

9.4

*Installing and migrating IBM MQ*

**IBM**

**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 517](#).

This edition applies to version 9 release 4 of IBM® MQ and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Installing and migrating

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You perform a range of tasks to install, uninstall, maintain, and migrate IBM MQ. These tasks are platform-specific where needed.

## About this task

To get started with installing and migrating IBM MQ, see the following topics.

## Procedure

- [“Installing and uninstalling IBM MQ” on page 5](#)
- [“Maintaining and migrating IBM MQ” on page 290](#)

# Installing and uninstalling IBM MQ

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Before you start installing IBM MQ, consider how you want to use it. Use these topics to help you to prepare for installation, install the product, and verify the installation. There is also information to help you to uninstall the product.

## About this task

To get started with installing IBM MQ, see the topics for the platforms that your enterprise uses. For concepts and considerations relating to installation, see [“IBM MQ installation overview” on page 6](#).

You can also apply and remove maintenance to IBM MQ. See [“Applying maintenance to IBM MQ” on page 294](#).



**Attention:** The information in this section applies to both Continuous Delivery (CD) and Long Term Support (LTS) releases.

Any information that applies specifically to an LTS or CD release is marked with the appropriate icon.







For tutorials to help you with installing and upgrading, see [A collection of tutorials for installing and upgrading IBM MQ on AIX®, Linux®, and Windows](#). The tutorials cover:

- Preparing a host for IBM MQ.
- Downloading the IBM MQ code.
- Installing and uninstalling the IBM MQ code, and applying fix packs.
- Upgrading from one version of IBM MQ to another, and moving a queue manager from one host to another.

## Procedure

1. To find information on installing IBM MQ, see the appropriate sections for the platform, or platforms, that your enterprise uses:

-  [“Installing and uninstalling IBM MQ on AIX” on page 32](#)
-  [“Installing IBM MQ on Linux using rpm” on page 108](#)
-  [“Installing and uninstalling IBM MQ on Windows” on page 159](#)
-  [“Installing IBM MQ for z/OS” on page 269](#)

2. To find out about concepts and considerations relating to installation, see [“IBM MQ installation overview”](#) on page 6.

## IBM MQ installation overview

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

### Related concepts

[“Multiple installations on AIX, Linux, and Windows”](#) on page 17

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Installation considerations for MQ Telemetry”](#) on page 251

MQ Telemetry is a component of the main IBM MQ product. You can choose to install MQ Telemetry when you first install IBM MQ, or when you modify an existing IBM MQ installation.

[“Managed File Transfer product options”](#) on page 246

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. These options are Managed File Transfer Agent, Managed File Transfer Service, Managed File Transfer Logger, or Managed File Transfer Tools.

### Related tasks

[“Maintaining and migrating IBM MQ”](#) on page 290

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[Installing Advanced Message Security](#)

Use the information for your platform to guide you through installing the Advanced Message Security (AMS) component.

## IBM MQ components and features

You can select the components or features that you require when you install IBM MQ.

**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. For more information, see [“License requirements”](#) on page 8 and [IBM MQ license information](#).

Also review the information on hardware and software requirements for the platform on which you are planning to install IBM MQ. For more information, see [“Where to find product requirements and support information”](#) on page 9.

## Installation of IBM MQ on Multiplatforms



IBM MQ can be installed as a server or a client. The installation images can be downloaded. See [“Where to find downloadable installation images”](#) on page 10.

Separate client eImages are no longer available for downloading from Passport Advantage. Instead, you can either get the client eImage from inside the main IBM MQ server eImage, which includes the server and client, or you can download the IBM MQ client components from Fix Central. Follow the links in [Resource adapter, clients and other resources](#).

An IBM MQ server is an installation of one or more queue managers that provide queuing services to one or more clients. All the IBM MQ objects, for example queues, exist only on the queue manager machine (the IBM MQ server machine), and not the client. An IBM MQ server can also support local IBM MQ applications.

An IBM MQ MQI client is a component that allows an application running on one system to communicate with a queue manager running on another system. The output from the call is sent back to the client, which passes it back to the application.

For detailed explanations of all the components that you can install, see:

- ▶ **AIX** [“IBM MQ components for AIX systems” on page 33](#)
- ▶ **IBM i** [“IBM MQ components for IBM i” on page 63](#)
- ▶ **Linux** [“IBM MQ rpm components for Linux systems” on page 108](#)
- ▶ **Linux** [“IBM MQ Debian components for Linux Ubuntu systems” on page 126](#)
- ▶ **Windows** [“IBM MQ features for Windows systems” on page 159](#)

For information about how to install IBM MQ on each supported platform, see the links in the following table:

*Table 1. Where to find IBM MQ installation information for each platform*

Platform	IBM MQ server	IBM MQ client
▶ <b>AIX</b> AIX	<a href="#">“Installing IBM MQ server on AIX” on page 43</a>	<a href="#">“Installing an IBM MQ client on AIX” on page 48</a>
▶ <b>IBM i</b> IBM i	<a href="#">“Installing IBM MQ server on IBM i” on page 66</a>	<a href="#">“Installing an IBM MQ client on IBM i” on page 79</a>
▶ <b>Linux</b> Linux	<a href="#">“Installing the first IBM MQ installation on Linux using the rpm command” on page 112</a>	<a href="#">“Installing an IBM MQ client on Linux using rpm” on page 119</a>
▶ <b>Linux</b> Linux	<a href="#">“Installing an IBM MQ server on Linux Ubuntu using Debian packages” on page 129</a>	<a href="#">“Installing an IBM MQ client on Linux Ubuntu using Debian packages” on page 135</a>
▶ <b>Windows</b> Windows	<a href="#">“Installing IBM MQ server on Windows” on page 177</a>	<a href="#">“Installing an IBM MQ client on Windows” on page 204</a>

▶ **MQ Adv.** For more information about installing IBM MQ Advanced for Multiplatforms, see [“Installing IBM MQ Advanced for Multiplatforms” on page 237](#).

**Note:** ▶ **HPE NonStop V8.1** Up to and including IBM MQ 8.0, IBM WebSphere® MQ for HP NonStop Server was also a component platform. Since then, this component has been supplied and supported separately as IBM MQ for HPE NonStop V8.1, which provides IBM MQ on HPE NonStop L-series and J-series platforms. The documentation is here: [IBM MQ for HPE NonStop V8.1](#).

## Installing IBM MQ clients and servers

### ▶ Multi

A client can be installed on its own, on a separate machine from the base product and server. It is also possible to have both a server and a client installation on the same system.

To install an IBM MQ client on a system that is already running an IBM MQ server, you must use the appropriate Server eImage downloaded from Passport Advantage. See [“Where to find downloadable installation images” on page 10](#).

Separate client eImages are no longer available for downloading from Passport Advantage. Instead, you can either get the client eImage from inside the main IBM MQ server eImage, which includes the server and client, or you can download the IBM MQ client components from Fix Central. Follow the links in [Resource adapter, clients and other resources](#).

Even if your client and server are installed on the same system, you must still define the MQI channel between them. See [Defining MQI channels](#) for details.

## Advanced Message Security, Managed File Transfer, MQ Telemetry, and Replicated data queue managers (RDQM)

Advanced Message Security, Managed File Transfer, MQ Telemetry, and RDQM are separately installed components of IBM MQ. Make sure that you purchase a license for using IBM MQ Advanced before installing any of these components (see [IBM MQ license information](#)). See [“Installing IBM MQ Advanced for Multiplatforms”](#) on page 237 for installation instructions.

### Installation of IBM MQ on z/OS



For information on installation options for IBM MQ for z/OS, see [“Installing IBM MQ for z/OS”](#) on page 269.

For information on installation options for IBM MQ Advanced for z/OS, see [“Installing IBM MQ Advanced for z/OS”](#) on page 280.



For information on installation options for IBM MQ Advanced for z/OS Value Unit Edition, see [“Installing IBM MQ Advanced for z/OS Value Unit Edition”](#) on page 283.

#### Related concepts

[“Planning considerations for installation on Multiplatforms”](#) on page 14

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Where to find downloadable installation images”](#) on page 10

You download installation images for IBM MQ from Passport Advantage, Fix Central, or (for z/OS systems) the ShopZ website. A number of IBM MQ components including fix packs, CSUs, clients, and the resource adapter are also available for downloading from Fix Central and elsewhere.

### License requirements

You must have purchased sufficient licenses for your installation. The details of the license agreement is stored on your system at installation time so that you can read it at any time. IBM MQ supports IBM License Metric Tool (ILMT).

**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. See [IBM MQ license information](#) for more details.

### License files

At installation, the license agreement files are copied into the `/licenses` directory under the `MQ_INSTALLATION_PATH`. You can read them at any time.



If you have installed a trial license, follow the instructions for converting a trial license on the platform, or platforms, your enterprise uses.



On IBM i, you can use the `WRKSWAGR` command to view the software licenses.

### ILMT

ILMT automatically detects IBM MQ, if you are using it, and checks with it each time a queue manager is started. You do not need to take any further action. You can install ILMT before or after IBM MQ.

The automatic detection applies to both the IBM MQ server and IBM MQ Java products.

#### Related concepts

[“Hardware and software requirements on Linux systems”](#) on page 95



Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

[“Hardware and software requirements on IBM i systems” on page 63](#)

Check that the server environment meets the prerequisites for installing IBM MQ for IBM i.

[“Hardware and software requirements on Windows systems” on page 169](#)

Check that the server environment meets the prerequisites for installing IBM MQ for Windows and install any prerequisite software that is missing from your system.

### **Related tasks**

[“Checking requirements on Windows” on page 169](#)

Before you install IBM MQ on Windows, you must check for the latest information and system requirements.

## **Where to find product requirements and support information**

Before you install IBM MQ, you must check for the latest information and system requirements.

You can consult the following sources to check that you have the information that you need to help you with planning your installation, including information on hardware and software requirements:

### **IBM MQ System Requirements website**

For details of the supported operating systems, and the prerequisites, supported software, and hardware requirements for each supported operating system, go to the [System Requirements for IBM MQ website](#) and follow the links to the Detailed System Requirements report for the version of IBM MQ that you are installing. You can select a report for a specific operating system or for a specific component. In both cases, there are separate reports for Long Term Support and Continuous Delivery.

### **Product readme file**

The product readme file includes information about last minute changes and known problems and workarounds. The latest version is available at the [IBM MQ, WebSphere MQ, and MQSeries® product readmes web page](#). Always check to see that you have the latest version of the product readme file.

### **Support information**

The [IBM MQ support web page](#) is regularly updated with the latest product support information. For example, if you are migrating from an earlier version, look under the heading *Solve a problem* for the document *Problems and solutions when migrating*.

### **Related concepts**

[“IBM MQ installation overview” on page 6](#)

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

[“Hardware and software requirements on AIX systems” on page 37](#)

Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

[“Hardware and software requirements on IBM i systems” on page 63](#)

Check that the server environment meets the prerequisites for installing IBM MQ for IBM i.

[“Hardware and software requirements on Linux systems” on page 95](#)

Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

[“Hardware and software requirements on Windows systems” on page 169](#)

Check that the server environment meets the prerequisites for installing IBM MQ for Windows and install any prerequisite software that is missing from your system.

### **Related tasks**

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

[“Installing IBM MQ for z/OS” on page 269](#)

Installation tasks that are associated with installing IBM MQ on z/OS systems are grouped in this section.

## Where to find downloadable installation images

You download installation images for IBM MQ from Passport Advantage, Fix Central, or (for z/OS systems) the ShopZ website. A number of IBM MQ components including fix packs, CSUs, clients, and the resource adapter are also available for downloading from Fix Central and elsewhere.

**Note:** This topic gives background information on the various types of downloadable images, and the various sites from which you can download them. If you are already familiar with this information, and are ready to download the latest images, go to [Downloading IBM MQ 9.4](#) then click the **CD** tab for the latest Continuous Delivery release or Cumulative Security Update (CSU), or the **LTS** tab for the latest Long Term Support fix pack or CSU.

## Passport Advantage (for multiplatforms releases)

**Multi** There are two Passport Advantage offerings. Passport Advantage is designed for larger enterprises and enterprises with multiple sites. Passport Advantage Express<sup>®</sup> is designed for smaller enterprises and single-site enterprises.

See the [Passport Advantage and Passport Advantage Express website](#) for further information on how you:

- Acquire new IBM software licenses.
- Renew Software Subscription and Support and Fixed Term Licenses.
- Buy and renew technical support for some [Selected Open Source](#) and other non-warranted applications.
- Subscribe to IBM SaaS offerings and acquire IBM Appliances.

You download IBM MQ Server eAssemblies for the full release on all supported platforms from Passport Advantage. The eImages that make up the full release can be downloaded individually if you do not need the full release.

The initial release is IBM MQ 9.4.0. For LTS users, it brings you up to date with the new functions that were incrementally added into IBM MQ 9.3 by the CD releases. For CD users, it is the next CD release after IBM MQ 9.3.5.

A free 90-day trial version of the LTS release, for each of the last two IBM MQ major versions, is available for download here: <https://www.ibm.biz/ibmmqtrial>. This is useful if you want to try out IBM MQ, or if you are waiting for a full version purchase to complete. When your purchase completes, you can convert your trial installation to a full production copy.

Separate client eImages are no longer available for downloading from Passport Advantage. Instead, you can either get the client eImage from inside the main IBM MQ server eImage, which includes the server and client, or you can download the IBM MQ client components from Fix Central. Follow the links in [Resource adapter, clients and other resources](#).

**Linux** **MQ Adv.** **CD** Also available from Passport Advantage (subject to entitlement) is the [IBM Aspera faspio Gateway](#).


**Note:** **Linux** **MQ Adv.** **CD** Prior to 1Q 2023, non-install images for building your own IBM MQ queue manager container images were available from Passport Advantage. These images are now available on Fix Central. Follow the link in [Resource adapter, clients and other resources](#).

For more information and download links, go to [Downloading IBM MQ 9.4](#) then select the CD or LTS tab.

## Fix Central (for Multiplatforms Fix Packs and CSUs)

**Multi** You download IBM MQ for Multiplatforms Fix Packs and CSUs from Fix Central. For more information and download links, go to [Downloading IBM MQ 9.4](#), then select the CD or LTS tab.

## Shopz (for z/OS releases and fixes)


 IBM MQ for z/OS downloads are available from the Shopz website. You have two options:

- Order the features as a new product installation.
- Apply PTFs to a previously installed release.

For more information and download links, go to [Downloading IBM MQ 9.4](#), then select the CD or LTS tab.

For complete information on IBM MQ for z/OS product packaging, see the Release For Announcement (RFA) on the [IBM Offering Information](#) site.



## Resource adapter, clients and other resources

 A number of IBM MQ resources are also made available on Fix Central and elsewhere.

Clients:

- [IBM MQ C and .NET clients](#)
- [IBM MQ Java / JMS client](#)
- [IBM MQ Java client components](#) (on Maven)
- [IBM MQ redistributable clients](#)
- [IBM MQ Resource Adapter](#) - For use with any Java EE 7 or Jakarta EE compliant application server
- [IBM MQ redistributable Managed File Transfer \(MFT\) Agents](#)
- [IBM MQ classes for .NET Standard](#) (on NuGet)
- [IBM MQ classes for XMS .NET Standard](#) (on NuGet)

Components:

- [IBM MQ Internet Pass-Thru \(MQIPT\)](#)
- [IBM MQ Explorer stand-alone install image](#) - CD only, but can be used to perform administration on any supported release of IBM MQ.
- [IBM MQ Native HA on AWS](#)
- [IBM MQ Kafka Connectors](#)
-  [IBM MQ Web Server stand-alone install image](#)
-  [IBM Instana Tracing Exit for IBM MQ](#)

Containers:

- Prebuilt: [IBM MQ Advanced container](#) (subject to entitlement).
- Build your own: <https://github.com/ibm-messaging/mq-container>. This works in conjunction with the non-install (unzippable) IBM MQ images to build an IBM MQ container image that can run under the Red Hat® OpenShift® anyuid security context constraint (SCC).
  - For production environments the three non-install images for Linux (subject to entitlement) are available here:
    - [IBM MQ Advanced non-install images for Linux](#)
  - Note that each version of these non-install images is supported for one year only when used as part of an IBM MQ CD release, or two years (with an optional extension for another year) when used as part of an IBM Cloud Pak® for Integration LTS release.
  - For development environments the non-install packages can be found at the following locations:
    - [IBM MQ Advanced for Developers non-install image for Linux x86-64](#)
    - [IBM MQ Advanced for Developers non-install image for Linux PPCLE](#)
    - [IBM MQ Advanced for Developers non-install image for Linux systemZ](#)

- **V 9.4.0** IBM MQ Advanced for Developers non-install image for Linux ARM64
- A sample helm chart is available here: <https://github.com/ibm-messaging/mq-helm>

Development:

- IBM MQ Advanced for Developers is available for the Windows and Linux platforms listed in the [IBM MQ 9.4 system requirements](#), running on x86-64 architectures. Also available (as-is, see the [readme](#)) is a 32-bit version for Raspberry Pi. Download from the following locations: [Windows](#) / [Linux](#) / [Ubuntu](#) / [Raspberry Pi](#)
- The IBM MQ Mac Toolkit for Development allows the execution of IBM MQ commands (for example MQSC commands) on macOS devices (both ARM64 and x86-64). It also contains client libraries that facilitate the development of macOS client applications that are executed on macOS devices (both ARM64 and x86-64). The client is used in the [Get started with IBM MQ tutorials](#).
- A pre-built [IBM MQ Advanced for Developers container image](#) is available from the IBM Container Registry. It runs on Linux/x86-64. Or you can [build your own](#) container image to run on ARM64 and x86-64 architectures.

## SupportPacs

IBM MQ SupportPacs provide downloadable code and documentation that complements the IBM MQ family of products. Each SupportPac supplies a particular function or service that can be used with one or more of the IBM MQ products.

- [SupportPacs for IBM MQ and other project areas](#)
- [IBM MQ - SupportPacs by Product](#)

## Related concepts

[“IBM MQ code signatures” on page 12](#)

For IBM MQ 9.4, downloadable .zip, and .tar.gz files are signed. Installable .rpm and .deb files are also signed. Where possible the signature is embedded in the file. For file formats that do not allow this, a separate .sig file is made available containing the signatures and the public keys to verify them.

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

## Related tasks

[Downloading IBM MQ classes for .NET Standard from the NuGet repository](#)

[Downloading IBM MQ classes for XMS .NET Standard from the NuGet repository](#)

## Related reference

[IBM MQ license information](#)

## Related information

[IBM MQ downloads for developers](#)

## IBM MQ code signatures

For IBM MQ 9.4, downloadable .zip, and .tar.gz files are signed. Installable .rpm and .deb files are also signed. Where possible the signature is embedded in the file. For file formats that do not allow this, a separate .sig file is made available containing the signatures and the public keys to verify them.

IBM MQ public certificates, checksums, pgp key and .sig files can be downloaded from the extra download packages at <https://ibm.biz/mq94signatures>.

## \*.zip files

IBM MQ deliverables in .zip file form contain an embedded digital signature that can be verified by using a recent Java Development Kit (JDK) as shown in the following example:

```
jarsigner -certs -verify 9.4.0.0-IBM-MQC-Redist-Java.zip
jar verified.
```

**Note:** More details, including the signer, can be found by running with the verbose option.

## \*.tar.gz files

IBM MQ deliverables in \*.tar.gz file form are signed by IBM MQ and their digital signatures are provided in the extra downloadable package. To verify a file's signature, use **openssl** as shown in the following example for 9.4.0.0-IBM-MQC-Redist-LinuxX64.tar.gz:

```
openssl dgst -sha256 -verify ibm_mq_public.pem -signature 9.4.0.0-IBM-MQC-Redist-
LinuxX64.tar.gz.sig 9.3.0.0-IBM-MQC-Redist-LinuxX64.tar.gz
Verified OK
```

## \*.rpm

The IBM-provided RPMs are signed with a digital signature, and systems will not recognize the signing key without it being authorized. Obtain the IBM MQ public signing gpg key from the extra downloadable package and install it into rpm. This only needs to be done once per system.

```
rpm --import ibm_mq_public.pgp
```

The validity of any of the IBM MQ RPMs can then be verified, for example:

```
# rpm -Kv MQSeriesRuntime-9.4.0-0.x86_64.rpm
MQSeriesRuntime-9.4.0-0.x86_64.rpm:
  Header V3 RSA/SHA256 Signature, key ID 0209b828: OK
  Header SHA1 digest: OK
  V3 RSA/SHA256 Signature, key ID 0209b828: OK
  MD5 digest: OK
```

**Note:** If you skip this step, then a harmless warning might be issued during RPM installation to indicate there is a signature but the system does not recognize the signing key, for example:

```
warning: MQSeriesRuntime-9.4.0-0.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID 0209b828:
NOKEY
```

## \*.deb

The IBM provided debian type packages are signed with an embedded digital signature. To verify a package you will need the IBM MQ public signing gpg key from the additional package, and the "debsigs" operating system package installed.

1. Import the gpg key and identify its gpg key value:

```
# gpg --import ibm_mq_public.pgp
gpg: keybox '/root/.gnupg/pubring.kbx' created
gpg: /root/.gnupg/trustdb.gpg: trustdb created
gpg: key D2D53B4E0209B828: public key "IBM MQ signing key <psirt@us.ibm.com>" imported
gpg: Total number processed: 1
gpg:                imported: 1
```

From this, the key value would be D2D53B4E0209B828 and the certificate alias would be "IBM MQ signing key <psirt@us.ibm.com>". The following instructions use those values – replace them with the ones calculated from your import.

2. Export the certificate alias into the system keyrings:

```
mkdir /usr/share/debsig/keyrings/D2D53B4E0209B828/
cd /usr/share/debsig/keyrings/D2D53B4E0209B828/
gpg --output IBMMQ.bin --export "IBM MQ signing key <psirt@us.ibm.com>"
```

3. Set up the system to enable a signing policy for this key:

```
mkdir /etc/debsig/policies/D2D53B4E0209B828/
cd /etc/debsig/policies/D2D53B4E0209B828/
```

Create a file called `IBM-MQ.pol` in this directory with the following contents. Note that only the 'id' fields need changing to the key value from step 1.

```
<?xml version="1.0"?>
<!DOCTYPE Policy SYSTEM "https://www.debian.org/debsig/1.0/policy.dtd">
<Policy xmlns="https://www.debian.org/debsig/1.0/">
  <Origin Name="IBM MQ signing key" id="D2D53B4E0209B828" Description="IBM MQ signing key"/>
  <Selection>
    <Required Type="origin" File="IBMMQ.bin" id="D2D53B4E0209B828"/>
  </Selection>
  <Verification MinOptional="0">
    <Required Type="origin" File="IBMMQ.bin" id="D2D53B4E0209B828"/>
  </Verification>
</Policy>
```

4. Validate packages individually using the `debsig-verify` utility:

```
# debsig-verify ibmmq-runtime_9.4.0.0_amd64.deb
debsig: Verified package from 'IBM MQ signing key' (IBM MQ signing key)
```

**Note:** Whilst it is possible to configure `dpkg` to verify signatures during installation, this is not advisable as it will cause `dpkg` to reject the installation of unsigned Debian files.

### Related tasks

[“Installing the first IBM MQ installation on Linux using the rpm command” on page 112](#)

You can install an IBM MQ server on a 64-bit Linux system using `rpm`. The instructions in this topic are for the first installation of IBM MQ on a Linux system.

[“Installing an IBM MQ client on Linux using rpm” on page 119](#)

Installing an IBM MQ client on a 64 bit Linux system.

[“Installing IBM MQ on Linux Red Hat using yum” on page 122](#)

You can install IBM MQ on Linux Red Hat by using the `yum` installer.


## Multi

### Planning considerations for installation on Multiplatforms

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

Before you start installing, consider how you want to use IBM MQ and review the information in this section, and also the information in the general [Planning](#) section.

When planning your installation, make sure that you check the hardware and software requirements for your system. For more information, see [“Where to find product requirements and support information” on page 9](#).

**Note:**  This information is about planning an installation on IBM MQ for Multiplatforms. For information about planning an installation on z/OS, see [“Planning to install IBM MQ for z/OS” on page 273](#).

## ALW

### Installation name on AIX, Linux, and Windows

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

You can choose the installation name and make it meaningful to you. For example, you might call a test system *testMQ*.

If you do not specify an installation name when the product is installed, a default installation name is automatically assigned. For the first installation, this name is *Installation1*. For the second installation, the name is *Installation2*, and so on. The installation name cannot be changed after the product is installed.

## Linux

## AIX

On AIX and Linux systems, the first IBM MQ installation is automatically given an installation name of *Installation1*.

**Note:** For subsequent installations, you can use the **crtmqinst** command to set the installation name before installing the product.

**Windows** On Windows systems, you can choose the installation name during the installation process.

The installation name can be up to 16 bytes and must be a combination of alphabetic and numeric characters in the ranges a-z, A-Z, and 0-9. You cannot use blank characters. The installation name must be unique, regardless of whether uppercase or lowercase characters are used. For example, the names `INSTALLATIONNAME` and `InstallationName` are not unique.

You can find out what installation name is assigned to an installation in a particular location using the **dspmqinst** command.

## Installation descriptions

Each installation can also have an installation description. This description can give more detailed information about an installation in cases where the installation name cannot provide enough information. These descriptions can be up to 64 single-byte characters, or 32 double-byte characters. The default installation description is blank. You can set the installation description using the **setmqinst** command.

### Related concepts

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

### Related reference

[dspmqinst](#)

[setmqinst](#)

[crtmqinst](#)

## **Multi** **Installation location on Multiplatforms**



You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.


## Default location


The default location for the IBM MQ product code is shown in the following table:



Platform	Installation location
<b>AIX</b> AIX	/usr/mqm
<b>IBM i</b> IBM i	/QIBM/ProdData/mqm
<b>Linux</b> Linux	/opt/mqm

Table 2. Installation location of IBM MQ (continued)

Platform	Installation location
 Windows systems	C:\Program Files\IBM\MQ
 Windows data directories	C:\ProgramData\IBM\MQ




**Important:**  For Windows installations, the directories are as stated, unless there is a previous installation of the product that still contains registry entries or queue managers, or both. In this situation, the new installation uses the old data directory location. For more information, see [Program and data directory locations](#).

 On IBM i, IBM MQ can only be installed in the default location. For more information about the directory structure of IBM i, see [Directory structure on IBM i](#)

  On AIX and Linux systems, working data is stored in /var/mqm, but you cannot change this location. For more information about the directory structure of AIX and Linux systems, see [Directory structure on AIX and Linux systems](#).



## Custom location installation

For an installation into a custom location, the path specified must either be an empty directory, or a path that does not exist. The length of the path is limited to 256 bytes. Permissions on the path must be such that the user mqm and users in the mqm group can access the directories.

-   On AIX and Linux systems, the path must not contain spaces.
-  On AIX, the product is installed into a User Specified Installation Location (USIL), which can be either an existing USIL or a new USIL that is automatically created by the installation process. If a custom location is specified, the product location is the path specified during installation, plus /usr/mqm.


For example, the path specified is /usr/custom\_location. The `MQ_INSTALLATION_PATH` is /usr/custom\_location/usr/mqm.

Access permissions for the USIL directory should be set to rwx for user and r-x for group and others (755).

- On the following platforms, the product location is the same path as specified during installation:
  -  Linux
  -  Windows

For example, on Linux, the path specified is /opt/custom\_location. The `MQ_INSTALLATION_PATH` is /opt/custom\_location.

**Note:** Use `rpm --prefix` to specify the value of `MQ_INSTALLATION_PATH`. See step “6” on page 114 in *Installing the first IBM MQ installation on Linux using the rpm command* for an example of using `rpm --prefix`.

- On the following platforms, you can install IBM MQ into a non empty `MQ_INSTALLATION_PATH` directory:
  -  Linux

On Linux, you do this by setting the environment variable `AMQ_OVERRIDE_EMPTY_INSTALL_PATH` to 1 before starting the installation.

Note, that a non empty directory in this context, indicates a directory which contains system files and directories.



For each installation, all of the IBM MQ components that you require must be installed in the same location.

For more information about how to install to a custom location, see the installation topics for the appropriate platform.

## Additional location restrictions

New IBM MQ installations should not be located in the following paths:

- In a path that is a subdirectory of another existing installation.
- In a path that is part of the direct path to an existing installation.

