTP nodes (defined in the httplistener component):

```
mqsireportproperties TEST -b httplistener -o HTTPListener -a
```

Display the HTTPSConnector port setting for the HTTP nodes (defined in the httplistener component):

```
mqsireportproperties TEST -b httplistener -o HTTPSConnector -n port
```

Changes to properties associated with configurable services

The following examples include the **-c** parameter to specify the configurable service to view.

Display the properties for all the broker's JMS provider resources (default JMS provider resources and those configurable services that you have defined by using the mqsicreateconfigurableservice command):

```
mqsireportproperties WBRK6_DEFAULT_BROKER -c JMSProviders
     -o AllReportableEntityNames -r
```

Display the properties for all the JMS provider resources of WebSphere_MQ.

```
mqsireportproperties WBRK6_DEFAULT_BROKER -c JMSProviders -o WebSphere_MQ -r
```

Changes to properties associated with execution groups

The following examples include the **-e** parameter to specify the execution group to view.

Display recursively all the current settings for the interbroker communication:

```
mqsireportproperties TEST -e default -o DynamicSubscriptionEngine -r
```

mqsireporttrace command

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS as a console command

Purpose:

Use the **mqsireporttrace** command to display the trace options currently in effect. This command is valid for:

- User trace. Specify the `-u` option.

  On z/OS, user trace is run against a specific execution group for a broker. You can specify an extra flag on the command to trace a specific message flow.
- Service trace. Specify the `-t` option. Use this option only if directed to do so by the action described in a `BIPxxxx` message, or by your IBM Support Center.

  On z/OS, service trace can be run for a specific execution group (like user trace). You can specify an extra flag on the command to trace a specific message flow.

  Unlike user trace, service trace can also be run against an active agent (that is, a broker, User Name Server, or Configuration Manager).

If you specify a broker, or any of its resources (execution group or message flow), you must have deployed those resources and the component must be running before you can query trace settings.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsireporttrace command - Windows, Linux and UNIX systems"
- "mqsireporttrace command - z/OS" on page 462

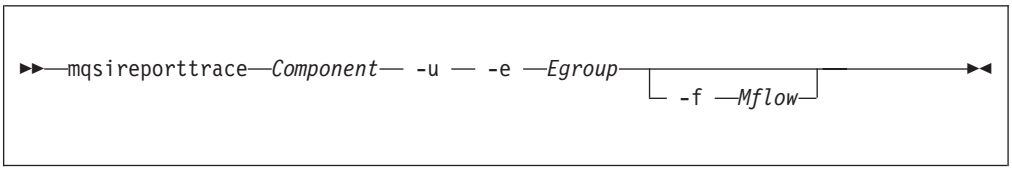
Authorization:

On Windows, Linux, and UNIX systems, the user ID used to issue the command must have **mqbrkrs** authority.

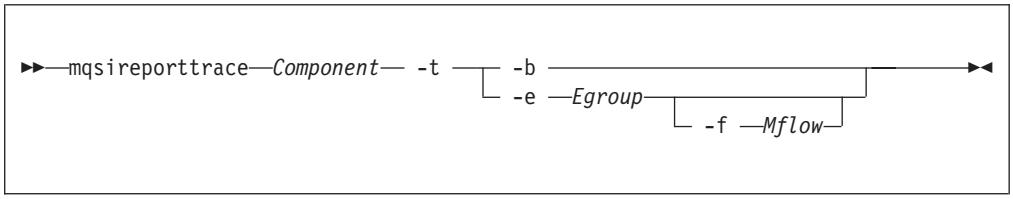
mqsireporttrace command - Windows, Linux and UNIX systems:

Syntax:

User trace:



Service trace:



Parameters:

Component
(Required) The name of a broker, or of a Configuration Manager, for which options are reported, or the fixed value `UserNameServer` (all are case sensitive on Linux and UNIX systems).

-u (Required for user trace) Derive report information from the user trace.

-e *Egroup*
(Required for user trace, otherwise optional) The label of the execution group for which a report is required. This is valid only if you have specified a broker as the component.

-f *Mflow*
(Optional) The label of the message flow for which a report is required. This is valid only if you have specified both a broker as the component and an execution group.

Additional parameters exclusive to service trace:

Use these options only when directed to do so by your IBM Support Center or by a `BIPxxxx` message.

-t (Required for service trace) Derive report information from the service trace.

-b (Alternative to **-e** on all platforms) Request a report for `agent` function.

Examples:

To report derive report information from service trace for execution group exgrp1 in broker WBRK_BROKER, enter the command:

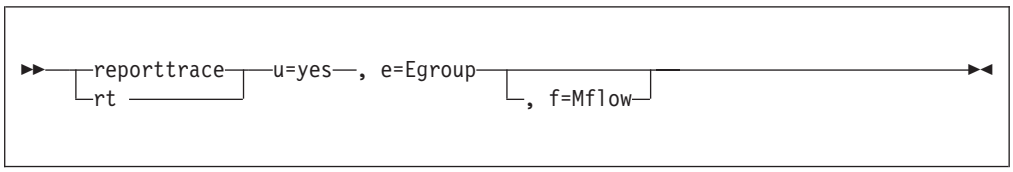
```
mqsireporttrace WBRK_BROKER -t -e "exgrp1"
```

mqsireporttrace command - z/OS:

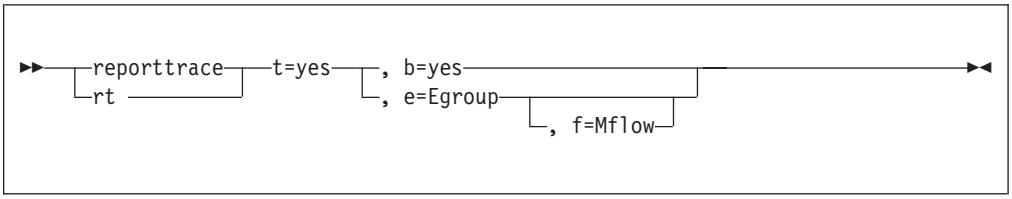
Syntax:

z/OS console command:

User trace:



Service trace:



Parameters:

-u (Required for user trace) Derive report information from the user trace.

-e *Egroup*
(Required for user trace, otherwise optional) The label of the execution group for which a report is required. This is valid only if you have specified a broker as the component.

This name is case sensitive; include the name in single quotes if it contains mixed-case characters.

-f *Mflow*
(Optional) The label of the message flow for which a report is required. This is valid only if you have specified both a broker as the component and an execution group.

This name is case sensitive; include the name in single quotes if it contains mixed-case characters.

Additional parameters exclusive to service trace:

Use these options only when directed to do so by your IBM Support Center or by a `BIPxxxx` message.

-t (Required for service trace) Derive report information from the service trace.

-b (Alternative to **-e** on all platforms) Request a report for `agent` function.

Examples:

To report derive report information from service trace for execution group exgrp1, enter the command:

```
F MQP1BRK,rt t=yes, e='exgrp1'
```

mqsirestoreconfigmgr command

Command to restore previously backed up Configuration Manager archive files that you created using the mqsibackupconfigmgr command.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPRSCM; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

This command restores a previously backed up Configuration Manager archive file that you created using the mqsibackupconfigmgr command.

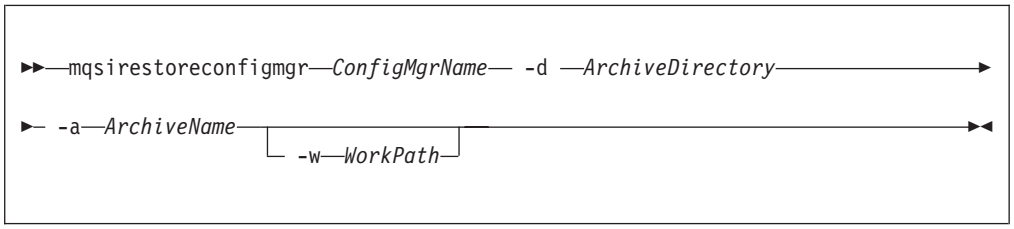
Usage notes:

1. Before you run the command, stop the Configuration Manager.
2. Run this command on the computer on which the Configuration Manager has been created.
3. If you are recovering the Configuration Manager because the configuration repository is damaged, restore the repository from a previously successful backup version.
4. If you plan to restore the Configuration Manager repository on z/OS and the platform from which it was originally backed up was not z/OS, or the other way round, you must copy the saved `service.properties` file to:

```
<Configuration Manager directory>/components/<component name>/<directory name>/service.properties
```

   after running the mqsirestoreconfigmgr command.

Syntax:



Parameters:

ConfigMgrName
(Required) The name of the Configuration Manager.

-d *ArchiveDirectory*
(Required) The directory where the archive is placed.

-a *ArchiveName*
(Required) Specifies the backup archive name.

-w *WorkPath*
(Optional) Specifies the path for the Configuration Manager repository.

Authorization:

On Windows this command changes security privileges for the ServiceUserID; the user ID used to invoke this command must be a member of the Windows **Administrators** group on the local system. In addition, for Linux and UNIX systems, the user ID must be a member of mqbrkrs.

mqsisetdbparms command

Use the mqsisetdbparms command to associate a specific user ID and password with a data source name (DSN) that is accessed from a message flow.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPSDBP.

Purpose:

Use the mqsisetdbparms command to create, alter, or delete the user ID and password pairs that are associated with the specified data source name (DSN).

Data source names are used in the following nodes:

- Compute
- Database
- DataDelete
- DataInsert
- DataUpdate
- Filter
- Mapping
- Warehouse

If you use the same DSN in multiple nodes to refer to the same database instance, the same user ID and password combination is used.

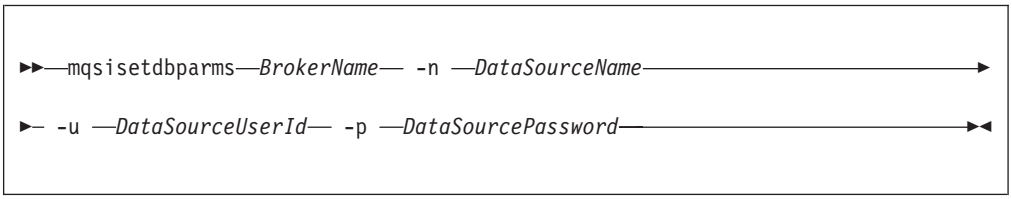
The user ID and password pair is created in the DSN folder under the broker's registry folder.

This command does not run if the broker is running. You must stop the broker before you run this command.

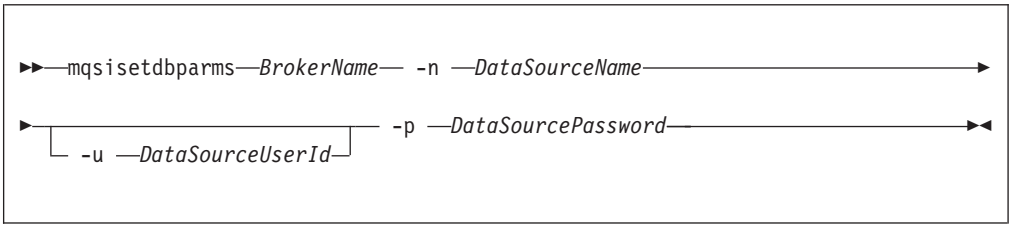
The mqsisetdbparms command does not apply to the broker databases. Therefore, you cannot use this command to override the broker data source name.

Syntax:

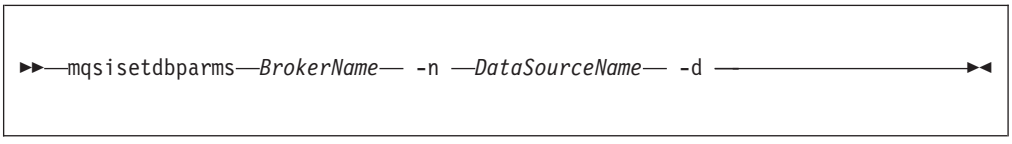
Create:



Alter:



Delete:



Parameters:

BrokerName
(Required) The name of the broker for which settings are to be created, altered, or deleted.

-n *DataSourceName*
(Required) The data source for which the user ID and password pair are to be modified.

-u *DataSourceUserId*
(Required for Create; Optional for Alter) The user ID to be associated with this data source.

-p *DataSourcePassword*
(Required for Create and Alter) The password to be associated with this data source.

For compatibility with existing systems, you can still specify `<password>`. However, if you do not specify a password with this parameter when you run the command you are prompted to enter a password during its invocation, and to enter the password a second time to verify that you have entered it correctly.

-d (Required for Delete) This parameter deletes the user ID and password pair for this data source from the registry.

Authorization:

Windows On Windows systems, the user ID that is used to invoke this command must have Administrator authority on the local system.

Linux UNIX On Linux and UNIX systems, the user ID that is used to invoke this command must be a member of the mqbrkrs group.

z/OS On z/OS, the user ID that is used to invoke this command must be a member of a group that has *READ* and *WRITE* access to the component directory.

Ensure that the registry is appropriately secured to prevent unauthorized access. mqsisetdbparms is not required for correct operation of the broker. However, if the broker administrator does not assign specific user IDs and passwords to specific data sources, the broker user ID (and password on Windows and UNIX systems) is used. The password is not stored in clear text in the file system.

Examples:

The following examples show the usage of the command without the additional Universal Record Identifier (URI):

```
mqsisetdbparms WBRK_BROKER -n MQBroker1 -u MQUserId -p password
mqsisetdbparms WBRK_BROKER -n MQBroker1 -d
```

The following examples show the use of the command when the URI for a JMS or JNDI resource name is substituted for the `DataSourceName` that is associated with the **-n** parameter.

For a JMS resource, the prefix is `"jms::"`; for JNDI, the prefix is `"jndi::"`; and for a JDBC provider, it is `"jdbc::"`.

On Linux and UNIX systems, if the parameter string includes a back slash (\) character, you must escape from this character by using a second back slash character (\\) when you enter the mqsisetdbparms command.

For example, to specify a user ID of myuserid and password secret for JMS topic connection factory tcf1 in broker MyBroker1, use the following syntax:

```
mqsisetdbparms MyBroker1 -n jms::tcf1 -u myuserid -p secret
```

Similarly, to specify the same security for a JNDI initial context com.sun.jndi.fscontext.RefFSContextFactory, enter the following command:

```
mqsisetdbparms MyBroker1 -n jndi::com.sun.jndi.fscontext.RefFSContextFactory
     -u myuserid -p secret
```

The preceding examples describe how to configure security for JMS and JNDI resources for *all* JMS nodes that use those resources in a broker.

To increase the degree of control that you have in the security of JMS nodes, you can associate a resource with an account name. The account name itself comprises the message flow name concatenated with the node label by means of the underscore character "_", that is:

Message Flow Name_Node label

For example, where the message flow name is MyJMSFlow1, and you require a specific user ID and password for JMSInput node MyJMSInput1, the resulting account name is:

MyJMSFlow1_MyJMSInput1

You can then use the account name string in the DataSource option of the mqsisetdbparms command by prefixing the account name with the resource type, and concatenating the account name with an at sign (@) character followed by the resource name itself:

<resource type><account name>@<resource name>

Therefore, assuming a JMS resource name of tcf1, used by JMSInput node MyJMSInput1 in message flow MyJMSFlow1, the following DataSourceName is used:

jms::MyJMSFlow1_MyJMSInput1@tcf1

Specifying a user ID of myuserid, a password of secret, a broker name of MyBroker1, and the DataSourceName name created from the account name, as described above, use the following syntax:

```
mqsisetdbparms MyBroker1 -n jms::MyJMSFlow1_MyJMSInput1@tcf1
                -u myuserid -p secret
```

mqsisetsecurity command

Supported platforms:

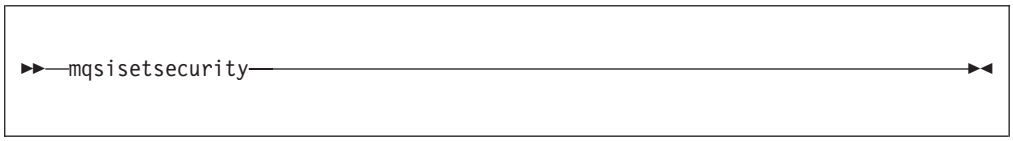
- Windows

Purpose:

Use the **mqsisetsecurity** command to create the Windows groups that WebSphere Message Broker requires for secure access to its runtime libraries and data.

This command runs automatically as part of the installation process of WebSphere Message Broker. If WebSphere MQ is installed after WebSphere Message Broker, you can issue this command to add your account to the MQM group provided you have **Administrator** authority.

Syntax:



Parameters:

None

Authorization:

The user ID used to invoke this command must belong to the **Administrators** group on the local system because creating groups is an administrative task.

mqsi_setupdatabase command

Supported platforms:

- AIX
- HP-UX (PA-RISC platform)
- Solaris (SPARC platform)

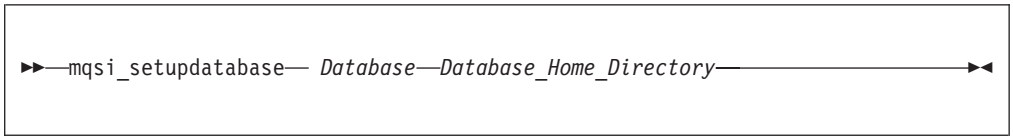
Purpose:

Use the mqsi_setupdatabase command to set up an Oracle database on the listed UNIX systems. Do not run this command for any other supported database.

Run the command for both broker and user databases. The command works for a remote database in the same way that it does for a local database.

Run this command after you have installed the Oracle database manager but before you create the broker database. If necessary, though, you can run the command before you install the Oracle database manager as long as you specify the intended database installation directory correctly.

Syntax:



Parameters:

Database
(Required) The database that you are installing. Supported values are:

- oracle9
- oracle10

Database_Home_Directory
(Required) The name of the directory in which the database is (or will be) installed (for example, `/usr/lpp/oracle9`).

Authorization:

The user ID used to run this command must be a member of the **mqbrkrs** group.

mqsistart command

The mqsistart command performs various tests on your system and starts WebSphere Message Broker if your system passes these tests.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS as a console command.

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsistart command - Windows, Linux and UNIX platforms"
- "mqsistart command - z/OS" on page 471

mqsistart command - Windows, Linux and UNIX platforms:

Use **mqsistart** to start a WebSphere Message Broker component.

Purpose:

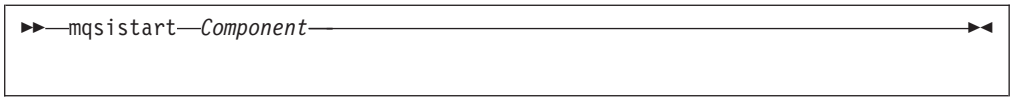
If the queue manager associated with this component (defined in the corresponding create command) is not already running, it is also started by this command. However, no listeners, channels, or channel initiators associated with the started component are started. If you have WebSphere MQ Version 6.0 installed, use the WebSphere MQ Explorer to start any required listeners, channels, or channel initiators. For earlier supported versions of WebSphere MQ, use the WebSphere MQ Services snap-in.

Successful completion of this command indicates that the Windows service, or Linux or UNIX daemon has started successfully, and that the component startup has been initiated. Check the Windows system event log or the Linux or UNIX syslog to determine if the component and all related software have started successfully, are initially active, and remain in an active state.

Any errors that have prevented successful startup, that are detected by the component, are recorded in the log. Continue to monitor the Windows system event log or Linux or UNIX syslog.

On Windows platforms, the queue manager is not started as a service and stops if you log off. To avoid this happening, either remain logged on, or change the startup status of the queue manager service as described in "Creating a Configuration Manager on Windows" on page 145. (If you lock your workstation, the queue manager does not stop).

Syntax:



Parameters:

Component
(Required) The component must have a broker name, a Configuration Manager name, or one of the following fixed values:

- Windows `UserNameServer` or `DatabaseInstanceMgr` on Windows platforms
- Linux UNIX `UserNameServer` on Linux and UNIX systems

Linux UNIX All of the names are case sensitive on Linux and UNIX systems.

Do not use the mqsistop command on a `DatabaseInstanceMgr` unless you are using the Derby database.

Authorization:

On Windows platforms, the user ID used to invoke this command must have **Administrator** authority on the local system.

On Linux and UNIX platforms, the user ID used to invoke this command must either be **root**, or must be the same as that specified in the `-i` parameter when the component was created. The user ID must also be a member of the **mqbrkrs** and **mqm** groups.

When the Windows service for your platform. or UNIX daemon starts, it runs under the user ID specified by the `-i` flag on the appropriate mqsicreatexxxx command.

The component only starts if the *ServiceUserID* specified, is authorized to access both the:

- Home directory, where WebSphere Message Broker has been installed.
- Working directory, if specified by the `-w` flag on the mqsicreatexxxx command.

The security requirements for using this command are summarized in “Security requirements for Windows platforms” on page 539(for Windows platforms) and “Security requirements for Linux and UNIX platforms” on page 538 (for Linux andUNIX platforms).

Responses:

- BIP8012 Unable to connect to system components
- BIP8013 Component does not exist
- BIP8015 Component cannot be started
- BIP8018 Component running
- BIP8024 Unable to locate executable
- BIP8025 Component disabled
- BIP8026 Unable to start component
- BIP8027 Unable to start WebSphere MQ
- BIP8028 WebSphere MQ unavailable
- BIP8030 Unable to modify user privileges

- BIP8048 Unable to start queue manager
- BIP8056 Unknown queue manager
- BIP8093 Queue manager being created
- BIP8094 Queue manager stopping

Examples:

```
mqsistart WBRK_BROKER
mqsistart DatabaseInstanceMgr
```

mqsistart command - z/OS:

Use the **startcomponent** command to start a WebSphere Message Broker component when its controller (control process) is already running, and the **start (/S)** command to bring a component into a state in which you can run the appropriate **change** command.

Purpose:

The following table distinguishes between the **start (/S)** and **startcomponent** commands, and lists the available options:

Component	Command	Description
Broker	/S <Broker started task name> /F <Broker started task name>,SC	Start broker. Starts the broker from a 'stop component' state.
Configuration Manager	/S <Configuration Manager started task name> /F <Configuration Manager started task name>,SC	Start Configuration Manager. Starts the Configuration Manager from a 'stop component' state.
User Name Server	/S <User Name Server started task name> /F <User Name Server started task name>,SC	Start User Name Server. Starts the User Name Server from a 'stop component' state.

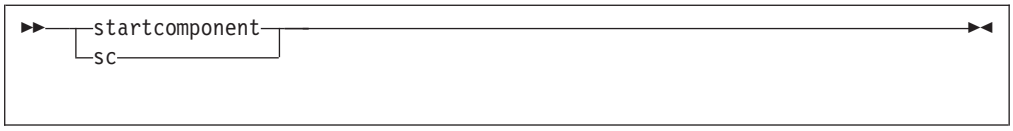
When the controller address space is started, this causes the component to start automatically. This behavior can be changed by an optional start parameter in the started task. If the parameter is set to MAN, the component does not start automatically; the default is AUTO.

Issuing commands against the controller means issuing start, stop, or modify commands from the console to the controller address space. There are two scenarios using this command. The first is that the controller is started with the parameter MAN instead of AUTO. The second is that, after a **stopcomponent** command, the component has to be restarted.

Syntax:

z/OS console command - startcomponent:

Synonym: sc



Examples:

```
F MQ00BRK,sc
```

mqsistartmsgflow command

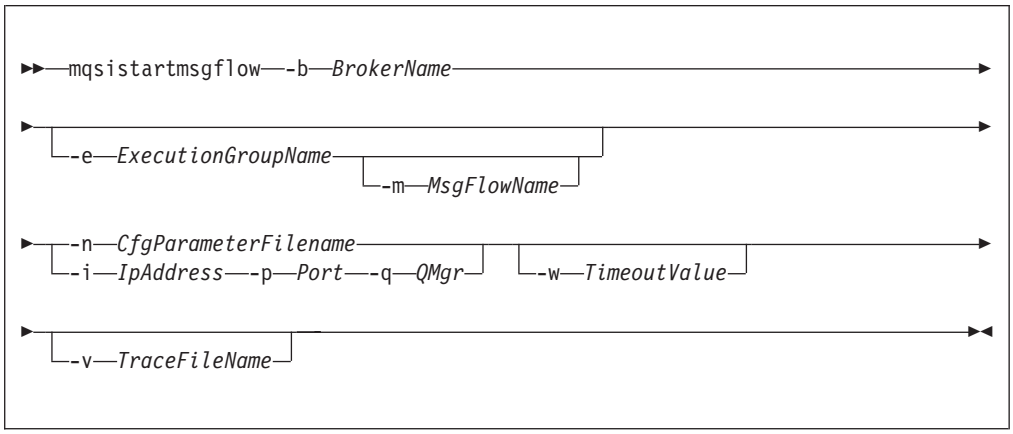
Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPSTMF; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

Use the **mqsistartmsgflow** command to start message flows.

Syntax:



Parameters:

-b *BrokerName*
(Required) The name of the broker on which to start message flows.

If you do not specify the **-e** and **-m** flags, all message flows on the broker are started.

-e *ExecutionGroupName*
(Optional) The name of the execution group on which message flows are started.

-m *MsgFlowName*
(Optional) The name of the message flow being started.

You can specify only one message flow in a single command. However, if you do not specify this parameter, all message flows on the execution group or broker are started.

If you specify this flag you must also specify the **-e** flag.

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you are using this file on z/OS you must remove the statement `encoding="UTF-8"` from the first line, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you do not supply this parameter, you must supply the **-i**, **-p**, and **-q** parameters.

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

If you are using this parameter on z/OS and want to connect to the local host you must set the value to `""`.

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-w *TimeoutValue*
(Optional) This parameter is the time in seconds that the utility waits to ensure that the command completed; the default value is 60.

-v *TraceFileName*
(Optional) This parameter sends internal debug trace information to the specified file.

Authorization:

To start message flows you must have sufficient authority defined in the Configuration Manager's access control list.

The permissions required are the same as the permission required to do the equivalent function in the Message Brokers Toolkit; see "ACL permissions" on page 537 for a list of permissions that can be defined in the Configuration Manager.

Responses:

This command returns the following responses:

0 (Success) States that the request completed successfully and the state of all message flows has been updated.

2 (Failure) States that at least one message flow can not be put into the correct state for any reason.

98 States that the Configuration Manager cannot be reached.

99 States that the supplied arguments to the utility are not valid.

Examples:

Starts all message flows on broker B1, which is controlled by the Configuration Manager whose connection details are described in cm1.configmgr. Control is returned to the caller when all message flows in the broker are reported as started, or the default time of one minute elapses, whichever is sooner.

```
mqsistartmsgflow –n cm1.configmgr –b B1
```

Starts all message flows on broker B1, which is controlled by the Configuration Manager whose connection details are described in cm1.configmgr. Control is returned to the caller when all message flows in the broker are reported as started, or two minutes elapses, whichever is sooner.

```
mqsistartmsgflow –n cm1.configmgr –b B1 –w 120
```

Start all message flows on Broker B1, which is controlled by the Configuration Manager. The Configuration Manager is hosted by the queue manager QM1 which is on local host:1414.

```
mqsistartmsgflow –q QM1 –i localhost –p 1414 –b B1
```

Enter **mqsistartmsgflow** to display usage information:

```
> mqsistartmsgflow
BIP1024I: Starts message flows.

> Syntax:
mqsistartmsgflow (-n cfgParameterFileName | ([-i ipAddress] [-p port] [-q qMgr]))
 -b brokerName [-e executionGroupName [-m flowName]] [-w timeoutValue]
[-v traceFileName]
Command Options:
'-n cfgParameterFileName' File containing Configuration Manager connection parameters (.configmgr)
'-i ipAddress' IP address or host name of the Configuration Manager
'-p port' port number of the Configuration Manager
'-q qMgr' queue manager of the Configuration Manager
'-b brokerName' name of the broker on which to start message flows
'-e executionGroupName' name of the execution group on which to start message flows.
If this is not specified, all message flows on the broker will be started.
'-m flowName' name of the message flow to start.
If this is not specified, all message flows on the execution group will be started.
'-w timeoutValue' time to wait (in seconds) for message flows to start (Default=60)
'-v traceFileName' send verbose internal trace to the specified file.
```

mqsistop command

The mqsistop command stops a WebSphere Message Broker component.

Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS as a console command

Select the appropriate link for details of this command on the platform, or platforms, that your enterprise uses:

- "mqsistop command - Windows, Linux, and UNIX systems"
- "mqsistop command - z/OS" on page 476

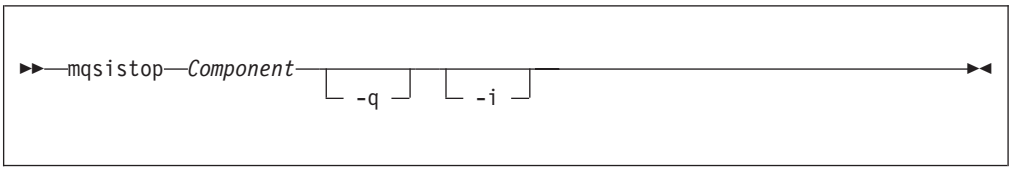
mqsistop command - Windows, Linux, and UNIX systems:

How to use the mqsistop command on Windows, Linux, and UNIX systems.

Purpose:

Use the **mqsistop** command to stop a WebSphere Message Broker component.

Syntax:



Parameters:

Component
(Required) The component must have a broker name, a Configuration Manager name, or one of the following fixed values:

- Windows `UserNameServer` or `DatabaseInstanceMgr` on Windows platforms
- Linux UNIX `UserNameServer` on Linux and UNIX systems

Linux UNIX All of the names are case sensitive on Linux and UNIX systems.

Do not use the mqsistop command on a `DatabaseInstanceMgr` unless you are using the Derby database.

-q (Optional) Stops the WebSphere MQ queue manager associated with this WebSphere Message Broker component.

Specify this flag only if the WebSphere Message Broker component is the last (or only) WebSphere Message Broker component active on this queue manager. The mqsistop command initiates a controlled shutdown of the queue manager, and informs other users of the queue manager that it is closing.

Stop other WebSphere Message Broker components that use this queue manager before you issue the mqsistop command with this option; alternatively stop them afterwards or restart the queue manager.

If you use this option, be aware that any listeners associated with this queue manager are not stopped with the queue manager. Stop these manually after issuing the mqsistop command.

-i (Optional) Immediately stops the broker.

Only specify this flag if you have already tried, and failed, to stop the broker in a controlled fashion using the mqsistop command without the `-i` flag.

Authorization:

Windows On Windows platforms, the user ID used to start the mqsistop command must belong to the **Administrators** group.

Linux UNIX On Linux and UNIX systems, the user ID used to invoke the mqsistop command must conform to the following requirements:

- The user ID must be a member of the **mqbrkrs** group.
- The user ID must either be *root*, or be the same as the user ID that started the component.
- If you specify the `-q` parameter, the user ID must be a member of the **mqm** group.

The security requirements for using the mqsistop command are summarized in the following topics:

- "Security requirements for Windows platforms" on page 539
- "Security requirements for Linux and UNIX platforms" on page 538

Responses:

- BIP8012 Unable to connect to system components
- BIP8013 Component does not exist
- BIP8016 Component cannot be stopped
- BIP8019 Component stopped
- BIP8030 Unable to modify user privileges
- BIP8049 Unable to stop queue manager
- BIP8093 Queue manager being created
- BIP8094 Queue manager stopping

Examples:

Windows **Windows**

To stop the Database Instance manager:

```
mqsistop DatabaseInstanceMgr
```

Windows Linux UNIX **Windows, Linux, and UNIX systems**

To stop the broker, *mybroker*, and the WebSphere MQ queue manager associated with it:

```
mqsistop mybroker -q
```

mqsistop command - z/OS:

Purpose:

Use the **mqsistop** command to stop a WebSphere Message Broker component; the controller must be running.

The following table distinguishes between the **stop (/P)** and **stopcomponent** commands, and lists the available options:

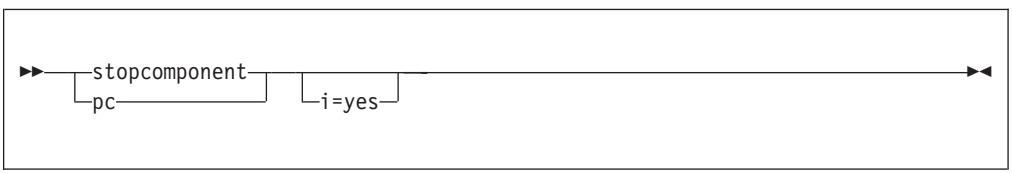
- Use the **stop (/P)** command to bring a component into a state in which you can run the appropriate **change** command.
- Use the **stopcomponent** command to stop a broker, Configuration Manager, or User Name Server when its controller (control process) is already running.

Component	Command	Description
Broker	/P <Broker started task name> /F <Broker started task name>,P /F <Broker started task name>,PC	Stop broker. Stop broker; this is the same as /P. You can also use /F <broker started task name>,STOP Stop broker component. This stops the broker process (including any execution group address spaces), but leaves the message broker console command server running inside the controller address space. This allows you to run the "mqsichangebroker command" on page 319 console command. Restart the broker afterwards by running the "mqsistart command" on page 469 (SC) console command.
Configuration Manager	/P <Configuration Manager started task name> /F <Configuration Manager started task name>,P /F <Configuration Manager started task name>,PC	Stop Configuration Manager. Stop Configuration Manager; this is the same as /P. You can also use /F <configMgr started task name>,STOP Stop Configuration Manager component. This stops the Configuration Manager process, but leaves the message broker console command server running inside the controller address space. This allows you to run the "mqsichangeconfigmgr command" on page 328 console command. Restart the broker afterwards by running the "mqsistart command" on page 469 (SC) console command.
User Name Server	/P <User Name Server started task name> /F <User Name Server started task name>,P /F <User Name Server started task name>,PC	Stop User Name Server. Stop User Name Server; this is the same as /P. You can also use /F <User Name Server started task name>,STOP Stop User Name Server started task name component. This stops the User Name Server process, but leaves the message broker console command server running inside the controller address space. This allows you to run the "mqsichangeusernameserver command" on page 361 console command. Restart the broker afterwards by running the "mqsistart command" on page 469 (SC) console command.

Syntax:

z/OS console command - stopcomponent:

Synonym: pc



Parameters:

-i (Optional) Immediately stop the broker.

Only specify this flag if you have already tried, and failed, to stop the broker in a controlled fashion using the mqsistop command without the `-i` flag.

This command is rejected by the WebSphere Message Broker console command server if a previous stop command has failed to complete. This can occur, for example, if one or more execution group address spaces cannot shutdown.

Examples:

```
F MQ00BRK,pc
```

mqsistopmsgflow command

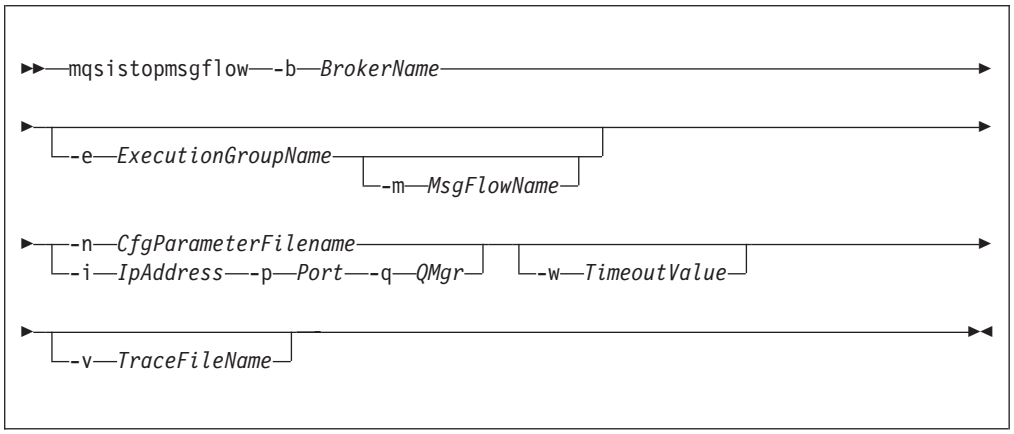
Supported platforms:

- Windows
- Linux and UNIX systems
- z/OS. Run this command by customizing and submitting BIPSPMF; see "Contents of the Configuration Manager PDSE" on page 494

Purpose:

Use the **mqsistopmsgflow** command to stop message flows.

Syntax:



Parameters:

-b *BrokerName*
(Required) The name of the broker on which to stop message flows.

If you do not specify the **-e** and **-m** flags, all message flows on the broker are stopped.

-e *ExecutionGroupName*
(Optional) The name of the execution group on which message flows are stopped.

-m *MsgFlowName*
(Optional) The name of the message flow being stopped.

You can specify only one message flow in a single command. However, if you do not specify this parameter, all message flows on the execution group or broker are stopped.

If you specify this flag you must also specify the **-e** flag.

-n *CfgParameterFileName*
(Optional) This parameter specifies the name of a `.configmgr` file that describes the connection parameters to the Configuration Manager.

The file is in XML, using the `.configmgr` format that is saved by the workbench; for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<configmgr crlNameList="" domainName="" host="winmvsd0" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you are using this file on z/OS you must remove the statement `encoding="UTF-8"` from the first line, and remove the value for the host attribute, to leave the statement as:

```
<?xml version="1.0"?>
<configmgr crlNameList="" domainName="" host="" listenerPort="2206"
queueManager="mq06" securityExit="" securityExitJar="" sslCipherSuite="NONE"
sslDistinguishedNames="" sslKeyStore="" sslTrustStore="" svrconn="SYSTEM.BKR.CONFIG"/>
```

If you do not supply this parameter, you must supply the **-i**, **-p**, and **-q** parameters.

-i *IpAddress*
(Optional) This parameter specifies the host name or IP address of the Configuration Manager.

If you are using this parameter on z/OS and want to connect to the local host you must set the value to `""`.

-p *Port*
(Optional) This parameter is the port number of the Configuration Manager.

-q *QMgr*
(Optional) This parameter specifies the name of the WebSphere MQ queue manager that the Configuration Manager is using.

If you do not supply the **-i**, **-p**, and **-q** parameters, you must specify the **-n** parameter.

-w *TimeoutValue*
(Optional) This parameter is the time in seconds that the utility waits to ensure that the command completed; the default value is 60.

-v *TraceFileName*
(Optional) This parameter sends internal debug trace information to the specified file.

Authorization:

To stop message flows you must have sufficient authority defined in the Configuration Manager's access control list.

The permissions required are the same as the permission required to do the equivalent function in the Message Brokers Toolkit; see "ACL permissions" on page 537 for a list of permissions that can be defined in the Configuration Manager.

Responses:

This command returns the following responses:

0 (Success) States that the request completed successfully and the state of all message flows has been updated.

2 (Failure) States that at least one message flow can not be put into the correct state for any reason.

98 States that the Configuration Manager cannot be reached.

99 States that the supplied arguments to the utility are not valid.

Examples:

Stops all message flows on execution group `default` on broker `B1`, which is controlled by the Configuration Manager whose connection details are described in `cm1.configmgr`. Control is returned to the caller when all message flows in the execution group are reported as stopped, or the default time of one minute elapses, whichever is sooner.

```
mqsistopmsgflow –n cm1.configmgr –b B1 -e default
```

Stops the message flow `flow1` on execution group `default` on broker `B1`, which is controlled by the Configuration Manager whose connection details are described in `cm1.configmgr`. Control is returned to the caller when the message flow is reported as stopped, or the default time of one minute elapses, whichever is sooner.

```
mqsistopmsgflow –n cm1.configmgr –b B1 -e default -m flow1
```

Enter **mqsistopmsgflow** to display usage information:

```
> mqsistopmsgflow
BIP1025I: Stops message flows.

> Syntax:
mqsistopmsgflow (-n cfgParameterFileName | ([-i ipAddress] [-p port] [-q qMgr]))
 -b brokerName [-e executionGroupName [-m flowName]] [-w timeoutValue]
[-v traceFileName]
Command Options:
'-n cfgParameterFileName' Configuration Manager connection file (.configmgr)
'-i ipAddress' IP address or host name of the Configuration Manager
'-p port' port number of the Configuration Manager
'-q qMgr' queue manager of the Configuration Manager
'-b brokerName' name of the broker on which to stop message flows
'-e executionGroupName' name of the execution group on which to stop message flows.
If this is not specified, all message flows on the broker will be stopped.
'-m flowName' name of the message flow to start.
If this is not specified, all message flows on the execution group will be stopped.
'-w timeoutValue' time to wait (in seconds) for message flows to stop (Default=60)
'-v traceFileName' send verbose internal trace to the specified file.
```

z/OS specific information

Follow the links below for more information:

- "Administration in z/OS" on page 481
- "z/OS customization" on page 483
- "z/OS JCL variables" on page 495

Administration in z/OS

In the z/OS environment, commands are issued through the console and others in batch jobs.