If IBM MQ is installed in `/opt/IBM/MQ/installations/1`, you cannot install in `/opt/IBM/MQ/installations/1/a`. Additionally, you should not install a new installation to `/opt/IBM/MQ`. However, you can install a new installation in `/opt/IBM/MQ/installations/2` or `/opt/IBM/MQnew` because neither of these is a part of the direct path `/opt/IBM/MQ/installations/1`.

- In a path that is a subdirectory of the default location, for example:

–  `/usr/mqm` on AIX.

–  `/opt/mqm` on Linux.

The reason an installation should not be located in a path that is a subdirectory of the default location is to avoid the risk if you later decide to install IBM MQ into the default location, and cannot then do so. If you do subsequently install into the default location, because IBM MQ has full access rights over the installation directory, existing files might be replaced or deleted. Scripts that you might subsequently run to uninstall IBM MQ might remove the installation directory at the end of the script.

- In a directory or subdirectory that is, or might later be used by another product, for example, an IBM Db2® installation, or operating system component.

You must not install to any directory located under `/opt/IBM/db2` where `/opt/IBM/db2` is an example.

- In a directory or subdirectory that the mqm user or mqm group does not have authority to write to.

### Related concepts

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

## **Multiple installations on AIX, Linux, and Windows**

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

You can choose where each copy of IBM MQ is installed, but each copy must be in a separate installation location. A maximum of 128 installations of IBM MQ can exist on a single machine at a time. You have a choice:

- Keep the simplicity of maintaining and managing a single installation of IBM MQ on a machine.

- Take advantage of the flexibility that is offered by enabling multiple IBM MQ installations.

## Decisions to make before installing

Before you install multiple copies of IBM MQ, you must make several decisions:

### Where will you install each copy of IBM MQ?

You can choose the installation location for your installations in IBM MQ. For more information, see [“Installation location on Multiplatforms”](#) on page 15.

### Do you need a primary installation?

A primary installation is an installation to which system-wide locations refer.

For more information, see [“Primary installation on AIX, Linux, and Windows”](#) on page 19.

### How will your applications connect?

You need to consider how your applications locate the appropriate IBM MQ libraries. For more information, see [Connecting applications in a multiple installation environment](#), and [Connecting .NET applications in a multiple installation environment](#).

### Do your existing exits need changing?

If IBM MQ is not installed in the default location, your exits need to be updated. For more information, see [Writing exits and installable services on AIX, Linux, and Windows](#).

### Which queue manager will be associated with which installation?

Each queue manager is associated with a particular installation. The installation that a queue manager is associated with limits that queue manager so that it can be administered only by commands from that installation. For more information, see [Associating a queue manager with an installation](#).

### How will you set up your environment to work with each installation?

With multiple installations on a system, you need to consider how you will work with particular installations, and how you will issue commands from that installation. You can either specify the full path to the command, or you can use the `setmqenv` or `crtmqenv` command to set environment variables. Setting the environment variables allows you to omit the path to the commands for that installation. For more information, see [setmqenv](#), and [crtmqenv](#).

When you have answered these questions, you can install IBM MQ after you have read [“IBM MQ installation overview”](#) on page 6.

If you have existing installations of IBM MQ and you want to use the multiple installation capability to migrate from one version of IBM MQ to another version, see [“Multi-installation queue manager coexistence on AIX, Linux, and Windows”](#) on page 376.

## The IBM message service client for .NET support pack and multiple installations

For multiple version support, on IBM MQ, the "Java and .NET Messaging and Web Services" feature must be installed with the IBM MQ product. For more information about installing the .NET feature, see [Installing IBM MQ classes for .NET](#).

### Related tasks

[Configuring multiple installations](#)

[Finding installations of IBM MQ on a system](#)

[“Migrating on AIX and Linux: side-by-side”](#) on page 431

[“Migrating on AIX and Linux: multi-stage”](#) on page 435

[“Choosing MSI Instance IDs for multiple server installations”](#) on page 181

For multiple silent installations, for each version that is installed you must find an MSI instance ID that is available to use for that installation.

[“Choosing MSI Instance IDs for multiple client installations”](#) on page 206

For multiple silent installations, for each version that is installed you must find an MSI instance ID that is available to use for that installation.

### **ALW** *Primary installation on AIX, Linux, and Windows*

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

You can install multiple versions of IBM MQ on AIX, Linux, and Windows. You can have more than one installation of IBM MQ on one of these systems at any time and, optionally, configure one of these installations as the primary installation. Environment variables and symbolic links pointing to a single installation are less meaningful when multiple versions exist. However, some functions require these system-wide locations to work. For example, custom user scripts for administering IBM MQ, and third party products. These functions work only on the primary installation.

**Linux** **AIX** On AIX and Linux systems, if you set an installation as the primary installation, symbolic links to the external libraries and control commands of that installation are added into /usr/lib, and /usr/bin. If you do not have a primary installation, the symbolic links are not created. For a list of the symbolic links that are made to the primary installation, see [“External library and control command links to primary installation on AIX and Linux”](#) on page 23.

**Windows** On Windows systems, the global environmental variables point to the directories into which the primary installation is installed. These environment variables are used to locate IBM MQ libraries, control commands, and header files. Additionally, on Windows systems, some features of the operating system require the central registration of interface libraries that are then loaded into a single process. With multiple versions of IBM MQ, there would be conflicting sets of IBM MQ libraries. The features would try to load these conflicting sets of libraries into a single process. Therefore, such features can be used only with the primary installation. For more information, see [“Features that can be used only with the primary installation on Windows”](#) on page 25.

*Table 3. Primary installation options*

Options	Valid installation configurations		More information
	Primary	Non-primary	
Single installation	Version 7.1 or later	None	If you want to continue working with a single installation in the same way as previous releases, configure your installation as the primary installation. For more information, see <a href="#">“Single installation of IBM MQ configured as the primary installation”</a> on page 20.
	None	Version 7.1 or later	If you want to continue working with a single installation, but do not want symbolic links or global environment variables created for you, configure your installation as non-primary. For more information,, see <a href="#">“Single installation of IBM MQ configured as non-primary”</a> on page 21.
Multiple installations	Version 7.1 or later	Version 7.1 or later	If you want to have multiple installations of IBM MQ, you can choose whether to make one of the installations primary. For more information, see <a href="#">“Multiple installations of IBM MQ”</a> on page 22.
	None	Version 7.1 or later.	

#### **Related concepts**

[“Single installation of IBM MQ configured as the primary installation”](#) on page 20

Marking an IBM MQ installation as primary adds symbolic links, or global environment variables to the system so that the IBM MQ commands and libraries used by applications are automatically available with minimum system setup required.

[“Single installation of IBM MQ configured as non-primary” on page 21](#)

If you install IBM MQ as non-primary you might have to configure a library path for applications to load IBM MQ libraries. On Windows, some product capabilities are available only when IBM MQ is configured as primary.

[“Multiple installations of IBM MQ” on page 22](#)

You can choose to have one of the IBM MQ installations configured as the primary installation. Your choice depends on how applications locate libraries.

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

## Related tasks


[Changing the primary installation](#)


 *Single installation of IBM MQ configured as the primary installation*

Marking an IBM MQ installation as primary adds symbolic links, or global environment variables to the system so that the IBM MQ commands and libraries used by applications are automatically available with minimum system setup required.

You decide where to install IBM MQ.

Where possible, configure applications and scripts to use the system search path to find the IBM MQ control commands or IBM MQ libraries. This configuration of applications and scripts provides maximum flexibility for undertaking future tasks such as migrating to the next release of IBM MQ, or installing a second installation. For more information about options for connecting your applications, see [Connecting applications in a multiple installation environment](#).

 On AIX and Linux, the first installation onto a system must be manually configured to be the primary installation.

 On Windows, the first installation is automatically configured as the primary installation.

Set the primary installation using the `setmqinst` command. For more information, see [“Uninstalling, upgrading, and maintaining the primary installation” on page 26](#).

## Related concepts

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

## Related tasks

[Changing the primary installation](#)

### *Single installation of IBM MQ configured as non-primary*

If you install IBM MQ as non-primary you might have to configure a library path for applications to load IBM MQ libraries. On Windows, some product capabilities are available only when IBM MQ is configured as primary.

## AIX and Linux systems



The implications of running a non-primary installation on AIX and Linux systems are as follows:

- Applications that locate their IBM MQ libraries using an embedded library path, for example, RPATH, cannot find those libraries if the following conditions are true:
  - IBM MQ is installed in a different directory from the directory specified in the RPATH
  - There are no symbolic links in /usr
- Where applications locate their libraries using an external library path, for example, LD\_LIBRARY\_PATH, you must configure the external library path to include the `MQ_INSTALLATION_PATH/lib` or `MQ_INSTALLATION_PATH/lib64` directory. The **setmqenv** and **crtmqenv** commands can configure a number of environment variables in the current shell, including the external library path.
- Most IBM MQ processes run as setuid/setgid. As a result, when loading user exits they ignore the external library path. User exits that reference IBM MQ libraries can find those libraries only if they are found in the library path embedded within them. They would be resolved if there were a symbolic link in /usr. User exits that are intended to be run on IBM WebSphere MQ 7.1, or later, can now be built so that they do not refer to IBM MQ libraries at all. Instead they rely on IBM MQ to pass in function pointers to the IBM MQ functions that the exit can then use. For more information, see [Writing exits and installable services on AIX, Linux, and Windows](#).

For more information about options for connecting your applications, see [Connecting applications in a multiple installation environment](#).

On AIX and Linux platforms, the first installation onto a system is not automatically configured as the primary installation. However, a single symbolic link is included in /usr/bin to locate the **dspmqr** command. If you do not want any symbolic links, you must remove this link using the following command:

```
setmqinst -x -p MQ_INSTALLATION_PATH
```

## Windows systems



The implications of running a non-primary installation on Windows are:

- Applications normally find their libraries using the external library path, PATH. There is no concept of an embedded library path or explicit library location. If the installation is non-primary, the global PATH environment variable does not contain the IBM MQ installation directory. For applications to find IBM MQ libraries, update the PATH environment variable to reference the IBM MQ installation directory. The **setmqenv** and **crtmqenv** commands can configure a number of environment variables in the current shell, including the external library path.
- Some product capabilities are available only when an installation is configured as the primary installation; see [“Features that can be used only with the primary installation on Windows”](#) on page 25.

By default, on Windows, the first installation is automatically configured as primary. You must manually deselect it as the primary installation.

### Related concepts

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

### Related tasks

[Changing the primary installation](#)

### Related reference

[setmqenv](#)

[crtmqenv](#)

### *Multiple installations of IBM MQ*

You can choose to have one of the IBM MQ installations configured as the primary installation. Your choice depends on how applications locate libraries.

The IBM MQ libraries, such as `mqm`, which ship with the product automatically use libraries of the level required by the queue manager to which they are connecting. This means that provided an application locates its IBM MQ libraries from an IBM MQ installation, it can connect to any queue manager on that system. Having one installation configured as primary ensures that if the application finds its IBM MQ interface library, the application can connect to any queue manager.

For more information about connecting applications in a multiple installation environment, see [Connecting applications in a multiple installation environment](#).

The primary installation is not automatically changed when you uninstall the primary installation. If you want another installation to be the primary installation, you must manually set the primary installation using the `setmqinst` command. For more information, see [“Uninstalling, upgrading, and maintaining the primary installation” on page 26](#).

### Related concepts

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

### Related tasks

[Changing the primary installation](#)

*Linux*

On AIX and Linux platforms the primary installation is the one to which links from the /usr file system are made. However, only a subset of those links created with previous releases are now made.





No links are created from /usr/include to any installation and only links to external libraries and documented control commands are made from /usr/lib, and where appropriate, /usr/lib64 (external libraries) and /usr/bin (control commands).

In order to run these commands you must complete the following steps:

1. provide a full path to the command in an available IBM MQ installation,
2. use the `setmqenv` script to update your shell environment,
3. manually add the bin directory from an IBM MQ installation directory to your PATH,
4. run the **setmqinst** command as root to make one of your existing IBM MQ installations the primary installation.

## External libraries

Links are made to the following external libraries, both 32-bit and 64-bit:

- libmqm
- libmqm\_r
- libmqmxa
- libmqmxa\_r
- libmqmax
- libmqmax\_r
- libmqmcb
- libmqmcb\_r
- libmqic
- libmqic\_r
- libmqcxa
- libmqcxa\_r
- libmqicb
- libmqicb\_r
- libimqb23ia
- libimqb23ia\_r
- libimqc23ia
- libimqc23ia\_r
- libimqs23ia
- libimqs23ia\_r
- libmqmzf
- libmqmzf\_r
-  libimqb23ca
-  libimqb23ca\_r
-  libimqc23ca
-  libimqc23ca\_r

- **V 9.4.0** libimqs23ca
- **V 9.4.0** libimqs23ca\_r

**V 9.4.0** Libraries containing "ia" have been built with the XLC 16 compiler, whilst libraries with "ca" in the name have been built with the XLC 17 compiler.

The following 64-bit only libraries are also linked to:



- libmqmxa64
- libmqmxa64\_r
- libmqcxa64
- libmqcxa64\_r

## Control commands

The following control commands are linked to from /usr/bin:

- addmqinf
- amqcrs6a
- amqcrsta
- amqmfscck
- crtmqinst
- dlrmqinst
- dspmqinst
- setmqinst
- crtmqcvx
- crtmqm
- dlrmqm
- dmpmqaut
- dmpmqlog
- dspmq
- dspmqaut
- dspmqcsv
- dspmqfls
- dspmqinf
- dspmqrte
- dspmqtrc
- dspmqtrn
- dspmqver
- endmqcsv
- endmqslr
- endmqm
- endmqtrc
- rcdmqimg
- rcrmjob
- rmvmqinf
- rsvmqtrn



- runmqchi
- runmqchl
- runmqdlq
-   runmqktool
- runmqlsr
- runmqsc
- runmqtmc
- runmqtrm
- setmqaut
- setmqenv
- setmqm
- setmqprd
- strmqcsv
- strmqm
- strmqtrc


### Related concepts

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

[“Features that can be used only with the primary installation on Windows” on page 25](#)

Some Windows operating-system features can be used only with the primary installation. This restriction is due to the central registration of interface libraries, which might conflict as a result of multiple versions of IBM MQ being installed.

 *Features that can be used only with the primary installation on Windows*

Some Windows operating-system features can be used only with the primary installation. This restriction is due to the central registration of interface libraries, which might conflict as a result of multiple versions of IBM MQ being installed.

### The .NET monitor

The IBM MQ .NET monitor can run in two different modes: transactional and non-transactional. The transactional mode uses MSDTC transaction coordination and requires that the .NET monitor is registered with COM+. The .NET monitor from the primary installation is the only .NET monitor that is registered with COM+.

Any attempt to run the .NET monitor in transactional mode with a non-primary installation results in the failure of the .NET monitor to enlist with MSDTC. The .NET monitor receives an MQRC\_INSTALLATION\_MISMATCH error, which in turn results in an AMQ8377 error message on the console.

### Related concepts

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

[“External library and control command links to primary installation on AIX and Linux” on page 23](#)

On AIX and Linux platforms the primary installation is the one to which links from the /usr file system are made. However, only a subset of those links created with previous releases are now made.

### *Uninstalling, upgrading, and maintaining the primary installation*

On all platforms, if you uninstall the primary installation, it ceases to be the primary installation. You must run the **setmqinst** command to select a new primary installation. On Windows, if you update the primary installation, it continues to be the primary installation. If you apply a fix pack to the primary installation, it continues to be the primary installation.

Be cautious about the effect uninstalling or upgrading the primary installation has on applications. Applications might be using the linkage library of the primary installation to switch to the linkage library of another installation. If such an application is running, you might not be able to uninstall the primary installation. The operating system might have locked the link library of the primary installation on behalf of the application. If the primary installation has been uninstalled, an application that loads the IBM MQ libraries it requires by linking to the primary installation is not able to start.

The solution is to switch the primary installation to another installation before uninstalling. Stop, and restart applications that are linked through the previous primary installation before uninstalling it.

## Windows

### Windows

If you update the primary installation, it stops being the primary installation at the beginning of the update procedure. If, by the end of the update procedure, you have not made another installation primary, the upgraded installation is made primary again.

## Maintenance

If you apply a fix pack to the primary installation, it stops being the primary installation at the beginning of the maintenance procedure. If, by the end of the maintenance procedure, you have not made another installation primary, the upgraded installation is made primary again.

### Related concepts

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

### Related tasks

[Changing the primary installation](#)

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

### **Server-to-server links on AIX, Linux, and Windows**

For verifying a server-to-server verification, the communication links between the two systems must be checked. Before you can do the verification, you must ensure that the communications protocol is installed and configured on both systems.

The examples used in the verification tasks listed in this topic for AIX, Linux, and Windows use TCP/IP.

The various communication protocols used by the supported platforms are as follows.

### **AIX**

IBM MQ supports both TCP and SNA. If you do not use TCP, see [Setting up communication on AIX and Linux systems](#).

### **Linux**

IBM MQ for Linux supports TCP on all Linux platforms. On x86 platforms and Power platforms, SNA is also supported. If you want to use the SNA LU6.2 support on these platforms, you need the IBM

Communications Server for Linux 6.2. The Communications Server is available as a PRPQ product from IBM. For more details, see [Communications Server](#).

If you do not use TCP, see [Setting up communication on AIX and Linux systems](#).

## **Windows**

IBM MQ for Windows supports TCP, SNA, NetBios, and SPX. If you do not use TCP, see [Setting up communication for Windows](#).

### **Related tasks**

[“Verifying an IBM MQ installation on AIX” on page 51](#)

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on AIX systems.

[“Verifying an IBM MQ installation on Linux” on page 140](#)

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on Linux systems.

[“Verifying an IBM MQ installation on Windows” on page 221](#)

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on Windows systems.

## **Redistributable IBM MQ clients**

The IBM MQ redistributable client is a collection of runtime files that are provided in a .zip or .tar file that can be redistributed to third parties under redistributable license terms. This provides a simple way of distributing applications and the runtime files that they require in a single package.

For information about redistributable license terms for the redistributable IBM MQ clients, see [IBM MQ Redistributable Components](#).

### **What are the IBM MQ redistributable clients?**


The redistributable client that is supplied with IBM MQ is also a non-installed and relocatable image. Maintenance of a redistributable, non-installed image, is achieved through replacement; that is, you download newer versions of the runtime components when they are shipped.

- A *redistributable* client implies distributing the required run time with an application both inside and outside of your environment.
- A *relocatable* client implies putting the files somewhere else other than a fixed default location. For example, instead of installing into /opt/ installing into /usr/local.
- A *non-installed* client implies that you are not required to lay down client files, and that these files can be copied as required.

From IBM MQ 8.0.0 Fix Pack 4, native redistributable client runtime libraries are provided for Linux x86-64 and Windows 64-bit platforms to make it simple to distribute both applications and the required IBM MQ runtime libraries. A third package, which is not platform-specific, contains the runtime files that are required for the Java/JMS applications, including the IBM MQ resource adapter for JMS applications that are running under an application server.

**Note:** For important considerations about bundling the relocatable JAR files for IBM MQ classes for JMS, see [What is installed for IBM MQ classes for JMS](#).

You can use the files that are contained in the redistributable images to run the following client applications:

- Native IBM MQ applications using the MQI written in C, C++, and COBOL.
- IBM MQ applications using the IBM MQ classes for Java and IBM MQ classes for JMS.
-  IBM MQ using fully managed and unmanaged .NET classes.

XMS .NET is shipped as part of the redistributable client. XMS .NET requires the IBM MQ .NET client (amqmdnet.dll). If unmanaged mode is to be used, then the IBM MQ C client libraries are also needed along with amqmdnet.dll.

Managed File Transfer Agent is optionally provided as an individual redistributable component, available to be downloaded as a tar package on Linux, or as zip package on Windows. This option enables developers to download, configure and test a Managed File Transfer Agent, to ensure it connects to an existing Managed File Transfer configuration and then make the configured agent bundle available to many users within their organization. Users who are unfamiliar with how Managed File Transfer works, can easily set up the pre-configured agent on their local environment and quickly connect to the relevant IBM MQ network. The users do not have to install IBM MQ to be able to transfer files. For more information, see [Configuring the Redistributable Managed File Transfer Agent](#).

## Downloading the redistributable client packages

You can download the redistributable client packages from Fix Central:

- [IBM MQ redistributable clients](#)
- [IBM MQ redistributable Managed File Transfer Agents](#)

The file names describe the file contents and equivalent maintenance levels.

For V9R4M0, the downloadable packages for the native redistributable client runtime libraries and JMS and Java runtime files are available under the following file names:

**Linux** **Long Term Support: 9.4.0 IBM MQ C redistributable client for Linux x86-64**  
9.4.0.0-IBM-MQC-Redist-LinuxX64.tar.gz

**Windows** **Long Term Support: 9.4.0 IBM MQ C and .NET redistributable client for Windows x64**  
9.4.0.0-IBM-MQC-Redist-Win64.zip

**Long Term Support: 9.3.0 IBM MQ JMS and Java redistributable client**  
9.4.0.0-IBM-MQC-Redist-Java.zip

For IBM MQ 9.4, the downloadable packages for the Redistributable Managed File Transfer Agent are available under the following file names:

**Linux** **Long Term Support: 9.4.0 Redistributable IBM MQ Managed File Transfer Agent for Linux X86-64**  
9.4.0.0-IBM-MQFA-Redist-LinuxX64

**Linux** **Long Term Support: 9.4.0 Redistributable IBM MQ Managed File Transfer Agent for Linux on z Systems**  
9.4.0.0-IBM-MQFA-Redist-LinuxS390X

**Linux** **Long Term Support: 9.4.0 Redistributable IBM MQ Managed File Transfer Agent for Linux PPC (Little Endian)**  
9.4.0.0-IBM-MQFA-Redist-LinuxPPC64LE

**Windows** **Long Term Support: 9.4.0 Redistributable IBM MQ Managed File Transfer Agent for Windows x64**  
9.4.0.0-IBM-MQFA-Redist-Win64

The IBM IPLA license agreement is extended for IBM MQ to enable you to download a number of additional runtime files from [Fix Central](#).

**Note:** See [Downloading and configuring Redistributable Managed File Transfer components](#) for details on upgrading those components.

### Related concepts

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Redistributable clients on Linux” on page 137](#)

The Linux x86-64 image is shipped in a `LinuxX64.tar.gz` file.

[“Redistributable clients on Windows” on page 219](#)

The Windows 64-bit image is shipped in a `Win64.zip` file.

[“.NET application runtime - Windows only” on page 220](#)

Considerations when using the .NET application.

## Related tasks

[Configuring the Redistributable Managed File Transfer Agent](#)

[Upgrading Redistributable Managed File Transfer components](#)

## **Limitations and other considerations for redistributable clients**

There are a number of points to consider when installing the IBM MQ C redistributable client for Linux x86-64 and the IBM MQ C and .NET redistributable client for Windows x64 packages.

## Limitations

### IBM Global Security Kit (GSKit) objects

No new GSKit objects are shipped. Only the runtime files are shipped, both in a regular installation and with the redistributable client.

### IBM JREs

No IBM JREs are provided with the redistributable client.

If you want to run Java/JMS applications, you must provide your own runtime environment. Your JRE, that applications run under, must meet the current SOE requirements and are bound by any restrictions or limitations that apply.

### Developing applications

Before IBM MQ 9.2.0, all other files that support the development and distribution of applications (including copybooks, header files, and sample source code) are not available in any of the redistributable client packages, including the IBM MQ C redistributable client packages, and are not licensed for redistribution. If you need to develop IBM MQ applications, you still need to perform a traditional installation so that you obtain the SDK files that are required to build client applications.

From IBM MQ 9.2.0, this limitation no longer applies to the IBM MQ C redistributable client packages. From IBM MQ 9.2.0, the IBM MQ C redistributable client packages include the elements required to build the application, that is the header files and copybooks. However, the sample source code is still not included in these packages.

## **Windows C runtime libraries**

You might have these libraries on your machine already, but if you do not, you need to download and install the following Microsoft C/C++ runtime libraries:

- Microsoft Visual C++ Redistributable 2008
- Microsoft Visual C++ Redistributable 2012

The download links for the redistributable downloads for each of these libraries can be found at [The latest supported Visual C++ downloads](#).

### **The redistributable Java client does not include any of the files related to the JMSAdmin tool**

A client installed by unpacking the redistributable Java client does not contain the JMSAdmin tool, or its prerequisite JAR files `fscontext.jar` and `providerutil.jar`. This means that the client

cannot connect to any file system contexts (.bindings files) created by a different installation that does have the JMSAdmin tool.

If you want to use a pre-existing file system context (.bindings file) with the redistributable Java client, you can obtain these pre-requisite JAR files from Maven:

- <https://mvnrepository.com/artifact/com.sun.jndi/providerutil/1.2>
- <https://mvnrepository.com/artifact/com.sun.jndi/fscontext>

From IBM MQ 9.2.0 Fix Pack 2 for Long Term Support and IBM MQ 9.2.2 for Continuous Delivery, the self-extracting JAR file *version-IBM-MQ-Install-Java-All.jar* includes all of the files related to the JMSAdmin tool. For more information, see [Obtaining the IBM MQ classes for JMS separately](#).

## Choosing the files to distribute with an application

A script file named **genmqpkg** is provided by the redistributable client under the `bin` directory. You can use the **genmqpkg** script to generate a smaller subset of files that are tailored to the needs of the application for which the files are intended to be distributed.

When you run the script, you are asked a series of interactive Yes or No questions to determine the runtime requirements for an IBM MQ application. Finally, **genmqpkg** asks you to supply a new target directory, where the script duplicates the required directories and files.

The **genmqpkg** script that is shipped with the IBM MQ C redistributable client packages includes an additional question asking whether the runtime requires the SDK to compile applications. For the IBM MQ C redistributable client packages, responses can be given programmatically. All the interactive prompts can be bypassed by setting environment variables and executing the command with a `-b` flag to indicate a batch mode.

**Important:** IBM support is only able to provide assistance with the full, unmodified set of files contained within the redistributable client packages.

## Home directory

A `/${HOME}/.mqm` directory is created when using an unregistered or non-installed version of IBM MQ, such as the redistributable client.

The directory is created so that IBM MQ has a reliable way of accessing its socket files using a path that fits within the **sun\_path** length. If IBM MQ cannot write to the HOME directory you receive an error message.

## Classpath changes

The classpath used by **dspmqver**, **setmqenv**, and **crtmqenv** commands adds the `com.ibm.mq.allclient.jar` and `com.ibm.mq.jakarta.client.jar` to the environment, immediately following the `com.ibm.mq.jar`, and `com.ibm.mqjms.jar`.

## Modular applications using IBM MQ classes for JMS or IBM MQ classes for Jakarta Messaging

**V 9.4.0**

You can configure modular applications to use IBM MQ classes for JMS and IBM MQ classes for Jakarta Messaging by requiring the appropriate module within your application, and including the appropriate directory in the module-path. For more information, see [Configuring your modular application to use IBM MQ classes for JMS or IBM MQ classes for Jakarta Messaging](#).

## Other considerations

The default data path of a non-installed client is:

## Linux Linux x86-64

\$HOME/IBM/MQ/data

## Windows Windows

%HOMEDRIVE%\%HOMEPATH%\IBM\MQ\data

On AIX and Linux systems, the length of the path must not contain spaces.

**Important:** A redistributable client runtime co-exists with a full IBM MQ client or server installation, provided that they are installed in different locations. However, unpacking a redistributable image into the same location as a full IBM MQ installation is not supported.

On Linux the `ccsid.tbl` used to define the supported CCSID conversions is traditionally expected to be found in the `UserData` directory structure, along with error logs, trace files, and so on. The `UserData` directory structure is populated by unpacking the redistributable client, and so, if the file is not found in its usual location, the redistributable client falls back to locate the file in the `/lib` subdirectory of the installation.