- *hlq*.SBIPSAMP has all the JCL samples to customize.
- *hlq*.SBIPPROC has all the JCL procedures to customize.

Stepname

The processes BIPSERVICE and BIPBROKER are in the same address space (control address space). After an Execution Group address space is started on z/OS, the stepname of the address space has the following value:

- The last eight characters are taken from the Execution Group label.
- Any lowercase characters are folded to upper case.
- Any non alphanumeric characters are changed to the character @.
- If the first character is not an alpha character, it is changed to A.

The stepname is not guaranteed to be a unique value. However, you are strongly recommended to ensure that the last eight characters of any Execution Group labels that are deployed to a z/OS broker are unique, and contain only alphanumeric characters; note that an Execution Group label has a maximum size of 3000 bytes.

See the following topics for more information:

- "Issuing commands to the z/OS console"
- "Guidance for issuing console commands in z/OS" on page 482
- "START and STOP commands on z/OS" on page 482

Issuing commands to the z/OS console

You operate the broker or User Name Server using the z/OS START, STOP, and MODIFY commands. You can issue commands, and get responses back from:

- The z/OS operator console
- The TSO CONSOLE facility
- The CONSOLE interface from REXX
- Products such as SDSF
- z/OS automation products, such as NetView®

However, you are likely to need to issue commands with mixed case, because execution group names are often in mixed case. You can issue commands with mixed case on the z/OS console, using the REXX CONSOLE interface, with products like SDSF V2.10 and higher, and NetView. Releases of SDSF before V2.10, and the TSO CONSOLE facility, do not support passing mixed case data.

If you do not have support for mixed case, you can submit the commands through a batch job. For example:

```
//MI01CMD JOB MSGCLASS=H
//  COMMAND 'f MQP1BRK,ct t=yes,e='default',l=debug,f='lowmfl''
//STEP1 EXEC PGM=IEFBR14
```

If your product for issuing console commands supports mixed case input, you might need to take special actions to use mixed case. For example in SDSF on OS/390® V2.10 and above, you can enter mixed case keyword values by typing /,

pressing ENTER, and entering the command in the popup window. If you enter / followed by the command, the command is translated to uppercase. In NetView, prefix the command with NETVASIS to get lowercase support.

Guidance for issuing console commands in z/OS

These examples use a broker called MQP1BRK. Start and stop the broker or User Name Server using the MVS START (S) and STOP (P) commands. If you want to pass information to the broker or User Name Server while it is running, use the MVS MODIFY command (F) to issue commands. For example:

```
F MQP1BKR,rt
```

This list summarizes the rules you must follow when issuing console commands:

- Each command starts with a verb followed by zero or more keyword=value pairs.
- There must be one or more blanks between the verb and the first keyword.
- All characters are converted to lowercase, unless they are within quotation marks.
- Multiple keywords are separated by , with no blanks.
- The keyword is always case insensitive.
- The value is case sensitive, unless specified otherwise (for example Yes/No, trace-modes).
- Each keyword must be followed by the equals sign = and parameter value. Enter parameters in any order in the form:

  ```
  flag=value
  ```

  and separate them with commas. Repeated parameters are not allowed.
- Strings that contain blanks or special characters must be enclosed in single quotation marks ('). If the string itself contains a quotation mark, the quotation mark is represented by two single quotation marks.
- The verb and keywords are not case sensitive.
- On mixed case consoles the case of values in single quotation marks (') is not changed.
- For YES/NO flags, all case combinations are allowed.
- The maximum length of the MODIFY command is 126 characters, including

  ```
  F taskname,
  ```

An example console command:

```
F MQP1BRK,changetrace u=Yes,l=normal,e='myExecutionGroup'
```

START and STOP commands on z/OS

These examples use a broker called MQP1BRK. Start and stop the broker, Configuration Manager, or User Name Server using the MVS START (S) and STOP (P) commands. If you want to pass information to the broker or User Name Server while it is running, use the MVS MODIFY command (F) to issue commands. For example:

```
F MQP1BRK,rt
```

The MVS command START (S) starts a broker, Configuration Manager, or User Name Server (server component) on MVS. This initiates the control address space, plus other address spaces as needed, to run that component.

If you have problems starting the broker, use the command:

```
S <broker name>,STRTP=MAN
```

This command starts the administration task but not the execution groups.

The MVS command STOP (P) stops a server component completely, including its control address space.

For administration purposes you can bring the server component into another state, where the control address space is still running, but all other components are stopped.

For example, this is needed in order to change broker startup parameters, see "mqsichangebroker command" on page 319. You can do this by using the MODIFY (/F) command on the started component, and using the startcomponent (SC) or stopcomponent (PC) options. See "mqsistart command" on page 469 and "mqsistop command" on page 474 for more information.

z/OS customization

This is an introduction topic for a number of reference topics in the area of z/OS customization. See the links under *Related reference information*.

Naming conventions for WebSphere Message Broker for z/OS

Decide upon a naming convention for your WebSphere Message Broker components to make customizing, operating, and administering easier.

Each broker requires its own queue manager. Base your broker name on the queue manager name. For example, append BRK to the queue manager name of MQP1, to give MQP1BRK. This naming convention has the following advantages:

- It is easy to associate the broker with the queue manager, because they both begin with the same characters.
- The started task name has the same name as the broker.
- You can have the broker name as part of the data set name, which makes it easier to administer.

Similarly, base the Configuration ManagerUser Name Server name on the queue manager name. For example, append CMGR or UNS to the queue manager name.

Using this convention, you might have the following component names for a queue manager MQP1.

- A broker called MQP1BRK with:
  - A started task name of MQP1BRK.
  - A started task user ID of MQP1BRK.
  - A PDSE containing definitions called hlq.MQP1BRK.xxx.
  - A UNIX System Services directory structure like /xxx/yyy/MQP1BRK.
  - A DB2 group called MQP1GRP.
- A User Name Server called MQP1UNS with:
  - A started task name of MQP1UNS.
  - A started task user ID of MQP1UNS.
  - A PDSE containing definitions called hlq.MQP1UNS.xxx.
  - A UNIX System Services directory structure like /xxx/yyy/MQP1UNS.

- A Configuration Manager called MQP1CMGR with:
  - A started task name of MQP1CMGR.
  - A started task user ID of MQP1CMGR.
  - A PDSE containing definitions called hlq.MQP1CMGR.xxx.
  - A UNIX System Services directory structure like /xxx/yyy/MQP1CMGR.

Plan for expansion by selecting names that allow growth.

If your broker name is in uppercase, ensure the broker name is also in uppercase in the workbench.

Customization tasks and roles on z/OS

Systems programmers do most of the customization of WebSphere Message Broker. Tasks that need to be performed by other people in your organization are identified in the table below:

Role	Task
z/OS systems programmer	"Customizing the z/OS environment" on page 102
	"Setting up z/OS security" on page 37
	"Summary of required access (z/OS)" on page 485
	"Customizing UNIX System Services on z/OS" on page 113
	"Creating the broker component" on page 139
	"Starting and stopping a broker on z/OS" on page 258
	"Checking APF attributes of bipimain on z/OS" on page 122
DB2 administrator	"Setting up DB2 security on z/OS" on page 38
	"Summary of required access (z/OS)" on page 485
	"DB2 planning on z/OS" on page 115
	"Priming DB2" on page 138
WebSphere MQ administrator	"Setting up WebSphere MQ" on page 39
	"Summary of required access (z/OS)" on page 485
	"WebSphere MQ planning for z/OS" on page 118
	"Creating the broker component" on page 139
	"Defining the started tasks to z/OS Workload Manager (WLM)" on page 120
WebSphere Message Broker administrator	"Setting up workbench access on z/OS" on page 40
	"Summary of required access (z/OS)" on page 485
	"Creating a broker on z/OS" on page 133
	"Creating the broker component" on page 139
	"Checking APF attributes of bipimain on z/OS" on page 122

Performance specialist	"Defining the started tasks to z/OS Workload Manager (WLM)" on page 120
Security administrator	"Setting up z/OS security" on page 37
	"Setting up DB2 security on z/OS" on page 38
	"Summary of required access (z/OS)"
	"Creating Publish/Subscribe user IDs" on page 40
Data administrator	"Setting up z/OS security" on page 37
	"Summary of required access (z/OS)"
	"Disk space requirements on z/OS" on page 489
	"Starting and stopping a broker on z/OS" on page 258
	"Using the file system on z/OS" on page 107
	"Binding a DB2 plan to use data-sharing groups on z/OS" on page 490

Some tasks, for example defining queue security, overlap two different roles.

Summary of required access (z/OS):

The professionals in your organization require access to components and resources on z/OS.

Authorizations required for the WebSphere Message Broker started-task user ID:

The directory authorizations required for all WebSphere Message Broker components are:

- *READ/EXECUTE* access to `<INSTPATH>`, where `<INSTPATH>` is the directory where WebSphere Message Broker for z/OS is installed by SMP/E.
- *READ/WRITE/EXECUTE* access to the component directory `++COMPONENTDIRECTORY++`.
- *READ/WRITE* access to the home directory.
- *READ/WRITE* access to the directory identified by `++HOME++`.
- In UNIX System Services, the started task user ID and the WebSphere Message Broker administrator user ID must both be members of the groups that have access to the installation and component directories, because they both need privileges over these. The owner of these directories needs to give the appropriate permissions to this group.

The following PDSE and DB2 authorizations are required only for a broker component, that is, not a Configuration Manager or User Name Server

READ access to the component PDSE is required.

DB2 authorizations for the started task user ID and the table owner ID are required:

- If a profile for db2subsystem.RRSAF exists in the DSNR class, the started task user ID needs access to the profile. For example, the following RACF command shows whether the profile exists:

  ```
  RLIST  DSNR (DB2P.RRSAF)
  ```

and the following command gives the required access:

```
PERMIT  DB2P.RRSAF  CLASS(DSNR) ID(WQMITASK)  ACCESS(READ)
```

- *SELECT* privilege on the tables SYSIBM.SYSTABLES, SYSIBM.SYSSYNONYMS, and SYSIBM.SYSDATABASE.
- *SELECT*, *UPDATE*, *INSERT*, and *DELETE* privileges on all broker system tables.
- DB2_TABLE_OWNER must be a valid authorization ID of the started task user ID.
- *EXECUTE* authority on the DSNACLI plan, or equivalent for the started task user ID.

WebSphere MQ authorizations

Enable WebSphere MQ security to protect your WebSphere MQ resources. If all WebSphere MQ security switches are enabled, define the following profiles and give the started task user ID the listed access to each profile. For each profile access listed, <MQ_QMNAME> represents the WebSphere MQ queue manager that the WebSphere Message Broker component is connected to, and TASKID represents the WebSphere Message Broker started-task user ID.

- Connection security: *READ* access to profile <MQ_QMNAME>.BATCH of class MQCONN. For example, for queue manager MQP1 and started task ID TASKID, use the RACF commands:

  ```
  RDEFINE MQCONN MQP1.BATCH UACC(NONE)
  PERMIT MQP1.BATCH CLASS(MQCONN) ID(TASKID) ACCESS(READ)
  ```

- Queue security: *UPDATE* access to profile <MQ_QMNAME>.queue of class MQQUEUE for all queues. Consider creating profiles for the following queues:
  - All component queues using the generic profile SYSTEM.BROKER.**
  - Any transmissions queues defined between component queue managers.
  - Any queues defined in message flows.
  - Dead-letter queues.

  For example, for queue manager MQP1 and started task ID TASKID, use the following RACF commands to restrict access to the component queues:

  ```
  RDEFINE MQQUEUE MQP1.SYSTEM.BROKER.** UACC(NONE)
  PERMIT MQP1.SYSTEM.BROKER.** CLASS(MQQUEUE) ID(TASKID) ACCESS(UPDATE)
  ```

- Context security: *CONTROL* access to profile <MQ_QMNAME>.CONTEXT of class MQADMIN. For example, for queue manager MQP1 and started task ID TASKID, use the following RACF commands:

  ```
  RDEFINE MQADMIN MQP1.CONTEXT UACC(NONE)
  PERMIT MQP1.CONTEXT.** CLASS(MQADMIN) ID(TASKID) ACCESS(CONTROL)
  ```

- Alternate user security: Define the alternate user authority as: *UPDATE* access to profile <MQ_QMNAME>.ALTERNATE.USER.id of class MQADMIN, where id represents the service ID of the Configuration Manager component. For example, for queue manager MQP1, started task ID TASKID, and configuration service ID CFGID, use the following RACF commands:

  ```
  RDEFINE MQADMIN MQP1.ALTERNATE.USER.CFGID UACC(NONE)
  PERMIT MQP1.ALTERNATE.USER.CFGID  CLASS(MQADMIN) ID(TASKID) ACCESS(UPDATE)
  ```

  UPDATE access to profile <MQ_QMNAME>.ALTERNATE.USER.id of class MQADMIN, where id represents the user ID of, for example, a Publish/Subscribe request.

- Process and namelist security: If you have WebSphere MQ security switches enabled in your system for process and namelist security, you do not need to define any access profiles in a WebSphere Message Broker default configuration.

For users connecting remotely from either the Message Brokers Toolkit or from a Configuration Manager Proxy application to the Configuration Manager on z/OS the following authorizations are required :

- Connection security: *READ* access to profile <MQ_QMNAME>.CHIN of class MQCONN. For example, for queue manager MQP1 and started task ID TASKID, use the following RACF commands:

```
RDEFINE MQCONN MQP1.CHIN UACC(NONE)
PERMIT MQP1.CHIN CLASS(MQCONN) ID(TASKID) ACCESS(READ)
```

- Alternate user security: Define the alternate user authority as: *UPDATE* access to profile <MQ_QMNAME>.ALTERNATE.USER.id of class MQADMIN, where id represents the user ID of the Message Brokers Toolkit or Configuration Manager Proxy application. For example, for queue manager MQP1, started task ID TASKID, and user ID USERID, use the following RACF commands:

```
RDEFINE MQADMIN MQP1.ALTERNATE.USER.USERID UACC(NONE)
PERMIT MQP1.ALTERNATE.USER.USERID  CLASS(MQADMIN) ID(TASKID) ACCESS(UPDATE)
```

Authorizations required for the WebSphere Message Broker administrator:

The broker administrator requires the following authorizations:

- *ALTER* access to the component PDSE.
- *READ*, *WRITE*, and *EXECUTE* access to the component directory ++COMPONENTDIRECTORY++.
- *READ/EXECUTE* access to <INSTPATH>, where <INSTPATH> is the directory where WebSphere Message Broker for z/OS is installed by SMP/E.
- *READ/WRITE* access to the directory identified by ++HOME++.
- In UNIX System Services, the started task user ID and the WebSphere Message Broker administrator user ID must both be members of the groups that have access to the installation and component directories, because they both need privileges over these. The owner of these directories needs to give the appropriate permissions to this group.
- To run the DB2 pass when creating and deleting components DBADM authority for the broker database is required.

Authorizations required for the DB2 administrator:

The DB2 administrator needs to have the following authorizations to run the DB2 configuration jobs BIPCRDB and BIPDLDB:

- *ALTER* access to the component PDSE.
- DB2 authorizations: SYSCTRL or SYSADM authority.
- CREATE STOGROUP, CREATE DATABASE, and CREATE TABLESPACEs.
- DROP DATABASE and DROP STOGROUP.

If the DB2 administrator runs the DB2 pass when creating and deleting a component, the administrator user ID also needs the following authorizations. Alternatively, you can grant authorization to the WebSphere Message Broker administrator to run the DB2 pass.

- *READ*, *WRITE*, and *EXECUTE* access to the component directory ++COMPONENTDIRECTORY++.
- *READ/EXECUTE* access to <INSTPATH>, where <INSTPATH> is the directory where WebSphere Message Broker for z/OS is installed by SMP/E.
- *READ/WRITE* access to the directory identified by ++HOME++.

- In UNIX System Services, the started task user ID and the WebSphere Message Broker administrator user ID must both be members of the groups that have access to the installation and component directories, because they both need privileges over these. The owner of these directories must give the appropriate permissions to this group.

Authorizations required for the WebSphere MQ administrator:

If the WebSphere MQ administrator runs the WebSphere MQ pass when creating a component, the administrator user ID requires the following authorizations. Alternatively WebSphere MQ, you can grant authorization to the WebSphere Message Broker administrator to run the WebSphere MQ pass.

- *ALTER* access to the component PDSE.
- Directory authorizations:
  - *READ/EXECUTE* access to <INSTPATH>, where <INSTPATH> is the directory where WebSphere Message Broker for z/OS is installed by SMP/E.
  - *READ*, *WRITE*, and *EXECUTE* access to the component directory ++COMPONENTDIRECTORY++.
  - *READ/WRITE* access to the directory identified by ++HOME++.

Enable WebSphere MQ security to protect your WebSphere MQ resources. If all WebSphere MQ security switches are enabled, define the following profiles and give the WebSphere MQ administrator the listed access to each profile in order to run the WebSphere MQ configurations jobs. For each profile access listed, MQ_QMNAME represents the WebSphere MQ queue manager that the WebSphere Message Broker component is connected to, and MQADMIN represents the WebSphere MQ administrator ID:

- Connection security: *READ* access to profile <MQ_QMNAME>.BATCH of class MQCONN. For example, for queue manager MQP1 and WebSphere MQ administrator ID MQADMIN, use the following RACF commands:

  ```
  RDEFINE MQCONN MQP1.BATCH UACC(NONE)
  PERMIT MQP1.BATCH CLASS(MQCONN) ID(MQADMIN) ACCESS(READ)
  ```

- Queue security: *UPDATE* access to profile <MQ_QMNAME>.queue of class MQQUEUE for component queues created or deleted. You can create a generic profile SYSTEM.BROKER.** For example, for queue manager MQP1 and WebSphere MQ administrator ID MQADMIN, use the following RACF commands to restrict access to the component queues:

  ```
  RDEFINE MQQUEUE MQP1.SYSTEM.BROKER.** UACC(NONE)
  PERMIT MQP1.SYSTEM.BROKER.** CLASS(MQQUEUE) ID(MQADMIN) ACCESS(UPDATE)
  ```

- System command server: *UPDATE* access to profile <MQ_QMNAME>.queue of class MQQUEUE for SYSTEM.COMMAND.**. For example, for queue manager MQP1 and WebSphere MQ administrator ID MQADMIN, use the following RACF commands to restrict access to the system command server:

  ```
  RDEFINE MQQUEUE MQP1.SYSTEM.COMMAND.** UACC(NONE)
  PERMIT MQP1.SYSTEM.COMMAND.** CLASS(MQQUEUE) ID(MQADMIN) ACCESS(UPDATE)
  ```

  UPDATE access to profile <MQ_QMNAME>.queue of class MQQUEUE for some system queues used during the create/delete job. You can create a generic profile <MQ_QMNAME>.**

- Command security:
  - To run the WebSphere MQ pass when creating a component you need:
    - *ALTER* access to <MQ_QMNAME>.DEFINE.QLOCAL of class MQCMDS.
    - *ALTER* access to <MQ_QMNAME>.DEFINE.QMODEL of class MQCMDS.

- *ALTER* access to <MQ_QMNAME>.DEFINE.CHANNEL of class MQCMDS.

– To run the WebSphere MQ pass when deleting a component you need:
  - *ALTER* access to <MQ_QMNAME>.DELETE.QLOCAL of class MQCMDS.
  - *ALTER* access to <MQ_QMNAME>.DELETE.QMODEL of class MQCMDS.
  - *ALTER* access to <MQ_QMNAME>.DELETE.CHANNEL of class MQCMDS.