## dspmqr output examples

### Linux

An example of `dspmqr` output from the redistributable client on Linux:

```
Name: IBM MQ
Version: 8.0.0.4
Level: p800-804-L150909
BuildType: IKAP - (Production)
Platform: IBM MQ for Linux (x86-64 platform)
Mode: 64-bit
O/S: Linux 2.6.32.59-0.7-default
InstName: MQNI08000004
InstDesc: IBM MQ V8.0.0.4 (Redistributable)
Primary: No
InstPath: /Development/johndoe/unzip/unpack
DataPath: /u/johndoe/IBM/MQ/data
MaxCmdLevel: 802
```

### Windows

An example of `dspmqr` output from the redistributable client on Windows:

```
Name: IBM MQ
Version: 8.0.0.4
Level: p800-804-L150909
BuildType: IKAP - (Production)
Platform: IBM MQ for Windows (x64 platform)
Mode: 64-bit
O/S: Windows 7 Professional x64 Edition, Build 7601: SP1
InstName: MQNI08000004
InstDesc: IBM MQ V8.0.0.4 (Redistributable)
Primary: No
InstPath: C:\Users\johndoe\Desktop\Redist
DataPath: C:\Users\johndoe\IBM\MQ\data
MaxCmdLevel: 802
```

## Related concepts

[“Redistributable IBM MQ clients” on page 27](#)

The IBM MQ redistributable client is a collection of runtime files that are provided in a `.zip` or `.tar` file that can be redistributed to third parties under redistributable license terms. This provides a simple way of distributing applications and the runtime files that they require in a single package.

[“.NET application runtime - Windows only” on page 220](#)



Considerations when using the .NET application.

## Linux IBM MQ non-install images

IBM MQ non-install images provide the IBM MQ product in a `tar.gz` format that can be unzipped and has no further installation steps. The purpose of this packaging of IBM MQ is to deliver the IBM MQ product in a format that can be used for building container images.

**Note:** These packages are provided only for building container images and are not supported for any other use cases.

Copies of these packages are provided with Developer, Non-Production and Production license terms for Linux x86-64, Linux on IBM Z and Linux on PPCLE. The [Github mq-container project](#) is a working example with documentation on how to build a container image using these packages. It is made available under an Apache V2 license and may be copied and customized for your own purposes.

To download the packages, go to [IBM MQ downloads](#) and follow the link to the IBM MQ release specific download document. Production and Non-Production packages are on IBM Fix Central and the Developer packages are on IBM Downloads.

The main differences between the installable and non-install IBM MQ packages are as follows:

### Security

- The user that starts the queue manager will be the user that the queue manager is running as.
- The primary group of the user starting the queue manager will be considered the administrative group rather than "mqm".
- No `setuid` on any IBM MQ executables. IBM MQ executables are required to run as a non-root user.
- It is no longer possible to authenticate incoming IBM MQ client users using local user credentials. IBM MQ is not authorized to access this operating system information, so only LDAP/UserExternal authorization can be used.

### Install

(If you using the IBM MQ Operator on OpenShift, this is handled transparently by the IBM MQ Operator.)

As no installer technology is used:

- The installation is not registered with the operating system.
- Initial data directory structures do not exist and should be created with `<MQ_INSTALLATION_PATH>/bin/crtmqdir -a -f`.

The product data directory is within the running user's home directory rather than `/var/mqm`. You can change the default directory of the data path by using the `MQ_OVERRIDE_DATA_PATH` environment variable.

**Note:** You must create the directory first, as the directory is not created automatically.

The `setmqenv` command can be used to initialize the current command environment, making it easier to work with the package.

### Related reference

[setmqenv \(set IBM MQ environment\)](#)

## AIX Installing and uninstalling IBM MQ on AIX

Installation tasks that are associated with installing IBM MQ on AIX systems are grouped in this section.

### About this task

To prepare for installation and to install the IBM MQ components, complete the following tasks.



For information about how to uninstall IBM MQ, see [“Uninstalling or modifying IBM MQ on AIX”](#) on page 60.

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ”](#) on page 294.

## Procedure

1. Check the system requirements.  
See [“Checking requirements on AIX”](#) on page 36.
2. Plan your installation.
  - As part of the planning process, you must choose which components to install and where to install them. See [“IBM MQ components for AIX systems”](#) on page 33.
  - You must also make some platform-specific choices. See [“Planning to install IBM MQ on AIX”](#) on page 38.
3. Prepare your system for installation of IBM MQ.  
See [“Preparing the system on AIX”](#) on page 38.
4. Install IBM MQ server.  
See [“Installing IBM MQ server on AIX”](#) on page 43.
5. Optional: Install an IBM MQ client.  
See [“Installing an IBM MQ client on AIX”](#) on page 48.
6. Verify your installation. See [“Verifying an IBM MQ installation on AIX”](#) on page 51.

## IBM MQ components for AIX systems

You can select the components that you require when you install IBM MQ.

**Important:** For details of what each purchase of IBM MQ entitles you to install, see [IBM MQ license information](#).

On AIX each component of IBM MQ is represented by a fileset. [Table 4 on page 33](#) shows the filesets that are available when installing an IBM MQ server or client on an AIX system:

Component	Description	Server media	Client media	Fileset name
<b>Runtime</b>	Contains files that are common to both server and client installations. <b>Note:</b> This component must be installed.	✓	✓	mqm.base.runtime
<b>Server</b>	You can use the server to run queue managers on your system and connect to other systems over a network. Provides messaging and queuing services to applications, and support for IBM MQ client connections.	✓		mqm.server.rte

Table 4. IBM MQ filesets for AIX systems (continued)

Component	Description	Server media	Client media	Fileset name
<b>Standard Client</b>	The IBM MQ MQI client is a small subset of IBM MQ, without a queue manager, that uses the queue manager and queues on other (server) systems. It can be used only when the system it is on is connected to another system that is running a full server version of IBM MQ. The client and the server can be on the same system if required.	✓	✓	mqm.client.rte
<b>SDK</b>	The SDK is required for compiling applications. It includes sample source files, and the bindings (files .H, .LIB, .DLL, and others), that you need to develop applications to run on IBM MQ.	✓	✓	mqm.base.sdk
<b>Sample programs</b>	The sample application programs are needed if you want to check your IBM MQ installation using the verification procedures.	✓	✓	mqm.base.samples
<b>Java messaging</b>	The files needed for messaging using Java (includes Java Message Service).	✓	✓	mqm.java.rte
<b>Man pages</b>	AIX man pages, in U.S. English, for: control commands MQI calls MQSC commands	✓	✓	mqm.man.en_US.data
<b>Java JRE</b>	A Java Runtime Environment that is used by those parts of IBM MQ that are written in Java.	✓	✓	mqm.jre.rte
<b>Message Catalogs</b>	For available languages, see the table of <a href="#">message catalogs</a> that follows.	✓	✓	
<b>IBM Global Security Kit (GSKit)</b>	IBM Global Security Kit (GSKit) V8 Certificate and TLS, Base Runtime.	✓	✓	mqm.gskit.rte

Table 4. IBM MQ filesets for AIX systems (continued)

Component	Description	Server media	Client media	Fileset name
<b>Telemetry Service</b>	<p>MQ Telemetry supports the connection of Internet Of Things (IOT) devices (that is, remote sensors, actuators and telemetry devices) that use the IBM MQ Telemetry Transport (MQTT) protocol. The telemetry (MQXR) service enables a queue manager to act as an MQTT server, and communicate with MQTT client apps.</p> <p>A set of MQTT clients is available from the <a href="#">Eclipse Paho downloads page</a>. These sample clients help you write your own MQTT client apps that IOT devices use to communicate with MQTT servers.</p> <p>See also “<a href="#">Installation considerations for MQ Telemetry</a>” on page 251.</p>	✓		mqm.xr.service
<b>Managed File Transfer</b>	<p>MQ Managed File Transfer transfers files between systems in a managed and auditable way, regardless of file size or the operating systems used. For information about the function of each component, see “<a href="#">Managed File Transfer product options</a>” on page 246.</p>	✓		mqm.ft.agent mqm.ft.base mqm.ft.logger mqm.ft.service mqm.ft.tools
<b>Advanced Message Security</b>	<p>Provides a high level of protection for sensitive data flowing through the IBM MQ network, while not impacting the end applications. You must install this component on all IBM MQ installations that host queues you want to protect.</p> <p>You must install the IBM Global Security Kit (GSKit) component on any IBM MQ installation that is used by a program that puts or gets messages to or from a protected queue, unless you are using only Java client connections.</p> <p>You must install the <b>Java JRE</b> component to install this component.</p>	✓		mqm.ams.rte
<b>AMQP Service</b>	<p>Install this component to make AMQP channels available. AMQP channels support AMQP 1.0 APIs. You can use AMQP channels to give AMQP applications access to the enterprise-level messaging facilities provided by IBM MQ.</p>	✓		mqm.amqp.rte
<b>REST API and Console</b>	<p>Adds HTTP based administration for IBM MQ through the REST API and IBM MQ Console.</p>	✓		mqm.web.rte

Table 5. IBM MQ message catalogs for AIX systems

Message catalog language	Component name
Brazilian Portuguese	mqm.msg.pt_BR
Czech	mqm.msg.cs_CZ
French	mqm.msg.fr_FR
German	mqm.msg.de_DE
Hungarian	mqm.msg.hu_HU
Italian	mqm.msg.it_IT
Japanese	mqm.msg.ja_JP, mqm.msg.Ja_JP
Korean	mqm.msg.ko_KR
Polish	mqm.msg.pl_PL
Russian	mqm.msg.ru_RU
Spanish	mqm.msg.es_ES
Simplified Chinese	mqm.msg.zh_CN, mqm.msg.Zh_CN
Traditional Chinese	mqm.msg.zh_TW, mqm.msg.Zh_TW
U.S. English	mqm.msg.en_US

### Related concepts

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

## Checking requirements on AIX

Before you install IBM MQ on AIX, you must check for the latest information and system requirements.

### About this task

A summary of the tasks that you must complete to check system requirements is listed here with links to further information.

### Procedure

1. Check that you have the latest information, including information on hardware and software requirements.  
See [“Where to find product requirements and support information” on page 9](#).
2. Check that your systems meet the initial hardware and software requirements for AIX.  
See [“Hardware and software requirements on AIX systems” on page 37](#).
3. Check that your systems have sufficient disk space for the installation.  
See [Disk space requirements](#).
4. Check that you have the correct licenses.  
See [“License requirements” on page 8](#) and [IBM MQ license information](#).

## What to do next

When you have completed these tasks, you are ready to start preparing your system for installation. For the next steps in installing IBM MQ, see [“Preparing the system on AIX” on page 38](#).

### Related concepts

[“IBM MQ installation overview” on page 6](#)

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Hardware and software requirements on AIX systems**

Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

For hardware and software requirements, see [System Requirements for IBM MQ](#).

## Host names


IBM MQ does not support host names that contain spaces. If you install IBM MQ on a system with a host name that contains spaces, you are unable to create any queue managers.

## 32-bit client support



**Attention:** There is no separate 32-bit client installation package. The client installation package and redistributable client contain both 32-bit and 64-bit IBM MQ client libraries. The included 32-bit libraries can be used by 32-bit applications on supported platforms where 32-bit support is offered by the operating system.

## Java Message Service

 From IBM MQ 9.3.0, Jakarta Messaging 3.0 is supported for developing new applications. IBM MQ 9.3.0 and later continue to support JMS 2.0 for existing applications. It is not supported to use both the Jakarta Messaging 3.0 API and the JMS 2.0 API in the same application. For more information, see [Using IBM MQ classes for JMS/Jakarta Messaging](#).

Java 8 is bundled with IBM MQ 9.0, but client components are built with Java 7 compatibility flags on.

For development, a JDK is required, and a JRE is required for running. The JRE does not need to be the JRE installed with IBM MQ, but has to be one from the supported list.

For a list of supported JDKs, see [System Requirements for IBM MQ](#).

You can check the version installed using the following command:

```
java -version
```

## Transport Layer Security (TLS)

If you want to use the TLS support, you need the IBM Global Security Kit (GSKit) version 8 package. This package is supplied with IBM MQ as one of the components available for installation.

## Unicode support on AIX

If you need to convert data to and from Unicode on your system, you must install the following file sets:

bos.iconv.ucs.com Unicode converters for AIX sets  
bos.iconv.ucs.ebcdic Unicode converters for EBCDIC sets  
bos.iconv.ucs.pc Unicode converters for PC sets

## AIX Planning to install IBM MQ on AIX

Before you install IBM MQ on AIX, you must choose which components to install and where to install them. You must also make some platform-specific choices.

### About this task

The following steps provide links to additional information to help you with planning your installation of IBM MQ on AIX.

As part of your planning activities, make sure that you review the information on hardware and software requirements for the platform on which you are planning to install IBM MQ. For more information, see [“Checking requirements on AIX” on page 36](#).

### Procedure

- Decide which IBM MQ components and features to install.  
See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).  
**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. For more information, see [“License requirements” on page 8](#) and [IBM MQ license information](#).
- Review the options for naming your installation.  
In some cases, you can choose an installation name to use instead of the default name. See [“Installation name on AIX, Linux, and Windows” on page 14](#).
- Review the options and restrictions for choosing an installation location for IBM MQ.  
For more information, see [“Installation location on Multiplatforms” on page 15](#).
- If you plan to install multiple copies of IBM MQ, see [“Multiple installations on AIX, Linux, and Windows” on page 17](#).
- If you already have a primary installation, or plan to have one, see [“Primary installation on AIX, Linux, and Windows” on page 19](#).
- Make sure that the communications protocol needed for server-to-server verification is installed and configured on both systems that you plan to use.  
For more information, see [“Server-to-server links on AIX, Linux, and Windows” on page 26](#).

## AIX Preparing the system on AIX

On AIX systems, you might have to complete several tasks before you install IBM MQ. You might also want to complete other tasks, depending on your installation intentions.

### About this task

The tasks that you perform to prepare your systems for installation are listed here. Complete the appropriate tasks for your platform before installing.

### Procedure

1. Set up a user ID of the name mqm, with a primary group of mqm.  
See [“Setting up the user and group on AIX” on page 39](#).

**Note:** If the group mqm and/or user mqm do not exist, during the installation of the product, the installer creates group mqm and user mqm with a home directory of /var/mqm.

2. Create file systems for both the product code and working data to be stored. See [“Creating file systems on AIX”](#) on page 40.
3. Configure any additional settings needed for your AIX system.  
See [“Configuring and tuning the operating system on AIX”](#) on page 42.

## What to do next

When you have completed the tasks to prepare the system, you are ready to start installing IBM MQ. To install a server, see [“Installing IBM MQ server on AIX”](#) on page 43. To install a client, see [“Installing an IBM MQ client on AIX”](#) on page 48.

### Related tasks

#### Planning

[“Maintaining and migrating IBM MQ”](#) on page 290

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[“Applying maintenance to IBM MQ”](#) on page 294

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Setting up the user and group on AIX**

On AIX systems, IBM MQ requires a user ID of the name mqm, with a primary group of mqm. The mqm user ID owns the directories and files that contain the resources associated with the product.

## Creating the user ID and group

Set the primary group of the mqm user to the group mqm.

**Note:** If the group mqm and/or user mqm do not exist, during the installation of the product, the installer creates group mqm and user mqm with a home directory of /var/mqm

If you are installing IBM MQ on multiple systems you might want to ensure each UID and GID of mqm has the same value on all systems. If you are planning to configure multi-instance queue managers, it is essential the UID and GID are the same from system to system. It is also important to have the same UID and GID values in virtualization scenarios.

You can use the System Management Interface Tool ( `smit` ), for which you require root authority.

1. To create the mqm group, display the required window using this sequence:

```
Security & Users
Groups
Add a Group
```

Set the group name field to mqm.

2. To create the user mqm, display the required window using this sequence:

```
Security & Users
Users
Add a User
```

Set the user name field to mqm.

3. To add a password to the new user ID, display the required window using this sequence:

```
Security & Users
```

```
Passwords
Change a User's Password
```

Set the password as required.

## Adding existing user IDs to the group

If you want to run administration commands, for example **crtmqm** (create queue manager) or **strmqm** (start queue manager), your user ID must be a member of the mqm group. This user ID must not be longer than 12 characters.

Users do not need mqm group authority to run applications that use the queue manager; it is needed only for the administration commands.

You can use `smitt` to add an existing user ID to the mqm group. Display the required menu using this sequence:

```
Security & Users
Users
Change / Show Characteristics of a User
```

Type the name of the user in the **User Name** field and press **Enter**. Add mqm to the **Group SET** field, which is a comma-separated list of the groups to which the user belongs. Users do not need to have their primary group set to mqm. If mqm is in their set of groups, they can use the administration commands.

## Log files created by MQ Telemetry service

The **umask** setting of the user ID that creates a queue manager will determine the permissions of the Telemetry log files generated for that queue manager. Even though the ownership of the log files will be set to mqm.

### Related concepts

[“Creating file systems on AIX” on page 40](#)

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation directory for the product code can be changed at installation time, but the working data location cannot be changed.

[“Configuring and tuning the operating system on Linux” on page 102](#)

Use this topic when you are configuring IBM MQ on Linux systems.

### Related tasks

[“Configuring and tuning the operating system on AIX” on page 42](#)

When installing IBM MQ on AIX systems, there are some additional settings that must be configured.

## **Creating file systems on AIX**

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation directory for the product code can be changed at installation time, but the working data location cannot be changed.

## Determining the size of a server installations file system

To determine the size of the `/var/mqm` file system for a server installation, consider:

- The maximum number of messages in the system at one time.
- Contingency for message buildups, if there is a system problem.
- The average size of the message data, plus 500 bytes for the message header.
- The number of queues.
- The size of log files and error messages.



- The amount of trace that is written to the `/var/mqm/trace` directory.

Storage requirements for IBM MQ also depend on which components you install, and how much working space you need. For more details, see [Disk space requirements](#).

## Creating a file system for the working data

Before you install IBM MQ, create and mount a file system called `/var/mqm` which is owned by the user `mqm` in the group `mqm`; see [“Setting up the user and group on AIX”](#) on page 39. This file system is used by all installations of IBM MQ on a system. If possible, use a partition strategy with a separate volume for the IBM MQ data. This means that other system activity is not affected if a large amount of IBM MQ work builds up. Configure the directory permissions to permit the `mqm` user to have full control, for example, file mode 755. These permissions will then be updated during the IBM MQ installation to match the permissions required by the queue manager.

## Creating separate file systems for errors and logs

You can also create separate file systems for your log data (`/var/mqm/log`) and error files (`/var/mqm/errors`). If possible, place these directories on different physical disks from the queue manager data (`/var/mqm/qmgrs`) and from each other.

If you create separate file systems the `/var/mqm/errors` directory can be NFS mounted. However, if you choose to NFS-mount `/var/mqm/errors`, the error logs might be lost if the network fails.

You can protect the stability of your queue manager by having separate file systems for:

- `/var/mqm/errors`
- `/var/mqm/trace`
- `/var/mqm/qmgrs`
- `/var/mqm/log`

In the case of `/var/mqm/errors`, it is rare that this directory receives large quantities of data. But it is sometimes seen, particularly if there is a severe system problem leading to IBM MQ writing a lot of diagnostic information in to `.FDC` files. In the case of `/var/mqm/trace`, files are only written here when you use `strmqtrc` to start tracing IBM MQ.

You can obtain better performance of normal IBM MQ operations (for example, syncpoints, MQPUT, MQGET of persistent messages) by placing the following on separate disks:

- `/var/mqm/qmgrs`
- `/var/mqm/log`

In the rare event that you need to trace an IBM MQ system for problem determination, you can reduce performance impact by placing the `/var/mqm/trace` file system on a separate disk.

If you are creating separate file systems, allow a minimum of 30 MB of storage for `/var/mqm`, 100 MB of storage for `/var/mqm/log`, and 10 MB of storage for `/var/mqm/errors`. The 100 MB minimum allowance of storage for `/var/mqm/log` is the absolute minimum required for a single queue manager and is not a recommended value. The size of a file system must be scaled according to the number of queue managers that you intend to use, the number of pages per log file, and the number of log files per queue manager.

For more information about file systems, see [File system support](#).

The size of the log file depends on the log settings that you use. The minimum sizes are for circular logging using the default settings. For more information about log sizes, see [Calculating the size of the log](#).

### Related concepts

[“Setting up the user and group on AIX”](#) on page 39

On AIX systems, IBM MQ requires a user ID of the name mqm, with a primary group of mqm. The mqm user ID owns the directories and files that contain the resources associated with the product.

### Related tasks

[“Configuring and tuning the operating system on AIX” on page 42](#)

When installing IBM MQ on AIX systems, there are some additional settings that must be configured.

## **Configuring and tuning the operating system on AIX**

When installing IBM MQ on AIX systems, there are some additional settings that must be configured.

### About this task

When you install IBM MQ on AIX systems, you must configure the following operating system settings:

- File descriptors
- System resource limits

### Procedure

- Increase the process limit for the number of file descriptors.

When running a multi-threaded process such as the agent process, you might reach the soft limit for file descriptors. This limit gives you the IBM MQ reason code MQRC\_UNEXPECTED\_ERROR (2195) and, if there are enough file descriptors, an IBM MQ FFST file.

To avoid this problem, increase the process limit for the number of file descriptors. You must alter the `nfiles` attribute in `/etc/security/limits` to 10,000 for the mqm user ID, or in the default stanza. To alter the number of file descriptors, complete the following steps:

- a) Check the maximum number of file descriptors available to a process running as mqm:

```
lsuser -a nfiles mqm
```

- b) Set the value to at least 10240:

```
chuser nfiles=10240 mqm
chuser nfiles_hard=10240 mqm
```

- Set the system resource limit for data segment and stack segment to unlimited using the following commands in a command prompt:

```
ulimit -d unlimited
ulimit -s unlimited
```



**Attention:** For an mqm user ID other than root, the value `unlimited` might not be permitted.

### What to do next

You can check your system configuration using the `mqconfig` command.

During high load IBM MQ can use virtual memory (swap space). If virtual memory becomes full it could cause IBM MQ processes to fail or become unstable, affecting the system.

To prevent this situation your IBM MQ administrator should ensure that the system has been allocated enough virtual memory as specified in the operating system guidelines.

For more information on configuring your system, see [How to configure AIX and Linux systems for IBM MQ](#).

### Related concepts

[“Setting up the user and group on AIX” on page 39](#)

On AIX systems, IBM MQ requires a user ID of the name mqm, with a primary group of mqm. The mqm user ID owns the directories and files that contain the resources associated with the product.

[“Creating file systems on AIX” on page 40](#)

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation directory for the product code can be changed at installation time, but the working data location cannot be changed.

## Installing IBM MQ server on AIX

You can install an IBM MQ server on AIX either interactively or silently.

### Before you begin

- Before you start the installation procedure, make sure that you complete the necessary steps that are outlined in [“Preparing the system on AIX” on page 38](#).
- IBM MQ can be installed into System Workload Partitions (WPARs) with both shared and private file systems. For installation into private file systems, IBM MQ can be installed directly into the System WPAR by using the procedure that is outlined in this topic. There are some limitations for shared /usr file systems:
  - The **dspmqinst** and **dspmqver** commands might report the primary installation incorrectly when compared with the symbolic links in /usr/bin. To synchronize the reporting of the primary installation in a System WPAR and the global environment, run **setmqinst** with the **-i** or **-x** parameter, on the individual zones.
  - You cannot change the primary installation within a WPAR. You must change the primary installation through the global environment, which has appropriate write access to /usr/bin.

**Note:** During installation to a non-default location, ATTENTION messages that relate to **errupdate** or **trcupdate** are produced. These messages are not errors. However, AIX system trace for IBM MQ is not supported for installations in a non-default location, and IBM MQ trace must be used for problem determination.

- If you install a copy of IBM MQ server for AIX by using a [downloadable installation image](#), obtained from Passport Advantage, you need to:

1. Decompress the tar file, by using the following command:

```
uncompress IBM_MQ_9.4.0_AIX.tar.Z
```

2. Extract the installation files from the tar file, by using the following command:

```
tar -xvf IBM_MQ_9.4.0_AIX.tar
```

3. Use the installation tools **installp** or **smitt** to install the IBM MQ server for AIX.

**Tip:** If you find that the Function keys do not work in SMIT, try pressing Esc and the Function key number to emulate the required Function key.

### About this task

IBM MQ is supplied as a set of filesets that are installed by using the standard AIX installation tools. The procedure uses the system management interface tool (SMIT), but you can choose to use **installp**, **geninstall** or the web-based System Manager. You can select which components you want to install. The components and file sets are listed in [“IBM MQ components for AIX systems” on page 33](#).

This procedure installs IBM MQ into the default location of /usr/mqm.

Use the procedure that is described in [“Installing the IBM MQ server silently on AIX” on page 45](#) if you want to install IBM MQ in any one of the following situations:

- As the first installation on your system by using **installp**

- As the first installation on your system, and you are installing the product to a location that is not the default location
- Alongside an existing installation

If you want to carry out a side-by-side installation, alongside an existing installation of IBM MQ in the default location, you must install the second version of the product in a location that is not the default. To create the non-default installation location you must use the **mkusil** command, which is available only from the command line.

You can then use **installp** (see “Installing the IBM MQ server silently on AIX” on page 45), or SMIT if you select the **Relocatable Software Installation** menu item.

If you want to carry out a single stage migration, refer to “Migrating on AIX and Linux: single-stage” on page 427.

## Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. Select the required smit window by using the following sequence:

```
Software Installation and Maintenance
Install and Update Software
Install and Update from ALL Available Software
```

4. Specify the input directory in the **INPUT device / directory for software** field.

- a) Enter a period character .
- b) Press the **Enter** key

5. List the software in the **SOFTWARE to install** field:

- a) Enter .
- b) Press **F4**

6. Select the file sets to install from the list. If you require messages in a language different from the language that is specified by the locale that is selected on your system, ensure that you include the appropriate message catalog. Enter **ALL** to install all applicable filesets.

7. View the license agreement:

- a) Change **Preview new LICENSE agreements?** to **yes**
- b) Press **Enter**

8. Accept the license agreements and install IBM MQ:

- a) Change **ACCEPT new license agreements?** to **yes**
- b) Change **Preview new LICENSE agreements?** to **no**
- c) Press **Enter**

## What to do next

- If you chose this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where *MQ\_INSTALLATION\_PATH* represents the directory where IBM MQ is installed.

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. For more information, see [“Verifying an IBM MQ installation on AIX” on page 51](#).

### Related concepts

[“Installation location on Multiplatforms” on page 15](#)

You can install IBM MQ into the default location. Alternatively, you can install into a custom location during the installation process. The location where IBM MQ is installed is known as the `MQ_INSTALLATION_PATH`.

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

### Related tasks

[“Installing the IBM MQ server silently on AIX” on page 45](#)

You can carry out a non-interactive installation of the IBM MQ server from the command line using the AIX **installp** command. A non-interactive installation is also known as a silent, or unattended installation.

[“Uninstalling or modifying IBM MQ on AIX” on page 60](#)

On AIX, you can uninstall the IBM MQ server or client using the System Management Interface Tool (SMIT) or the **installp** command. You can also modify an installation by uninstalling a subset of the file sets.

[Changing the primary installation](#)

### Related reference

[setmqinst](#)

## **Installing the IBM MQ server silently on AIX**

You can carry out a non-interactive installation of the IBM MQ server from the command line using the AIX **installp** command. A non-interactive installation is also known as a silent, or unattended installation.

### Before you begin

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on AIX” on page 38](#).

**Note:** During installation, errors relating to **errupdate** or **trcupdate** might occur. This can be caused by installing to a non-default location, if so these errors can be safely ignored. However, native trace for IBM MQ is only supported when installed in the default location.

### About this task

You can use this method to install to a non-default location, and can select which components you want to install. The components and filesets are listed in [“IBM MQ components and features” on page 6](#).

### Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. Install the product in one of the following ways:

- Install the whole product in the default location:

```
installp -acgXYd . all
```

- Install selected file sets in the default location:

```
installp -acgXYd . list of file sets
```

- Install the whole product in a non-default location using the -R flag:

```
installp -R USIL_Directory -acgXYd . all
```

- Install selected file sets in a non-default location using the -R flag:

```
installp -R USIL_Directory -acgXYd . list of file sets
```

where *USIL\_Directory* is a directory which exists before the command is run; it must not contain any spaces or `usr/mqm`. IBM MQ is installed underneath the directory specified. For example, if `/USIL1` is specified, the IBM MQ product files are located in `/USIL1/usr/mqm`. This location is known as the *MQ\_INSTALLATION\_PATH*.

## What to do next

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where *MQ\_INSTALLATION\_PATH* represents the directory where IBM MQ is installed.

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. See [“Verifying an IBM MQ installation on AIX” on page 51](#), for more information.

## Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ (AIX, Linux, and Windows), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

## Related tasks

[“Installing IBM MQ server on AIX” on page 43](#)

You can install an IBM MQ server on AIX either interactively or silently.

[“Uninstalling or modifying IBM MQ on AIX” on page 60](#)

On AIX, you can uninstall the IBM MQ server or client using the System Management Interface Tool (SMIT) or the **installp** command. You can also modify an installation by uninstalling a subset of the file sets.

[Changing the primary installation](#)

### Related reference

[setmqinst](#)

[User Specified Installation Location \(USIL\)](#)

## Converting a trial license on AIX

Convert a trial license to a full license without reinstalling IBM MQ.

When the trial license expires, the "count-down" displayed by the **strmqm** command informs you the license has expired, and the command does not run.

### Before you begin

1. IBM MQ is installed with a trial license.
2. You have access to the installation media of a fully licensed copy of IBM MQ.

### About this task

Run the **setmqprd** command to convert a trial license to a full license.

If you do not want to apply a full license to your trial copy of IBM MQ, you can uninstall it at any time.

### Procedure

1. Obtain the full license from the fully licensed installation media.

The full license file is `amqpcert.lic`. On AIX, it is in the `/MediaRoot/licenses` directory on the installation media.

2. Run the **setmqprd** command from the installation that you are upgrading:

```
MQ_INSTALLATION_PATH/bin/setmqprd /MediaRoot/licenses/amqpcert.lic
```

### Related reference

[setmqprd](#)

## Displaying messages in your national language on AIX

To display messages from a different national language message catalog, you must install the appropriate catalog and set the **LANG** environment variable.

### About this task

Messages in the language specified by the locale selected on your machine at installation time are installed by default.

To find out which language is currently in use, run the **locale** command.

If this returns a language which is not one of the national languages provided by IBM MQ, you must select a national language, otherwise you will not get a message catalog installed on your system.

Message catalogs for all languages are installed in `MQ_INSTALLATION_PATH/msg/language identifier`, where *language identifier* is one of the identifiers in [Table 6 on page 48](#). If you require messages in a different language, perform the following steps:

## Procedure

1. Install the appropriate message catalog (see [“IBM MQ components and features”](#) on page 6 ).
2. To select messages in a different language, ensure the **LANG** environment variable is set to the identifier for the language you want to install:

Identifier	Language
cs_CZ	Czech
de_DE	German
es_ES	Spanish
fr_FR	French
hu_HU	Hungarian
it_IT	Italian
ja_JP	Japanese
ko_KR	Korean
pl_PL	Polish
pt_BR	Brazilian Portuguese
ru_RU	Russian
zh_CN	Simplified Chinese
zh_TW	Traditional Chinese

AIX has some additional message catalogs:

Identifier	Language
Ja_JP	Japanese
Zh_CN	Simplified Chinese
Zh_TW	Traditional Chinese

## Installing an IBM MQ client on AIX

You can interactively install the IBM MQ client for AIX using `smit`.

### Before you begin

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on AIX”](#) on page 38.

### About this task

IBM MQ is supplied as a set of filesets that are installed using the standard AIX installation tools. The procedure uses the System Management Interface Tool (`smit`), but you can choose to use **installp**, **geninstall** or the web-based System Manager. You can select which components you want to install. The components and filesets are listed in [“IBM MQ components for AIX systems”](#) on page 33. You must install at least the Runtime and Client components.



This procedure installs IBM MQ into the default location. If you want to install to a non-default location, you must use **installp**, see [“Installing an IBM MQ client silently on AIX”](#) on page 50.

## Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. Select the required smit window using the following sequence:

```
Software Installation and Maintenance
Install and Update Software
Install and Update from ALL Available Software
```

4. Click **List** to display the input device or directory for the software and select the location that contains the installation images.
5. Select the **SOFTWARE to install** field to obtain a list of available filesets, and select the filesets you want to install. Ensure that you include the appropriate message catalog if you require messages in a language different from the language specified by the locale specified on your system. Enter **ALL** to install all applicable filesets.
6. Change **Preview new LICENSE agreements?** to **yes** and press Enter to view the license agreements.
7. If you have a previous version of the product on your system, change the **Automatically install requisite software** to **no**.
8. Change **ACCEPT new license agreements?** to **yes** and press Enter to accept the license agreements.
9. Change **Preview new LICENSE agreements?** to **no** and press Enter to install IBM MQ.

## What to do next

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Testing communication between a client and a server on AIX”](#) on page 59.

## Related tasks

[“Uninstalling or modifying IBM MQ on AIX”](#) on page 60

On AIX, you can uninstall the IBM MQ server or client using the System Management Interface Tool (SMIT) or the **installp** command. You can also modify an installation by uninstalling a subset of the file sets.

## **AIX** Installing an IBM MQ client silently on AIX

You can carry out a non-interactive, or silent, installation of an IBM MQ client from the command line using the AIX **installp** command.

### Before you begin

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on AIX” on page 38](#).

**Note:** Installation to a non-default location is not supported on systems that have the AIX Trusted Computing Base (TCB) enabled.

### About this task

You can use this method to install to a non-default location, and can select which components you want to install. The components and filesets are listed in [“IBM MQ components and features” on page 6](#). You must install at least the Runtime and Client components.

### Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. Install the product in one of the following ways:

- Install the whole product in the default location:

```
installp -acgXYd . all
```

- Install selected filesets in the default location:

```
installp -acgXYd . list of file sets
```

- Install the whole product in a non-default location using the -R flag:

```
installp -R USIL_Directory -acgXYd . all
```

- Install selected filesets in a non-default location using the -R flag:

```
installp -R USIL_Directory -acgXYd . list of file sets
```

where the directory specified with the -R flag is an AIX User Specified Installation Location (USIL) directory which exists before the command is run; it must not contain any spaces or `usr/mqm`.

IBM MQ is installed underneath the directory specified. For example, if `/USIL1` is specified, the IBM MQ product files are located in `/USIL1/usr/mqm`. This location is known as the `MQ_INSTALLATION_PATH`.

### What to do next

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Testing communication between a client and a server on AIX” on page 59](#).

AIX

## Verifying an IBM MQ installation on AIX

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on AIX systems.

### About this task

You can verify a local (stand-alone) server installation or a server-to-server installation of the IBM MQ server:

- A local server installation has no communication links with other IBM MQ installations.
- A server-to-server installation does have links to other installations.

You can also verify that your IBM MQ MQI client installation completed successfully and that the communication link is working.

### Procedure

- To verify a local server installation, see [“Verifying a local server installation using the command line on AIX” on page 51](#).
- To verify a server-to-server installation, see [“Verifying a server-to-server installation using the command line on AIX” on page 53](#).
- To verify a client installation, see [“Verifying a client installation using the command line on AIX” on page 56](#).

AIX

### Verifying a local server installation using the command line on AIX

On AIX systems, you can verify a local server installation by using the command line to create a simple configuration of one queue manager and one queue.

### Before you begin

To verify the installation, you must first install the samples package.

Before beginning the verification procedure, you might want to check that you have the latest fixes for your system. For more information about where to find the latest updates, see [“Checking requirements on AIX” on page 36](#).

### About this task

Use the following steps to configure your default queue manager from the command line. After the queue manager is configured, use the `amqsput` sample program to put a message on the queue. You then use the `amqsget` sample program to get the message back from the queue.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. On an AIX system, log in as a user in the mqm group.
2. Set up your environment:
  - a) Set up environment variables for use with a particular installation by entering one the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- b) Check that the environment is set up correctly by entering the following command:

```
dspmqr
```

If the command completes successfully, and the expected version number and installation name are returned, the environment is set up correctly.

3. Create a queue manager called QMA by entering the following command:

```
crtmqm QMA
```

Messages indicate when the queue manager is created, and when the default IBM MQ objects are created.

4. Start the queue manager by entering the following command:

```
strmqm QMA
```

A message indicates when the queue manager starts.

5. Start MQSC by entering the following command:

```
runmqsc QMA
```

A message indicates when MQSC starts. MQSC has no command prompt.

6. Define a local queue called QUEUE1 by entering the following command:

```
DEFINE QLOCAL (QUEUE1)
```

A message indicates when the queue is created.

7. Stop MQSC by entering the following command:

```
end
```

Messages are shown, followed by the command prompt.

**Note:** Subsequent steps require that the samples package is installed.

8. Change into the *MQ\_INSTALLATION\_PATH/samp/bin* directory, which contains the sample programs.

*MQ\_INSTALLATION\_PATH* represents the high-level directory in which IBM MQ is installed.

9. Put a message on the queue by entering the following commands

```
./amqsput QUEUE1 QMA
```

The following messages are shown:

```
Sample AMQSPUT0 start  
target queue is QUEUE1
```

10. Type some message text on one or more lines, where each line is a different message. Enter a blank line to end the message input.

The following message is shown:

```
Sample AMQSPUT0 end
```

Your messages are now on the queue and the command prompt is shown.

11. Get the messages from the queue, by entering the following command:

```
./amqsget QUEUE1 QMA
```

The sample program starts, and your messages are displayed.

## Results

You have successfully verified your local installation.

## **Verifying a server-to-server installation using the command line on AIX**

You can verify a server-to-server installation using two servers, one as a sender and one as a receiver.

### Before you begin

- On AIX, IBM MQ supports both TCP and SNA.

The examples in this task use TCP/IP. If you do not use TCP, see [Setting up communication on AIX and Linux](#).

- If you are using TCP/IP, make sure that TCP/IP and IBM MQ are installed on both servers.
- Make sure that you are a member of the IBM MQ administrators group (**mqm**) on each server.
- Decide which installation is the sender server and which installation is the receiver server. The installations might be on the same system, or on different systems.

### About this task

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

### Procedure

1. On the **receiver** server:

- a) On AIX, log in as a user in the mqm group.
- b) Check which ports are free, for example by running **netstat**. For more information about this command, see the documentation of your operating system.

If port 1414 is not in use, make a note of 1414 to use as the port number in step 2 h. Use the same number for the port for your listener later in the verification. If it is in use, note a port that is not in use; for example 1415.

- c) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- d) Create a queue manager called QMB by entering the following command at the command prompt:

```
crtmqm QMB
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- e) Start the queue manager by entering the following command:

```
startmqm QMB
```

A message tells you when the queue manager has started.

- f) Start MQSC by entering the following command:

```
runmqsc QMB
```

A message tells you that MQSC has started. MQSC has no command prompt.

- g) Define a local queue called RECEIVER.Q by entering the following command:

```
DEFINE QLOCAL (RECEIVER.Q)
```

A message tells you the queue has been created.

- h) Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT ( PORT_NUMBER )
```

Where *port\_number* is the name of the port the listener runs on. This number must be the same as the number used when defining your sender channel.

- i) Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```

**Note:** Do not start the listener in the background from any shell that automatically lowers the priority of background processes.

- j) Define a receiver channel by entering the following command:

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (RCVR) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

- k) End MQSC by typing:

```
end
```

Some messages are displayed, followed by the command prompt.

## 2. On the **sender** server:

- a) As the sender server is an AIX system, log in as a user in the mqm group.  
b) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Create a queue manager called QMA by entering the following command at the command prompt:

```
crtmqm QMA
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- d) Start the queue manager, by entering the following command:

```
startmqm QMA
```

A message tells you when the queue manager has started.

- e) Start MQSC by entering the following command:

```
runmqsc QMA
```

A message tells you that an MQSC session has started. MQSC had no command prompt.

- f) Define a local queue called QMB (to be used as a transmission queue) by entering the following command:

```
DEFINE QLOCAL (QMB) USAGE (XMITQ)
```

A message tells you when the queue has been created.

- g) Define a local definition of the remote queue with by entering the following command:

```
DEFINE QRREMOTE (LOCAL.DEF.OF.REMOTE.QUEUE) RNAME (RECEIVER.Q) RQMNAME ('QMB') XMITQ (QMB)
```

- h) Define a sender channel by entering one of the following commands:

*con-name* is the TCP/IP address of the receiver system. If both installations are on the same system, the *con-name* is localhost. *port* is the port you noted in [1 b](#). If you do not specify a port, the default value of 1414 is used.

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (SDR) CONNAME ('CON-NAME(PORT)') XMITQ (QMB) TRPTYPE (TCP)
```

- i) Start the sender channel by entering the following command:

```
START CHANNEL(QMA.QMB)
```

The receiver channel on the receiver server starts automatically when the sender channel starts.

- j) Stop MQSC by entering the following command:

```
end
```

Some messages are displayed, followed by the command prompt.

- k) If the sender server is a Linux or AIX system, change into the *MQ\_INSTALLATION\_PATH/samp/bin* directory. This directory contains the sample programs. *MQ\_INSTALLATION\_PATH* represents the high-level directory in which IBM MQ is installed.

- l) If both the sender server and receiver server are installations on the same system, check that the queue managers have been created on different installations by entering the following command:

```
dspmqr -o installation
```

If the queue managers are on the same installation, move either QMA to the sender installation or QMB to the receiver installation by using the **setmqm** command. For more information, see [setmqm](#).

- m) Put a message on the local definition of the remote queue, which in turn specifies the name of the remote queue. Enter one of the following commands:

- On AIX and Linux:

```
./amqsput LOCAL.DEF.OF.REMOTE.QUEUE QMA
```

- On Windows:

```
amqsput LOCAL.DEF.OF.REMOTE.QUEUE QMA
```

A message tells you that amqsput has started.

- n) Type some message text on one or more lines, followed by a blank line.

A message tells you that amqsput has ended. Your message is now on the queue and the command prompt is displayed again.

### 3. On the **receiver** server:

- a) As your receiver server is an AIX system, change into the *MQ\_INSTALLATION\_PATH/samp/bin* directory.

This directory contains the sample programs. `MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.

b) Get the message from the queue on the receiver by entering the following command:

```
./amqsget RECEIVER.Q QMB
```

The sample program starts, and your message is displayed. After a pause, the sample ends. Then the command prompt is displayed.

## Results

You have now successfully verified the server-to-server installation.

### **Verifying a client installation using the command line on AIX**

You can verify a client installation using the command line. On the server you create a queue manager, a local queue, a listener, and a server-connection channel. You must also apply security rules to allow the client to connect and make use of the queue defined. On the client you create a client-connection channel, and then use the sample PUT and GET programs to complete the verification procedure.

### **About this task**

The verification procedure shows how to create a queue manager called `queue.manager.1`, a local queue called `QUEUE1`, and a server-connection channel called `CHANNEL1` on the server.

It shows how to create the client-connection channel on the IBM MQ MQI client workstation. It then shows how to use the sample programs to put a message onto a queue, and get the message from the queue.

The example does not address any client security issues. See [Setting up IBM MQ MQI client security for details](#) if you are concerned with IBM MQ MQI client security issues.

The verification procedure assumes that:

- The full IBM MQ server product has been installed on a server.
- The server installation is accessible on your network.
- The IBM MQ MQI client software has been installed on a client system.
- The IBM MQ sample programs have been installed.
- TCP/IP has been configured on the server and client systems. For more information, see [Configuring connections between the server and client](#).

### **Procedure**

1. Set up the server using the command line, using the instructions in [“Setting up the server using the command line on AIX”](#) on page 56.
2. Set up the client, using the instructions in [“Connecting to a queue manager, using the MQSERVER environment variable on AIX”](#) on page 58.
3. Test the communications between client and server, using the instructions in [“Testing communication between a client and a server on AIX”](#) on page 59.

### **Setting up the server using the command line on AIX**

Follow these instructions to create a queue manager, queue, and channel on the server. You can then use these objects to verify the installation.

### **About this task**

These instructions assume that no queue manager or other IBM MQ objects have been defined.



IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Create a user ID on the server that is not in the mqm group.  
This user ID must exist on the server and client. This is the user ID that the sample applications must be run as, otherwise a 2035 error is returned.
2. Log in as a user in the mqm group.
3. You must set various environment variables so that the installation can be used in the current shell.  
You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

4. Create a queue manager called `QUEUE.MANAGER.1` by entering the following command:

```
crtmqm QUEUE.MANAGER.1
```

You see messages telling you that the queue manager has been created.

5. Start the queue manager by entering the following command:

```
strmqm QUEUE.MANAGER.1
```

A message tells you when the queue manager has started.

6. Start MQSC by entering the following command:

```
runmqsc QUEUE.MANAGER.1
```

A message tells you that an MQSC session has started. MQSC has no command prompt.

7. Define a local queue called `QUEUE1` by entering the following command:

```
DEFINE QLOCAL(QUEUE1)
```

A message tells you when the queue has been created.

8. Allow the user ID that you created in step 1 to use `QUEUE1` by entering the following command:

```
SET AUTHREC PROFILE(QUEUE1) OBJTYPE(Queue) PRINCIPAL(' non_mqm_user ') AUTHADD(put,get)
```

where *non\_mqm\_user* is the user ID created in step 1. A message tells you when the authorization has been set. You must also run the following command to give the user ID authority to connect:

```
SET AUTHREC OBJTYPE(QMGR) PRINCIPAL(' non_mqm_user ') AUTHADD(connect)
```

If this command is not run, a 2305 stop error is returned.

9. Define a server-connection channel by entering the following command:

```
DEFINE CHANNEL (CHANNEL1) CHLTYPE (SVRCONN) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

10. Allow your client channel to connect to the queue manager and run under the user ID that you created in step 1, by entering the following MQSC command:

```
SET CHLAUTH(CHANNEL1) TYPE(ADDRESSMAP) ADDRESS(' client_ipaddr ') MCAUSER(' non_mqm_user ')
```

where *client\_ipaddr* is the IP address of the client system, and *non\_mqm\_user* is the user ID created in step 1. A message tells you when the rule has been set.

11. Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT (port_number)
```

where *port\_number* is the number of the port the listener is to run on. This number must be the same as the number used when defining your client-connection channel in [“Installing an IBM MQ client on AIX” on page 48](#).

**Note:** If you omit the port parameter from the command, a default value of 1414 is used for the listener port. If you want to specify a port other than 1414, you must include the port parameter in the command, as shown.

12. Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```

13. Stop MQSC by entering:

```
end
```

You see some messages, followed by the command prompt.

## What to do next

Follow the instructions to set up the client. See [“Connecting to a queue manager, using the MQSERVER environment variable on AIX” on page 58](#).

### AIX

*Connecting to a queue manager, using the MQSERVER environment variable on AIX*

When an IBM MQ application is run on the IBM MQ MQI client, it requires the name of the MQI channel, the communication type, and the address of the server to be used. Provide these parameters by defining the MQSERVER environment variable.

## Before you begin

Before you start this task, you must complete the task, [“Setting up the server using the command line on AIX” on page 56](#), and save the following information:

- The host name or IP address of the server and port number that you specified when creating the listener.
- The channel name of the server-connection channel.

## About this task

This task describes how to connect an IBM MQ MQI client, by defining the MQSERVER environment variable on the client.

You can give the client access to the generated client channel definition table, `amqc1chl.tab` instead; see [Accessing client-connection channel definitions](#).

## Procedure

1. Log in as the userid that you created in Step 1 of [“Verifying a client installation using the command line on AIX” on page 56](#).
2. Check the TCP/IP connection. From the client, enter one of the following commands:
  - `ping server-hostname`
  - `ping n.n.n.n`

`n.n.n.n` represents the network address. You can set the network address in IPv4 dotted decimal form, for example, `192.0.2.0`. Alternatively, set the address in IPv6 hexadecimal form, for example `2001:0DB8:0204:acff:fe97:2c34:fde0:3485`.

If the **ping** command fails, correct your TCP/IP configuration.

3. Set the MQSERVER environment variable. From the client, enter the following command:

```
export MQSERVER=CHANNEL1/TCP/'server-address (port)'
```

Where:

- *CHANNEL1* is the server-connection channel name.
- *server-address* is the TCP/IP host name of the server.
- *port* is the TCP/IP port number the server is listening on.

If you do not give a port number, IBM MQ uses the one specified in the `qm.ini` file, or the client configuration file. If no value is specified in these files, IBM MQ uses the port number identified in the TCP/IP services file for the service name `MQSeries`. If an `MQSeries` entry in the services file does not exist, a default value of 1414 is used. It is important that the port number used by the client and the port number used by the server listener program are the same.

## What to do next

Use the sample programs to test communication between the client and server; see [“Testing communication between a client and a server on AIX”](#) on page 59.

### *Testing communication between a client and a server on AIX*

On the IBM MQ MQI client workstation, use the `amqsputc` sample program to put a message on the queue at the server workstation. Use the `amqsgetc` sample program to get the message from the queue back to the client.

## Before you begin

Complete the previous topics in this section:

- Set up a queue manager, channels, and queue.
- Open a command window.
- Set system environment variables.

## About this task

Note that IBM MQ object definitions are case-sensitive. Text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Change to the `MQ_INSTALLATION_PATH/samp/bin` directory, which contains the sample programs.  
`MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.
2. You must set certain environment variables so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

3. Start the PUT program for `QUEUE1` on `QUEUE.MANAGER.1` by entering the following command:

```
./amqsputc QUEUE1 QUEUE.MANAGER.1
```

If the command is successful, the following messages are displayed:

```
Sample AMQSPUT0 start target queue is QUEUE1
```

**Tip:** You might get the error, `MQRC_NOT_AUTHORIZED (2035)`. By default, channel authentication is enabled when a queue manager is created. Channel authentication prevents privileged users accessing a queue manager as an IBM MQ MQI client. For verifying the installation, you can either

change the MCA user ID to a non-privileged user, or disable channel authentication. To disable channel authentication run the following MQSC command:

```
ALTER QMGR CHLAUTH(DISABLED)
```

When you finish the test, if you do not delete the queue manager, re-enable channel authentication:

```
ALTER QMGR CHLAUTH(ENABLED)
```

4. Type some message text, then press **Enter** twice.

The following message is displayed:

```
Sample AMQSPUT0 end
```

Your message is now on the queue that is on the server queue manager.

5. Start the GET program for QUEUE1 on QUEUE.MANAGER.1 by entering the following command:

```
./amqsgetc QUEUE1 QUEUE.MANAGER.1
```

The sample program starts, and your message is displayed. After a short pause (approximately 30 seconds), the sample ends and the command prompt is displayed again.

## Results

You have now successfully verified the client installation.

## What to do next

1. You must set various environment variables on the server so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

2. On the server, stop the queue manager by entering the following command:

```
endmqm QUEUE.MANAGER.1
```

3. On the server, delete the queue manager by entering the following command:

```
dltmqm QUEUE.MANAGER.1
```

## Uninstalling or modifying IBM MQ on AIX

On AIX, you can uninstall the IBM MQ server or client using the System Management Interface Tool (SMIT) or the **installp** command. You can also modify an installation by uninstalling a subset of the file sets.

### Before you begin

If any updates have been applied, remove them before starting the uninstallation or modification procedure. For more information, see [“Reverting to the previous maintenance level on AIX” on page 298](#).

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

### Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling or modifying, if you have not already done so.

2. For a server installation, end any IBM MQ activity associated with the installation you are uninstalling or modifying:

- a) Log in as a user in the group mqm.
- b) Set up your environment to work with the installation you want to uninstall or modify. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqr -o installation
```

- d) Stop all running queue managers associated with the installation you want to uninstall or modify. Enter the following command for each queue manager:

```
endmqm QMgrName
```

- e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqclr -m QMgrName
```

3. Log in as root.

4. Uninstall or modify IBM MQ using either **installp** or **smit**. If IBM MQ was installed in a non-default location, you must use **installp**.

- To uninstall or modify IBM MQ by using **installp**, enter one of the following commands:
  - To uninstall an installation in the default location `/usr/mqm`:

```
installp -u mqm
```

- To uninstall an installation in a non-default location:

```
installp -R usil -u mqm
```

where *usil* is the path of the User Specified Installation Location (USIL) specified when the product was installed.

- To modify an installation in a non-default location:

```
installp -R usil -u list of file sets
```

where *usil* is the path of the User Specified Installation Location (USIL) specified when the product was installed.

- To uninstall or modify IBM MQ by using **smit**, complete the following steps:
  - a. Select the required **smit** window using the following sequence:

```
Software Installation and Maintenance
Software Maintenance and Utilities
Remove Installed Software
```

- b. List the software in the **SOFTWARE name** field:

- i) Enter `.`
- ii) Press **F4**

- c. Select the file sets to uninstall from the list (those beginning with mqm):

- For a complete uninstall, select all file sets.
- To modify the installation, select a subset of the file sets.

After selecting the file sets, press **Enter**. There is an option at this stage to do a preview. Leave the option set to the default value of **Yes** to preview the file sets you are uninstalling, or select **No** to not preview these file sets.

d. Press **Enter** on the **Remove Installed Software** panel, it asks whether you are sure, press **Enter**.

## Results

After uninstallation, certain files under the directory trees `/var/mqm` and `/etc/opt/mqm` are not removed. These files contain user data and remain so subsequent installations can reuse the data. Most of the remaining files contain text, such as INI files, error logs, and FDC files. The directory tree `/var/mqm/shared` contains files that are shared across installations, including the executable shared libraries `libmqzsd.a` and `libmqzsd_r.a`.

## What to do next

- If the product successfully uninstalled, you can delete any files and directories contained in the `/usr/mqm` directory under the User Specified Installation Location (USIL) specified in the **installp** uninstallation command.
- Use the **ls1pp** command to check for other products installed in the USIL. If there are no other products installed in the USIL and you do not intend to use it again, you can delete the USIL using the **rmusil** command.
- If there are no other IBM MQ installations on the system, and you are not planning to reinstall or migrate, you can delete the `/var/mqm` and `/etc/opt/mqm` directory trees, including the files `libmqzsd.a` and `libmqzsd_r.a`. Deleting these directories destroys all queue managers and their associated data.
- You can optionally remove installations, once IBM MQ is uninstalled, from the [Installation configuration file, mqinst.ini](#) using the commands listed.

**Note:** If you are not going to install another version of IBM MQ, you can delete the existing installations using the **dltmqinst** command. Otherwise, if you install IBM MQ to the same location, the old installation name is applied.

## IBM i Installing and uninstalling IBM MQ on IBM i

Installation tasks that are associated with installing IBM MQ on IBM i systems are grouped in this section.

### About this task

To prepare for installation and to install the IBM MQ components, complete the following tasks.

For information about how to uninstall IBM MQ, see [“Uninstalling IBM MQ for IBM i”](#) on page 89.

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ”](#) on page 294.

### Procedure

1. Check the system requirements.  
See [“Hardware and software requirements on IBM i systems”](#) on page 63.
2. Plan your installation.
  - As part of the planning process, you must choose which components to install and where to install them. See [“IBM MQ components for IBM i”](#) on page 63.
  - You must also make some platform-specific choices. See [“Planning to install IBM MQ on IBM i”](#) on page 64.
3. Prepare your system for installation of IBM MQ.  
See [“Preparing the system on IBM i”](#) on page 65.
4. Install IBM MQ server.

See [“Installing IBM MQ server on IBM i”](#) on page 66.

5. Optional: Install an IBM MQ client.

See [“Installing an IBM MQ client on IBM i”](#) on page 79.

6. Verify your installation. See [“Verifying an IBM MQ installation on IBM i”](#) on page 84.

## IBM i IBM MQ components for IBM i

The IBM MQ components that are available for IBM i.

**Important:** For details of what each purchase of IBM MQ entitles you to install, see [IBM MQ license information](#).

The components are as follows:

### Server (Base)

Support to enable you to create and support your own applications. This includes the runtime component that provides support for external applications. It also includes support for client connections from IBM MQ installations on other computers.

### Samples (Option 1)

Sample application programs. The source is supplied in the QMQMSAMP library and executable files are supplied in the QMQM library.

### AMS (Option 2)

The AMS component.

### IBM MQ Console and REST API (Option 3)

Adds HTTP based administration for IBM MQ through the REST API and IBM MQ Console.

To use this feature, you must install the following prerequisites:

- 5724L26 IBM MQ Java Messaging and Web Services
- 5770JV1 Java SE 8

### Managed File Transfer (MFT) components

#### \*BASE

Support to enable you to create and support your own MFT applications. It also includes support for client connections from IBM MQ MFT installations on other computers.

#### 2

Tools support

#### 3

Agent

#### 4

Services

You must install \*BASE first because the other three options depend on \*BASE. Note that option 4 requires that option 3 is installed.

### Related concepts

[“IBM MQ components and features”](#) on page 6

You can select the components or features that you require when you install IBM MQ.