For queue manager MQP1 and WebSphere MQ administrator ID MQADMIN, use the following RACF commands:

```
RDEFINE MQCMDS MQP1.DELETE.QLOCAL UACC(NONE)
PERMIT MQP1.DELETE.QLOCAL CLASS(MQCMDS) ID(MQADMIN) ACCESS(ALTER)
```

- Resource command security: *ALTER* access to MQP1.QUEUE.queue of class MQADMIN for each queue created or deleted. You can create a generic profile SYSTEM.BROKER.**. For example, for queue manager MQP1 and WebSphere MQ administrator ID MQADMIN, use the RACF commands:

```
RDEFINE MQADMIN MQP1.QUEUE.SYSTEM.BROKER.** UACC(NONE)
PERMIT MQP1.QUEUE.SYSTEM.BROKER.** CLASS(MQADMIN) ID(MQADMIN) ACCESS(ALTER)
```

- Process and namelist security: If you have WebSphere MQ security switches enabled in your system for process and namelist security, you do not need to define any access profiles in a WebSphere Message Broker default configuration.

For a description of how to implement WebSphere MQ security using RACF, see "Setting up WebSphere MQ" on page 39.

Authorizations required for the DB2 subsystem started-task user ID:

DB2 needs *ALTER* access to the catalog value specified in DB2_STOR_GROUP_VCAT because it creates data sets with this high-level qualifier.

Disk space requirements on z/OS

The WebSphere Message Broker for z/OS installation uses approximately 400 MB of disk space; you should plan on using 500 MB which will also allow for new service to be applied and also for the component directories.

When you apply service, if you do not replace your existing install (for example you apply the new fix pack level alongside your existing install) then you need to plan the same amount of disk space for the higher service level libraries.

If you are transferring the files using *tar* to package them, you need approximately 200 MB of space for the .tar file.

You can check how much space is used and how much is free in a file system using the OMVS command:

```
df -P /pathname
```

100 MB is 3 276 800 512 byte sectors.

The following table gives guidance on the space required for a minimum installation (base installation and verification test) of WebSphere Message Broker for z/OS components.

Component	*Space required*	*Purpose*
DB2 database (broker only)	6 MB	Holds the broker system tables.

Component directory	20 MB	Holds the runtime information and output directories for the component. This includes trace files and other user problem determination data, which can become large.
Component PDSE	1 MB	Holds the customization and administration jobs, procedures, and data for the component. The data set must be allocated with a fixed record length of 80 (LRECL=80) and a format of FB 80. Reserve directory space for 50 members, or use a PDSE if possible.
Started task user ID home directory	8 GB	Collect diagnostic materials, for example dumps. Dumps are usually more than 500MB in size. 8 GB of space needs to be available in the file system, but many user IDs can have their home directory in the file system.

The Component directory and the Started task user ID home directory must be different to ensure that, when dumps are taken in the Started task user ID home directory, they do not cause problems with the runtime broker that still needs to write to the Component directory.

Binding a DB2 plan to use data-sharing groups on z/OS

During customization, you can specify which plan name to use, or use the default DSNACLI. If you are using XPLINK, the default plan is called DSNACLX. If you want your broker to access DB2 data-sharing groups other than its own, the DSNACLI plan must be bound in a special way. If the broker uses one data sharing group, but might want to access tables on DSNONE and DSNTWO, which are in different data-sharing groups, amend the DB2 supplied job DSNTIJCL to do the following:

```
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNAOCLI)MEMBER(DSNCLIQR)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNONE.DSNAOCLI)MEMBER(DSNCLIQR)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLICS)ISOLATION(CS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLINC)ISOLATION(NC)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIRR)ISOLATION(RR)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIRS)ISOLATION(RS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIUR)ISOLATION(UR)
```

```
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIC1)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIC2)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIF4)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIMS)
BIND PACKAGE (DSNTWO.DSNAOCLI)MEMBER(DSNCLIQR)
BIND PLAN(DSNACLI)-
PKLIST(*.DSNAOCLI.DSNCLICS -
*.DSNAOCLI.DSNCLINC -
*.DSNAOCLI.DSNCLIRR -
*.DSNAOCLI.DSNCLIRS -
*.DSNAOCLI.DSNCLIUR -
*.DSNAOCLI.DSNCLIC1 -
*.DSNAOCLI.DSNCLIC2 -
*.DSNAOCLI.DSNCLIF4 -
*.DSNAOCLI.DSNCLIMS -
*.DSNAOCLI.DSNCLIQR )
```

Customization planning checklist for z/OS

Use the information contained in the following tables to make a note of the values to use when you customize your system variables. For further information, see:

- "Installation information - broker and User Name Server" on page 133
- "Installation information - Configuration Manager" on page 147
- "DB2 information" on page 134
- "Component information - broker" on page 134
- "Component information - Configuration Manager" on page 147
- "Component information - User Name Server" on page 156

Contents of the broker PDSE

After you have successfully customized the broker, the broker PDSE members have been set up.

Broker PDSE members originating in <hlq>.SBIPSAMP

The PDSE members are described in the following table.

Description	Name
Broker profile	BIPBPROF
Job to run the broker DB2 database backup	BIPBUDB
Broker DB2 dsnaoini file "Sample BIPDSNAO file" on page 526 lists the shipped BIPDSNAO file.	BIPDSNAO
Job to run the broker DB2 database QUIESCE	BIPQSDB
Job to run the broker DB2 database report	BIPRPDB
Job to run the broker DB2 database restore	BIPRSDB
Job to run the broker DB2 run statistics example	BIPRUNST

Broker PDSE members originating in <hlq>.SBIPPROC

The PDSE members are described in the following table.

Description	Name

Commented sample job to identify database resources, including tables and table spaces for performance tuning purposes	BIPALDB
Commented sample job to identify WebSphere MQ resources, including queues for performance tuning purposes	BIPALMQ
Job to run mqsibrowse command. Use this command only at the request of IBM service.	BIPBRWS
Job to run the mqsichangebroker command	BIPCHBK
Job to run the mqsichangeflowstats command	BIPCHMS
Job to run the mqsichangeproperties command	BIPCHPR
Job to run the mqsichangeflowuserexits command	BIPCHUE
Removes an MQSeries Publish/Subscribe broker as a neighbor; runs the mqsiclearmqpubsub command	BIPCLMP
Job to run the mqsicreatebroker command to: • Create the DB2 tables • Create the WebSphere MQ resources • Create the broker registry "Sample BIPCBRK file" on page 507 lists the shipped BIPCRBK file.	BIPCRBK
Job to create the DB2 storage group, database and table spaces. "Sample BIPCRDB file" on page 516 lists the shipped BIPCRDB file.	BIPCRDB
Job to run the mqsideletebroker command	BIPDLBK
Job to drop the DB2 database and storage groups	BIPDLDB
Edit macro for customization. Rename BIPEDIT to a unique name that identifies it to the current component; for example, MQ01EDBK "Sample BIPEDIT file" on page 527 lists the shipped BIPEDIT file.	BIPEDIT (MQP1BRK)
Job to run the mqsiformatlog command.	BIPFMLG
Job to convert BIPBPROF profile to a valid ENVFILE. "Sample BIPGEN file" on page 528 lists the shipped BIPGEN file.	BIPGEN
Job to run the mqsijoinmqpubsub command	BIPJNMP
Job to run the mqsilist command	BIPLIST
Job to run the mqsilistmqpubsub command	BIPLSMP
Job to change DB2 definitions when migrating from Version 2.1 to Version 6.0	BIPMGTB
Job to run the mqsireadlog command.	BIPRELG
Job to run the mqsireportflowstats command	BIPRPMS
Job to run the mqsireportproperties command	BIPRPPR
Job to run the mqsireportflowuserexits command	BIPRPUE
Job to define a data source, user ID, and password for user data sources.	BIPSDBP
(started task). Rename BIPBRKP to **the same as the ++STARTEDTASKNAME++**. "Sample BIPBRKP file" on page 504 lists the shipped BIPBRKP file.	BIPBRKP

Use the standard z/OS IPCS facilities to take a dump. You require access to the following:

- COMPONENT_PDSE
- ComponentDirectory
- SYS1.MIGLIB
- SYS1.SBLSCLI0
- SYS1.PARMLIB
- IPCS

Contents of the User Name Server PDSE

After successfully customizing the User Name Server, the members in your User Name Server PDSE are as follows:

User Name Server PDSE members originating in <hlq>.SBIPSAMP

Description	Name
User Name Server profile "Sample BIPUPROF file" on page 532 lists the shipped BIPUPROF file.	BIPUROF

User Name Server PDSE members originating in <hlq>.SBIPPROC

Description	Name
Commented sample job to identify WebSphere MQ resources, including queues for performance tuning purposes	BIPALMQ
Job to run the mqsichangeusernameserver command.	BIPCHUN
Job to run the mqsicreateusernameserver command to: • Create the WebSphere MQ resources • Create the User Name Server registry "Sample BIPCRUN file" on page 524 lists the shipped BIPCRUN file.	BIPCRUN
Job to run the mqsideleteusernameserver command.	BIPDLUN
Edit macro for customization. Rename BIPEDIT to a unique name that identifies it to the current component; for example, MQ01EDUN. "Sample BIPEDIT file" on page 527 lists the shipped BIPEDIT file.	BIPEDIT
Job to run the mqsiformatlog command.	BIPFMLG
Generate ENVFILE. "Sample BIPGEN file" on page 528 lists the shipped BIPGEN file.	BIPGEN
Job to run the mqsilist command.	BIPLIST
Job to run the mqsireadlog command.	BIPRELG
Started task. Rename BIPUNSP to **the same as the ++STARTEDTASKNAME++**. "Sample BIPUNSP file" on page 530 lists the shipped BIPUNSP file.	BIPUNSP

Use the standard z/OS IPCS facilities to take a dump. You require access to the following:

- COMPONENT_PDSE
- ComponentDirectory

- SYS1.MIGLIB
- SYS1.SBLSCLI0
- SYS1.PARMLIB
- IPCS

Contents of the Configuration Manager PDSE

After successfully customizing the Configuration Manager, the members in your Configuration Manager PDSE are as follows:

Configuration Manager PDSE members originating in <hlq>.SBIPSAMP

Description	Name
Configuration Manager profile "Sample BIPCPROF file" on page 511 lists the shipped BIPCPROF file.	BIPCPROF

Configuration Manager PDSE members originating in <hlq>.SBIPPROC

Description	Name
Commented sample job to identify WebSphere MQ resources, including queues for performance tuning purposes	BIPALMQ
Job to run the mqsibackupconfigmgr command	BIPBUCM
Job to run the mqsichangeconfigmgr command	BIPCHCM
Job to run the mqsicreateaclentry command	BIPCRACL
Job to run the mqsicreateconfigmgr command to: • Create the WebSphere MQ resources • Create the Configuration Manager registry . "Sample BIPCRCM file" on page 514 lists the shipped BIPCRCM file.	BIPCRCM
Job to run the mqsicreateexecutiongroup command	BIPCREG
Job to run the mqsideleteaclentry command	BIPDLACL
Job to run the mqsideleteconfigmgr command	BIPDLCM
Job to run the mqsideleteexecutiongroup command	BIPDLEG
Job to run the mqsideploy command	BIPDPLY
Edit macro for customization. Rename BIPEDIT to a unique name that identifies it to the current component; for example, MQ01EDCM. "Sample BIPEDIT file" on page 527 lists the shipped BIPEDIT file.	BIPEDIT
Job to run the mqsiformatlog command.	BIPFMLG
Job to convert BIPCPROF profile to a valid ENVFILE. "Sample BIPGEN file" on page 528 lists the shipped BIPGEN file.	BIPGEN
Job to run the mqsilistaclentry command	BIPLIACL
Job to run the mqsilist command	BIPLIST
Job to run the mqsireadlog command.	BIPRELG
Job to run the mqsirestoreconfigmgr command	BIPRSCM

Job to run the mqsistopmsgflow command	BIPSPMF
Job to run the mqsistartmsgflow command	BIPSTMF
Started task. Rename BIPCMGRP to **the same as the ++STARTEDTASKNAME++**. "Sample BIPCMGRP file" on page 509 lists the shipped BIPCMGRP file.	BIPCMGRP

Use the standard z/OS IPCS facilities to take a dump. You require access to the following:

- COMPONENT_PDSE
- ComponentDirectory
- SYS1.MIGLIB
- SYS1.SBLSCLI0
- SYS1.PARMLIB
- IPCS

z/OS JCL variables

The following table lists all the JCL variables that you can customize in alphabetical order, together with a description and an example value.

JCL variable	Description	Example value
++ACTIVEUSEREXITLIST++	Active user exit list	'MyExit1: MyExit2'
++ARM++	Specifies if a component should use Automatic Restart Management (ARM).	YES
++ARMNAME++	ARM name. Required if ++ARM++ is set to YES.	Q482BRK
++ARMTYPE++	ARM type. Required if ++ARM++ is set to YES.	SYSWMQI
++COMPONENTDATASET++	The dataset where all JCL relevant to a particular component is saved.	TESTDEV.MQP1BRK.BROKER
++COMPONENTDIRECTORY++	The file system directory where the component exists. This directory includes subdirectories, for example, /log and /registry	mqsi/brokers/MQP1BRK
++COMPONENTNAME++	The name you give the component when you create it.	MQP1BRK
++COMPONENTPROFILE++	Profile name.	BIPBPROF, BIPCPROF, or BIPUPROF

JCL variable	Description	Example value
++COMPONENTRESOURCE++	Required specifically by BIPBRWS. It represents the resource to be displayed.	BNBRCONNECTIONS
++DB2BUFFERPOOL++	The name of the DB2 buffer pool associated with the component for which the JCL is submitted.	BP0
++DB2CONVERSION++	Specifies the DB2 Converter.	SINGLE
++DB2CURRENTSQLID++	The DB2 user ID for the component and commands.	MQP1BRK
++DB2DATABASE++	The name of the DB2 database associated with the component for which the JCL is submitted.	DMQP1BRK
++DB2HLQ++	DB2 high-level-qualifier	SYS2.DB2.V710
++DB2INDEXBP++	DB2 index bufferpool	BP0
++DB2LOBBP++	DB2 LOB table bufferpool	BP0
++DB2LOCATION++	The DB2 location value of the DB2 subsystem to which the component connects.	DSN710PK
++DB2PLAN++	The DB2 plan value.	DSNTEP71
++DB2PLANNAME++	The DB2 plan name.	DSNACLI
++DB2PROGRAM++	The DB2 program value.	DSNTEP2
++DB2RUNLIB++	The DB2 run library value.	DSN710PK.RUNLIB.LOAD
++DB2STORAGEGROUP++	The name of the DB2 storage group associated with the component for which the JCL is submitted.	MQP1STOR
++DB2SUBSYSTEM++	The DB2 subsystem ID which the component connects.	DFK4
++DB2TABLEOWNER++	Broker tables schema name.	MQP1BRK
++EXECUTIONGROUPNAME++	The name of an execution group.	Default

JCL variable	Description	Example value
++HOME++	The file system home directory for the component's user ID. This is required to dynamically generate the `ENVFILE` from `BIPBPROF`, and is also used for STDOUT and STDERR output. You must have the appropriate RACF authorities to write to this file system directory when submitting JCL to run a command.	/u/mqp1brk
++INACTIVEUSEREXITLIST++	Inactive user exit list	'OtherExitA: OtherExitB'
++INSTALL++	The directory where you install the product.	/usr/lpp/mqsi
++JAVA++	Location of Java installation.	/usr/lpp/java/IBM/J1.4
++LANGLETTER++	The letter for the language in which you want messages shown.	E (English)
++LOCALE++	Locale of environment where commands are run by submitting JCL.	C
++MESSAGECASE++	Determines if messages should appear in mixed case.	YES
++MESSAGEFLOWNAME++	Name of the message flow	MyTestMsgFlow
++MQPATH++	WebSphere MQ location	/usr/lpp/mqm
++NEIGHBOURQUEUEMANAGER++	Required specifically by BIPCLMP for the mqsiclearmqpubsub command. It represents the name of the neighboring QueueManager	MQP1
++OBJECTNAME++	Required specifically by BIPRPPR for the mqsireportproperties command. It represents the name of the object.	DynamicSubscriptionEngine

JCL variable	Description	Example value
++OPTIONS++	Many commands submitted by JCL require additional options. See each command's reference material for additional information on options specific to that command.	N/A
++PARENTQUEUEMANAGERNAME++	Required specifically by BIPJNMP for the mqsijoinmqpubsub command. It represents the name of the parent QueueManager.	MQP1
++PROPERTYNAME++	Required specifically by BIPCHPR for the mqsichangeproperties command. It represents the name of the property to be changed.	multicastEnabled
++PROPERTYVALUE++	Required specifically by BIPCHPR for the mqsichangeproperties command. It represents the new value of the property to be changed.	false
++QUEUEMANAGER++	The name of the QueueManager associated with the component for which you submit the JCL.	MQP1
++STARTEDTASKNAME++	Name of the Started Task JCL. This can be a maximum of 8 characters.	MQP1BRK
++TIMEZONE++	Time zome of environment where commands are run by submitting JCL.	GMT0BST
++WMQHLQ++	WebSphere MQ high-level-qualifier	MQM.V531
++XMLTOOLKIT++	IBM XML Toolkit location	/usr/lpp/ixm/IBM/xml4c-5_5

z/OS sample files supplied

The following files are provided as sample source that you can customize:

- "Sample BIPBPROF file" on page 499
- "Sample BIPBRKP file" on page 504

Sample BIPBPROF file

```
#********************************************************************
#*                                                                  *
#* @START_COPYRIGHT@                                               *
#*                                                                  *
#* Licensed Materials - Property of IBM;                            *
#* 5655-G97 (c) Copyright IBM Corp. 2004;                           *
#* All Rights Reserved;                                             *
#* US Government Users Restricted Rights - use,                     *
#* duplication or disclosure restricted by GSA                      *
#* ADP Schedule Contract with IBM Corp.;                            *
#* See Copyright Instructions                                       *
#*                                                                  *
#* @END_COPYRIGHT@                                                 *
#*                                                                  *
#********************************************************************
#*              IBM WebSphere Event/Message Brokers                 *
#*                                                                  *
#* Sample profile for a broker.                                     *
#*                                                                  *
#********************************************************************
#* MORE INFORMATION - See:                                          *
#*                                                                  *
#*    WebSphere Event/Message Brokers Information Centre.           *
#*                                                                  *
#* IMPORTANT:                                                       *
#*                                                                  *
#*     You must submit BIPGEN each time you update this profile!    *
#*                                                                  *
#********************************************************************
#* CUSTOMIZE HERE FOR YOUR INSTALLATION
#* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
#*                                                                  *
#*    Replace   ++INSTALL++
#*                      WBI Brokers installation directory.
#*                      e.g. '/usr/lpp/mqsi'
#*
#*    Replace   ++COMPONENTDIRECTORY++
#*                      Broker directory.
#*                      e.g. '/mqsi/brokers/MQ01BRK'
#*
#*    Replace   ++COMPONENTDATASET++
#*                      Component dataset.
#*                      e.g. 'BIP.BROKER.MQ01BRK'
#*
#*    Replace   ++COMPONENTNAME++
#*                      Broker name.
#*                      e.g. 'MQ01BRK'
#*
#*    Replace   ++LOCALE++
```

```
#*                      Locale.
#*                      e.g. 'C'
#*
#*    Replace   ++TIMEZONE++
#*                      Time zone.
#*                      e.g. 'GMT0BST'
#*
#*    Replace   ++JAVA++
#*                      Java location.
#*                      e.g. '/usr/lpp/java/IBM/J1.4'
#*
#*    Replace   ++XMLTOOLKIT++
#*                      IBM XML Toolkit location.
#*                      e.g. '/usr/lpp/ixm/IBM/xml4c-5_5'
#*
#*    Replace   ++DB2CONVERSION++
#*                      Specifies the DB2 Converter.
#*                      e.g. 'SINGLE'
#*
#*    Replace   ++DB2DATABASE++
#*                      Needed by the mqsicreatebroker command to
#*                      determine the DB2 database.
#*                      e.g. 'DMQ01BRK'
#*
#*    Replace   ++DB2STORAGEGROUP++
#*                      Needed by the mqsicreatebroker command to
#*                      determine the DB2 storagegroup.
#*                      e.g. 'MQ01STOR'
#*
#*********************************************************************
# 1. Component Settings
#*********************************************************************
#
# 1.1 MQSI_REGISTRY references the component path. Also needed by
#     commands.
#     e.g. MQSI_REGISTRY=/mqsi/brokers/MQ01BRK
#
# 1.2 MQSI_COMPONENT_NAME is set to the broker name.
#     e.g. MQSI_COMPONENT_NAME=MQ01BRK
#
# 1.3 MQSI_FILEPATH needed by commands to reference the component
#     version install path.
#     e.g. MQSI_FILEPATH=usr/lpp/mqsi/V6R0M0
#
# 1.4 MQSI_LILPATH needed by components to find LILs
#     e.g. MQSI_FILEPATH=usr/lpp/mqsi/V6R0M0/lil
#
export MQSI_REGISTRY=++COMPONENTDIRECTORY++
export MQSI_COMPONENT_NAME=++COMPONENTNAME++
export MQSI_FILEPATH=++INSTALL++
export MQSI_LILPATH=$MQSI_FILEPATH/lil


#*********************************************************************
# 2. NLS Settings
#*********************************************************************
#
# 2.1 LANG and LC_ALL determine in which locale the component
#     will run.
#     e.g. LANG=Ja_JP.IBM-939 and LC_ALL=Ja_JP.IBM-939 for
#          japanese locale.
#          LANG=C, LC_ALL=C for US English locale.
#
# 2.2 TZ has the timezone setting in which you are located.
#     e.g. TZ=EST5                    for USA Eastern Standard Time
#          TZ=MEZ-1MES,M3.5.0,M10.5.0 for Central Europe
#          TZ=GMT0BST                 for the UK
```

```
#          Please refer to the IBM Manual
#          "Unix System Services Command Reference SC28-1892.
#
# 2.3 NLSPATH contains the location of the message catalog(s).
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 2.4 MQSI_CONSOLE_NLSPATH is used to locate the messages for
#     the console.
#     For Japanese or S-Chinese messages, change En_US to
#     Ja_JP or Zh_CN below. For English messages these can be
#     displayed in mixed or upper case only. (see MC_MESSAGES)
#     Note that MQSI_CONSOLE_NLSPATH does not use %L or %N
#
export LANG=++LOCALE++
export LC_ALL=++LOCALE++
export TZ=++TIMEZONE++
export NLSPATH=$MQSI_FILEPATH/messages/%L/%N
export NLSPATH=$NLSPATH:$MQSI_FILEPATH/nnsy/MIF/messages/%N
export MQSI_CONSOLE_NLSPATH=$MQSI_FILEPATH/messages/En_US


#*****************************************************************
# 3. Automatic Restart Management (ARM) Settings
#*****************************************************************
#
# 3.1 MQSI_USE_ARM specifies whether to use ARM.
#     e.g. MQSI_USE_ARM=YES for ARM enabled.
#          MQSI_USE_ARM=NO  for ARM not enabled.
#
# 3.2 MQSI_ARM_ELEMENTNAME required if ARM enabled.
#
# 3.3 MQSI_ARM_ELEMENTTYPE required if ARM enabled.
#
export MQSI_USE_ARM=NO
export MQSI_ARM_ELEMENTNAME=++COMPONENTNAME++
export MQSI_ARM_ELEMENTTYPE=


#*****************************************************************
# 4. DB2 Settings
#*****************************************************************
#
# 4.1 MQSI_DB2_ALWAYS_PREPARE
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 4.2 MQSI_DB2_CONVERSION specifies the DB2 Converter.
#     e.g. MQSI_DB2_CONVERSION=SINGLE
#                     WBIMB uses a SQL_EBCDIC_SCCSID to determine
#                     the DB2 converter.
#                     Note that this setting reflects the current
#                     WBIMB behavior.
#          MQSI_DB2_CONVERSION=MIXED
#                     WBIMB uses SQL_EBCDIC_MCCSID to determine
#                     the DB2 converter.
#                     Note that this setting requires that DB2 is
#                     configured to accept mixed byte data. This
#                     setting should be used when the customer
#                     wants data to be stored in the configured
#                     DB2 EBCDIC mixed byte code page.
#          MQSI_DB2_CONVERSION=LOCAL
#                     WBIMB uses localConverter identified by
#                     LC_ALL/LANG settings. This complies to what
#                     is done on distributed. This setting
#                     requires that WBIMB and DB2 are using the same
#                     codepage, otherwise only WBIMB can read DB2
#                     data correctly, it gets unreadable for other
#                     ( non-WBIMB ) applications that want to read
```

```
#                     the data.
#
# 4.3 MQSI_DB2_DATABASE needed by the mqsicreatebroker command to
#     determine the DB2 database.
#     e.g. MQSI_DB2_DATABASE=DMQ01BRK
#
# 4.4 MQSI_DB2_STORAGEGROUP needed by the mqsicreatebroker command
#     to determine the DB2 storagegroup.
#     e.g. MQSI_DB2_STORAGEGROUP=MQ01STOR
#
# 4.5 DSNAOINI references the component dsnaoini file.
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
export MQSI_DB2_ALWAYS_PREPARE=NO
export MQSI_DB2_CONVERSION=++DB2CONVERSION++
export MQSI_DB2_DATABASE=++DB2DATABASE++
export MQSI_DB2_STORAGEGROUP=++DB2STORAGEGROUP++
export DSNAOINI=//\'++COMPONENTDATASET++\(BIPDSNAO\)\'

#*********************************************************************
# 5. Java Settings
#*********************************************************************
#
# 5.1 JAVAHOME contains the root directory of the JAVA install.
#     e.g. JAVAHOME=/usr/lpp/java/IBM/J1.4
#     Note that the Java version must be at least 1.4.1
#
export JAVAHOME=++JAVA++


#*********************************************************************
# 6. DistHub Settings
#*********************************************************************
#
# 6.1 DISTHUB_PATH is the path to DistHub product executables
#     (NO NEED TO CHANGE DEFAULT UNLESS USING A NON-STANDARD
#      INSTALLATION PATH FOR DISTHUB!)
#
export DISTHUB_PATH=$MQSI_FILEPATH


#*********************************************************************
# 7. Message Broker with Rules and Formatter Extensions Settings
#*********************************************************************
#
# 7.1 NNSY_ROOT references NNSY executables.
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 7.2 NNSY_CATALOGUES references NNSY catalogues.
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 7.3 NN_CONFIG_FILE_PATH default location of nnsyreg.dat
#     configuration file.
#     Regardless of where NN_CONFIG_FILE_PATH points, the first
#     place that will be checked for the nnsyreg.dat files, is
#     $MQSI_FILEPATH/bin.  Any nnsyreg.dat file in this directory
#     will be used, even if another exists in the location pointed
#     to by the NN_CONFIG_FILE_PATH environment variable. It is
#     recommended that any instances of the nnsyreg.dat in the
#     $MQSI_FILEPATH/bin directory be removed, and placed in
#     environment specific locations, to preserve multi-user
#     capability.
#     e.g. NN_CONFIG_FILE_PATH=/usr/lpp/NNSY/bin
#
# See documentation supplied with Rules and Formatter
# Extensions for further information.
#
```

```
export NNSY_ROOT=$MQSI_FILEPATH/nnsy
export NNSY_CATALOGUES=$MQSI_FILEPATH/nnsy/NNSYCatalogues/en_US
export NN_CONFIG_FILE_PATH=


#*********************************************************************
# 8. WBI Broker Settings
#*********************************************************************
#
# 8.1 _BPX_BATCH_SPAWN
#     (MUST NOT CHANGE FROM DEFAULT!)
#
# 8.2 MQSI_MC_MESSAGES determines if messages should appear in
#     mixed case or upper case.
#     e.g. MQSI_MC_MESSAGES=YES for mixed case
#          MQSI_MC_MESSAGES=NO for upper case
#
# 8.3 MQSI_COMMAND_DATABASE_ECHO if defined, mqsi commands
#     display information when creating DB2 tables/indexes.
#
# 8.4 MQSI_COMMAND_ZOS_MQ_ECHO if defined, mqsi commands display
#     information returned from the MQ command server when
#     creating/deleting queues.
#
# 8.5 MQSI_COMMAND_ZOS_MQ_ECHO_RC if defined, mqsi commands display
#     reason and return codes from the MQ command server when
#     creating/deleting queues.
#
# 8.6 MQSI_DEPLOY_PROGRESS if defined, shows deployment progress
#     by the execution group
#
# 8.7 STEPLIB
#     (MUST NOT CHANGE FROM DEFAULT!)
#
export _BPX_BATCH_SPAWN=NO
export MQSI_MC_MESSAGES=NO
export MQSI_COMMAND_DATABASE_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO_RC=1
export MQSI_DEPLOY_PROGRESS=1
export STEPLIB=CURRENT


#*********************************************************************
# 9. Other Settings
#*********************************************************************
#
# NO NEED TO CHANGE FROM DEFAULT!
#
CP=$MQSI_FILEPATH/classes
CP=$CP:$MQSI_FILEPATH/classes/config.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxy.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxySamples.jar
CP=$CP:$MQSI_FILEPATH/classes/configutil.jar
CP=$CP:$JAVAHOME/lib
CP=$CP:$MQSI_FILEPATH/messages
export CLASSPATH=$CP
export ICU_DATA=$MQSI_FILEPATH/nnsy/lib
XMLTOOLKIT=++XMLTOOLKIT++
LP=$MQSI_FILEPATH/lib/wbirf
LP=$LP:$MQSI_FILEPATH/lib/wbimb
LP=$LP:$MQSI_FILEPATH/lib/wbieb
LP=$LP:$MQSI_FILEPATH/lib
LP=$LP:$MQSI_FILEPATH/nnsy/lib
LP=$LP:$MQSI_FILEPATH/nnsy/MIF/lib
LP=$LP:$JAVAHOME/lib
LP=$LP:$JAVAHOME/bin
```

```
LP=$LP:$JAVAHOME/bin/classic
LP=$LP:$XMLTOOLKIT/lib
export LIBPATH=$LP
export PATH=$MQSI_FILEPATH/bin
export PATH=$PATH:$MQSI_FILEPATH/nnsy/bin
export PATH=$PATH:/bin
export PATH=$PATH:$JAVAHOME/bin
```

Note that the NNSY values apply only if you are using the Rules and Formatter Extension. You should read the documentation supplied with this feature for further information.

Sample BIPBRKP file

```
//*********************************************************************
//*                                                                   *
//* @START_COPYRIGHT@                                                 *
//*                                                                   *
//* Licensed Materials - Property of IBM;                             *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                            *
//* All Rights Reserved;                                              *
//* US Government Users Restricted Rights - use,                      *
//* duplication or disclosure restricted by GSA                       *
//* ADP Schedule Contract with IBM Corp.;                             *
//* See Copyright Instructions                                        *
//*                                                                   *
//* @END_COPYRIGHT@                                                   *
//*                                                                   *
//*********************************************************************
//*              IBM WebSphere Event/Message Brokers                  *
//*                                                                   *
//* Sample job to start a broker.                                     *
//*                                                                   *
//*********************************************************************
//* MORE INFORMATION - See:                                           *
//*                                                                   *
//*    WebSphere Event/Message Brokers Information Centre.            *
//*                                                                   *
//*********************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                   *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi'
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
//*                      e.g. 'MQ01'
//*
//*    Replace   ++COMPONENTDIRECTORY++
//*                      Broker directory.
//*                      e.g. '/mqsi/brokers/MQ01BRK'
//*
//*    Replace   ++STARTEDTASKNAME++
//*                      Started Task Name (max 8 chars uppercase).
//*                      e.g. 'MQ01BRK'
//*
//*    Replace   ++COMPONENTDATASET++
//*                      Broker dataset.
//*                      e.g. 'BIP.BROKER.MQ01BRK'
//*
```

```
//*    Replace   ++DB2HLQ++
//*                      DB2 high-level-qualifier.
//*                      e.g. 'SYS2.DB2.V710'
//*
//*    Replace   ++DB2RUNLIB++
//*                      DB2.
//*                      e.g. 'DSN710PK.RUNLIB.LOAD'
//*
//*    Replace   ++WMQHLQ++
//*                      WebSphere MQ high-level-qualifier.
//*                      e.g. 'MQM.V531'
//*
//*    Replace   ++WMBHLQ++
//*                      WebSphere Message Broker
//*                      high-level-qualifier.
//*
//*                      ONLY NEEDED IF USING EVENT NOTIFICATION
//*
//*                      e.g. 'MB.V6R0M0'
//*
//*********************************************************************
//*
//* Following variables are changed when starting a DataFlowEngine:
//*     Semaphore ID
//*       SE=<Semaphore ID=""> (default is '')
//*     Shared Memory Segment ID
//*       SH=<Shared Memory=""> (default is '')
//*     Component Unique Name
//*       COMPK='' (default is ++STARTEDTASKNAME++)
//*     Start Parameter
//*       STRTP='' (default is 'AUTO')
//*
//*********************************************************************
//*
//++STARTEDTASKNAME++ PROC INSTP='++INSTALL++',
//         MAINP='bipimain',
//         SRVMP='bipservice',
//         COMPK='++STARTEDTASKNAME++',
//         COMDS='++COMPONENTDATASET++',
//         STRTP='AUTO',
//*        COMPDIR='++COMPONENTDIRECTORY++',
//         SE='',
//         SH='',
//         HOME='++HOME++',
//         DB2HLQ='++DB2HLQ++',
//         WMQHLQ='++WMQHLQ++',
//         DUMPDS=&SYSUID..BROKER.D&LYYMMDD..T&LHHMMSS..DUMP
//*
//*********************************************************************
//* Copy ENVFILE to SYSOUT
//*********************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='&HOME./ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*********************************************************************
//* Copy DSNAOINI to SYSOUT
//*********************************************************************
//*
//COPYDSN  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(DSNAOINI)'
//SYSTSPRT DD DUMMY
```

```
//BIPFROM  DD DISP=SHR,DSN=&COMDS.(BIPDSNAO)
//DSNAOINI DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*****************************************************************
//* Test to see if starting a DataFlowEngine address space.
//* Should return RC=0 if starting a Control address space or
//* UserNameServer address space, RC=12 if starting a DataFlowEngine
//* address space.
//*****************************************************************
//*
//CHECKDFE EXEC PGM=IKJEFT01,
//         PARM='LISTDS ''&COMDS.&SE.'''
//SYSTSIN  DD DUMMY
//SYSTSPRT DD DUMMY
//SYSMDUMP DD SYSOUT=*
//*
//         IF (RC=0) THEN
//*
//*****************************************************************
//* Broker DB2 and MQ verification
//*****************************************************************
//*
//VFYDB2MQ EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/bipcvp b ++QUEUEMANAGER++'
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&DB2HLQ..SDSNEXIT
//         DD DISP=SHR,DSN=&DB2HLQ..SDSNLOAD
//         DD DISP=SHR,DSN=&DB2HLQ..SDSNLOD2
//         DD DISP=SHR,DSN=++DB2RUNLIB++
//*        MQSeries Runtime Libraries
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSMDUMP DD SYSOUT=*
//*
//         ENDIF
//*
//*****************************************************************
//* Check RCs from previous steps
//*****************************************************************
//*
//         IF (CHECKDFE.RC NE 0) OR
//            (VFYDB2MQ.RC EQ 0) THEN
//*
//*****************************************************************
//* Step to delete residual locks
//* (this is only needed if the broker is ARM enabled)
//*****************************************************************
//*
//*RMLOCKS  EXEC PGM=BPXBATCH,REGION=0M,TIME=NOLIMIT,
//*         PARM='SH rm -f &COMPDIR./common/locks/*'
//*
//*****************************************************************
//* Start either :
//* Control Address Space (bipimain, bipservice and bipbroker)
//* DataFlowEngine Address Space (bipimain and DataFlowEngine)
//*****************************************************************
//*
//BROKER   EXEC PGM=BPXBATA8,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/&MAINP. &SRVMP. &SE. &SH. &COMPK.
//             &STRTP.'
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&DB2HLQ..SDSNEXIT
```

```
//         DD DISP=SHR,DSN=&DB2HLQ..SDSNLOAD
//         DD DISP=SHR,DSN=&DB2HLQ..SDSNLOD2
//         DD DISP=SHR,DSN=++DB2RUNLIB++
//*        MQSeries Runtime Libraries
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//*        APF Authorized Library of Message Broker
//*        Required if using Event Notification
//*        (All librarys in concatenation
//*         need to be APF authorized)
//*        DD DISP=SHR,DSN=++WMBHLQ++.SBIPAUTH
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSMDUMP DD DSNAME=&DUMPDS,
//  UNIT=SYSDA,
//  SPACE=(CYL,(800,250)),
//  DCB=(LRECL=4160,BLKSIZE=24960,RECFM=FBS),
//  DISP=(NEW,KEEP,CATLG)
//*
//*
//*********************************************************************
//* Clean up Dump file for normal termination
//*********************************************************************
//*
//         IF (BROKER.RC EQ 0) THEN
//DUMPCLN  EXEC PGM=IEFBR14
//INFILE   DD DSNAME=&DUMPDS,
//         DISP=(OLD,DELETE)
//         ENDIF
//         ENDIF
//*
//*--------------------------------------------------------------------
//         PEND
//*--------------------------------------------------------------------
//*
//
```

Sample BIPCBRK file

```
//BIPCRBK JOB
//*********************************************************************
//*                                                                   *
//* @START_COPYRIGHT@                                                *
//*                                                                   *
//* Licensed Materials - Property of IBM;                             *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                            *
//* All Rights Reserved;                                              *
//* US Government Users Restricted Rights - use,                      *
//* duplication or disclosure restricted by GSA                       *
//* ADP Schedule Contract with IBM Corp.;                             *
//* See Copyright Instructions                                        *
//*                                                                   *
//* @END_COPYRIGHT@                                                  *
//*                                                                   *
//*********************************************************************
//*              IBM WebSphere Event/Message Brokers                  *
//*                                                                   *
//* Sample job to create a broker (mqsicreatebroker).                 *
//*                                                                   *
//*********************************************************************
//* MORE INFORMATION - See:                                           *
//*                                                                   *
//*    WebSphere Event/Message Brokers Information Centre.            *
//* Topic "an07080"                                                   *
//*                                                                   *
//*********************************************************************
```

```
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                   *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi'
//*
//*    Replace   ++COMPONENTNAME++
//*                      Broker name.
//*                      e.g. 'MQ01BRK'
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
//*                      e.g. 'MQ01'
//*
//*    Replace   ++DB2TABLEOWNER++
//*                      DB2 table owner userid.
//*                      e.g. 'MQ01BRK'
//*
//*    Replace   ++DB2LOCATION++
//*                      DB2 location.
//*                      e.g. 'DSN710PK'
//*
//*    Replace   ++OPTIONS++
//*                      Options for mqsicreatebroker command.
//*                      e.g. '-1'
//*
//*                      z/OS specific options are
//*                          -1 Registry pass only
//*                             This creates the broker directory.
//*                          -2 MQ pass only
//*                             This creates the broker MQ queues.
//*                          -3 DB2 pass only
//*                             This creates the broker tables/indexes.
//*
//*                      Please see documentation for other options.
//*
//*    Replace   ++DB2HLQ++
//*                      DB2 high-level-qualifier.
//*                      e.g. 'SYS2.DB2.V710'
//*
//*    Replace   ++WMQHLQ++
//*                      WebSphere MQ high-level-qualifier.
//*                      e.g. 'MQM.V531'
//*
//*******************************************************************
//*
//*******************************************************************
//* Copy ENVFILE to SYSOUT
//*******************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*******************************************************************
//* Run mqsicreatebroker command
//*******************************************************************
```

```
//*
//BIPCRBK  EXEC PGM=IKJEFT01,REGION=0M
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++DB2HLQ++.SDSNEXIT
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOAD
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOD2
//*        MQSeries Runtime Libraries
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQANLE
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQAUTH
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQLOAD
//STDENV   DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
BPXBATSL PGM -
  ++INSTALL++/bin/-
mqsicreatebroker -
  ++COMPONENTNAME++ -
  -q ++QUEUEMANAGER++ -
  -u ++DB2TABLEOWNER++ -
  -n ++DB2LOCATION++ -
  ++OPTIONS++
/*
//
```

Sample BIPCMGRP file

```
//*******************************************************************
//*                                                                 *
//* @START_COPYRIGHT@                                              *
//*                                                                 *
//* Licensed Materials - Property of IBM;                          *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                         *
//* All Rights Reserved;                                           *
//* US Government Users Restricted Rights - use,                   *
//* duplication or disclosure restricted by GSA                    *
//* ADP Schedule Contract with IBM Corp.;                          *
//* See Copyright Instructions                                     *
//*                                                                 *
//* @END_COPYRIGHT@                                                *
//*                                                                 *
//*******************************************************************
//*              IBM WebSphere Event/Message Brokers                *
//*                                                                 *
//* Sample job to start a configmgr.                               *
//*                                                                 *
//*******************************************************************
//* MORE INFORMATION - See:                                        *
//*                                                                 *
//*    WebSphere Event/Message Brokers Information Centre.         *
//*                                                                 *
//*******************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                 *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi'
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
```

```
//*                     e.g. 'MQ01'
//*
//*    Replace   ++COMPONENTDIRECTORY++
//*                     ConfigMgr directory.
//*                     e.g. '/mqsi/configmgr/MQ01BRK'
//*
//*    Replace   ++STARTEDTASKNAME++
//*                     Started Task Name (max 8 chars uppercase).
//*                     e.g. 'MQ01CMGR'
//*
//*    Replace   ++WMQHLQ++
//*                     WebSphere MQ high-level-qualifier.
//*                     e.g. 'MQM.V531'
//*
//*********************************************************************
//*
//++STARTEDTASKNAME++ PROC INSTP='++INSTALL++',
//         MAINP='bipimain',
//         SRVMP='bipservice',
//         COMPK='++STARTEDTASKNAME++',
//         STRTP='AUTO',
//*        COMPDIR='++COMPONENTDIRECTORY++',
//         HOME='++HOME++',
//         WMQHLQ='++WMQHLQ++',
//         DUMPDS=&SYSUID..CMGR.D&LYYMMDD..T&LHHMMSS..DUMP
//*
//*********************************************************************
//* Copy ENVFILE to SYSOUT
//*********************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='&HOME./ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*********************************************************************
//* ConfigMgr MQ verification
//*********************************************************************
//*
//VFYMQ    EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/bipcvp c ++QUEUEMANAGER++'
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSMDUMP DD SYSOUT=*
//*
//*********************************************************************
//* Check RC from previous steps
//*********************************************************************
//*
//         IF (RC=0) THEN
//*
//*********************************************************************
//* Step to delete residual locks
//* (this is only needed if the configmgr is ARM enabled)
//*********************************************************************
//*
//*RMLOCKS  EXEC PGM=BPXBATCH,REGION=0M,TIME=NOLIMIT,
//*         PARM='SH rm -f &COMPDIR./common/locks/*'
//*
```

```
//*************************************************************
//* Start :
//* ConfigMgr Address Space (bipimain, bipservice and bipconfigmgr)
//*************************************************************
//*
//CMGR     EXEC PGM=BPXBATA8,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/&MAINP. &SRVMP. &COMPK. &STRTP.'
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSMDUMP DD DSNAME=&DUMPDS,
//  UNIT=SYSDA,
//  SPACE=(CYL,(800,250)),
//  DCB=(LRECL=4160,BLKSIZE=24960,RECFM=FBS),
//  DISP=(NEW,KEEP,CATLG)
//*
//*
//*************************************************************
//* Clean up Dump file for normal termination
//*************************************************************
//*
//         IF (CMGR.RC EQ 0) THEN
//DUMPCLN  EXEC PGM=IEFBR14
//INFILE   DD DSNAME=&DUMPDS,
//         DISP=(OLD,DELETE)
//         ENDIF
//         ENDIF
//*
//*-------------------------------------------------------------
//         PEND
//*-------------------------------------------------------------
//*
//
```

Sample BIPCPROF file

```
#*************************************************************
#*                                                           *
#* @START_COPYRIGHT@                                        *
#*                                                           *
#* Licensed Materials - Property of IBM;                     *
#* 5655-G97 (c) Copyright IBM Corp. 2004;                    *
#* All Rights Reserved;                                      *
#* US Government Users Restricted Rights - use,              *
#* duplication or disclosure restricted by GSA               *
#* ADP Schedule Contract with IBM Corp.;                     *
#* See Copyright Instructions                                *
#*                                                           *
#* @END_COPYRIGHT@                                          *
#*                                                           *
#*************************************************************
#*              IBM WebSphere Event/Message Brokers          *
#*                                                           *
#* Sample profile for a configmgr.                           *
#*                                                           *
#*************************************************************
#* MORE INFORMATION - See:                                   *
#*                                                           *
#*    WebSphere Event/Message Brokers Information Centre.    *
#*                                                           *
#* IMPORTANT:                                                *
#*                                                           *
#*     You must submit BIPGEN each time you update this profile!  *
#*                                                           *
```

```
#*******************************************************************
#* CUSTOMIZE HERE FOR YOUR INSTALLATION
#* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
#*                                                                 *
#*    Replace   ++INSTALL++
#*                      WBI Brokers installation directory.
#*                      e.g. '/usr/lpp/mqsi'
#*
#*    Replace   ++COMPONENTDIRECTORY++
#*                      Configmgr directory.
#*                      e.g. '/mqsi/configmgr/MQ01CMGR'
#*
#*    Replace   ++COMPONENTNAME++
#*                      ConfigMgr Name.
#*                      e.g. 'MQ01CMGR'
#*
#*    Replace   ++LOCALE++
#*                      Locale.
#*                      e.g. 'C'
#*
#*    Replace   ++TIMEZONE++
#*                      Time zone.
#*                      e.g. 'GMT0BST'
#*
#*    Replace   ++JAVA++
#*                      Java location.
#*                      e.g. '/usr/lpp/java/IBM/J1.4'
#*
#*    Replace   ++XMLTOOLKIT++
#*                      IBM XML Toolkit location.
#*                      e.g. '/usr/lpp/ixm/IBM/xml4c-5_5'
#*
#*    Replace   ++MQPATH++
#*                      MQ location.
#*                      e.g. '/usr/lpp/mqm'
#*
#*******************************************************************
# 1. Component Settings
#*******************************************************************
#
# 1.1 MQSI_REGISTRY references the component path. Also needed by
#     commands.
#     e.g. MQSI_REGISTRY=/mqsi/configmgr/MQ01CMGR
#
# 1.2 MQSI_COMPONENT_NAME is set to the ConfigMgr name.
#     e.g. MQSI_COMPONENT_NAME=MQ01CMGR
#
# 1.3 MQSI_FILEPATH needed by commands to reference the component
#     version install path.
#     e.g. MQSI_FILEPATH=usr/lpp/mqsi/V6R0M0
#
export MQSI_REGISTRY=++COMPONENTDIRECTORY++
export MQSI_COMPONENT_NAME=++COMPONENTNAME++
export MQSI_FILEPATH=++INSTALL++


#*******************************************************************
# 2. NLS Settings
#*******************************************************************
#
# 2.1 LANG and LC_ALL determine in which locale the component
#     will run.
#     e.g. LANG=Ja_JP.IBM-939 and LC_ALL=Ja_JP.IBM-939 for
#          japanese locale.
#          LANG=C, LC_ALL=C for US English locale.
#
# 2.2 TZ has the timezone setting in which you are located.
```

```
#     e.g. TZ=EST5                    for USA Eastern Standard Time
#          TZ=MEZ-1MES,M3.5.0,M10.5.0 for Central Europe
#          TZ=GMT0BST                 for the UK
#          Please refer to the IBM Manual
#          "Unix System Services Command Reference SC28-1892.
#
# 2.3 NLSPATH contains the location of the message catalog(s).
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 2.4 MQSI_CONSOLE_NLSPATH is used to locate the messages for
#     the console.
#     For Japanese or S-Chinese messages, change En_US to
#     Ja_JP or Zh_CN below. For English messages these can be
#     displayed in mixed or upper case only. (see MC_MESSAGES)
#     Note that MQSI_CONSOLE_NLSPATH does not use %L or %N
#
export LANG=++LOCALE++
export LC_ALL=++LOCALE++
export TZ=++TIMEZONE++
export NLSPATH=$MQSI_FILEPATH/messages/%L/%N
export MQSI_CONSOLE_NLSPATH=$MQSI_FILEPATH/messages/En_US


#*********************************************************************
# 3. Automatic Restart Management (ARM) Settings
#*********************************************************************
#
# 3.1 MQSI_USE_ARM specifies whether to use ARM.
#     e.g. MQSI_USE_ARM=YES for ARM enabled.
#          MQSI_USE_ARM=NO  for ARM not enabled.
#
# 3.2 MQSI_ARM_ELEMENTNAME required if ARM enabled.
#
# 3.3 MQSI_ARM_ELEMENTTYPE required if ARM enabled.
#
export MQSI_USE_ARM=NO
export MQSI_ARM_ELEMENTNAME=++COMPONENTNAME++
export MQSI_ARM_ELEMENTTYPE=


#*********************************************************************
# 4. Java Settings
#*********************************************************************
#
# 4.1 JAVAHOME contains the root directory of the JAVA install.
#     e.g. JAVAHOME=/usr/lpp/java/IBM/J1.4
#     Note that the Java version must be at least 1.4.1
#
export JAVAHOME=++JAVA++


#*********************************************************************
# 5. WBI Configmgr Settings
#*********************************************************************
#
# 5.1 _BPX_BATCH_SPAWN
#     (MUST NOT CHANGE FROM DEFAULT!)
#
# 5.2 MQSI_MC_MESSAGES determines if messages should appear in
#     mixed case or upper case.
#     e.g. MQSI_MC_MESSAGES=YES for mixed case
#          MQSI_MC_MESSAGES=NO for upper case
#
# 5.3 MQSI_COMMAND_DATABASE_ECHO if defined, mqsi commands
#     display information when creating DB2 tables/indexes.
#
# 5.4 MQSI_COMMAND_ZOS_MQ_ECHO if defined, mqsi commands display
```

```
#     information returned from the MQ command server when
#     creating/deleting queues.
#
# 5.5 MQSI_COMMAND_ZOS_MQ_ECHO_RC if defined, mqsi commands display
#     reason and return codes from the MQ command server when
#     creating/deleting queues.
#
# 5.6 STEPLIB
#     (MUST NOT CHANGE FROM DEFAULT!)
#
export _BPX_BATCH_SPAWN=NO
export MQSI_MC_MESSAGES=NO
export MQSI_COMMAND_DATABASE_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO_RC=1
export STEPLIB=CURRENT


#*****************************************************************
# 6. Other Settings
#*****************************************************************
#
# NO NEED TO CHANGE FROM DEFAULT!
#
CP=++MQPATH++/java/lib/com.ibm.mq.jar
CP=$CP:++MQPATH++/java/lib/connector.jar
CP=$CP:$MQSI_FILEPATH/classes
CP=$CP:$JAVAHOME/lib
CP=$CP:$MQSI_FILEPATH/classes/config.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxy.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxySamples.jar
CP=$CP:$MQSI_FILEPATH/classes/configutil.jar
CP=$CP:$MQSI_FILEPATH/messages
export CLASSPATH=$CP
XMLTOOLKIT=++XMLTOOLKIT++
LP=++MQPATH++/java/lib
LP=$LP:$MQSI_FILEPATH/lib/wbirf
LP=$LP:$MQSI_FILEPATH/lib/wbimb
LP=$LP:$MQSI_FILEPATH/lib/wbieb
LP=$LP:$MQSI_FILEPATH/lib
LP=$LP:$JAVAHOME/lib
LP=$LP:$JAVAHOME/bin
LP=$LP:$JAVAHOME/bin/classic
LP=$LP:$XMLTOOLKIT/lib
export LIBPATH=$LP
export PATH=$MQSI_FILEPATH/bin
export PATH=$PATH:$JAVAHOME/bin
```

Sample BIPCRCM file

```
//BIPCRCM JOB
//*****************************************************************
//*                                                               *
//* @START_COPYRIGHT@                                            *
//*                                                               *
//* Licensed Materials - Property of IBM;                         *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                        *
//* All Rights Reserved;                                          *
//* US Government Users Restricted Rights - use,                  *
//* duplication or disclosure restricted by GSA                   *
//* ADP Schedule Contract with IBM Corp.;                         *
//* See Copyright Instructions                                    *
//*                                                               *
//* @END_COPYRIGHT@                                              *
//*                                                               *
//*****************************************************************
//*              IBM WebSphere Event/Message Brokers              *
//*                                                               *
```

```
//* Sample job to create a configmgr (mqsicreateconfigmgr).        *
//*                                                                *
//******************************************************************
//* MORE INFORMATION - See:                                        *
//*                                                                *
//*    WebSphere Event/Message Brokers Information Centre.         *
//* Topic "an23000"                                                *
//*                                                                *
//******************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi'
//*
//*    Replace   ++COMPONENTNAME++
//*                      ConfigMgr Name.
//*                      e.g. 'MQ01CMGR'
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
//*                      e.g. 'MQ01'
//*
//*    Replace   ++OPTIONS++
//*                      Options for mqsicreateconfigmgr command.
//*                      e.g. '-1'
//*
//*                      z/OS specific options are
//*                          -1 Registry pass only
//*                             This creates the configmgr directory.
//*                          -2 MQ pass only
//*                             This creates the configmgr MQ queues.
//*
//*                      Please see documentation for other options.
//*
//*    Replace   ++WMQHLQ++
//*                      WebSphere MQ high-level-qualifier.
//*                      e.g. 'MQM.V531'
//*
//******************************************************************
//*
//******************************************************************
//* Copy ENVFILE to SYSOUT
//******************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//******************************************************************
//* Run mqsicreateconfigmgr command
//******************************************************************
//*
//BIPCRCM  EXEC PGM=IKJEFT01,REGION=0M
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++WMQHLQ++.SCSQANLE
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQAUTH
```

```
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQLOAD
//STDENV   DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
BPXBATSL PGM -
  ++INSTALL++/bin/-
mqsicreateconfigmgr -
  ++COMPONENTNAME++ -
  -q ++QUEUEMANAGER++ -
  ++OPTIONS++
/*
//
```

Sample BIPCRDB file

```
//BIPCRDB JOB
//*******************************************************************
//*                                                                 *
//* @START_COPYRIGHT@                                              *
//*                                                                 *
//* Licensed Materials - Property of IBM;                          *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                         *
//* All Rights Reserved;                                           *
//* US Government Users Restricted Rights - use,                   *
//* duplication or disclosure restricted by GSA                    *
//* ADP Schedule Contract with IBM Corp.;                          *
//* See Copyright Instructions                                     *
//*                                                                 *
//* @END_COPYRIGHT@                                                *
//*                                                                 *
//*******************************************************************
//*              IBM WebSphere Event/Message Brokers                *
//*                                                                 *
//* Create broker storagegroup / database and tablespaces.         *
//*                                                                 *
//*******************************************************************
//* MORE INFORMATION - See:                                        *
//*                                                                 *
//*    WebSphere Event/Message Brokers Information Centre.         *
//*                                                                 *
//*                                                                 *
//*******************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                 *
//*    Replace   ++DB2HLQ++
//*                      DB2 high-level-qualifier.
//*                      e.g. 'SYS2.DB2.V710'
//*
//*    Replace   ++DB2RUNLIB++
//*                      DB2.
//*                      e.g. 'DSN710PK.RUNLIB.LOAD'
//*
//*    Replace   ++DB2SUBSYSTEM++
//*                      DB2 SSID.
//*                      e.g. 'DFK4'
//*
//*    Replace   ++DB2LOCATION++
//*                      DB2 location.
//*                      e.g. 'DSN710PK'
//*
//*    Replace   ++DB2CURRENTSQLID++
//*                      SET CURRENT SQLID user ID.
//*                      e.g. 'MQ01GRP'
//*
```

```
//*    Replace   ++DB2DATABASE++
//*                      DB2 database.
//*                      e.g. 'DMQ01BRK'
//*
//*    Replace   ++DB2STORAGEGROUP++
//*                      DB2 storagegroup.
//*                      e.g. 'MQ01STOR'
//*
//*    Replace   ++DB2BUFFERPOOL++
//*                      DB2 base table bufferpool.
//*                      e.g. 'BP0'
//*
//*    Replace   ++DB2INDEXBP++
//*                      DB2 index bufferpool.
//*                      e.g. 'BP0'
//*
//*    Replace   ++DB2LOBBP++
//*                      DB2 LOB table bufferpool.
//*                      e.g. 'BP0'
//*
//*    Replace   ++DB2SAMPLEPROGRAM++
//*                      DB2 sample program name.
//*                      e.g. 'DSNTEP2'
//*
//*    Replace   ++DB2SAMPLEPROGRAMPLAN++
//*                      DB2 sample program plan name.
//*                      e.g. 'DSNTEP71'
//*
//*********************************************************************
//*
//*********************************************************************
//* Create broker storagegroup
//*********************************************************************
//*
//STORGRP  EXEC PGM=IKJEFT01,REGION=0M
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++DB2HLQ++.SDSNEXIT
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOAD
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOD2
//         DD DISP=SHR,DSN=++DB2RUNLIB++
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
DSN SYSTEM(++DB2SUBSYSTEM++)
   RUN -
     PROGRAM(++DB2SAMPLEPROGRAM++) -
     PLAN(++DB2SAMPLEPROGRAMPLAN++)
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN    DD *
  SET CURRENT SQLID='++DB2CURRENTSQLID++';
  CREATE STOGROUP ++DB2STORAGEGROUP++
     VOLUMES('*')
     VCAT ++DB2LOCATION++;
/*
//*
//*********************************************************************
//* Create broker database
//*********************************************************************
//*
//DATABASE EXEC PGM=IKJEFT01,REGION=0M
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++DB2HLQ++.SDSNEXIT
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOAD
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOD2
//         DD DISP=SHR,DSN=++DB2RUNLIB++
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
```

```
DSN SYSTEM(++DB2SUBSYSTEM++)
   RUN -
     PROGRAM(++DB2SAMPLEPROGRAM++) -
     PLAN(++DB2SAMPLEPROGRAMPLAN++)
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN    DD *
  SET CURRENT SQLID='++DB2CURRENTSQLID++';
  CREATE DATABASE ++DB2DATABASE++
     STOGROUP ++DB2STORAGEGROUP++
     INDEXBP  ++DB2INDEXBP++;
/*
//*
//*******************************************************************
//* Create broker tablespaces
//*******************************************************************
//*
//TABLESPC EXEC PGM=IKJEFT01,REGION=0M
//*        DB2 Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++DB2HLQ++.SDSNEXIT
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOAD
//         DD DISP=SHR,DSN=++DB2HLQ++.SDSNLOD2
//         DD DISP=SHR,DSN=++DB2RUNLIB++
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
DSN SYSTEM(++DB2SUBSYSTEM++)
   RUN -
     PROGRAM(++DB2SAMPLEPROGRAM++) -
     PLAN(++DB2SAMPLEPROGRAMPLAN++)
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN    DD *
  SET CURRENT SQLID='++DB2CURRENTSQLID++';
  CREATE TABLESPACE BSUBSCRI
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY     7200
          SECQTY      720
    ERASE NO
    FREEPAGE     5
    PCTFREE     20
    SEGSIZE     32
    BUFFERPOOL ++DB2BUFFERPOOL++
    LOCKSIZE ROW
    CLOSE NO;

  CREATE TABLESPACE BPUBLISH
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY     7200
          SECQTY      720
    ERASE NO
    FREEPAGE     5
    PCTFREE     20
    SEGSIZE     32
    BUFFERPOOL ++DB2BUFFERPOOL++
    LOCKSIZE ANY
    CLOSE NO;

  CREATE TABLESPACE BCLIENTU
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY     7200
          SECQTY      720
    ERASE NO
    FREEPAGE     5
    PCTFREE     20
```

```
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BUSERCON
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BTOPOLOG
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BNBRCONN
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRETAINE
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ROW
  CLOSE NO;

CREATE TABLESPACE BACLENTR
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
```

```
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BMQPSTOP
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BUSERNAM
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BGROUPNA
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BUSERMEM
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BROKERAA
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;
```

```
CREATE TABLESPACE BROKERAE
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BROKERRE
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRMINFO
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRMRTDIN
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRMRTDDE
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRMWFDIN
```

```
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BRMPHYSI
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE TABLESPACE BAGGREGA
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ROW
  CLOSE NO;

CREATE TABLESPACE BMULTICA
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY     7200
        SECQTY      720
  ERASE NO
  FREEPAGE     5
  PCTFREE     20
  SEGSIZE     32
  BUFFERPOOL ++DB2BUFFERPOOL++
  LOCKSIZE ANY
  CLOSE NO;

CREATE LOB TABLESPACE BSUBLOB1
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BSUBLOB2
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;
```

```
CREATE LOB TABLESPACE BSUBLOB3
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BPUBLLOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BCLIELOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BRETLOB1
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BRETLOB2
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BACLELOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BMQPSLOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BMULTLOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
        PRIQTY    72000
        SECQTY     7200
  BUFFERPOOL ++DB2LOBBP++
  LOCKSIZE   LOB;

CREATE LOB TABLESPACE BROKALOB
  IN ++DB2DATABASE++
  USING STOGROUP ++DB2STORAGEGROUP++
```

```
          PRIQTY    72000
          SECQTY     7200
    BUFFERPOOL ++DB2LOBBP++
    LOCKSIZE   LOB;

  CREATE LOB TABLESPACE BROKRLOB
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY    72000
          SECQTY     7200
    BUFFERPOOL ++DB2LOBBP++
    LOCKSIZE   LOB;

  CREATE LOB TABLESPACE BRMRTLOB
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY    72000
          SECQTY     7200
    BUFFERPOOL ++DB2LOBBP++
    LOCKSIZE   LOB;

  CREATE LOB TABLESPACE BRMPHLOB
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
          PRIQTY    72000
          SECQTY     7200
    BUFFERPOOL ++DB2LOBBP++
    LOCKSIZE   LOB;

  CREATE LOB TABLESPACE BAGGRLOB
    IN ++DB2DATABASE++
    USING STOGROUP ++DB2STORAGEGROUP++
           PRIQTY    72000
           SECQTY     7200
    BUFFERPOOL ++DB2LOBBP++
    LOCKSIZE   LOB;
/*
//
```