## IBM i Hardware and software requirements on IBM i systems

Check that the server environment meets the prerequisites for installing IBM MQ for IBM i.

Before installation, you must check that your system meets the hardware and software requirements set out in the IBM MQ system requirements page. See [System Requirements for IBM MQ](#).

## Storage requirements for IBM MQ server

The storage requirements for IBM i depend on which components you install, and how much working space you need. The storage requirements also depend on the number of queues that you use, the number and size of the messages on the queues, and whether the messages are persistent. You also require archiving capacity on disk, tape, or other media. For more information, see [System Requirements for IBM MQ](#).

Disk storage is also required:

- Prerequisite software
- Optional software
- Your application programs

## Installing prerequisite software

To install the prerequisite software that is provided in the IBM MQ server installation image, choose one of the following options:

- Navigate to the root of the server installation image, then double-click `setup.exe`. The IBM MQ Installation Launchpad window is displayed. From this window, click the **Software Prerequisites** option. Use this option to check what prerequisite software is already installed, then install any missing software.
- Navigate to the `Prereqs` folder of the server installation image. Select the folder for the software item to be installed, then start the installation program.

## Prerequisite PTFs for multiple certificate support

You are not limited to a single certificate for TLS channels. To use multiple certificates on IBM i platforms, you must install the following program temporary fixes (PTFs):

[MF57749](#)  
[MF57889](#)  
[SI52214](#)  
[MF58003](#)

See [Digital certificate labels: understanding the requirements](#) for details about how to select certificates by using certificate labels.

### Related concepts

[“License requirements” on page 8](#)

You must have purchased sufficient licenses for your installation. The details of the license agreement is stored on your system at installation time so that you can read it at any time. IBM MQ supports IBM License Metric Tool (ILMT).

[“Where to find product requirements and support information” on page 9](#)

Before you install IBM MQ, you must check for the latest information and system requirements.

## Planning to install IBM MQ on IBM i

Before you install IBM MQ on IBM i, you must choose which components to install and where to install them. You must also make some platform-specific choices.

## About this task

The following steps provide links to additional information to help you with planning your installation of IBM MQ on IBM i.



## Procedure

1. As part of your planning activities, make sure that you review the information on hardware and software requirements for the platform on which you are planning to install IBM MQ.  
For more information, see [“Hardware and software requirements on IBM i systems”](#) on page 63.
2. Decide which IBM MQ components and features to install.  
See [“IBM MQ components and features”](#) on page 6 and [“Where to find downloadable installation images”](#) on page 10.

**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. For more information, see [“License requirements”](#) on page 8 and [IBM MQ license information](#).

## **Preparing the system on IBM i**

On IBM i systems, you might have to complete several tasks before you install IBM MQ. You might also want to complete other tasks, depending on your installation intentions.

### About this task

The tasks that you perform to prepare your systems for installation are listed here. Complete the appropriate tasks for your platform before installing.

## Procedure

Configure any additional settings needed for your IBM i system.  
See [“Configuring and tuning the operating system on IBM i”](#) on page 65.

### What to do next

When you have completed the tasks to prepare the system, you are ready to start installing IBM MQ. To install a server, see [“Installing IBM MQ server on IBM i”](#) on page 66. To install a client, see [“Installing an IBM MQ client on IBM i”](#) on page 79.

#### Related tasks

##### Planning

[“Maintaining and migrating IBM MQ”](#) on page 290

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[“Applying maintenance to IBM MQ”](#) on page 294

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Configuring and tuning the operating system on IBM i**

Before installing IBM MQ for IBM i, there are several system values which need to be checked using the DSPSYSVAL command. If necessary, reset the values using the CHGSYSVAL command.

Check the following values and change if required:

### QCCSID

Every message has a coded-character set identifier (CCSID) in its header. The CCSID tag identifies the code page and character set of the source.

A queue manager obtains its CCSID from the job that created it. If the job CCSID is not a valid value in the range 1-65534, the queue manager uses the default CCSID value (65535) instead. You can change the CCSID used by the IBM MQ queue manager by using the CL command **CHGMQM**.

**Note:** The CCSID must be either single-byte character set (SBCS), or mixed, that is SBCS and DBCS. It must not be DBCS only.

## QSYSLIBL

Ensure that QSYS2 is included in the list of libraries that make up the system part of the library list. IBM MQ uses programs in this library for data conversion and SNA LU 6.2 communication.

**Note:** Do not have QMQM as part of the system or user portion of the library list.

## QALWOBJRST

Ensure that the QALWOBJRST system value is set to \*ALL or \*ALWPGMADP before you install MQ. If it is set to \*NONE, installation fails.

After installation, reset QALWOBJRST to its original value to maintain system security.

## QSHRMEMCTL

Ensure that the QSHRMEMCTL system value is set to 1 (Allowed).

A value of 1 is used in environments where pointers can be shared amongst programs between different jobs.

IBM MQ requires this setting to use the shared memory APIs shmat and shmget and to share its pointers across jobs.

If it is not set correctly, initialization of IBM MQ fails with system return code "3401" (Permission denied), and commands such as CRTMQM, STRMQM, ENDMQM, TRCMQM fail.

## QFRCCVNRST

Ensure that the QFRCCVNRST system value is set to 0 (Restore all objects without conversion), or 1 (Objects with validation errors are converted), before you install MQ. If it is not set, installation fails.

## QMLTTHDACN

Optionally set this to control the generation of messages into joblogs. Set QMLTTHDACN to 2 to get messages generated in a joblog; set it to 1 to avoid the messages. For example, the message CPD000D is an informational message that is generated when a command that is not thread-safe is issued from a multi-threaded application. Setting QMLTTHDACN to 1 avoids the message.

## Related concepts

[“Hardware and software requirements on IBM i systems” on page 63](#)

Check that the server environment meets the prerequisites for installing IBM MQ for IBM i.

[“License requirements” on page 8](#)

You must have purchased sufficient licenses for your installation. The details of the license agreement is stored on your system at installation time so that you can read it at any time. IBM MQ supports IBM License Metric Tool (ILMT).

## Related tasks

[“Installing IBM MQ server on IBM i” on page 66](#)

You install IBM MQ for IBM i by installing the IBM MQ server in its primary language, installing samples and installing additional languages.

## Installing IBM MQ server on IBM i

You install IBM MQ for IBM i by installing the IBM MQ server in its primary language, installing samples and installing additional languages.

## Before you begin

**Note:** Installing the latest version of the IBM MQ server includes client capabilities. Only install the stand-alone client if you do not need the server capabilities.

You have completed planning the installation, downloaded the installation eImage, and set the system values. See [“Configuring and tuning the operating system on IBM i” on page 65](#).

For a complete list of IBM MQ installable services and components for IBM i systems, see [Installable services and components for IBM i](#)

## About this task

How to install the base IBM MQ server in its primary language, install samples, and install translated versions from a choice of national-languages.

You can install only one instance of IBM MQ for IBM i in each partition of your server.

## Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Install the IBM MQ for IBM i base product, and primary language.

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

where the parameters of RSTLICPGM are,

### **LICPGM(5724H72)**

The product identifier for IBM i.

### **DEV(*installation device*)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### **OPTION (\*BASE)**

Install the IBM MQ for IBM i base product.

### **Unspecified parameters**

Unspecified parameters, such as **RSTOBJ (\*ALL)**, revert to defaults. The command installs both IBM MQ and the language files for the primary language of your system. For installing additional languages, see step 4.

3. Optional: Install the samples using the command:

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (1) OUTPUT (*PRINT)
```

Where the parameters of RSTLICPGM are,

### **LICPGM (5724H72)**

The product identifier for IBM i.

### **DEV (*installation device*)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### **OPTION (1)**

Install the samples for IBM i.

### **OUTPUT (\*PRINT)**

The output is printed with the spooled output of the job.

4. Optional: Install the AMS component by using the following command:

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (2) OUTPUT (*PRINT)
```

Where the parameters of RSTLICPGM are,

### **LICPGM (5724H72)**

The product identifier for IBM i.

### **DEV (*installation device*)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### **OPTION (2)**

Install AMS for IBM i.

### **OUTPUT (\*PRINT)**

The output is printed with the spooled output of the job.

5. Optional: Install the WEB component by using the following command:

Where the parameters of RSTLICPGM are,

**LICPGM (5724H72)**

The product identifier for IBM i.

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

**OPTION (3)**

Install the WEB component for IBM i.

**OUTPUT (\*PRINT)**

The output is printed with the spooled output of the job.

**Note:** To use this feature, you must install the following prerequisites:

- 5724L26 IBM MQ Java Messaging and Web Services
- 5770JV1 Java SE 8

6. Optional: To install additional languages, sign on to the system with a user profile that has \*ALLOBJ special authority. Choose a language code from the table.

<i>Table 8. Globalizations of IBM MQ for IBM i.</i>	
<b>Language ID</b>	<b>Language</b>
2909	Belgian English
2966	Belgian French MNCS (Multi-National Character Set)
2980	Brazilian Portuguese
2981	Canadian French MNCS
2975	Czech
2924	English uppercase and lowercase
2984	English US DBCS
2938	English US uppercase DBCS
2928	French
2940	French MNCS
2929	German
2939	German MNCS
2976	Hungarian
2932	Italian
2942	Italian MNCS
2962	Japanese
2930	Japanese Universal
2986	Korean
2978	Polish
2979	Russian
2989	Simplified Chinese
2931	Spanish

- If installing Japanese language feature code 2962, ensure the CCSID of the job installing the product is set to 939 and not 930. Do this to avoid problems with invariant lowercase characters in CCSID 930

```
CHGJOB CCSID(939)
```

- If the language feature code is not in the table then the product has not been translated into your language. You must choose one of the available language feature codes and install that version instead. You must manually change the system library list to use IBM MQ in that language load.

```
CHGSYSLIBL LIB(QSYS2924)
```

See also *How a language of your choice is displayed for licensed programs* in [How a language is displayed for IBM i functions](#) in the IBM i product documentation.

- If you are using Korean DBCS and you configure your terminal emulators to 24\*80 sessions you might find that EDTF incorrectly displays DBCS characters in MQ error log messages that extend beyond 80 columns. To avoid this, configure your terminal emulators to use sessions capable of displaying 132 columns, for example 27\*132.
- Issue the following command specifying the appropriate language ID:

```
RSTLICPGM LICPGM(5724H72) DEV( installation device ) RSTOBJ(*LNG) LNG( language ID )
```

This installs the commands, message file, and panel groups into the relevant QSYS library for the language. For example, library QSYS2928 is used for French. If this QSYS29nn library does not exist, it is created by the RSTLICPGM command.

7. To ensure that the product has loaded correctly, issue the Display Software Resources (DSPSFWRSC) command and check that the licensed program 5724H72 is listed. If you have installed the base and the optional samples, you see:

```
Resource
ID      Option Feature Description
5724H72 *BASE 5050   IBM MQ for IBM i
5724H72 *BASE 2924   IBM MQ for IBM i
5724H72 1      5050   IBM MQ for IBM i - Samples
```

8. Press F11, while viewing the Display Software Resources screen, and you see the library and version number of the products installed:

```
Resource      Feature
ID            Option Feature Type    Library Release
5724H72      *BASE 5050   *CODE  QMQM   V9R4M0
5724H72      *BASE 2924   *LNG   QMQM   V9R4M0
5724H72      1      5050   *CODE  QMQMSAMP V9R4M0
```

9. If you have installed additional language versions, you also see entries for these versions. For example, if you have installed the French version, for which the language ID is 2928, you see:

a)

```
Resource
ID      Option Feature Description
5724H72 *BASE 2928   IBM MQ for IBM i
```

b) and when you press F11:

```
Resource      Feature
ID            Option Feature Type    Library Release
5724H72      *BASE 2928   *LNG   QSYS2928 V9R4M0
```

10. Use the command DSPMQMVER to check exactly what version you have installed. For V9R4M0, it reports:

- Do the post installation tasks of checking for updates, checking program authorities and starting the IBM MQ subsystem, see [“Performing post installation tasks for IBM MQ on IBM i” on page 77.](#)

## What to do next

If you want to see how the installation went in more detail, perform one or more of the following tasks:

- View the log file using the DSPJOBLOG command.
- View the spoolfile generated from the RSTLICPGM command.

If the installation of IBM MQ fails, see [“Handling installation failures for IBM i” on page 78.](#)

## Related concepts

[“Uninstalling IBM MQ for IBM i” on page 89](#)

There are two ways of uninstalling IBM MQ for IBM i.

## **Installing IBM MQ server silently on IBM i**

You can perform a non-interactive installation of IBM MQ using the CALL PGM(QSYS/QLPACAGR) command. A non-interactive installation is also known as a silent, or unattended installation.

## Before you begin

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on IBM i” on page 65.](#)

## About this task

This topic describes the non-interactive installation of a server.

## Procedure

- Pre-agree the license terms and conditions for the base by running the command,

```
CALL PGM ( QSYS/QLPACAGR) PARM ('5724H72' 'V9R2M0' '0000' 0)
```

Where the parameters of **PARM** are,

### **5724H72**

The product identifier for IBM i.

### **V9R4M0**

The version, release, and modification level.

### **0000**

The option number for the IBM MQ product.

### **0**

Unused error structure.

- Optionally pre-agree the license terms and conditions for the samples by running the command,

```
CALL PGM (QSYS/QLPACAGR) PARM ('5724H72' 'V9R2M0' '0001' 0)
```

Where the parameters of **PARM** are,

### **5724H72**

The product identifier for IBM i.

### **V9R4M0**

The version, release, and modification level.

**0001**

The option number for the IBM MQ product.

**0**

Unused error structure.

3. Install the IBM MQ for IBM i base product, and primary language.

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

where the parameters of RSTLICPGM are,

**LICPGM(5724H72)**

The product identifier for IBM i.

**DEV(installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

**OPTION (\*BASE)**

Install the IBM MQ for IBM i base product.

**Unspecified parameters**

Unspecified parameters, such as **RSTOBJ (\*ALL)**, revert to defaults. The command installs both IBM MQ and the language files for the primary language of your system. For installing additional languages, see step 4.

4. Optional: Install the samples using the command:

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (1) OUTPUT (*PRINT)
```

Where the parameters of RSTLICPGM are,

**LICPGM (5724H72)**

The product identifier for IBM i.

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

**OPTION (1)**

Install the samples for IBM i.

**OUTPUT (\*PRINT)**

The output is printed with the spooled output of the job.

5. Optional: To install additional languages, sign on to the system with a user profile that has \*ALLOBJ special authority. Choose a language code from the table.

<i>Table 9. Globalizations of IBM MQ for IBM i.</i>	
<b>Language ID</b>	<b>Language</b>
2909	Belgian English
2966	Belgian French MNCS (Multi-National Character Set)
2980	Brazilian Portuguese
2981	Canadian French MNCS
2975	Czech
2924	English uppercase and lowercase
2984	English US DBCS
2938	English US uppercase DBCS
2928	French
2940	French MNCS

Table 9. Globalizations of IBM MQ for IBM i. (continued)	
Language ID	Language
2929	German
2939	German MNCS
2976	Hungarian
2932	Italian
2942	Italian MNCS
2962	Japanese
2930	Japanese Universal
2986	Korean
2978	Polish
2979	Russian
2989	Simplified Chinese
2931	Spanish

- If installing Japanese language feature code 2962, ensure the CCSID of the job installing the product is set to 939 and not 930. Do this to avoid problems with invariant lowercase characters in CCSID 930

```
CHGJOB CCSID(939)
```

- If the language feature code is not in the table then the product has not been translated into your language. You must choose one of the available language feature codes and install that version instead. You must manually change the system library list to use IBM MQ in that language load.

```
CHGSYSLIBL LIB(QSYS2924)
```

See also *How a language of your choice is displayed for licensed programs* in [How a language is displayed for IBM i functions](#) in the IBM i product documentation.

- If you are using Korean DBCS and you configure your terminal emulators to 24\*80 sessions you might find that EDTF incorrectly displays DBCS characters in MQ error log messages that extend beyond 80 columns. To avoid this, configure your terminal emulators to use sessions capable of displaying 132 columns, for example 27\*132.
- Issue the following command specifying the appropriate language ID:

```
RSTLICPGM LICPGM(5724H72) DEV( installation device ) RSTOBJ(*LNG) LNG( language ID )
```

This installs the commands, message file, and panel groups into the relevant QSYS library for the language. For example, library QSYS2928 is used for French. If this QSYS29nn library does not exist, it is created by the RSTLICPGM command.

6. To ensure that the product has loaded correctly, issue the Display Software Resources (DSPSFWRSC) command and check that the licensed program 5724H72 is listed. If you have installed the base and the optional samples, you see:



```

Resource
ID      Option Feature Description
5724H72 *BASE  5050   IBM MQ for IBM i
5724H72 *BASE  2924   IBM MQ for IBM i
5724H72 1      5050   IBM MQ for IBM i - Samples

```

7. Press F11, while viewing the Display Software Resources screen, and you see the library and version number of the products installed:

```

Resource      Feature
ID      Option Feature Type Library Release
5724H72 *BASE  5050   *CODE QMQM V9R4M0
5724H72 *BASE  2924   *LNG  QMQM V9R4M0
5724H72 1      5050   *CODE QMQMSAMP V9R4M0

```

8. If you have installed additional language versions, you also see entries for these versions. For example, if you have installed the French version, for which the language ID is 2928, you see:

a)

```

Resource
ID      Option Feature Description
5724H72 *BASE  2928   IBM MQ for IBM i

```

b) and when you press F11:

```

Resource      Feature
ID      Option Feature Type Library Release
5724H72 *BASE  2928   *LNG  QSYS2928 V9R4M0

```

9. Use the command DSPMQMVER to check exactly what version you have installed. For V9R4M0, it reports:

```
Version: 9.3.0.0
```

10. Do the post installation tasks of checking for updates, checking program authorities and starting the IBM MQ subsystem, see [“Performing post installation tasks for IBM MQ on IBM i”](#) on page 77.

## What to do next

If you want to see how the installation went in more detail, perform one or more of the following tasks:

- View the log file using the DSPJOBLOG command.
- View the spoolfile generated from the RSTLICPGM command.

If the installation of IBM MQ fails, see [“Handling installation failures for IBM i”](#) on page 78.

## IBM i **Installing Managed File Transfer on IBM i**

Install IBM MQ Managed File Transfer for IBM i by installing IBM MQ Java Messaging and Web Services server in its primary language, and installing additional options.

## Before you begin

**Note:** Installing the latest version of IBM MQ Managed File Transfer includes client capabilities.

You have completed planning the installation, downloaded the installation image, and set the system values. See [“Configuring and tuning the operating system on IBM i”](#) on page 65.

You have installed the following components:

<i>Table 10. Software requirements for IBM MQ Managed File Transfer</i>		
Program	Option	Description
5761JV1	14 or 15	Java SE 7 32 bit or Java SE 7 64 bit

Table 10. Software requirements for IBM MQ Managed File Transfer (continued)

Program	Option	Description
5770SS1	39	International Components for Unicode
5724L26	*BASE	IBM MQ Java Messaging and Web Services

## About this task

How to install base Managed File Transfer in its primary language, and install the other options.

You can install only one instance of Managed File Transfer for IBM i in each partition of your server.

## Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Install Managed File Transfer for IBM i, base product.

```
RSTLICPGM LICPGM (5725M50) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

where the parameters of RSTLICPGM are,

### LICPGM (5725M50)

The product identifier for Managed File Transfer for IBM i.

### DEV (installation device)

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### OPTION (\*BASE)

Install Managed File Transfer for IBM i for the IBM MQ base product.

### Unspecified parameters

Unspecified parameters such as **RSTOBJ** (\*ALL), revert to defaults. The command installs both IBM MQ and the language files for the primary language of your system.

3. Optional: Install the tools using the command:

```
RSTLICPGM LICPGM(5725M50) DEV(installation device) OPTION(2) OUTPUT(*PRINT)
```

Where the parameters of RSTLICPGM are,

### LICPGM (5725M50)

The product identifier for Managed File Transfer for IBM i.

### DEV (installation device)

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### OPTION (2)

Install the tools for Managed File Transfer for IBM i.

### OUTPUT (\*PRINT)

The output is printed with the spooled output of the job.

Repeat step [“3” on page 74](#) for options 3 (agent) and 4 (services)

4. To ensure that the product has loaded correctly, issue the Display Software Resources (DSPSFWRSC) command and check that the licensed program 5725M50 is listed. If you have installed the base and the optional tools, you see:

```
Resource
ID      Option  Feature  Description
5725M50 *BASE   5050    Managed File Transfer for IBM i
5725M50 *BASE   2924    Managed File Transfer for IBM i
5725M50 2       5050    Managed File Transfer for IBM i - Tools
```

5. Press F11, while viewing the Display Software Resources screen, and you see the library and version number of the products installed:

Resource ID	Option	Feature	Type	Library	Release
5725M50	*BASE	5050	*CODE	QMOMMFT	V9R4M0
5725M50	*BASE	2924	*LNG	QMOMMFT	V9R4M0
5725M50	2	5050	*CODE	MFTT00L	V9R4M0

6. Do the post installation tasks of checking for updates, checking program authorities, and starting the Managed File Transfer subsystem.

## What to do next

If you want to see how the installation went in more detail, perform one or more of the following tasks:

- View the log file using the DSPJOBLOG command.
- View the spoolfile generated from the RSTLICPGM command.

If the installation of IBM MQ fails, see [“Handling installation failures for IBM i”](#) on page 78.

## **Installing IBM MQ for IBM i from a downloaded installation image**

You can perform an installation of IBM MQ for IBM i from an installation image downloaded from IBM.

## Before you begin

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on IBM i”](#) on page 65.

## About this task

Two installation images are provided as zip files, a client and server image. These images contain all the licensed programs, and a client only image for the clients only.

The client and server image contains all seven compressed IBM i save files ( **SAVF** ), while the client image contains four save files. The save files are:

- MQ92BASE - IBM MQ client and server base program objects
- MQ92SAMP - IBM MQ client & server samples
- MQ92EN24 - IBM MQ client and server English US (2924) language objects

plus the client only images:

- MQ92CBASE - IBM MQ client
- MQ92CSAMP - IBM MQ client samples
- MQ92JBASE - IBM MQ Java
- MQ92JSAMP - IBM MQ Java samples

## Procedure

1. Download one of the installation images and extract it to a temporary directory.
2. On IBM i, create a library containing sufficient empty save files to hold the uploaded files by using the commands:

```

CRTLIB LIB(MQ92PROD)
CRTSAVF FILE(MQ92PROD/MQ92BASE) /* Server and Client */
CRTSAVF FILE(MQ92PROD/MQ92SAMP) /* Server and Client Samples */
CRTSAVF FILE(MQ92PROD/MQ92EN24) /* 2924 English */
CRTSAVF FILE(MQ92PROD/MQ92CBASE) /* Standalone Client */
CRTSAVF FILE(MQ92PROD/MQ92CSAMP) /* Standalone Client Samples */
CRTSAVF FILE(MQ92PROD/MQ92JBASE) /* Java and JMS Classes */
CRTSAVF FILE(MQ92PROD/MQ92JSAMP) /* Java and JMS Samples */

```

For additional languages

```

CRTSAVF FILE(MQ92PROD/MQ92EN09) /* 2929 Belgian English */
CRTSAVF FILE(MQ92PROD/MQ92FR28) /* 2928 French */
CRTSAVF FILE(MQ92PROD/MQ92JA30) /* 2930 Japanese */
CRTSAVF FILE(MQ92PROD/MQ92ES31) /* 2931 Spanish */
CRTSAVF FILE(MQ92PROD/MQ92IT32) /* 2932 Italian */
CRTSAVF FILE(MQ92PROD/MQ92EN38) /* 2938 English DBCS UPPERCASE */
CRTSAVF FILE(MQ92PROD/MQ92FR40) /* 2940 French MNCS */
CRTSAVF FILE(MQ92PROD/MQ92IT42) /* 2942 Italian MNCS */
CRTSAVF FILE(MQ92PROD/MQ92FR66) /* 2966 French MNCS */
CRTSAVF FILE(MQ92PROD/MQ92FR81) /* 2981 French MNCS */
CRTSAVF FILE(MQ92PROD/MQ92EN84) /* 2984 English DBCS */
CRTSAVF FILE(MQ92PROD/MQ92CZ75) /* 2975 Czech */
CRTSAVF FILE(MQ92PROD/MQ92HU76) /* 2976 Hungarian */
CRTSAVF FILE(MQ92PROD/MQ92PL78) /* 2978 Polish */
CRTSAVF FILE(MQ92PROD/MQ92RU79) /* 2979 Russian */
CRTSAVF FILE(MQ92PROD/MQ92PT80) /* 2980 Portugese/Brazilian */
CRTSAVF FILE(MQ92PROD/MQ92JA62) /* 2962 Japanese */
CRTSAVF FILE(MQ92PROD/MQ92K086) /* 2986 Korean */
CRTSAVF FILE(MQ92PROD/MQ92ZH89) /* 2989 Chinese */
CRTSAVF FILE(MQ92PROD/MQ92DE29) /* 2929 German */
CRTSAVF FILE(MQ92PROD/MQ92DE39) /* 2939 German */

```

3. Start an ftp session to your IBM i machine and upload the required save files with the commands:

```

ftp (your_ibmi_hostname)
bin
put MQ92BASE MQ92PROD/MQ92BASE
put MQ92SAMP MQ92PROD/MQ92SAMP
put MQ92EN24 MQ92PROD/MQ92EN24
put MQ92CBASE MQ92PROD/MQ92CBASE
put MQ92CSAMP MQ92PROD/MQ92CSAMP
put MQ92JBASE MQ92PROD/MQ92JBASE
put MQ92JSAMP MQ92PROD/MQ92JSAMP

```

For additional language loads:

```

put MQ92EN09 MQ92PROD/MQ92EN09
put MQ92FR28 MQ92PROD/MQ92FR28
put MQ92JA30 MQ92PROD/MQ92JA30
put MQ92ES31 MQ92PROD/MQ92ES31
put MQ92IT32 MQ92PROD/MQ92IT32
put MQ92EN38 MQ92PROD/MQ92EN38
put MQ92FR40 MQ92PROD/MQ92FR40
put MQ92IT42 MQ92PROD/MQ92IT42
put MQ92FR66 MQ92PROD/MQ92FR66
put MQ92FR81 MQ92PROD/MQ92FR81
put MQ92EN84 MQ92PROD/MQ92EN84
put MQ92CZ75 MQ92PROD/MQ92CZ75
put MQ92HU76 MQ92PROD/MQ92HU76
put MQ92PL78 MQ92PROD/MQ92PL78
put MQ92RU79 MQ92PROD/MQ92RU79
put MQ92PT80 MQ92PROD/MQ92PT80
put MQ92JA62 MQ92PROD/MQ92JA62
put MQ92K086 MQ92PROD/MQ92K086
put MQ92ZH89 MQ92PROD/MQ92ZH89
put MQ92DE29 MQ92PROD/MQ92DE29
put MQ92DE39 MQ92PROD/MQ92DE39

```

4. To prepare for installation of IBM MQ for IBM i, sign on to your IBM i machine and ensure that you have followed the instructions detailed in [“Preparing the system on IBM i”](#) on page 65.
5. Enter the **RSTLICPGM** commands, specifying the installation device as \*SAVF and naming the save file containing the options that you want to install.

The IBM MQ Java licensed program can be installed stand-alone or can coexist with any of the other licensed programs.

The IBM MQ client can be installed standalone, but it can only coexist with the IBM MQ Java on the same system.

Attempting to install the IBM MQ server on a system where the IBM MQ client is already installed performs a slip installation upgrade, replacing the client with the server licensed program.

Attempting to install the IBM MQ client stand-alone over the top of an existing server licensed program is not possible, and the installation fails.