Sample BIPCRUN file

```
//BIPCRUN JOB
//*******************************************************************
//*                                                                 *
//* @START_COPYRIGHT@                                              *
//*                                                                 *
//* Licensed Materials - Property of IBM;                          *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                         *
//* All Rights Reserved;                                           *
//* US Government Users Restricted Rights - use,                   *
//* duplication or disclosure restricted by GSA                    *
//* ADP Schedule Contract with IBM Corp.;                          *
//* See Copyright Instructions                                     *
//*                                                                *
//* @END_COPYRIGHT@                                                *
//*                                                                *
//*******************************************************************
//*              IBM WebSphere Event/Message Brokers               *
//*                                                                *
//* Sample job to create a usernameserver                          *
//*                                    (mqsicreateusernameserver). *
//*                                                                *
//*******************************************************************
//* MORE INFORMATION - See:                                        *
//*                                                                *
//*    WebSphere Event/Message Brokers Information Centre.         *
//* Topic "an07200"                                                *
//*                                                                *
```

```
//*************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                           *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi '
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
//*                      e.g. 'MQ01'
//*
//*    Replace   ++OPTIONS++
//*                      Options for mqsicreateusernameserver.
//*                      e.g. '-1'
//*
//*                      z/OS specific options are
//*                          -1 Registry pass only
//*                             This creates the uns directory.
//*                          -2 MQ pass only
//*                             This creates the uns MQ queues.
//*
//*                      Please see documentation for other options.
//*
//*    Replace   ++WMQHLQ++
//*                      WebSphere MQ high-level-qualifier.
//*                      e.g. 'MQM.V531'
//*
//*************************************************************
//*
//*************************************************************
//* Copy ENVFILE to SYSOUT
//*************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*************************************************************
//* Run mqsicreateusernameserver command
//*************************************************************
//*
//BIPCRUN  EXEC PGM=IKJEFT01,REGION=0M
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=++WMQHLQ++.SCSQANLE
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQAUTH
//         DD DISP=SHR,DSN=++WMQHLQ++.SCSQLOAD
//STDENV   DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
BPXBATSL PGM -
  ++INSTALL++/bin/-
mqsicreateusernameserver -
```

```
  -q ++QUEUEMANAGER++ -
  ++OPTIONS++
/*
//
```

Sample BIPDSNAO file

```
;*********************************************************************
;*                                                                   *
;* @START_COPYRIGHT@                                                *
;*                                                                   *
;* Licensed Materials - Property of IBM;                             *
;* 5655-G97 (c) Copyright IBM Corp. 2004;                            *
;* All Rights Reserved;                                              *
;* US Government Users Restricted Rights - use,                      *
;* duplication or disclosure restricted by GSA                       *
;* ADP Schedule Contract with IBM Corp.;                             *
;* See Copyright Instructions                                        *
;*                                                                   *
;* @END_COPYRIGHT@                                                  *
;*                                                                   *
;*********************************************************************
;*              IBM WebSphere Event/Message Brokers                  *
;*                                                                   *
;* Sample dsnaoini for a broker, usernamerserver or configmgr.       *
;*                                                                   *
;*********************************************************************
;* MORE INFORMATION - See:                                           *
;*                                                                   *
;*    WebSphere Event/Message Brokers Information Centre.            *
;*                                                                   *
;*********************************************************************
;* CUSTOMIZE HERE FOR YOUR INSTALLATION
;* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
;*                                                                   *
;*    Replace   ++COMPONENTDIRECTORY++
;*                      Component directory.
;*                      e.g. '/mqsi/brokers/MQ01BRK'
;*
;*    Replace   ++DB2SUBSYSTEM++
;*                      DB2 SSID.
;*                      e.g. 'DFK4'
;*
;*    Replace   ++DB2LOCATION++
;*                      DB2 location.
;*                      e.g. 'DSN810PK'
;*
;*    Replace   ++DB2CURRENTSQLID++
;*                      CURRENT SQLID user ID.
;*                      e.g. 'MQ01GRP'
;*
;*    Replace   ++DB2DSNACLIPLAN++
;*                      DB2 plan name for dsnacli.
;*                      e.g. 'DSNACLI'
;*
;*********************************************************************
[COMMON]
APPLTRACE=0
APPLTRACEfilename=++COMPONENTDIRECTORY++/output/traceodbc
CONNECTTYPE=2
DIAGTRACE=0
DIAGTRACE_NO_WRAP=0
MAXCONN=0
MULTICONTEXT=0
MVSDEFAULTSSID=++DB2SUBSYSTEM++

; SUBSYSTEM
[++DB2SUBSYSTEM++]
```

```
MVSATTACHTYPE=RRSAF
PLANNAME=++DB2DSNACLIPLAN++

; DATASOURCES
[++DB2LOCATION++]
CURRENTSQLID=++DB2CURRENTSQLID++
```

Sample BIPEDIT file

```
/* REXX  */
/*********************************************************************/
/*                                                                   */
/*  @START_COPYRIGHT@                                                */
/*                                                                   */
/*  Licensed Materials - Property of IBM;                            */
/*  5655-G97 (c) Copyright IBM Corp. 2004;                           */
/*  All Rights Reserved;                                             */
/*  US Government Users Restricted Rights - use,                     */
/*  duplication or disclosure restricted by GSA                      */
/*  ADP Schedule Contract with IBM Corp.;                            */
/*  See Copyright Instructions                                       */
/*                                                                   */
/*  @END_COPYRIGHT@                                                  */
/*                                                                   */
/*********************************************************************/
/*              IBM WebSphere Event/Message Brokers                  */
/*                                                                   */
/* REXX utility to customize JCL.                                    */
/*                                                                   */
/*********************************************************************/
/* MORE INFORMATION - See:                                           */
/*                                                                   */
/*    WebSphere Event/Message Brokers Information Centre.            */
/*                                                                   */
/*********************************************************************/
/*                                                                   */
/*  This edit macro can be used to assist you in configuring your    */
/*  Broker configuration files.                                      */
/*  1. Edit this file to alter the change commands so the second     */
/*     parameter is the value for your installaton                   */
/*  2. Save the file                                                 */
/*  3. Rename it to a broker related file, for example VCP1EDIT for  */
/*     Broker called VCP1BRK                                         */
/*  4. In TSO or TSO command shell ( often ISPF option 6) execute    */
/*     ALTLIB ACTIVATE APPLICATION(EXEC) DA('WBI.V5.SBIPPROC')       */
/*     where WBI.V5.SBIPPROC is the name of the PDS contaning this   */
/*     macro                                                         */
/*  5. Using the same ISPF session, edit a configuration file        */
/*  6. Type the macro name at the commands line and press enter      */
/*     This will execute the macro.                                  */
/*     If you get Command not found, then check you issued the command */
/*     in 4. in the same ISPF session                                */
/*  7. If the macro has any errors, cancel from the file being edited */
/*     resolve the errors in the macro and retry                     */
/*                                                                   */
/*********************************************************************/
/*   See the product docmentation on the meaning of the fields below=*/
/*********************************************************************/
ISREDIT MACRO NOPROCESS
ADDRESS ISREDIT
/* All components (Broker , Configuration Manager and User Name Server) */
"change ++INSTALL++ install_value                       all"
"change ++COMPONENTDIRECTORY++ compdir_value            all"
"change ++COMPONENTNAME++ MQ01BRK                       all"
"change ++HOME++ /u/mq01brk                             all"
"change ++OPTIONS++ options_value                       all"
"change ++LOCALE++ C                                    all"
"change ++TIMEZONE++ GMT0BST                            all"
```

```
"change ++JAVA++ /usr/lpp/java/IBM/J1.4                  all"
"change ++WMQHLQ++ MQM.V531                              all"
"change ++QUEUEMANAGER++ MQ01                            all"
"change ++COMPONENTDATASET++ componentdataset_value      all"
"change ++STARTEDTASKNAME++ MQ01BRK                      all"
"change ++COMPONENTPROFILE++ componentprofile_value      all"
"change ++XMLTOOLKIT++ /usr/lpp/ixm/IBM/xml4c-5_5        all"
/* Broker only                                                          */
/* (Delete if Configuration Manager or User Name Server)                */
"change ++DB2CONVERSION++ SINGLE                         all"
"change ++DB2SUBSYSTEM++ dbdsubsystem_value              all"
"change ++DB2LOCATION++ db2location_value                all"
"change ++DB2TABLEOWNER++ MQ01GRP                        all"
"change ++DB2CURRENTSQLID++ MQ01GRP                      all"
"change ++DB2DSNACLIPLAN++ dsnacli_value                 all"
"change ++DB2HLQ++ SYS2.DB2.V710                         all"
"change ++DB2RUNLIB++ runlib_value                       all"
"change ++DB2SAMPLEPROGRAM++ sampleprogram_value         all"
"change ++DB2SAMPLEPROGRAMPLAN++ sampleprogramplan_value all"
"change ++DB2DATABASE++ DMQ01BRK                         all"
"change ++DB2STORAGEGROUP++ MQ01STOR                     all"
"change ++DB2BUFFERPOOL++ BP0                            all"
"change ++DB2INDEXBP++ BP0                               all"
"change ++DB2LOBBP++ BP0                                 all"
/* Configuration Manager only                                           */
/* (Delete if Broker or User Name Server)                               */
"change ++MQPATH++ /usr/lpp/mqm                          all"
```

Sample BIPGEN file

```
//BIPGEN JOB
//*******************************************************************
//*                                                                 *
//* @START_COPYRIGHT@                                               *
//*                                                                 *
//* Licensed Materials - Property of IBM;                           *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                          *
//* All Rights Reserved;                                            *
//* US Government Users Restricted Rights - use,                    *
//* duplication or disclosure restricted by GSA                     *
//* ADP Schedule Contract with IBM Corp.;                           *
//* See Copyright Instructions                                      *
//*                                                                 *
//* @END_COPYRIGHT@                                                 *
//*                                                                 *
//*******************************************************************
//*              IBM WebSphere Event/Message Brokers                *
//*                                                                 *
//* Copy component profile to the file system and generate an       *
//* ENVFILE.                                                        *
//*                                                                 *
//* IMPORTANT:                                                      *
//*                                                                 *
//*     You must submit BIPGEN each time you update a profile!      *
//*                                                                 *
//*******************************************************************
//* MORE INFORMATION - See:                                         *
//*                                                                 *
//*    WebSphere Event/Message Brokers Information Centre.          *
//*                                                                 *
//*******************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                                 *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
```

```
//*
//*    Replace   ++COMPONENTDATASET++
//*                      Component dataset.
//*                      e.g. 'BIP.BROKER.MQ01BRK'
//*
//*    Replace   ++COMPONENTPROFILE++
//*                      Component profile name.
//*                      e.g. Broker         = 'BIPBPROF'
//*                           Usernameserver = 'BIPUPROF'
//*                           Configmgr      = 'BIPCPROF'
//*
//*********************************************************************
//*
//*********************************************************************
//* Copy BIPBPROF/BIPUPROF/BIPCPROF to file system
//*********************************************************************
//*
//COPYPROF EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(BIPPROF)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD DISP=SHR,DSN=++COMPONENTDATASET++(++COMPONENTPROFILE++)
//BIPPROF  DD PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
//            PATHMODE=(SIRWXU,SIRWXG),
//            PATH='++HOME++/bipprof'
//SYSTSIN  DD DUMMY
//*
//*********************************************************************
//* Copy BIPPROF to SYSOUT
//*********************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(BIPPROF)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/bipprof'
//BIPPROF  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*********************************************************************
//* Create ENVFILE from BIPPROF
//*********************************************************************
//*
//CREATENV EXEC PGM=IKJEFT01,REGION=0M
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
  BPXBATCH SH -
  . ++HOME++/bipprof; -
  /bin/printenv> -
  ++HOME++/ENVFILE
//*
//*********************************************************************
//* Copy ENVFILE to SYSOUT
//*********************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='++HOME++/ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//
```

Sample BIPUNSP file

```
//*************************************************************
//*                                                           *
//* @START_COPYRIGHT@                                         *
//*                                                           *
//* Licensed Materials - Property of IBM;                     *
//* 5655-G97 (c) Copyright IBM Corp. 2004;                    *
//* All Rights Reserved;                                      *
//* US Government Users Restricted Rights - use,              *
//* duplication or disclosure restricted by GSA               *
//* ADP Schedule Contract with IBM Corp.;                     *
//* See Copyright Instructions                                *
//*                                                           *
//* @END_COPYRIGHT@                                           *
//*                                                           *
//*************************************************************
//*              IBM WebSphere Event/Message Brokers          *
//*                                                           *
//* Sample job to start a usernameserver.                     *
//*                                                           *
//*************************************************************
//* MORE INFORMATION - See:                                   *
//*                                                           *
//*    WebSphere Event/Message Brokers Information Centre.    *
//*                                                           *
//*************************************************************
//* CUSTOMIZE THIS JCL HERE FOR YOUR INSTALLATION
//* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
//*                                                           *
//*    Replace   ++HOME++
//*                      Home directory where ENVFILE and STDERR
//*                      and STDOUT files will be created.
//*                      e.g. '/u/home'
//*
//*    Replace   ++INSTALL++
//*                      WBI Brokers installation directory.
//*                      e.g. '/usr/lpp/mqsi'
//*
//*    Replace   ++QUEUEMANAGER++
//*                      Queue manager name.
//*                      e.g. 'MQ01'
//*
//*    Replace   ++COMPONENTDIRECTORY++
//*                      Usernameserver directory.
//*                      e.g. '/mqsi/brokers/MQ01BRK'
//*
//*    Replace   ++STARTEDTASKNAME++
//*                      Started Task Name (max 8 chars uppercase).
//*                      e.g. 'MQ01BRK'
//*
//*    Replace   ++WMQHLQ++
//*                      WebSphere MQ high-level-qualifier.
//*                      e.g. 'MQM.V531'
//*
//*************************************************************
//*
//++STARTEDTASKNAME++ PROC INSTP='++INSTALL++',
//         MAINP='bipimain',
//         SRVMP='bipservice',
//         COMPK='++STARTEDTASKNAME++',
//         STRTP='AUTO',
//         COMPDIR='++COMPONENTDIRECTORY++',
//         STDD='OTRUNC',
//         HOME='++HOME++',
//         WMQHLQ='++WMQHLQ++'
//*
//*************************************************************
```

```
//* Copy ENVFILE to SYSOUT
//*********************************************************************
//*
//COPYENV  EXEC PGM=IKJEFT01,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(ENVFILE)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='&HOME./ENVFILE'
//ENVFILE  DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*********************************************************************
//* UserNameServer MQ verification
//*********************************************************************
//*
//VFYDB2MQ EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/bipcvp u ++QUEUEMANAGER++'
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSMDUMP DD SYSOUT=*
//*
//*********************************************************************
//* Check RC from previous steps
//*********************************************************************
//*
//         IF (RC=0) THEN
//*
//*********************************************************************
//* Step to delete residual locks
//* (this is only needed if the broker is ARM enabled)
//*********************************************************************
//*
//*RMLOCKS  EXEC PGM=BPXBATCH,REGION=0M,TIME=NOLIMIT,
//*         PARM='SH rm -f &COMPDIR./common/locks/*'
//*
//*********************************************************************
//* Start :
//* UserNameServer Address Space (bipimain, bipservice and bipuns)
//*********************************************************************
//*
//UNS      EXEC PGM=BPXBATCH,REGION=0M,TIME=NOLIMIT,
//         PARM='PGM &INSTP./bin/&MAINP. &SRVMP. &COMPK. &STRTP.'
//*        MQSeries Runtime Libraries
//STEPLIB  DD DISP=SHR,DSN=&WMQHLQ..SCSQANLE
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQAUTH
//         DD DISP=SHR,DSN=&WMQHLQ..SCSQLOAD
//STDENV   DD PATH='&HOME./ENVFILE'
//STDOUT   DD PATHOPTS=(OWRONLY,OCREAT,&STDD),
//            PATHMODE=(SIRWXU,SIRWXG),
//            PATH='&COMPDIR./output/stdout'
//STDERR   DD PATHOPTS=(OWRONLY,OCREAT,&STDD),
//            PATHMODE=(SIRWXU,SIRWXG),
//            PATH='&COMPDIR./output/stderr'
//SYSMDUMP DD SYSOUT=*
//*
//*********************************************************************
//* Copy stdout to SYSOUT
//*********************************************************************
//*
//COPYOUT  EXEC PGM=IKJEFT01,COND=EVEN,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(STDOUT)'
//SYSTSPRT DD DUMMY
```

```
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='&COMPDIR./output/stdout'
//STDOUT   DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//*****************************************************************
//* Copy stderr to SYSOUT
//*****************************************************************
//*
//COPYERR  EXEC PGM=IKJEFT01,COND=EVEN,
//         PARM='OCOPY INDD(BIPFROM) OUTDD(STDERR)'
//SYSTSPRT DD DUMMY
//BIPFROM  DD PATHOPTS=(ORDONLY),
//            PATH='&COMPDIR./output/stderr'
//STDERR   DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN  DD DUMMY
//*
//         ENDIF
//*
//*--------------------------------------------------------------
//         PEND
//*--------------------------------------------------------------
//*
//
```

Sample BIPUPROF file

```
#*****************************************************************
#*                                                               *
#* @START_COPYRIGHT@                                            *
#*                                                               *
#* Licensed Materials - Property of IBM;                         *
#* 5655-G97 (c) Copyright IBM Corp. 2004;                        *
#* All Rights Reserved;                                          *
#* US Government Users Restricted Rights - use,                  *
#* duplication or disclosure restricted by GSA                   *
#* ADP Schedule Contract with IBM Corp.;                         *
#* See Copyright Instructions                                    *
#*                                                               *
#* @END_COPYRIGHT@                                              *
#*                                                               *
#*****************************************************************
#*              IBM WebSphere Event/Message Brokers              *
#*                                                               *
#* Sample profile for a usernameserver.                          *
#*                                                               *
#*****************************************************************
#* MORE INFORMATION - See:                                       *
#*                                                               *
#*    WebSphere Event/Message Brokers Information Centre.        *
#*                                                               *
#* IMPORTANT:                                                    *
#*                                                               *
#*     You must submit BIPGEN each time you update this profile! *
#*                                                               *
#*****************************************************************
#* CUSTOMIZE HERE FOR YOUR INSTALLATION
#* YOU MUST DO GLOBAL CHANGES ON THESE PARAMETERS USING YOUR EDITOR
#*                                                               *
#*    Replace   ++INSTALL++
#*                      WBI Brokers installation directory.
#*                      e.g. '/usr/lpp/mqsi'
#*
#*    Replace   ++COMPONENTDIRECTORY++
#*                      Usernameserver directory.
#*                      e.g. '/mqsi/uns/MQ01BRK'
#*
#*    Replace   ++LOCALE++
```

```
#*                      Locale.
#*                      e.g. 'C'
#*
#*    Replace   ++TIMEZONE++
#*                      Time zone.
#*                      e.g. 'GMT0BST'
#*
#*    Replace   ++JAVA++
#*                      Java location.
#*                      e.g. '/usr/lpp/java/IBM/J1.4'
#*
#*    Replace   ++XMLTOOLKIT++
#*                      IBM XML Toolkit location.
#*                      e.g. '/usr/lpp/ixm/IBM/xml4c-5_5'
#*
#*********************************************************************
# 1. Component Settings
#*********************************************************************
#
# 1.1 MQSI_REGISTRY references the component path. Also needed by
#     commands.
#     e.g. MQSI_REGISTRY=/mqsi/uns/MQ01BRK
#
# 1.2 MQSI_COMPONENT_NAME is set to the UserNameServer name.
#     (DO NOT CHANGE FROM DEFAULT!)
#
# 1.3 MQSI_FILEPATH needed by commands to reference the component
#     version install path.
#     e.g. MQSI_FILEPATH=usr/lpp/mqsi/V6R0M0
#
export MQSI_REGISTRY=++COMPONENTDIRECTORY++
export MQSI_COMPONENT_NAME=UserNameServer
export MQSI_FILEPATH=++INSTALL++


#*********************************************************************
# 2. NLS Settings
#*********************************************************************
#
# 2.1 LANG and LC_ALL determine in which locale the component
#     will run.
#     e.g. LANG=Ja_JP.IBM-939 and LC_ALL=Ja_JP.IBM-939 for
#          japanese locale.
#          LANG=C, LC_ALL=C for US English locale.
#
# 2.2 TZ has the timezone setting in which you are located.
#     e.g. TZ=EST5                    for USA Eastern Standard Time
#          TZ=MEZ-1MES,M3.5.0,M10.5.0 for Central Europe
#          TZ=GMT0BST                 for the UK
#          Please refer to the IBM Manual
#          "Unix System Services Command Reference SC28-1892.
#
# 2.3 NLSPATH contains the location of the message catalog(s).
#     (NO NEED TO CHANGE FROM DEFAULT!)
#
# 2.4 MQSI_CONSOLE_NLSPATH is used to locate the messages for
#     the console.
#     For Japanese or S-Chinese messages, change En_US to
#     Ja_JP or Zh_CN below. For English messages these can be
#     displayed in mixed or upper case only. (see MC_MESSAGES)
#     Note that MQSI_CONSOLE_NLSPATH does not use %L or %N
#
export LANG=++LOCALE++
export LC_ALL=++LOCALE++
export TZ=++TIMEZONE++
export NLSPATH=$MQSI_FILEPATH/messages/%L/%N
export MQSI_CONSOLE_NLSPATH=$MQSI_FILEPATH/messages/En_US
```

```
#*******************************************************************
# 3. Automatic Restart Management (ARM) Settings
#*******************************************************************
#
# 3.1 MQSI_USE_ARM specifies whether to use ARM.
#     e.g. MQSI_USE_ARM=YES for ARM enabled.
#          MQSI_USE_ARM=NO  for ARM not enabled.
#
# 3.2 MQSI_ARM_ELEMENTNAME required if ARM enabled.
#
# 3.3 MQSI_ARM_ELEMENTTYPE required if ARM enabled.
#
export MQSI_USE_ARM=NO
export MQSI_ARM_ELEMENTNAME=
export MQSI_ARM_ELEMENTTYPE=


#*******************************************************************
# 4. Java Settings
#*******************************************************************
#
# 4.1 JAVAHOME contains the root directory of the JAVA install.
#     e.g. JAVAHOME=/usr/lpp/java/IBM/J1.4
#     Note that the Java version must be at least 1.4.1
#
export JAVAHOME=++JAVA++


#*******************************************************************
# 5. WBI Usernameserver Settings
#*******************************************************************
#
# 5.1 _BPX_BATCH_SPAWN
#     (MUST NOT CHANGE FROM DEFAULT!)
#
# 5.2 MQSI_MC_MESSAGES determines if messages should appear in
#     mixed case or upper case.
#     e.g. MQSI_MC_MESSAGES=YES for mixed case
#          MQSI_MC_MESSAGES=NO for upper case
#
# 5.3 MQSI_COMMAND_DATABASE_ECHO if defined, mqsi commands
#     display information when creating DB2 tables/indexes.
#
# 5.4 MQSI_COMMAND_ZOS_MQ_ECHO if defined, mqsi commands display
#     information returned from the MQ command server when
#     creating/deleting queues.
#
# 5.5 MQSI_COMMAND_ZOS_MQ_ECHO_RC if defined, mqsi commands display
#     reason and return codes from the MQ command server when
#     creating/deleting queues.
#
# 5.6 STEPLIB
#     (MUST NOT CHANGE FROM DEFAULT!)
#
export _BPX_BATCH_SPAWN=NO
export MQSI_MC_MESSAGES=NO
export MQSI_COMMAND_DATABASE_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO=1
export MQSI_COMMAND_ZOS_MQ_ECHO_RC=1
export STEPLIB=CURRENT


#*******************************************************************
# 6. Other Settings
#*******************************************************************
```

```
#
# NO NEED TO CHANGE FROM DEFAULT!
#
CP=$MQSI_FILEPATH/classes
CP=$CP:$MQSI_FILEPATH/classes/config.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxy.jar
CP=$CP:$MQSI_FILEPATH/classes/ConfigManagerProxySamples.jar
CP=$CP:$MQSI_FILEPATH/classes/configutil.jar
CP=$CP:$MQSI_FILEPATH/messages
CP=$CP:$JAVAHOME/lib
export CLASSPATH=$CP
XMLTOOLKIT=++XMLTOOLKIT++
LP=$MQSI_FILEPATH/lib/wbirf
LP=$LP:$MQSI_FILEPATH/lib/wbimb
LP=$LP:$MQSI_FILEPATH/lib/wbieb
LP=$LP:$MQSI_FILEPATH/lib
LP=$LP:$JAVAHOME/lib
LP=$LP:$JAVAHOME/bin
LP=$LP:$JAVAHOME/bin/classic
LP=$LP:$XMLTOOLKIT/lib
export LIBPATH=$LP
export PATH=$MQSI_FILEPATH/bin
export PATH=$PATH:$JAVAHOME/bin
```

Security requirements for administrative tasks

This section contains the following topics:

ACL permissions

WebSphere Message Broker uses Access Control List (ACL) entries to govern which users and groups can manipulate objects in the broker domain. There are four different access levels that can be granted for a user or group: Full, View, Deploy, and Edit. Not all access levels are valid for all object types. The following table lists the actions which can be performed by a user with a given permission:

Object	Permission	Rights
Topology	Full control	• Create and delete brokers. • Create and delete collectives. • Add and remove brokers from collectives. • Create and delete connections. • Deploy topology. • All topology View permission rights
	View	• View topology configuration and managed subcomponents.
Broker	Full control	• Create and delete execution groups. • Edit all broker properties. • All broker Deploy permission rights. • All execution groups Full control permission rights for contained execution groups. • All broker View permission rights.
	Deploy	• Deploy broker configuration. • All broker View permission rights.
	View	• View broker configuration and managed subcomponents. • Implicit view access to Topology.
Execution group	Full control	• Edit all execution group properties. • Start and stop execution groups. • All execution group Deploy permission rights. • All execution group View permission rights.
	Deploy	• Deploy execution group configuration. • Start and stop assigned message flows. • Start and stop trace. • All execution group View permission rights.
	View	• View execution group configuration and managed subcomponents. • Implicit View access to parent broker and topology.

Object	Permission	Rights
Root topic	Full control	• Edit "Topic Access Control List". • All root topic Deploy permissions. • All root topic Edit permissions. • All root topic View permissions.
	Deploy	• Deploy entire topic configuration. • All root topic View permissions.
	Edit	• Create and delete child topics. • All root topic View permissions.
	View	• View all topics (including child topics), and any managed subcomponents.
Subscription	Full control	• Delete any subscription. • All subscription "View" permissions.
	View	• View or query all subscriptions and any managed subcomponents.

Security requirements for Linux and UNIX platforms

A summary of the authorizations in a Linux or UNIX environment.

User is...	Linux or UNIX domain
Creating a component	• Member of mqbrkrs and mqm. • When root is used to issue the create command, it can nominate any user to run the component.
Installing	• Superuser.
Uninstalling	• Superuser.
Changing a component	• Member of mqbrkrs.
Deleting a component	• Member of mqbrkrs and mqm.
Starting a component	• Member of mqbrkrs. • Member of mqm.
Stopping a component	• Member of mqbrkrs. • The user ID must either be root, or the same as the user ID that started the component. • Member of mqm if -q is specified.
Listing a component	• Member of mqbrkrs.
Changing, displaying, retrieving trace information.	• Member of mqbrkrs.
Running User Name Server (login ID).	• Member of mqbrkrs. The User Name Server runs under the login ID specified in the create command.
Running broker (WebSphere MQ non-trusted application) (login ID).	• Member of mqbrkrs. • The broker runs under the login ID that started it. • If root started the component then the broker runs under the login ID specified as the service ID in the create command.
Running broker (WebSphere MQ trusted application) (login ID).	• Login ID must be mqm. • mqm must be a member of mqbrkrs.
Clearing, joining, listing WebSphere MQ publish/subscribe brokers.	• Member of mqbrkrs.

User is...	Linux or UNIX domain
Running publish/subscribe applications.	• Any user, subject to topic and WebSphere MQ queue access control.

Note: When the service user ID is root, all of the libraries loaded by the broker, including all of the user-written plug-in libraries and all of the shared libraries that they might access, also have root access to all of the system resources (for example, file sets). Review and assess the risk involved in granting this level of authorization.

Security requirements for Windows platforms

Security requirements depend on the administrative task that you want to perform.

The following table summarizes the requirements for administrative tasks. It shows what group membership is required if you are using a local security domain defined on your local system SALONE, or a primary domain named PRIMARY, or a trusted domain named TRUSTED. The contents of this table assume that you have created both the Configuration Manager and the User Name Server with the same security domain.

User is...	Local domain (SALONE)	Primary domain (PRIMARY) / Windows Single domain (PRIMARY)	Trusted domain (TRUSTED) / Windows Parent/Child domain in domain tree (TRUSTED)
Creating a broker, Configuration Manager, User Name Server, or database (with mqsicreatedb)	• Must be a user ID defined in SALONE • Member of Administrators	• Must be a user ID defined in PRIMARY • Member of SALONE\Administrators	• Must be a user ID defined in TRUSTED • Member of SALONE\Administrators
Changing a broker, Configuration Manager, User Name Server, DatabaseInstanceMgr	• Must be a user ID defined in SALONE • Member of Administrators	• Must be a user ID defined in PRIMARY • Member of SALONE\Administrators	• Must be a user ID defined in TRUSTED • Member of SALONE\Administrators
Deleting a broker, Configuration Manager, User Name Server, or database (with mqsideletedb)	• Member of Administrators	• Member of SALONE\Administrators	• Member of SALONE\Administrators
Starting a broker, Configuration Manager, User Name Server, or DatabaseInstanceMgr	• Member of Administrators	• Member of SALONE\Administrators	• Member of SALONE\Administrators
Listing a broker, Configuration Manager, User Name Server, or DatabaseInstanceMgr	• Must be a user ID defined in SALONE • User ID must have the authority to query the registry values under WebSphereMQIntegrator entry in the registry. • Member of mqbrkrs if issuing the command: `mqsilist` *`broker_name execution_group_name`*	• Must be a user ID defined in PRIMARY • User ID must have the authority to query the registry values under WebSphereMQIntegrator entry in the registry. • Member of PRIMARY\Domain mqbrkrs if issuing the command: `mqsilist` *`broker_name execution_group_name`*	• Must be a user ID defined in TRUSTED • User ID must have the authority to query the registry values under WebSphereMQIntegrator entry in the registry. • Member of TRUSTED\Domain mqbrkrs if issuing the command: `mqsilist` *`broker_name execution_group_name`*

User is...	Local domain (SALONE)	Primary domain (PRIMARY) / Windows Single domain (PRIMARY)	Trusted domain (TRUSTED) / Windows Parent/Child domain in domain tree (TRUSTED)
Changing, displaying, retrieving trace information	• Must be a user ID defined in SALONE • Member of mqbrkrs	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs
Running a User Name Server (service user ID)	• Must be a user ID defined in SALONE • Member of mqbrkrs	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs
Running a DatabaseInstanceMgr (service user ID)	• Must be a user ID defined in SALONE • Member of mqbrkrs	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs
Running a Configuration Manager (service user ID)	• Must be a user ID defined in SALONE • Member of mqbrkrs • Member of mqm • Member of Adminstrators	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs • Member of SALONE\mqm [1] • Member of SALONE/Adminstrators	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs • Member of SALONE\mqm[2] • Member of SALONE/Adminstrators
Running a broker (WebSphere MQ fastpath off) (service user ID)	• Must be a user ID defined in SALONE • Member of mqbrkrs	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs
Running a broker (WebSphere MQ fastpath on) (service user ID)	• Must be a user ID defined in SALONE • Member of mqbrkrs • Member of mqm	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs • Member of SALONE\mqm	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs • Member of SALONE\mqm
Clearing, joining, or listing WebSphere MQ Publish/Subscribe brokers	• Must be a user ID defined in SALONE • Member of mqbrkrs	• Must be a user ID defined in PRIMARY • Member of PRIMARY\Domain mqbrkrs	• Must be a user ID defined in TRUSTED • Member of TRUSTED\Domain mqbrkrs
Running a Message Brokers Toolkit[3]	• Must be a user ID defined in SALONE[4]. For example, SALONE\User1 is valid, PRIMARY\User2 and TRUSTED\User3 are not.	• Regardless of whether domain awareness is enabled, when using Message Brokers Toolkit ACLs, user IDs must be members of any local ACL groups created on SALONE.	• Regardless of whether domain awareness is enabled, when using Message Brokers Toolkit ACLs, user IDs must be members of any local ACL groups created on SALONE.
Running publish/subscribe applications	• Must be a user ID defined in SALONE. For example, SALONE\User1 is valid, PRIMARY\User2 and TRUSTED\User3 are not.	• Must be a user ID defined in PRIMARY. For example, PRIMARY\User2 is valid, SALONE\User1 and TRUSTED\User3 are not.	• Must be a user ID defined in TRUSTED. For example, TRUSTED\User3 is valid, SALONE\User1 and PRIMARY\User2 are not.

Notes:

1. If you are running in a primary domain, you can also:
   - Define the user ID in the domain PRIMARY.
   - Add this ID to the group PRIMARY\Domain mqm.

- Add the PRIMARY\Domain mqm group to the group SALONE\mqm.

2. If you are running in a trusted domain, you can also:
   - Define the user ID in the domain TRUSTED.
   - Add this ID to the group TRUSTED\Domain mqm.
   - Add the TRUSTED\Domain mqm group to the group SALONE\mqm.
3. All Message Brokers Toolkit users need read access to the WebSphere MQ java \lib subdirectory of the WebSphere MQ home directory (the default location is X:\Program Files \WebSphere MQ , where X: is the operating system disk). This access is restricted to users in the local group mqm by WebSphere MQ. WebSphere Message Broker installation overrides this restriction and gives read access for this subdirectory to all users.
4. If a valid user ID is defined in the domain used by the Configuration Manager (for example, PRIMARY\User4), an identical user defined in a different domain (for example, DOMAIN2\User4) can access the Message Brokers Toolkit with the authorities of PRIMARY\User4.

The following general notes also apply:

1. Ensure that the service user ID has the required access to relevant directories of the product directory tree; for example, write access to the logs directory. If you have set a workpath for any component to a non-default value, ensure that the services user ID has appropriate access to this location.
2. If you are running a Configuration Manager with one user ID and a broker with a different user ID on another computer, you might see an error message when trying to deploy message flows and message sets to the broker. To avoid this error:
   - Ensure that the broker's user ID is a member of the mqm and mqbrkrs groups.
   - Define the user ID for the broker on the computer where the Configuration Manager is running.
   - Define the user ID for the Configuration Manager on the computer where the broker is running.
   - Ensure that all user IDs are in lowercase so that they are compatible between computers.

Broker security changes with Windows 2003 and Windows XP

On Windows 2003 and Windows XP, the service user ID must be a member of the mqbrkrs group and optionally a member of the Administrators group. As a member of the Administrators group, the service user ID has permission to access the registry keys of the broker so that it can access broker information. If the service user ID does not belong to the Administrators group, you can edit the Windows registry so that the service user ID can access the registry keys without having Administrators permissions.

The instructions for both operating systems are identical except where stated.

1. Click **Start** → **Run**, enter `regedt32`, and click **OK**. The Registry Editor opens.
2. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\WebSphereMQIntegrator` in the left pane.

3. Right-click **WebSphereMQIntegrator** and select **Permissions**. The Permissions for WebSphereMQIntegrator window opens.
4. Click **Add** below the list of Group or user names. The Select Users or Groups window opens.
5. Click **Advanced** and then **Find Now** to list the current users and groups. From the list, select the mqbrkrs group to highlight it, and click **OK** twice.
6. Click **Advanced** on the Permissions for WebSphereMQIntegrator window to set special permissions. The Advanced Security Settings for WebSphereMQIntegrator window opens.
7. Highlight mqbrkrs and click **Edit**. The Permission Entry for WebSphereMQIntegrator window opens.
8. Select **Set Value**, **Create Subkey**, and **Delete** and click **OK**.
9. Ensure on Windows 2003 that **Allow inheritable permissions** is selected, or on Windows XP that **Inherit from parent** is selected, and click **OK**.
10. Click **OK** to close the remaining windows, and then close the Registry Editor.

Security requirements for z/OS

This table is a summary of the UNIX System Services file access authorizations in a z/OS environment.

User is...	File access
Creating broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS user ID issuing the command • The broker, User Name Server and Configuration Manager run under their z/OS assigned started task ID
Installing	• *READ* and *WRITE* access to the installation directory by the z/OS user ID installing the product
Uninstalling	• *READ* and *WRITE* access to the installation directory by the z/OS user ID uninstalling the product
Changing broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS user ID issuing the command
Deleting broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS user ID issuing the command
Starting broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS assigned started task user ID
Stopping broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS assigned started task user ID
Listing broker, User Name Server, Configuration Manager	• *READ* and *WRITE* access to the component directory by the z/OS user ID issuing the command
Changing, displaying, retrieving trace information.	• *READ* and *WRITE* access to the component directory by the z/OS user ID issuing the command
Clearing, joining, listing WebSphere MQ publish/subscribe brokers.	• *READ* and *WRITE* access to the component directory by the z/OS assigned started task user ID • Member of **mqbrkrs** group
Running publish/subscribe applications.	• Any user, subject to topic and WebSphere MQ queue access control.

Part 5. Appendixes

Appendix. Notices for WebSphere Message Broker

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this information in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this information. The furnishing of this information does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106-0032,
Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the information. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this information at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM United Kingdom Laboratories,
Mail Point 151,
Hursley Park,
Winchester,
Hampshire,
England
SO21 2JN

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Programming License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information includes examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not

been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

(C) (*your company name*) (*year*). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. *_enter the year or years_*. All rights reserved.

Trademarks in the WebSphere Message Broker information center

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

AIX	CICS	DB2
DB2 Connect	DB2 Universal Database	developerWorks
Domino		Everyplace
FFST	First Failure Support Technology	IBM
IBMLink	IMS	IMS/ESA
Informix	iSeries	i5/OS
Language Environment	Lotus	MQSeries
MVS	NetView	OS/400
OS/390	Passport Advantage	POWER
pSeries	RACF	Rational
Redbooks	RETAIN	RS/6000
SupportPac	System i	S/390
Tivoli	VisualAge	WebSphere
xSeries	z/OS	zSeries

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Intel and Pentium are trademarks or registered trademark of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Index

D

E

F

G

H

I

L

M

N

O

P

Q

R

S

T

U

W

X

Z

Printed in USA