For example:

```
/* IBM MQ Client and Server program objects */
RSTLICPGM LICPGM(5724H72) DEV(*SAVF) SAVF(MQ92PROD/MQ92BASE) +
RSTOBJ(*PGM) OPTION(*BASE) OUTPUT(*PRINT)

/* IBM MQ Client & Server English 2924 Language Load */
RSTLICPGM LICPGM(5724H72) DEV(*SAVF) SAVF(MQ92PROD/MQ92EN24) +
RSTOBJ(*LNG) LNG(2924) OUTPUT(*PRINT)

/* Additional languages - alter SAVF and LNG parameters... */
/* IBM MQ Client & Server Japanese 2930 Language Load */
RSTLICPGM LICPGM(5724H72) DEV(*SAVF) SAVF(MQ92PROD/MQ92JA30) +
RSTOBJ(*LNG) LNG(2930) OUTPUT(*PRINT)

/* IBM MQ Client & Server Samples */
RSTLICPGM LICPGM(5724H72) DEV(*SAVF) SAVF(MQ92PROD/MQ92SAMP) +
OPTION(1) OUTPUT(*PRINT)

/* IBM MQ Java */
RSTLICPGM LICPGM(5724L26) DEV(*SAVF) SAVF(MQ92PROD/MQ92JBASE) +
OPTION(*BASE) OUTPUT(*PRINT)

/* IBM MQ Java Samples */
RSTLICPGM LICPGM(5724L26) DEV(*SAVF) SAVF(MQ92PROD/MQ92JSAMP) +
OPTION(1) OUTPUT(*PRINT)

/* IBM MQ Client */
RSTLICPGM LICPGM(5725A49) DEV(*SAVF) SAVF(MQ92PROD/MQ92CBASE) +
OPTION(*BASE) OUTPUT(*PRINT)

/* IBM MQ Client Samples */
RSTLICPGM LICPGM(5725A49) DEV(*SAVF) SAVF(MQ92PROD/MQ92CSAMP) +
OPTION(1) OUTPUT(*PRINT)
```

6. Do the post installation tasks of checking for updates, checking program authorities and starting the IBM MQ subsystem, see [“Performing post installation tasks for IBM MQ on IBM i” on page 77](#).

## What to do next

If you want to see how the installation went in more detail, perform one or more of the following tasks:

- View the log file using the DSPJOBLOG command.
- View the spoolfile generated from the RSTLICPGM command.

If the installation of IBM MQ fails, see [“Handling installation failures for IBM i” on page 78](#).

## **Performing post installation tasks for IBM MQ on IBM i**

Tasks to perform after you have installed IBM MQ for IBM i, and before using it.

### About this task

When you have correctly installed IBM MQ for IBM i on your system:

### Procedure

1. See the IBM MQ website at [IBM MQ product page](#) for the latest product information.
2. Install and apply all fix packs.

3. Where you have more than one system and a mixture of releases of OS/400 or IBM i, and IBM MQ, you must take care when compiling CL programs. You must compile CL programs either on the system they are to run on, or on one with an identical combination of releases of OS/400 or IBM i, and IBM MQ. When you install later versions of IBM MQ, delete all IBM MQ commands from previous releases in any QSYSVvRrMm libraries using the QSYS/DLTCMD command.
4. If you have not installed IBM MQ on your system before, you must add user profiles to the QMQMADM group profile. Make all user profiles that are to be used for creating and administering queue managers members of the QMQMADM group profile, using the command CHGUSRPRF.
  - a) Start the IBM MQ subsystem, by issuing the command:

```
STRSBS SBSD(QMQM/QMQM)
```

**Note:** The subsystem must be started after each IPL of the system, so you might choose to start it as part of your system startup process.

5. Create the system-default objects. The system-default objects are created automatically when you issue the CRTMQM command to create a queue manager. For example: CRTMQM MQMNAME(QMGRNAME) ASP(\*SYSTEM). You can refresh them using the STRMQM command (Warning: this command will replace any existing default objects). For example: STRMQM MQMNAME(QMGRNAME) RDEFSYS(\*YES). Refer to the onscreen help for information about using this command.

**Note:** on the command STRMQM MQMNAME(QMGRNAME) RDEFSYS(\*YES):

- The command does not re-create the objects, it performs a CRTxxxx REPLACE(\*YES) for all of the SYSTEM.\* objects.
- This means that it refreshes the parameters on the objects back to their defaults. So if, for example, on the SYSTEM.DEFAULT.LOCAL.QUEUE object, TRGENBL had previously been changed to \*YES, then, when the command is run, it is changed back to TRGENBL(\*NO).
- If any messages exist on a queue, they are not removed, because the queues are not physically deleted.
- The contents of the SYSTEM.AUTH.DATA.QUEUE are untouched when this command is run.
- So, if the contents of this (or any other significant queue) become corrupt, it must be physically deleted and re-created either from scratch, or from a backup.

## Results

You are now ready to start using IBM MQ for IBM i.

**Note:** When you install IBM MQ for IBM i, two user profiles are created:

- QMQM
- QMQMADM

These two objects are central to the correct running of IBM MQ for IBM i. Do not alter or delete them. If you do, IBM cannot guarantee correct behavior of your product.

If you uninstall IBM MQ and data, these profiles are deleted. If you uninstall IBM MQ only, these profiles are retained.

## Handling installation failures for IBM i

If the installation of IBM MQ Server or Client for IBM i fails, you must remove the installed and partially installed objects before attempting reinstallation.

## Procedure

1. Delete installed options using DLTLICPGM LICPGM(5725A49)OPTION(\*ALL).

2. Delete partially installed options by deleting the QMQM library (and the QMQMSAMP libraries if necessary).
3. Delete the IFS directory /QIBM/ProdData/mqm and its subdirectories using the EDTF command, for example: `EDTF STMF ('/QIBM/ProdData/mqm')` and select **option 9** for the mqm directory.

If the installation of IBM MQ Java fails, remove the partly installed objects before attempting reinstallation:

- a. Delete the QMQMJAVA library.
- b. Delete the IFS directory /QIBM/ProdData/mqm/java and its subdirectories using the **EDTF** command, for example:

```
EDTF STMF ('/QIBM/ProdData/mqm')
```

Select option 9 against the Java directory.

## IBM i **Converting a trial license on IBM i**

Convert a trial license to a full license without reinstalling IBM MQ.

When the trial license expires, the "count-down" displayed by the **strmqm** command informs you the license has expired, and the command does not run.

### Before you begin

1. IBM MQ is installed with a trial license.
2. You have access to the installation media of a fully licensed copy of IBM MQ.

### About this task

Run the **setmqprd** command to convert a trial license to a full license.

If you do not want to apply a full license to your trial copy of IBM MQ, you can uninstall it at any time.

### Procedure

1. Obtain the full license from the fully licensed installation media.

The full license file is `amqpcert.lic`.

2. Run the **setmqprd** command from the installation that you are upgrading:

```
CALL PGM(QMQM/SETMQPRD) PARM('LICENSE_PATH/amqpcert.lic')
```

where `LICENSE_PATH` is the path to the `amqpcert.lic` file that you obtained.

### Related reference

[setmqprd](#)

## IBM i **Installing an IBM MQ client on IBM i**

The IBM MQ client for IBM i is a part of the IBM MQ product.

### Before you begin



**Attention:** If you have already installed the IBM MQ server, you already have a client and must not attempt to install the stand-alone client.

You can install only one instance of IBM MQ client for IBM i in each partition of your server.

When you install IBM MQ client for IBM i two user profiles are created:

- QMQM
- QMQMADM

These two objects are central to the correct running of IBM MQ for IBM i. Do not alter or delete them. If you do, IBM cannot guarantee correct behavior of your product. These profiles are retained when the product is deleted.

## About this task

This procedure covers the installation of both the client and the client samples. If you do not want to install the client samples, then do not complete the steps specific to the samples.

After following the optional step to pre-agree the license, and then issuing the **RSTLICPGM** command, the installation runs without requiring any interactive input.

## Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSEC0FR.
2. Optional: Pre-agree the license terms and conditions. If you do not choose to pre-agree the license, the license agreement is displayed for you to accept. Run the following commands to pre-agree the license terms and conditions:

- a) For the client:

```
CALL PGM (QSYS/QLPACAGR) PARM ('5725A49' 'V9R2M0' '0000' 0)
```

The parameters of **PARM** are:

### 5725A49

The product identifier for IBM MQ client for IBM i

### V9R4M0

The version, release, and modification level

### 0000

The option number for the base IBM MQ client for IBM i product

### 0

Unused error structure

- b) For the client samples:

```
CALL PGM (QSYS/QLPACAGR) PARM ('5725A49' 'V9R2M0' '0001' 0)
```

The parameters of **PARM** are:

### 5725A49

The product identifier for IBM MQ client for IBM i

### V9R4M0

The version, release, and modification level

### 0001

The option number for the samples

### 0

Unused error structure

3. Issue the installation command to run the installation without requiring any interactive input:

- a) Install the client by issuing the following command:

```
RSTLICPGM LICPGM (5725A49) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

The parameters of RSTLICPGM are:



**LICPGM (5725A49)**

The product identifier for IBM MQ client for IBM i

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01

**OPTION (\*BASE)**

The level of IBM MQ client for IBM i product installed

**OUTPUT (\*PRINT)**

Whether the spooled output of the job is printed

- b) Install the samples by issuing the following command:

```
RSTLICPGM LICPGM (5725A49) DEV (installation device) OPTION (1) OUTPUT (*PRINT)
```

The parameters of RSTLICPGM are:

**LICPGM (5725A49)**

The product identifier for IBM MQ client for IBM i

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01

**OPTION (1)**

The samples option

**OUTPUT (\*PRINT)**

Whether the spooled output of the job is printed

4. To ensure that the product has loaded correctly, issue the Display Software Resources ( **DSPSFWRSC** ) command and check that the licensed program 5725A49 is listed. If you have installed the base and the optional samples, you see:

```
Resource
ID   Option Feature Description
5725A49 *BASE 5050  IBM MQ client for IBM i
5725A49 1    5050  IBM MQ client for IBM i -Samples
```

5. To see the library and version number of the products installed, press **F11**, while viewing the Display Software Resources screen. The following screen is displayed:

```
Resource          Feature
ID   Option Feature Type Library Release
5725A49 *BASE 5050 *CODE QMQM V9R4M0
5725A49 1    5050 *CODE QMQMSAMP V9R4M0
```

6. To check exactly what version you have installed, use the **DSPMQMVER** program.  
For example, /QSYS.LIB/QMQM.LIB/DSPMQMVER.PGM -a in a qshell.

## What to do next

If you want to see how the installation went in more detail, perform one or more of the following tasks:

- View the log file using the DSPJOBLOG command.
- View the spoolfile generated from the RSTLICPGM command.

If the installation of IBM MQ client for IBM i failed, see [“Handling installation failures for IBM i” on page 78](#)

### Related concepts

[“Uninstalling IBM MQ for IBM i” on page 89](#)

There are two ways of uninstalling IBM MQ for IBM i.

### **IBM i** *Installation of IBM MQ client and IBM MQ server for IBM i*

When you install an IBM MQ server on an IBM i system, the client is also automatically installed.

The installed version of the IBM MQ client for IBM i can be refreshed by using a "slip installation" which replaces an existing installation with a fresh image.

Installing a client over an existing client results in a successful installation.

Installing a client over an existing server results in a failure with a CPDB6A4 error.

Installing a server over an existing client results in a successful upgrade of the client to both server and client capabilities.

### **IBM i** *Installing IBM MQ Java messaging and web services for IBM i*

Install IBM MQ Java messaging and web services for IBM i, using the **RSTLICPGM** command.

#### **Before you begin**

**JMS 3.0** From IBM MQ 9.3.0, Jakarta Messaging 3.0 is supported for developing new applications. IBM MQ 9.3.0 and later continue to support JMS 2.0 for existing applications. It is not supported to use both the Jakarta Messaging 3.0 API and the JMS 2.0 API in the same application. For more information, see [Using IBM MQ classes for JMS/Jakarta Messaging](#).

You can install only one instance of IBM MQ Client for IBM i in each partition of your server.

If you have an older version of Java messaging and web services (5724L26) installed and want to install a newer version, you can install the new version without uninstalling the older one.

If you have MA88 installed (5648C60), and try to install anyway, the installation fails with a warning requesting you to uninstall the old client. To uninstall MA88, issue the following command:

```
DLTLICPGM LICPGM(5648C60) OPTION(*ALL)
```

If this command fails to delete the IFS directory /QIBM/ProdData/mqm/java and its subdirectories, use the EDTF command and select option 9 against the Java directory. For example:

```
EDTF STMF('/QIBM/ProdData/mqm')
```

#### **About this task**

This procedure covers the installation of both the Java messaging and web services, and the Java messaging and web services samples. If you do not want to install the samples, then do not complete the steps specific to the samples.

After following the optional step to pre-agree the license, and then issuing the **RSTLICPGM** command, the installation runs without requiring any interactive input.

#### **Procedure**

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Optional: Pre-agree the license terms and conditions. If you do not choose to pre-agree the license, the license agreement is displayed for you to accept. Run the following commands to pre-agree the license terms and conditions:
  - a) For Java messaging and web services:

```
CALL PGM (QSYS/QLPACAGR) PARM ('5724L26' 'V9R2M0' '0000' 0)
```

The parameters of **PARM** are:

**5724L26**

The product identifier for IBM MQ Java messaging and web services for IBM i

**V9R4M0**

The version, release, and modification level

**0000**

The option number for the base IBM MQ Java messaging and web services product.

**0**

Unused error structure

b) For the samples:

```
CALL PGM (QSYS/QLPACAGR) PARM ('5724L26' 'V9R2M0' '0001' 0)
```

The parameters of **PARM** are:

**5724L26**

The product identifier for IBM MQ Java messaging and web services for IBM i

**V9R4M0**

The version, release, and modification level

**0001**

The option number for the samples.

**0**

Unused error structure

3. Issue the installation command to run the installation without requiring any interactive input:

a) Install the IBM MQ Java messaging and web services by issuing the following command:

```
RSTLICPGM LICPGM (5724L26) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

The parameters of RSTLICPGM are:

**LICPGM (5724L26)**

The product identifier for IBM MQ Java messaging and web services for IBM i

**DEV (*installation device*)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01

**OPTION (\*BASE)**

Install the base IBM MQ Java messaging and web services for IBM i

**OUTPUT (\*PRINT)**

Whether the spooled output of the job is printed

b) Install the samples by issuing the following command:

```
RSTLICPGM LICPGM (5724L26) DEV (installation device) OPTION (1) OUTPUT (*PRINT)
```

The parameters of RSTLICPGM are:

**LICPGM (5724L26)**

The product identifier for IBM MQ Java messaging and web services for IBM i

**DEV (*installation device*)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01

**OPTION (1)**

Install the samples

## OUTPUT (\*PRINT)

Whether the spooled output of the job is printed

4. To ensure that the product has loaded correctly, issue the Display Software Resources (DSPSFWRSC) command and check that the licensed program 5724L26 is listed. If you have installed the base and the optional samples, you see:

```
Resource
ID      Option Feature Description
5724L26 *BASE  5050  IBM MQ Java Messaging and Web Services
5724L26 1      5050  IBM MQ Java Messaging and Web Services - Samp
```

5. Press **F11** while viewing the Display Software Resources screen, and you see the library and version number of the products installed:

```
Resource          Feature
ID      Option Feature Type  Library Release
5724L26 *BASE  5050  *CODE QMQMJAVA V9R4M0
5724L26 1      5050  *CODE QMQMJAVA V9R4M0
```

6. Check what versions you have installed by using the following commands:

IBM MQ Classes for Java:

```
java com.ibm.mq.MQJavaLevel
```

**Note:** For this command to work, you might have to set your environment classpath to:

- /QIBM/ProdData/mqm/java/lib/com.ibm.mq.jar

IBM MQ Classes for Java Message Service:

```
java com.ibm.mq.jms.MQJMSLevel
```

**Note:** For this command to work, you might need to set your environment classpath to:

- /QIBM/ProdData/mqm/java/lib/com.ibm.mq.jakarta.client.jar (Jakarta Messaging 3.0) or /QIBM/ProdData/mqm/java/lib/com.ibm.mq.allclient.jar (JMS 2.0)

See [Environment variables relevant to IBM MQ classes for Java](#) and [Environment variables used by IBM MQ classes for JMS](#).

For IBM MQ for IBM i 9.2, both report:

```
Version: 9.2.0.0
```

**Note:** The command uses the Java classes, and so it reports the version and also performs some verification that the classes are installed and working.

7. See the following topics for full details of verification of both:

- [Using IBM MQ classes for Java](#)
- [Using IBM MQ classes for JMS](#)

## IBM i Verifying an IBM MQ installation on IBM i

The topics in this section provide instructions on how to verify a client installation of IBM MQ on IBM i systems.

### IBM i Verifying a client installation using the command line on IBM i

You can verify a client installation using the command line. On the server you create a queue manager, a local queue, a listener, and a server-connection channel. You must also apply security rules to allow

the client to connect and make use of the queue defined. On the client you create a client-connection channel, and then use the sample PUT and GET programs to complete the verification procedure.

The verification procedure shows how to create a queue manager called `queue.manager.1`, a local queue called `QUEUE1`, and a server-connection channel called `CHANNEL1` on the server.

It shows how to create the client-connection channel on the IBM MQ MQI client workstation. It then shows how to use the sample programs to put a message onto a queue, and get the message from the queue.

The example does not address any client security issues. See [Setting up IBM MQ MQI client security](#) for details if you are concerned with IBM MQ MQI client security issues.

The verification procedure assumes that:

- The full IBM MQ server product has been installed on a server.
- The server installation is accessible on your network.
- The IBM MQ MQI client software has been installed on a client system.
- The IBM MQ sample programs have been installed.
- TCP/IP has been configured on the server and client systems. For more information, see [Configuring connections between the server and client](#).

First, set up the server using the command line, using the instructions in [“Setting up the server using the command line IBM i”](#) on page 85.

Once you have set up the server, you must set up the client, using the instructions in [“Connecting to a queue manager, using the MQSERVER environment variable on IBM i”](#) on page 87.

Finally, you can test the communications between client and server, using the instructions in [“Testing communication between a client and a server on IBM i”](#) on page 88.

### *Setting up the server using the command line IBM i*

Follow these instructions to create a queue manager, queue, and channel on the server. You can then use these objects to verify the installation.

## About this task

These instructions assume that no queue manager or other IBM MQ objects have been defined.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Create a user ID on the server that is not in the `mqm` group.  
This user ID must exist on the server and client. This is the user ID that the sample applications must be run as, otherwise a 2035 error is returned.
2. Log in as a user in the MQM group.
3. Create a queue manager called `QUEUE.MANAGER.1` by entering the following command:

```
crtmqm QUEUE.MANAGER.1
```

You see messages telling you that the queue manager has been created.

4. Start the queue manager by entering the following command:

```
strmqm QUEUE.MANAGER.1
```

A message tells you when the queue manager has started.

5. Define a local queue called QUEUE1 by entering the following command:

```
CRTMQMQ QNAME(QUEUE1) QTYPE(*LCL)
```

A message tells you when the queue has been created.

6. Allow the user ID that you created in step 1 to use QUEUE1 by entering the following command:

```
SET AUTHREC PROFILE(QUEUE1) OBJTYPE(Queue) PRINCIPAL(' non_mqm_user ') AUTHADD(PUT,GET)
```

where *non\_mqm\_user* is the user ID created in step 1. A message tells you when the authorization has been set. You must also run the following command to give the user ID authority to connect:

```
SET AUTHREC OBJTYPE(QMGR) PRINCIPAL(' non_mqm_user ') AUTHADD(CONNECT)
```

If this command is not run, a 2305 stop error is returned.

7. Define a server-connection channel by entering the following command:

```
CRTMQMCHL CHLNAME(CHANNEL1) CHLTYPE(*SVRCN) TRPTYPE(*TCP)  
MCAUSRID('QMQM')
```

A message tells you when the channel has been created.

8. Allow your client channel to connect to the queue manager and run under the user ID that you created in step 1, by entering the following MQSC command:

```
SET CHLAUTH(CHANNEL1) TYPE(ADDRESSMAP) ADDRESS(' client_ipaddr ') MCAUSER(' non_mqm_user ')
```

where *client\_ipaddr* is the IP address of the client system, and *non\_mqm\_user* is the user ID created in step 1. A message tells you when the rule has been set.

9. Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT (port_number)
```

where *port\_number* is the number of the port the listener is to run on. This number must be the same as the number used when defining your client-connection channel in [“Installing an IBM MQ client on IBM i”](#) on page 79.

**Note:** If you omit the port parameter from the command, a default value of 1414 is used for the listener port. If you want to specify a port other than 1414, you must include the port parameter in the command, as shown.

10. Start the listener by entering the following command:

```
STRMQLSR MQMNAME('QUEUE.MANAGER.1') PORT(1414)
```

11. Stop MQSC by entering:

```
end
```

You see some messages, followed by the command prompt.

## What to do next

Follow the instructions to set up the client. See [“Connecting to a queue manager, using the MQSERVER environment variable on IBM i”](#) on page 87.

When an IBM MQ application is run on the IBM MQ MQI client, it requires the name of the MQI channel, the communication type, and the address of the server to be used. Provide these parameters by defining the MQSERVER environment variable.

## Before you begin

Before you start this task, you must complete the task, [“Setting up the server using the command line IBM i”](#) on page 85, and save the following information:

- The host name or IP address of the server and port number that you specified when creating the listener.
- The channel name of the server-connection channel.

## About this task

This task describes how to connect an IBM MQ MQI client, by defining the MQSERVER environment variable on the client.

## Procedure

1. Log in as the userid that you created in Step 1 of [“Setting up the server using the command line IBM i”](#) on page 85.
2. Check the TCP/IP connection. From the client, enter one of the following commands:

- `ping server-hostname`
- `ping n.n.n.n`

`n.n.n.n` represents the network address. You can set the network address in IPv4 dotted decimal form, for example, `192.0.2.0`. Alternatively, set the address in IPv6 hexadecimal form, for example `2001:0DB8:0204:acff:fe97:2c34:fde0:3485`.

If the **ping** command fails, correct your TCP/IP configuration.

3. Set the MQSERVER environment variable. From the client, enter one the following command:

```
ADDENVVAR ENVVAR(MQSERVER) VALUE('CHANNEL1/TCP/server-address (port)')
```

Where:

- `CHANNEL1` is the server-connection channel name.
- `server-address` is the TCP/IP host name of the server.
- `port` is the TCP/IP port number the server is listening on.

If you do not give a port number, IBM MQ uses the one specified in the `qm.ini` file, or the client configuration file. If no value is specified in these files, IBM MQ uses the port number identified in the TCP/IP services file for the service name `MQSeries`. If an `MQSeries` entry in the services file does not exist, a default value of 1414 is used. It is important that the port number used by the client and the port number used by the server listener program are the same.

## What to do next

Use the sample programs to test communication between the client and server; see [“Testing communication between a client and a server on IBM i”](#) on page 88.

On the IBM MQ MQI client workstation, use the `amqsputc` sample program to put a message on the queue at the server workstation. Use the `amqsgetc` sample program to get the message from the queue back to the client.

## Before you begin

Complete the previous topics in this section:

- Set up a queue manager, channels, and queue.
- Open a command window.
- Set system environment variables.

## About this task

Note that IBM MQ object definitions are case-sensitive. Text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Start the PUT program for `QUEUE1` on `QUEUE.MANAGER.1` by entering the following command:

```
CALL PGM(QMQM/AMQSPUTC) PARM(QUEUE1 QUEUE.MANAGER.1)
```

If the command is successful, the following messages are displayed:

```
Sample AMQSPUT0 start target queue is QUEUE1
```

**Tip:** You might get the error, `MQRC_NOT_AUTHORIZED (2035)`. By default, channel authentication is enabled when a queue manager is created. Channel authentication prevents privileged users accessing a queue manager as an IBM MQ MQI client. For verifying the installation, you can either change the MCA user ID to a non-privileged user, or disable channel authentication. To disable channel authentication run the following MQSC command:

```
ALTER QMGR CHLAUTH(DISABLED)
```

When you finish the test, if you do not delete the queue manager, re-enable channel authentication:

```
ALTER QMGR CHLAUTH(ENABLED)
```

2. Type some message text, then press **Enter** twice.

The following message is displayed:

```
Sample AMQSPUT0 end
```

Your message is now on the queue that is on the server queue manager.

3. Start the GET program for `QUEUE1` on `QUEUE.MANAGER.1` by entering the following command:

```
CALL PGM(QMQM/AMQSGETC) PARM(QUEUE1 QUEUE.MANAGER.1)
```

The sample program starts, and your message is displayed. After a short pause (approximately 30 seconds), the sample ends and the command prompt is displayed again.

## Results

You have now successfully verified the client installation.



## What to do next

1. On the server, stop the queue manager by entering the following command:

```
ENDMQM MQMNAME(Queue.MANAGER.1)
```

2. On the server, delete the queue manager by entering the following command:

```
DLTMQM MQMNAME(Queue.MANAGER.1)
```

## IBM i Uninstalling IBM MQ for IBM i

There are two ways of uninstalling IBM MQ for IBM i.

To uninstall IBM MQ for IBM i, perform one of the following tasks:

- A *standard* deletion removes IBM MQ product code but preserves user data.
- An *entire* deletion removes both IBM MQ product code and user data.

Both types of deletion require you to be signed on to the system with a user profile that has \*ALLOBJ special authority, for example, QSECOFR. Security administrator (\*SECADM) special authority is also required to delete the QMQM and QMQMADM user profiles.

### Related concepts

[“Reinstalling IBM MQ for IBM i” on page 94](#)

You can reinstall IBM MQ for IBM i without losing any of your data.

### Related tasks

[“Uninstalling IBM MQ but retaining data on IBM i” on page 89](#)

If you want to retain your user data, for example, because you intend to reinstall IBM MQ for IBM i at a later date, you must perform a standard deletion of the product.

[“Uninstalling IBM MQ and data on IBM i” on page 91](#)

You can delete IBM MQ entirely, including all user data.

[“Uninstalling IBM MQ Java Messaging and Web Services on IBM i” on page 92](#)

Follow these instructions to uninstall IBM MQ Java.

[“Uninstalling IBM MQ MQI client for IBM i” on page 93](#)

If the IBM MQ MQI client for IBM i must be uninstalled, follow the correct procedure to ensure that all the relevant directories and files are removed.

## IBM i Uninstalling IBM MQ but retaining data on IBM i

If you want to retain your user data, for example, because you intend to reinstall IBM MQ for IBM i at a later date, you must perform a standard deletion of the product.

### About this task

To perform a standard deletion of IBM MQ for IBM i, so that your user data is retained, complete the following steps:

### Procedure

1. Quiesce IBM MQ for IBM i.  
For more information, see [Quiescing IBM MQ for IBM i](#).
2. End the IBM MQ subsystem, by issuing the command:

```
ENDSBS SBS(QMQM)
```

3. Ensure that no locks are held on the library QMQM, by issuing the command:

```
WRKOBJLCK OBJ(QMQM) OBJTYPE(*LIB)
```

4. Use the Delete Licensed Program (DLTLICPGM) command to delete the base product (and also the samples, AMS, and WEB components if you chose to install them).

To delete only the samples, issue the command:

```
DLTLICPGM LICPGM( 5724H72 ) OPTION(1)
```

To delete only the AMS component, issue the command:

```
DLTLICPGM LICPGM( 5724H72 ) OPTION(2)
```

To delete only the WEB component, issue the command:

```
DLTLICPGM LICPGM( 5724H72 ) OPTION(3)
```

To delete only extra language versions installed, issue the command:

```
DLTLICPGM LICPGM(5724H72) LNG(nnnn)
```

where *nnnn* is the language number, as in the list here:

Language ID	Language
2909	Belgian English
2966	Belgian French MNCS (Multi-National Character Set)
2981	Canadian French MNCS
2975	Czech
2950	English uppercase
2924	English uppercase and lowercase
2984	English US DBCS
2938	English US uppercase DBCS
2928	French
2940	French MNCS
2929	German
2939	German MNCS
2976	Hungarian
2932	Italian
2942	Italian MNCS
2962	Japanese
2986	Korean
2978	Polish
2979	Russian

Table 11. Globalizations of IBM MQ for IBM i. (continued)	
Language ID	Language
2989	Simplified Chinese
2931	Spanish

To delete the base product and all other installed components, issue the command:

```
DLTLICPGM LICPGM( 5724H72 ) OPTION(*ALL)
```

## Results

Deleting IBM MQ for IBM i in this way deletes only the objects that belong to IBM MQ: the QMQM library, the QMQM samp library, and the subdirectories that belong to IBM MQ server within the /QIBM/ProdData/mqm directory.

If that leaves no other subdirectories (for example, if IBM MQ Java is installed it uses subdirectories there) then the /QIBM/ProdData/mqm directory itself is deleted.

None of the queue manager journal libraries, or IFS directories based upon /QIBM/UserData are removed.

## Uninstalling IBM MQ and data on IBM i

You can delete IBM MQ entirely, including all user data.

## About this task

**Important:** If you are going to delete IBM MQ entirely, including all user data, save your user data first. It cannot be recovered.

To delete IBM MQ for IBM i entirely, complete the following steps:

## Procedure

1. Quiesce IBM MQ for IBM i.  
For more information, see [Quiescing IBM MQ for IBM i](#).
2. Delete each queue manager in turn by using the command WRKMQM and selecting option 4.
3. End the IBM MQ subsystem, by issuing the command:

```
ENDSBS SBS(QMQM)
```

4. Ensure that no locks are held on the library QMQM, by issuing the command:

```
WRKOBJLCK OBJ(QMQM) OBJTYPE(*LIB)
```

5. Optional: If you want to also uninstall IBM MQ Java, you can do it now, using the command:

```
DLTLICPGM LICPGM( 5724L26 ) OPTION(*ALL)
```

This will also uninstall the Java Samples, if they were installed.

6. Use the Delete Licensed Program (DLTLICPGM) command to delete the base product (and also the samples if you chose to install them). To delete the base product and the samples issue the command:

```
DLTLICPGM LICPGM( 5724H72 ) OPTION(*ALL)
```

7. Delete the directory /QIBM/UserData/mqm and its subdirectories. Do this using the EDTF command and selecting option 9 (recursive delete) for the mqm directory, as follows,

**Note:** If you do this, you no longer have any information regarding your installation. Use this command with extreme caution.

The format of the command is:

```
EDTF STMF('/QIBM/UserData')
```

Alternatively, you can delete the /QIBM/UserData/mqm directory and its subdirectories by repeated use of the RMVLNK and RMVDIR commands.

8. Identify all the users who belong to the QMQMADM group. Use the DSPUSRPRF command to display a list of them. You must remove the QMQMADM group profile from their user profiles before you can delete the QMQMADM user profile. The format of the command is:

```
DSPUSRPRF USRPRF(QMQMADM) TYPE(*GRPMBR)
```

9. You must alter the ownership or delete the objects. For each of the user profiles QMQM and QMQMADM, use the WRKOBJOWN command to list all the objects owned by the profile. The format of the command is:

```
WRKOBJOWN USRPRF( PROFILE )
```

10. Delete the two user profiles. The format of the command is:

```
DLTUSRPRF USRPRF(QMQM) OWNNOBJOPT(*DLT)  
DLTUSRPRF USRPRF(QMQMADM) OWNNOBJOPT(*DLT)
```

**IBM i**

## **Uninstalling IBM MQ Java Messaging and Web Services on IBM i**

Follow these instructions to uninstall IBM MQ Java.

### **About this task**

To uninstall the IBM MQ Java product.

### **Procedure**

1. Make sure you are signed on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Issue the command:

```
DLTLICPGM LICPGM(5724L26) OPTION(*ALL)
```

### **Results**

Deleting IBM MQ Java for IBM i deletes the objects that belong to it: the QMQMJAVA library, and the subdirectories that belong to IBM MQ Java within the /QIBM/ProdData/mqm directory.

If that leaves no other subdirectories (for example if the IBM MQ Server is installed it uses subdirectories there) then the /QIBM/ProdData/mqm directory itself is deleted.

## Uninstalling IBM MQ MQI client for IBM i

If the IBM MQ MQI client for IBM i must be uninstalled, follow the correct procedure to ensure that all the relevant directories and files are removed.

### Procedure

1. Make sure you are signed on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Use the Delete Licensed Program (**DLTLICPGM**) command to delete the IBM MQ MQI client for IBM i product (and also the samples if you chose to install them):

To delete only the samples, issue the command

```
DLTLICPGM LICPGM(5725A49) OPTION(1)
```

To delete IBM MQ MQI client and the samples, issue the command:

```
DLTLICPGM LICPGM(5725A49) OPTION(*ALL)
```

### Results

Deleting IBM MQ MQI client for IBM i deletes the objects that belong to it - the QMQM library, and the subdirectories that belong to IBM MQ MQI client for IBM i within the /QIBM/ProdData/mqm directory. If that leaves no other subdirectories (for example if the IBM MQ Java Client for IBM i is installed it uses subdirectories there) then the /QIBM/ProdData/mqm directory itself is deleted.

## Uninstalling Managed File Transfer on IBM i

Follow these instructions to uninstall Managed File Transfer on IBM i.

### Before you begin

To uninstall IBM MQ Managed File Transfer for IBM i, perform one of the following tasks:

- A *standard* deletion removes Managed File Transfer product code but preserves user data.
- An *entire* deletion removes both Managed File Transfer product code and user data.

Note that an entire deletion requires that you manually remove the configuration data in the /QIBM/UserData/mqm/mqft directory.

Both types of deletion require you to be signed on to the system with a user profile that has \*ALLOBJ special authority, for example, QSECOFR.

### About this task

To uninstall the Managed File Transfer product.

### Procedure

1. Make sure you are signed on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Issue the command:

```
DLTLICPGM LICPGM(5725M50) OPTION(*ALL)
```

## Results

Deleting Managed File Transfer for IBM i deletes the objects that belong to it: the QMQMMFT library, and the subdirectories that belong to Managed File Transfer within the /QIBM/ProdData/mqm directory.

Note that licence files are copied to /QIBM/ProdData/mqm/properties/version, and an uninstallation will delete files in this directory. However, files are left in /QIBM/ProdData/mqm/properties/5725M50 as trash. For a clean uninstallation, you must delete the files in this directory.

### **Reinstalling IBM MQ for IBM i**

You can reinstall IBM MQ for IBM i without losing any of your data.

When you reinstall IBM MQ for IBM i, the system checks whether the IBM MQ configuration file (mqc.ini) exists. If the file exists, it is kept and used with the newly installed system. If the file does not exist, an empty mqc.ini file is placed in the directory /QIBM/UserData/mqm.

All data that you have in the UserData directory is referenced by the newly installed system. In addition, all the queue manager-associated libraries containing journal and receiver information are referenced by the new system.

### **Related tasks**

[“Installing IBM MQ server on IBM i” on page 66](#)

You install IBM MQ for IBM i by installing the IBM MQ server in its primary language, installing samples and installing additional languages.

## **Installing and uninstalling IBM MQ on Linux**

Installation tasks that are associated with installing IBM MQ on Linux are grouped in this section.

### **About this task**

To prepare for installation and to install IBM MQ, complete the following tasks.

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ” on page 294](#).

### **Procedure**

- To install IBM MQ on Linux using rpm, see [“Installing IBM MQ on Linux using rpm” on page 108](#).
- To install IBM MQ on Linux Ubuntu using a Debian installer, see [“Installing IBM MQ on Linux Ubuntu using Debian” on page 125](#).

## **Checking requirements on Linux**

Before you install IBM MQ on Linux, you must check for the latest information and system requirements.

### **About this task**

A summary of the tasks that you must complete to check system requirements are listed here with links to further information.

### **Procedure**

1. Check that you have the latest information, including information on hardware and software requirements.  
See [“Where to find product requirements and support information” on page 9](#).
2. Check that your systems meet the initial hardware and software requirements for Linux.  
See [“Hardware and software requirements on Linux systems” on page 95](#).

3. Check that your systems have sufficient disk space for the installation.  
See [Disk space requirements](#).
4. Check that you have the correct licenses.  
See [“License requirements” on page 8](#) and [IBM MQ license information](#).

## What to do next

When you have completed these tasks, you are ready to start preparing your system for installation. For the next steps in installing IBM MQ, see [“Preparing the system on Linux” on page 98](#).

### Related concepts

[“IBM MQ installation overview” on page 6](#)

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Hardware and software requirements on Linux systems**

Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

For basic hardware and software requirements, see [System Requirements for IBM MQ](#).

## Host names

IBM MQ does not support host names that contain spaces. If you install IBM MQ on a system with a host name that contains spaces, you are unable to create any queue managers.

## 64-bit Linux distributions might no longer support 32-bit applications by default



**Attention:** There is no separate 32-bit client installation package. The client installation package and redistributable client contain both 32-bit and 64-bit IBM MQ client libraries. The included 32-bit libraries can be used by 32-bit applications on supported platforms where 32-bit support is offered by the operating system.

If the 32-bit Linux support libraries are not installed, 32-bit applications will not run. If you need this functionality, install the 32-bit support libraries. Here are the names of the packages that contain the required libraries:

For Red Hat.

```
Red Hat Enterprise Linux for System x (64 bit):  
glibc.i686  
libstdc++.i686  
Red Hat Enterprise Linux Server for IBM Z:  
glibc.s390  
libstdc++.s390
```

For Ubuntu.

```
Ubuntu Linux for System x (64 bit):  
libc6:i386  
libstdc++6:i386  
Ubuntu Linux for IBM Z:  
libc6-s390  
lib32stdc++6
```

For SUSE Linux.

```
SUSE Linux Enterprise Server for System x (64 bit):
```

```
glibc-32bit
libstdc++6-32bit
SUSE Linux Enterprise Server for IBM Z:
glibc-32bit
libstdc++6-32bit
```

Check the [System Requirements for IBM MQ](#) to see which Linux distributions are supported on IBM MQ. For example there is no 32-bit support for SUSE Linux Enterprise Server 15 (all architectures), or for Red Hat Enterprise Linux Server for IBM Z 8.

## Java Message Service

**JMS 3.0** From IBM MQ 9.3.0, Jakarta Messaging 3.0 is supported for developing new applications. IBM MQ 9.3.0 and later continue to support JMS 2.0 for existing applications. It is not supported to use both the Jakarta Messaging 3.0 API and the JMS 2.0 API in the same application. For more information, see [Using IBM MQ classes for JMS/Jakarta Messaging](#).

Java 8 is bundled with IBM MQ 9.0 but client components are built with Java 7 compatibility flags on.

For development, a JDK is required, and a JRE is required for running. The JRE does not need to be the JRE installed with IBM MQ, but has to be one from the supported list.

For a list of supported JDKs, see [System Requirements for IBM MQ](#).

On Linux: On the Power platform, the 32 bit and 64 bit JDKs are typically installed to different locations, for example, the 32 bit JDK is located in /opt/IBMJava2-ppc-50 and the 64 bit JDK is located in /opt/IBMJava2-ppc64-50. Ensure that the PATH variable is correctly set for your applications that use Java.

You can check the version installed using the following command:

```
java -version
```

## Transport Layer Security (TLS)

If you want to use the TLS support, you need the IBM Global Security Kit (GSKit) version 8 package. This package is supplied with IBM MQ as one of the components available for installation.

### Installing the g++ version runtime support

If you intend to run TLS channels then you must have the g++ runtime libraries installed. The GNU g++ libraries are called `libgcc_s.so` and `libstdc++.so.6`. On RPM based systems these are installed as part of the `libgcc` and `libstdc++` software packages.

The version of these libraries installed must be compatible with g++ version 3.4.

See [System Requirements for IBM MQ](#) for further details on the required packages for TLS support.

On 64 bit platforms, install both the 32 bit and the 64 bit versions of the package so that 32 bit and 64 bit processes can both use TLS functions.

## IBM MQ Explorer requirements

On Linux, IBM MQ Explorer can be installed by downloading and installing the stand-alone IBM MQ Explorer from Fix Central. See [IBM MQ Explorer Requirements](#) for the minimum requirements that your system needs if you want to use IBM MQ Explorer.

**Note:** IBM MQ Explorer for Linux is available for use only with IBM MQ on x86-64 platforms.

## RDQM (replicated data queue manager)

Pacemaker is one of the prerequisites for RDQM. Pacemaker requires that certain Linux packages are installed on the system. The list for RHEL 8.2 assumes that a minimal set of system packages has been



installed that includes the mandatory and default packages from the mandatory groups of the Server environment group.

The prerequisites for supported levels of RHEL 8 (Pacemaker 2) are:

- cifs-utils
- libtool-ltdl
- libxslt
- net-snmp-libs
- nfs-utils
- perl-TimeDate
- psmisc
- python36
- python3-lxml

**V 9.4.0**

The prerequisites for supported levels of RHEL 9 (Pacemaker 2) are:

- libxslt
- net-snmp-libs
- nfs-utils
- nfs-utils-coreos
- perl-TimeDate
- python3-lxml
- python-unversioned-command

These packages in turn have their own requirements (which are not listed here). When Pacemaker is installed, it reports any missing packages that also need to be installed before installation can complete successfully.

## Requirements for IBM MQ classes for .NET

See [Prerequisites for .NET Core on Linux](#) for the dependencies required to run .NET on Linux.

**Linux**

## Planning to install IBM MQ on Linux

Before you install IBM MQ on Linux, you must choose which components to install and where to install them. You must also make some platform-specific choices.

### About this task

The following steps provide links to additional information to help you with planning your installation of IBM MQ on Linux.

As part of your planning activities, make sure that you review the information on hardware and software requirements for the platform on which you are planning to install IBM MQ. For more information, see [“Checking requirements on Linux” on page 94](#).

### Procedure

1. Decide which IBM MQ components and features to install.

See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).

**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. For more information, see [“License requirements” on page 8](#) and [IBM MQ license information](#).

2. Review the options for naming your installation.

In some cases, you can choose an installation name to use instead of the default name. See [“Installation name on AIX, Linux, and Windows” on page 14](#).

3. Review the options and restrictions for choosing an installation location for IBM MQ.

For more information, see [“Installation location on Multiplatforms” on page 15](#).

4. If you plan to install multiple copies of IBM MQ, see [“Multiple installations on AIX, Linux, and Windows” on page 17](#).

5. If you already have a primary installation, or plan to have one, see [“Primary installation on AIX, Linux, and Windows” on page 19](#).

6. Make sure that the communications protocol needed for server-to-server verification is installed and configured on both systems that you plan to use.

For more information, see [“Server-to-server links on AIX, Linux, and Windows” on page 26](#).

7. Determine whether you need to install the Java runtime environment (JRE).

From IBM MQ 9.1.0, if you are not using Java in your messaging applications, and you are not using portions of IBM MQ that are written in Java, you have the option to not install the JRE (or to remove the JRE if it was already installed).



**Attention:** If you choose not to install the JRE, or to remove the JRE if it was already installed:

- You must use the **runmqakm** command to manage key repositories. The **runmqktool** command is not available.
- Use of the **runmqras** command fails unless a JRE at version 7, or later, is available on the system path.

On Linux, you can install IBM MQ without installing the MQSeriesJRE RPM, unless you are installing the portions of the product that require the presence of the JRE, in which case the RPM prerequisites test fails. You can also install the MQSeriesGSKit RPM without the JRE.

Upgrading from an earlier version of IBM MQ to IBM MQ 9.1.0 or later adds the separately installed JRE feature to the installed product.

For more information, see [runmqakm and runmqktool commands on AIX, Linux, and Windows](#).

## **Preparing the system on Linux**

On Linux systems, you might have to complete several tasks before you install IBM MQ. You might also want to complete other tasks, depending on your installation intentions.

### **About this task**

The tasks that you perform to prepare your systems for installation are listed here. Complete the appropriate tasks for your platform before installing.

### **Procedure**

1. Set up a user ID of the name mqm, with a primary group of mqm.

See [“Setting up the user and group on Linux” on page 99](#).

**Note:** If the group mqm and/or user mqm do not exist, during the installation of the product, the installer creates group mqm and user mqm with a home directory of `/var/mqm`.

2. Create file systems for both the product code and working data to be stored. See [“Creating file systems on Linux” on page 100](#).

3. Configure any additional settings needed for your Linux system.

See [“Configuring and tuning the operating system on Linux” on page 102](#).

## What to do next

When you have completed the tasks to prepare the system, you are ready to start installing IBM MQ. To install a server using rpm, see [“Installing the first IBM MQ installation on Linux using the rpm command” on page 112](#). To install a client using rpm, see [“Installing an IBM MQ client on Linux using rpm” on page 119](#).

To install a server using a Debian installer, see [“Installing an IBM MQ server on Linux Ubuntu using Debian packages” on page 129](#). To install a client using a Debian installer, see [“Installing an IBM MQ client on Linux Ubuntu using Debian packages” on page 135](#)

**Important:** Having both Debian and rpm installed versions of IBM MQ on the same system is not supported.

## Related tasks

### Planning

[“Maintaining and migrating IBM MQ” on page 290](#)

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Setting up the user and group on Linux**

On Linux systems, IBM MQ requires a user ID of the name mqm, with a primary group of mqm. The mqm user ID owns the directories and files that contain the resources associated with the product.

## Using Active Directory

If you are using Active Directory to provide centralized user and group definitions to your Linux system, it is not possible to have both an mqm user and mqm group definition in Active Directory because that service does not permit users and groups to have the same name.

You should:

- Put an mqm group definition in the Active Directory before installing IBM MQ, so that other users in the directory can later be made part of the shared group definition.
- Create the mqm user locally, or allow it to be created during the installation process.

## Creating the user ID and group

Set the primary group of the mqm user to the group mqm.

If you are installing IBM MQ on multiple systems you might want to ensure each UID and GID of mqm has the same value on all systems. If you are planning to configure multi-instance queue managers, it is essential the UID and GID are the same from system to system. It is also important to have the same UID and GID values in virtualization scenarios.

RPM creates the mqm user ID and group mqm, with a home directory of `/var/mqm`, as part of the installation procedure if they do not exist.

If you have special requirements for these IDs (for example they need to have the same values as other machines you are using, or your users and group ID are centrally managed) you should create the IDs before running the installation procedure, using the **groupadd** and **useradd** commands to set the UID and GID the same on each machine.

**Note:** The only IBM MQ requirement, is that the mqm user should have the mqm group as its primary group.

## Adding existing user IDs to the group on Linux systems

If you want to run administration commands, for example `crtmqm` (create queue manager) or `strmqm` (start queue manager), your user ID must be a member of the `mqm` group. This user ID must not be longer than 12 characters.

Users do not need `mqm` group authority to run applications that use the queue manager; it is needed only for the administration commands.

## Log files created by MQ Telemetry service

The `umask` setting of the user ID that creates a queue manager will determine the permissions of the Telemetry log files generated for that queue manager. Even though the ownership of the log files will be set to `mqm`.

### Related concepts

[“Creating file systems on AIX” on page 40](#)

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation directory for the product code can be changed at installation time, but the working data location cannot be changed.

[“Configuring and tuning the operating system on Linux” on page 102](#)

Use this topic when you are configuring IBM MQ on Linux systems.

### Related tasks

[“Configuring and tuning the operating system on AIX” on page 42](#)

When installing IBM MQ on AIX systems, there are some additional settings that must be configured.

## **Creating file systems on Linux**

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation directory for the product code can be changed at installation time, but the working data location cannot be changed.

## Determining the size of a server installations file system

To determine the size of the `/var/mqm` file system for a server installation, consider:

- The maximum number of messages in the system at one time.
- Contingency for message buildups, if there is a system problem.
- The average size of the message data, plus 500 bytes for the message header.
- The number of queues.
- The size of log files and error messages.
- The amount of trace that is written to the `/var/mqm/trace` directory.

Storage requirements for IBM MQ also depend on which components you install, and how much working space you need. For more details, see [Disk space requirements](#).

## Creating a file system for the working data

Before you install IBM MQ, create and mount a file system called `/var/mqm` which is owned by the user `mqm` in the group `mqm`; see [“Setting up the user and group on Linux” on page 99](#). This file system is used by all installations of IBM MQ on a system. If possible, use a partition strategy with a separate volume for the IBM MQ data. This means that other system activity is not affected if a large amount of IBM MQ work builds up. Configure the directory permissions to permit the `mqm` user to have full control, for example, file mode 755. These permissions will then be updated during the IBM MQ installation to match the permissions required by the queue manager.

## Creating separate file systems for errors and logs

You can also create separate file systems for your log data ( `/var/mqm/log` ) and error files ( `/var/mqm/errors` ). If possible, place these directories on different physical disks from the queue manager data ( `/var/mqm/qmgrs` ) and from each other.

If you create separate file systems the `/var/mqm/errors` directory can be NFS mounted. However, if you choose to NFS-mount `/var/mqm/errors`, the error logs might be lost if the network fails.

You can protect the stability of your queue manager by having separate file systems for:

- `/var/mqm/errors`
- `/var/mqm/trace`
- `/var/mqm/qmgrs`
- `/var/mqm/log`

In the case of `/var/mqm/errors`, it is rare that this directory receives large quantities of data. But it is sometimes seen, particularly if there is a severe system problem leading to IBM MQ writing a lot of diagnostic information in to `.FDC` files. In the case of `/var/mqm/trace`, files are only written here when you use `strmqtrc` to start tracing IBM MQ.

You can obtain better performance of normal IBM MQ operations (for example, syncpoints, MQPUT, MQGET of persistent messages) by placing the following on separate disks:

- `/var/mqm/qmgrs`
- `/var/mqm/log`

In the rare event that you need to trace an IBM MQ system for problem determination, you can reduce performance impact by placing the `/var/mqm/trace` file system on a separate disk.

If you are creating separate file systems, allow a minimum of 30 MB of storage for `/var/mqm`, 100 MB of storage for `/var/mqm/log`, and 10 MB of storage for `/var/mqm/errors`. The 100 MB minimum allowance of storage for `/var/mqm/log` is the absolute minimum required for a single queue manager and is not a recommended value. The size of a file system must be scaled according to the number of queue managers that you intend to use, the number of pages per log file, and the number of log files per queue manager.

For more information about file systems, see [File system support](#).

The size of the log file depends on the log settings that you use. The minimum sizes are for circular logging using the default settings. For more information about log sizes, see [Calculating the size of the log](#).

### Linux

For a client installation, the file system can be mounted on a remote network device, for example NFS.

If you are performing both a client and a server installation, the requirements of the server installation take precedence over the requirements of the client installation.

Allow 15 MB as a minimum for an IBM MQ client.

A new sample IBM MQ MQI client configuration file is created in the `var/mqm` directory, by the client package, during installation, but only if this file does not exist. This file contains the `ClientExitPath` stanza. An example `mqclient.ini` file is shown in [IBM MQ MQI client configuration file, mqclient.ini](#).

If you are using a common configuration file for multiple clients, either in the IBM MQ installation directory or in another location using the `MQCLNTCF` environment variable, you must grant read access to all user identifiers under which the IBM MQ client applications run. If, for any reason, the file cannot be read the failure is traced, and the search logic continues as if the file had not existed.

### Related concepts

[“Setting up the user and group on Linux” on page 99](#)

On Linux systems, IBM MQ requires a user ID of the name `mqm`, with a primary group of `mqm`. The `mqm` user ID owns the directories and files that contain the resources associated with the product.

[“Configuring and tuning the operating system on Linux” on page 102](#)

Use this topic when you are configuring IBM MQ on Linux systems.

## **Configuring and tuning the operating system on Linux**

Use this topic when you are configuring IBM MQ on Linux systems.

**Note:** The information in this topic principally concerns global kernel tuning parameters, and applies to all Linux systems. The exception to this statement are the sections described in [“Configuring the users who start IBM MQ”](#) on page 105, which are specific to the user.

### Shell interpreter

Ensure that `/bin/sh` shell is a valid shell interpreter compatible with the Bourne shell, otherwise the post-installation configuration of IBM MQ does not complete successfully. If the shell was not installed using RPM, you might see a prerequisites failure of `/bin/sh` shell when you try to install IBM MQ. The failure is because the RPM tables do not recognize that a valid shell interpreter is installed. If the failure occurs, you can reinstall the `/bin/sh` shell by using RPM, or specify the RPM option `--nodeps` to disable dependency checking during installation of IBM MQ.

**Note:** The `--dbpath` option is not supported when installing IBM MQ on Linux.

### Swap space

During high load IBM MQ can use virtual memory (swap space). If virtual memory becomes full it could cause IBM MQ processes to fail or become unstable, affecting the system.

To prevent this situation your IBM MQ administrator should ensure that the system has been allocated enough virtual memory as specified in the operating system guidelines.

### System V IPC kernel configuration

IBM MQ uses System V IPC resources, in particular shared memory. However, a limited number of semaphores are also used.

The minimum configuration for IBM MQ for these resources is as follows:

Name	Kernel-name	Value	Increase	Description
shmmni	kernel.shmmni	4096	Yes	Maximum number of shared memory segments
shmmax	kernel.shmmax	268435456	No	Maximum size of a shared-memory segment (bytes)
shmall	kernel.shmall	2097152	Yes	Maximum amount of shared memory (pages)
semmsl	kernel.sem	32	No	Maximum amount of semaphores permitted per set
semmns	kernel.sem	4096	Yes	Maximum number of semaphores
semopm	kernel.sem	32	No	Maximum number of operations in single operations
semnmi	kernel.sem	128	Yes	Maximum number of semaphore sets
thrmx	kernel.threads-max	32768	Yes	Maximum number of threads
pidmax	kernel.pid_max	32768	Yes	Maximum number of process identifiers

#### Notes:

1. These values are sufficient to run two moderate sized queue managers on the system. If you intend to run more than two queue managers, or the queue managers are to process a significant workload, you might need to increase the values displayed as Yes in the Increase column.
2. The `kernel.sem` values are contained within a single kernel parameter containing the four values in order.

To view the current value of the parameter log on, as a user with root authority, and type:

```
sysctl Kernel-name
```

To add or alter these values, log on as a user with root authority. Open the file `/etc/sysctl.conf` with a text editor, then add or change the following entries to your chosen values:

```
kernel.shmni = 4096
kernel.shmall = 2097152
kernel.shmmax = 268435456
kernel.sem = 32 4096 32 128
```

Then save and close the file.

To load these **sysctl** values immediately, enter the following command `sysctl -p`.

If you do not issue the `sysctl -p` command, the new values are loaded when the system is rebooted.

By default the Linux kernel has a maximum process identifier, that can also be used with threads, and might limit the allowed number of threads.

The operating system reports when the system lacks the necessary resources to create another thread, or the system-imposed limit on the total number of threads in a process `{PTHREAD_THREADS_MAX}` would be exceeded.

For more information on `kernel.threads-max` and `kernel.pid-max`, see [Resource shortage in IBM MQ queue manager when running a large number of clients](#)

## Setting RemoveIPC on IBM MQ



**Attention:** Leaving the setting of **RemoveIPC** on its default value of Yes in the login manager configuration files (`logind.conf` and `logind.conf.d`) might cause IBM MQ owned IPC resources being removed outside the control of IBM MQ.

You should set the value to No. For more information on **RemoveIPC** see the [login.conf](#) man page.

## TCP/IP configuration

If you want to use **keepalive** for IBM MQ channels, you can configure the operation of the KEEPALIVE using the kernel parameters:

```
net.ipv4.tcp_keepalive_intvl
net.ipv4.tcp_keepalive_probes
net.ipv4.tcp_keepalive_time
```

See [Using the TCP/IP SO\\_KEEPALIVE option](#) for further information.

To view the current value of the parameter log on, as a user with root authority, and type `sysctl Kernel-name`.

To add or alter these values, log on as a user with root authority. Open the file `/etc/sysctl.conf` with a text editor, then add or change the following entries to your chosen values.

To load these **sysctl** values immediately, enter the following command `sysctl -p`.

If you do not issue the `sysctl -p` command, the new values are loaded when the system is rebooted.

## RDQM - configuring resource limits and environment variables

For replicated data queue managers (RDQMs), configure the `nproc` and `nofile` values for the `mqm` user in `/etc/security/limits.conf`. Alternatively set `LimitNOFILE` and `LimitNPROC` variables in the Pacemaker systemd service unit file for RDQM, named `rdqm.conf`. If the resource limits (`nproc` and/or `nofile`) are configured in both `limits.conf` and `rdqm.conf`, the higher value of the limits configured is used by the RDQM queue manager. You can use `rdqm.conf` to configure other resource limits (for example, stack size) and environment variables. Note that the `rdqm.conf` file is only read when the queue manager is started automatically by Pacemaker. This might be at system startup, or when the queue manager fails over to the node where the `rdqm.conf` file exists. If the queue manager is started manually with the `strmqm` command, it will inherit the environment where `strmqm` is run.

The following steps create a sample configuration in `rdqm.conf`:

1. Log in as root on the RDQM node.
2. Create the directory `/etc/systemd/system/pacemaker.service.d`.
3. Create the file `rdqm.conf` in that directory. The `rdqm.conf` file contains the required environment variables and resource limits in the following format:

```
[Service]
Environment="MQ_ENV_VAR=1"
LimitNOFILE=65536
LimitNPROC=32768
LimitSTACK=16777216
```

For more details on configuring the systemd unit file, consult your operating system documentation.

4. Restart the pacemaker service:

```
systemctl daemon-reload
systemctl restart pacemaker.service
```

Any RDQM queue managers running on this node move to another node while pacemaker is restarted.

5. Repeat the procedure on the other two RDQM nodes so that the same configuration is used by the RDQM queue manager when it fails over or switches over to other nodes.

**Note:** You should use `qm.ini` attributes in preference to environment variables to control queue manager behavior because the `qm.ini` file is replicated between RDQM nodes.

## RDQM - configuring the kernel console log level

The DRBD kernel module (`kmod-drbd`) can sometimes write many messages at the `KERN_ERR` (3) log level. To prevent these messages being copied to the system console, which can cause significant processing delays affecting the entire system, reduce the first number of the `kernel.printk` parameter to 3. For more information about kernel message priorities, see <https://www.kernel.org/doc/html/latest/core-api/printk-basics.html>.

To view the current value of the parameter, log on as a user with root authority and type `sysctl kernel.printk`.

To add or alter this value, log on as a user with root authority. Open the file `/etc/sysctl.conf` with a text editor, then add or change the following entry to your chosen value:

```
kernel.printk = 3 4 1 7
```

To load these `sysctl` values immediately, enter the command `sysctl -p`. If you do not issue the `sysctl -p` command, the new values are loaded when the system is rebooted.

## 32-bit support on 64-bit Linux platforms

Some 64-bit Linux distributions no longer support 32-bit applications by default. For details of affected platforms, and guidance on enabling 32-bit applications to run on these platforms, see [“Hardware and software requirements on Linux systems” on page 95](#).



## Configuring the users who start IBM MQ

You must make the configuration changes described in *Maximum open files* and *Maximum processes* for all users who start IBM MQ. This usually includes the mqm user ID, but the same changes must be made for any other user IDs who start queue managers.

For queue managers started with **systemd**, specify equivalent **NOFILE** and **NPROC** values in the unit file that contains the queue manager service configuration.

### Maximum open files

The maximum number of open file-handles in the system is controlled by the parameter **fs.file-max**

The minimum value for this parameter for a system with two moderate sized queue managers is 524288.

**Note:** If the operating system default is higher, you should leave the higher setting, or consult your operating system provider.

You are likely to need a higher value if you intend to run more than two queue managers, or the queue managers are to process a significant workload.

To view the current value of a parameter, log on as a user with root authority, and type `sysctl fs.file-max`.

To add or alter these values, log on as a user with root authority. Open the file `/etc/sysctl.conf` with a text editor, then add or change the following entry to your chosen value:

```
fs.file-max = 524288
```

Then save and close the file.

To load these **sysctl** values immediately, enter the following command `sysctl -p`.

If you do not issue the `sysctl -p` command, the new values are loaded when the system is rebooted.

If you are using a pluggable security module such as PAM (Pluggable Authentication Module), ensure that this module does not unduly restrict the number of open files for the mqm user. To report the maximum number of open file descriptors per process for the mqm user, login as the mqm user and enter the following values:

```
ulimit -n
```

For a standard IBM MQ queue manager, set the *nofile* value for the mqm user to 10240 or more. To set the maximum number of open file descriptors for processes running under the mqm user, add the following information to the `/etc/security/limits.conf` file:

```
mqm      hard  nofile  10240
mqm      soft  nofile  10240
```

The pluggable security module limits are not applied to queue managers started with **systemd**. To start an IBM MQ queue manager with **systemd** set **LimitNOFILE** to 10240 or more in the unit file that contains the queue manager service configuration.

For instructions on how to configure *nofile* for RDQM queue managers, see [RDQM - configuring resource limits and environment variables](#).

### Maximum processes

A running IBM MQ queue manager consists of a number of thread programs. Each connected application increases the number of threads running in the queue manager processes. It is normal for an operating system to limit the maximum number of processes that a user runs. The limit prevents operating system failures due to an individual user or subsystem creating too many processes. You must ensure that the

maximum number of processes that the mqm user is allowed to run is sufficient. The number of processes must include the number of channels and applications that connect to the queue manager.

The following calculation is useful when determining the number of processes for the mqm user:

$$nproc = 2048 + clientConnections * 4 + qmgrChannels * 4 + localBindingConnections$$

where:

- *clientConnections* is the maximum number of connections from clients on other machines connecting to queue managers on this machine.
- *qmgrChannels* is the maximum number of running channels (as opposed to channel definitions) to other queue managers. This includes cluster channels, sender/receiver channels, and so on.
- *localBindingConnections* does not include application threads.

The following assumptions are made in this algorithm:

- 2048 is a large enough contingency to cover the queue manager threads. This might need to be increased if a lot of other applications are running.
- When setting *nproc*, take into account the maximum number of applications, connections, channels and queue managers that might be run on the machine in the future.
- This algorithm takes a pessimistic view and the actual *nproc* needed might be slightly lower for later versions of IBM MQ and fastpath channels.
- On Linux, each thread is implemented as a light-weight process (LWP) and each LWP is counted as one process against *nproc*.

You can use the `PAM_limits` security module to control the number of processes that users run. You can configure the maximum number of processes for the mqm user as follows:

mqm	hard	nproc	4096
mqm	soft	nproc	4096

For more details on how to configure the `PAM_limits` security module type, enter the following command:

```
man limits.conf
```

The pluggable security module limits are not applied to queue managers started with **systemd**. To start an IBM MQ queue manager with **systemd** set **LimitNPROC** to a suitable value in the unit file that contains the queue manager service configuration.

For instructions on how to configure *nproc* for RDQM queue managers, see [RDQM - configuring resource limits and environment variables](#).

You can check your system configuration using the `mqconfig` command.

For more information on configuring your system, see [How to configure AIX and Linux systems for IBM MQ](#).

### Related concepts

[“Setting up the user and group on Linux” on page 99](#)

On Linux systems, IBM MQ requires a user ID of the name `mqm`, with a primary group of `mqm`. The `mqm` user ID owns the directories and files that contain the resources associated with the product.

[“Creating file systems on Linux” on page 100](#)

Before installing IBM MQ, you might need to create file systems for both the product code and working data to be stored. There are minimum storage requirements for these file systems. The default installation

directory for the product code can be changed at installation time, but the working data location cannot be changed.

### Related reference

[mqconfig](#)

## Accepting the license on IBM MQ for Linux

You can choose to accept the license before or after installing the product on Linux platforms.

### About this task

Accepting the IBM MQ license before you install the product causes the following issues for Linux users:

- It stops you adding the IBM MQ RPM to a yum repository.
- It does not fit well with working in the cloud, where the RPM is installed as part of building the image.
- It does not fit well with unzippable packages, where no code is run before installation.

Accepting the license after installation lets you set up your own repository to install from.

### Notes:

- You still have to accept the license before you use the product.
- You must have the correct license, or licenses, for the components you want to install. See [license requirements](#).
- If you have installed a trial license, follow the instructions for converting a trial license. See [“Converting a trial license on Linux”](#) on page 139.

### Procedure

- Accept the license before installing the product

To accept the license before installing the product, follow the instructions for installing the server by [preparing your system](#), then follow the appropriate instructions for your operating system:

#### **rpm**

See [“Installing the first IBM MQ installation on Linux using the rpm command”](#) on page 112.

#### **yum**

See [“Installing IBM MQ on Linux Red Hat using yum”](#) on page 122.

#### **Ubuntu using Debian**

See [“Installing IBM MQ on Linux Ubuntu using Debian”](#) on page 125.

- Accept the license after installing the product

You can use the **MQLICENSE** environment variable to accept or view an IBM MQ license after you install the product. **MQLICENSE** can be set to one of two values:

#### **accept**

Accept the license post-installation.

#### **view**

Display the license, if the license has been accepted.

To accept the license post-installation, use this command:

```
export MQLICENSE=accept
```

To view the license, use this command:

```
export MQLICENSE=view
```

Alternatively, you can use the following commands to accept or view an IBM MQ license after you install the product:

- [mqlicense](#) (accept license post installation)
- [dspmqlic](#) (display IBM MQ license)



**Attention:** Do not use the `mqlicense.sh` script from the installation media, because this script can only be used to accept the license before installation.

## **Linux** Installing IBM MQ on Linux using rpm

Installation tasks that are associated with installing IBM MQ on Linux systems using rpm are grouped in this section.

### About this task

To install IBM MQ using rpm, complete the following tasks.

For information about how to uninstall IBM MQ, see [“Uninstalling or modifying IBM MQ on Linux using rpm”](#) on page 151.

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ”](#) on page 294.

### Procedure

1. Check the system requirements.  
See [“Checking requirements on Linux”](#) on page 94.
2. Plan your installation.
  - As part of the planning process, you must choose which components to install and where to install them. See [“IBM MQ rpm components for Linux systems”](#) on page 108.
  - You must also make some platform-specific choices. See [“Planning to install IBM MQ on Linux”](#) on page 97.
3. Prepare your system for installation of IBM MQ.  
See [“Preparing the system on Linux”](#) on page 98.
4. Install IBM MQ server.  
See [“Installing the first IBM MQ installation on Linux using the rpm command”](#) on page 112, and [“Installing additional IBM MQ installations on Linux using the rpm command”](#) on page 116.
5. Optional: Install an IBM MQ client.  
See [“Installing an IBM MQ client on Linux using rpm”](#) on page 119.
6. Verify your installation. See [“Verifying an IBM MQ installation on Linux”](#) on page 140.

## **Linux** IBM MQ rpm components for Linux systems

You can select the components that you require when you install IBM MQ.

### Important:

1. For details of what each purchase of IBM MQ entitles you to install, see [IBM MQ license information](#).
2. The RPM package `MQSeriesGSKit` file must be installed for server and client installation.

To display these components you can use, for example, the following command:

```
rpm -qa | grep MQ | xargs rpm -q --info
```

[Table 13](#) on page 109 shows the components that are available when installing an IBM MQ server or client on a Linux system:

Table 13. IBM MQ components for Linux systems

Component	Description	Server media	Client media	RPM package name
<b>Runtime</b>	Contains files that are common to both server and client installations. <b>Note:</b> MQSeriesRuntime component must be installed.	✓	✓	MQSeriesRuntime
<b>Server</b>	You can use the server to run queue managers on your system and connect to other systems over a network. Provides messaging and queuing services to applications, and support for IBM MQ client connections.	✓		MQSeriesServer
<b>Standard Client</b>	The IBM MQ MQI client is a small subset of IBM MQ, without a queue manager, that uses the queue manager and queues on other (server) systems. It can be used only when the system it is on is connected to another system that is running a full server version of IBM MQ. The client and the server can be on the same system if required.	✓	✓	MQSeriesClient
<b>SDK</b>	The SDK is required for compiling applications. It includes sample source files, and the bindings (files .H, .LIB, .DLL, and others), that you need to develop applications to run on IBM MQ.	✓	✓	MQSeriesSDK
<b>Sample programs</b>	The sample application programs are needed if you want to check your IBM MQ installation using the verification procedures.	✓	✓	MQSeriesSamples
<b>Java messaging</b>	The files needed for messaging using Java (includes Java Message Service).	✓	✓	MQSeriesJava
<b>Man pages</b>	Linux man pages, in U.S. English, for: control commands MQI calls MQSC commands	✓	✓	MQSeriesMan
<b>Java JRE</b>	A Java Runtime Environment that is used by those parts of IBM MQ that are written in Java.	✓	✓	MQSeriesJRE
<b>Message Catalogs</b>	For available languages, see the table of <a href="#">message catalogs</a> that follows.	✓	✓	
<b>IBM Global Security Kit (GSKit)</b>	IBM Global Security Kit (GSKit) V8 Certificate and TLS, Base Runtime.	✓	✓	MQSeriesGSKit

Table 13. IBM MQ components for Linux systems (continued)

Component	Description	Server media	Client media	RPM package name
<b>Telemetry Service</b>	<p>MQ Telemetry supports the connection of Internet Of Things (IOT) devices (that is, remote sensors, actuators and telemetry devices) that use the IBM MQ Telemetry Transport (MQTT) protocol. The telemetry (MQXR) service enables a queue manager to act as an MQTT server, and communicate with MQTT client apps.</p> <p><b>Note:</b> The telemetry service is only available on Linux for x86-64 (64 bit) and Linux for IBM Z.</p> <p>A set of MQTT clients is available from the <a href="#">Eclipse Paho downloads page</a>. These sample clients help you write your own MQTT client apps that IOT devices use to communicate with MQTT servers.</p> <p>See also “<a href="#">Installation considerations for MQ Telemetry</a>” on page 251.</p>	✓		MQSeriesXRService
<b>Managed File Transfer</b>	<p>MQ Managed File Transfer transfers files between systems in a managed and auditable way, regardless of file size or the operating systems used. For information about the function of each component, see “<a href="#">Managed File Transfer product options</a>” on page 246.</p>	✓		MQSeriesFTAgent MQSeriesFTBase MQSeriesFTLogger MQSeriesFTService MQSeriesFTTools
<b>Advanced Message Security</b>	<p>Provides a high level of protection for sensitive data flowing through the IBM MQ network, while not impacting the end applications. You must install this component on all IBM MQ installations that host queues you want to protect.</p> <p>You must install the IBM Global Security Kit (GSKit) component on any IBM MQ installation that is used by a program that puts or gets messages to or from a protected queue, unless you are using only Java client connections.</p> <p>You must install the <b>Java JRE</b> component to install this component.</p>	✓		MQSeriesAMS

Table 13. IBM MQ components for Linux systems (continued)

Component	Description	Server media	Client media	RPM package name
<b>AMQP Service</b>	Install this component to make AMQP channels available. AMQP channels support AMQP 1.0 APIs. You can use AMQP channels to give AMQP applications access to the enterprise-level messaging facilities provided by IBM MQ.	✓		MQSeriesAMQP
<b>REST API and IBM MQ Console</b>	Adds HTTP based administration for IBM MQ through the REST API and IBM MQ Console.	✓		MQSeriesWeb
<b>RDQM (replicated data queue manager)</b>	Install this component to make the replicated data queue manager high availability configuration available. See “Installing RDQM (replicated data queue managers)” on page 256 for more information.  <b>Note:</b>  This component is available only on Linux for x86-64 (64 bit), on RHEL 8.8 or later.  This component is not supported for use with Docker.	✓		MQSeriesRDQM

**Notes:**

- **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
- **Removed** V 9.4.0 V 9.4.0 The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).
- **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.  
  
➤ **Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.  
  
 Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.
- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

Table 14. IBM MQ message catalogs for Linux systems

Message catalog language	RPM package name
Brazilian Portuguese	MQSeriesMsg_pt

Table 14. IBM MQ message catalogs for Linux systems (continued)

Message catalog language	RPM package name
Czech	MQSeriesMsg_cs
French	MQSeriesMsg_fr
German	MQSeriesMsg_de
Hungarian	MQSeriesMsg_hu
Italian	MQSeriesMsg_it
Japanese	MQSeriesMsg_ja
Korean	MQSeriesMsg_ko
Polish	MQSeriesMsg_pl
Russian	MQSeriesMsg_ru
Spanish	MQSeriesMsg_es
Simplified Chinese	MQSeriesMsg_Zh_CN
Traditional Chinese	MQSeriesMsg_Zh_TW
U.S. English	not applicable

### Related concepts

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

[“Planning considerations for installation on Multiplatforms” on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

### **Installing the first IBM MQ installation on Linux using the rpm command**

You can install an IBM MQ server on a 64-bit Linux system using rpm. The instructions in this topic are for the first installation of IBM MQ on a Linux system.

### Before you begin

- The instructions in this topic are for the first installation of IBM MQ on a Linux system. For instructions on how to install additional IBM MQ installations, see [“Installing additional IBM MQ installations on Linux using the rpm command” on page 116](#).
- Before you start the installation procedure, ensure that you have completed the necessary steps outlined in [“Preparing the system on Linux” on page 98](#).

### About this task

Install the server by using the RPM Package Manager installer to select the components you want to install. The components and package names are listed in [“IBM MQ rpm components for Linux systems” on page 108](#).



**Attention:** Unless you install all your required packages in the same operation, you must install the packages in the following order:

MQSeriesRuntime  
 MQSeriesJRE  
 MQSeriesJava  
 MQSeriesGSKit  
 MQSeriesServer



MQSeriesWeb  
MQSeriesFTBase  
MQSeriesFTAgent  
MQSeriesFTService  
MQSeriesFTLogger  
MQSeriesFTTools  
MQSeriesAMQP  
MQSeriesAMS  
MQSeriesXRService  
MQSeriesClient  
MQSeriesMan  
MQSeriesMsg  
MQSeriesSamples  
MQSeriesSDK

## Notes:

1. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
2. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).
3. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.  
**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.  
Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.
4. From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

## Procedure

1. Log in as root, or with sufficient authority to run the following commands.  
You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).
2. Optional: If your installation media is a [downloadable installation image](#), obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the tar file:
  - a) For example, if you download part number CC7K6ML, you decompress the file by using the following command:

```
gunzip CC7K6ML.tar.gz
```

- b) Similarly, extract the installation files from the tar file by using the following command:

```
tar -xvf CC7K6ML.tar
```

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

3. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

4. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

5. Optional: Obtain the IBM MQ public signing gpg key and install it into rpm.

```
rpm --import ibm_mq_public.pgp
```

The IBM-provided RPMs are signed with a digital signature, and your system will not recognize that signature without further steps. This only needs to be done once for each system. For more information, see [“IBM MQ code signatures” on page 12](#).

The validity of any of the IBM MQ RPMs can then be verified, for example:

```
# rpm -Kv MQSeriesRuntime-9.4.0-0.x86_64.rpm
MQSeriesRuntime-9.4.0-0.x86_64.rpm:
  Header V3 RSA/SHA256 Signature, key ID 0209b828: OK
  Header SHA1 digest: OK
  V3 RSA/SHA256 Signature, key ID 0209b828: OK
  MD5 digest: OK
```

**Note:** If you skip this step, then a harmless warning might be issued during RPM installation to indicate there is a signature but the system does not recognize the signing key, for example:

```
warning: MQSeriesRuntime-9.4.0-0.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID 0209b828:
NOKEY
```

6. Install IBM MQ.

To support the running of a queue manager, you must install at least the `MQSeriesRuntime` and the `MQSeriesServer` components.

**Important:** The components that you need to install might not all be in the same folder on the installation media. Some components might be under the `/Advanced` folder. For more information about installing IBM MQ Advanced components, see [“Installing IBM MQ Advanced for Multiplatforms” on page 237](#).

- For IBM MQ 9.4, install IBM MQ in the default location `/opt/mqm` by using the `rpm -Uvh` command:

For example, to install all components that are available in your current location on the installation media to the default location, use the following command:

```
rpm -Uvh MQSeries*.rpm
```

To install the runtime and server components to the default location, use the following command:

```
rpm -Uvh MQSeriesRuntime-*.rpm MQSeriesServer-*.rpm MQSeriesGSKit-*.rpm
```

- Install IBM MQ in a non-default location by using the `--prefix` option. All of the IBM MQ components that you require must be installed in the same location:

The installation path specified must be either an empty directory, the root of an unused file system, or a path that does not exist. The length of the path is limited to 256 bytes and must not contain spaces.

For example, enter the following installation path to install the runtime and server components to the `/opt/customLocation` directory on a 64-bit Linux system:

```
rpm --prefix /opt/customLocation -Uvh MQSeriesRuntime-*.rpm MQSeriesServer-*.rpm
```

## Results

You installed IBM MQ on your Linux system.

## What to do next

- If required, you can now set this installation to be the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where `MQ_INSTALLATION_PATH` represents the directory where IBM MQ is installed.

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the `setmqenv` or `crtmqenv` command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. See [“Verifying an IBM MQ installation on Linux” on page 140](#), for more information.
- Only a user with a UID that is a member of the `mqm` group can issue administration commands. If you want to enable users to issue administration commands, they must be added to the `mqm` group. For more information, see [“Setting up the user and group on Linux” on page 99](#) and [Authority to administer IBM MQ on AIX, Linux, and Windows systems](#).

## Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ (AIX, Linux, and Windows), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

## Related tasks

[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the `rpm` command. You can also modify an installation by removing selected packages (components) currently installed on your system.

[Changing the primary installation](#)

## Related reference

[setmqinst](#)

## Linux **Installing additional IBM MQ installations on Linux using the rpm**

### command

You can install additional IBM MQ servers on a 64-bit Linux system by using the **crtmqpkg** command during the installation process.

### Before you begin



**CAUTION:** The instructions in this topic do not apply to Linux Ubuntu or Linux on Power® Systems - Little Endian. For information about these platforms, see [“Installing IBM MQ on Linux Ubuntu using Debian” on page 125.](#)

- The instructions in this topic are for additional installations of IBM MQ on a Linux system. For instructions on how to install the first IBM MQ installation, see [“Installing the first IBM MQ installation on Linux using the rpm command” on page 112.](#)
- Before you start the installation procedure, ensure that you have completed the necessary steps outlined in [“Preparing the system on Linux” on page 98.](#)
- Before you can run the **crtmqpkg** command on Linux, you must have the **pax** and **rpmbuild** commands installed. These commands are not supplied as part of the product. You must get them from your Linux distribution supplier. The **rpmbuild** command is located in the **rpm-build** package.

### About this task





Install the server by using the RPM Package Manager installer to select the components you want to install. The components and package names are listed in [“IBM MQ rpm components for Linux systems” on page 108.](#)




**Attention:** Unless you install all your required packages in the same operation, you must install the packages in the following order:

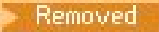
MQSeriesRuntime  
MQSeriesJRE  
MQSeriesJava  
MQSeriesGSKit  
MQSeriesServer  
MQSeriesWeb  
MQSeriesFTBase  
MQSeriesFTAgent  
MQSeriesFTService  
MQSeriesFTLogger  
MQSeriesFTTools  
MQSeriesAMQP  
MQSeriesAMS  
MQSeriesXRService  
MQSeriesExplorer  
MQSeriesClient  
MQSeriesMan  
MQSeriesMsg  
MQSeriesSamples  
MQSeriesSDK

### Notes:

1.  **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
2.  **Removed**  **V 9.4.0**  **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise.

Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

3.  For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.

 For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

4. From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

## Procedure

1. Optional: Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

2. Optional: If your installation media is a [downloadable installation image](#), obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the tar file:
  - a) For example, if you download part number CC7K6ML, you decompress the file by using the following command:

```
gunzip CC7K6ML.tar.gz
```

- b) Similarly, extract the installation files from the tar file by using the following command:

```
tar -xvf CC7K6ML.tar
```

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

3. Set your current directory to the location of the installation files. The location might be a network location, or a local file system directory.
4. Optional: Run the **crtmqpkg** command to create a unique set of packages to install on the system.

The **crtmqpkg** command is required only if this is not the first installation of IBM MQ on the system. If you have earlier versions of IBM MQ installed on your system, then installing the latest version works correctly if you install it in a different location.

Before you can run the **crtmqpkg** command on Linux, you must have the **pax** and **rpmbuild** commands installed. For more information, see [Before you begin](#).

To run the **crtmqpkg** command on a Linux system:

- a) Enter the following command:

```
./crtmqpkg suffix
```

where *suffix* is a name of your choosing that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is located at `/var/tmp`. You must ensure that the system has

enough free space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the `crtmqpkg` command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix
```

- b) Set your current directory to the location specified when the `crtmqpkg` command operation completes successfully.

This directory is a subdirectory of the `/var/tmp/mq_rpms` directory, in which the unique set of packages is created. The packages have the *suffix* value contained within the file name. For example, using a suffix of "1":

```
./crtmqpkg 1
```

means there is a subdirectory named `/var/tmp/mq_rpms/1/x86_64`.

The packages are renamed according to the subdirectory, for example:

```
From: MQSeriesRuntime-9.4.0-0.x86_64.rpm  
To: MQSeriesRuntime-1-9.4.0-0.x86_64.rpm
```

5. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

6. Install IBM MQ.

To support the running of a queue manager, you must install at least the `MQSeriesRuntime` and the `MQSeriesServer` components.

**Important:** The components that you need to install might not all be in the same folder on the installation media. Some components might be under the `/Advanced` folder. For more information about installing IBM MQ Advanced components, see [“Installing IBM MQ Advanced for Multiplatforms” on page 237](#).

- For IBM MQ 9.4, install IBM MQ in the default location `/opt/mqm`:

For example, to install all components that are available in your current location on the installation media to the default location, use the following command:

```
rpm -Uvh MQSeries*.rpm
```

To install the runtime and server components to the default location, use the following command:

```
rpm -Uvh MQSeriesRuntime-*.rpm MQSeriesServer-*.rpm
```

- Install IBM MQ in a non-default location by using the `--prefix` option. For each installation, all of the IBM MQ components that you require must be installed in the same location.

The installation path specified must be either an empty directory, the root of an unused file system, or a path that does not exist. The length of the path is limited to 256 bytes and must not contain spaces.

For example, enter the following installation path to install the runtime and server components to the `/opt/customLocation` directory on a 64-bit Linux system:

```
rpm --prefix /opt/customLocation -Uvh MQSeriesRuntime-*.rpm
MQSeriesServer-*.rpm
```

## Results

You installed IBM MQ on your Linux system.

## What to do next

- If required, you can now set this installation to be the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where `MQ_INSTALLATION_PATH` represents the directory where IBM MQ is installed.

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ . For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. See [“Verifying an IBM MQ installation on Linux” on page 140](#), for more information.
- Only a user with a UID that is a member of the **mqm** group can issue administration commands. If you want to enable users to issue administration commands, they must be added to the **mqm** group. For more information, see [“Setting up the user and group on Linux” on page 99](#) and [Authority to administer IBM MQ on AIX, Linux, and Windows systems](#).

## Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

## Related tasks

[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the **rpm** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

[Changing the primary installation](#)

## Related reference

[setmqinst](#)

## **Installing an IBM MQ client on Linux using rpm**

Installing an IBM MQ client on a 64 bit Linux system.

## Before you begin

- Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on Linux” on page 98](#).
- If this installation is not the only installation on the system, you must ensure that you have write access to `/var/tmp`.

## About this task

This task describes the installation of the client, using the RPM Package Manager installer to select which components you want to install. You must install at least the Runtime and Client components. The components are listed in [“IBM MQ rpm components for Linux systems”](#) on page 108.

## Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script:

```
./mqlicense.sh
```

The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license.

If possible, `mqlicense.sh` opens an X-window to display the license.

If you need the license to be presented as text in the current shell, which can be read by a screen reader, type the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux”](#) on page 107 for more information about license acceptance.

4. If you have multiple installations on this system, you must run **crtmqpkg** to create a unique set of packages to install on the system:

- a) Enter the following command:

```
./crtmqpkg suffix
```

where *suffix* is a name of your choosing, that will uniquely identify the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

- b) Set your current directory to the location specified when the **crtmqpkg** command completes.

This directory is a sub-directory of `/var/tmp/mq_rpms`, in which the unique set of packages is created. The packages have the *suffix* value contained within the filename.

5. Optional: Obtain the IBM MQ public signing gpg key and install it into rpm.

```
rpm --import ibm_mq_public.gpg
```

The IBM-provided RPMs are signed with a digital signature, and your system will not recognize that signature without further steps. This only needs to be done once for each system. For more information, see [“IBM MQ code signatures”](#) on page 12.

The validity of any of the IBM MQ RPMs can then be verified, for example:

```
# rpm -Kv MQSeriesRuntime-9.4.0-0.x86_64.rpm
MQSeriesRuntime-9.4.0-0.x86_64.rpm:
  Header V3 RSA/SHA256 Signature, key ID 0209b828: OK
  Header SHA1 digest: OK
```



```
V3 RSA/SHA256 Signature, key ID 0209b828: OK
MD5 digest: OK
```

**Note:** If you skip this step, then a harmless warning might be issued during RPM installation to indicate there is a signature but the system does not recognize the signing key, for example:

```
warning: MQSeriesRuntime-9.4.0-0.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID 0209b828:
NOKEY
```

## 6. Install IBM MQ.

The minimum components you must install are the MQSeriesRuntime, the MQSeriesClient, and the MQSeriesGSKit.

- To install to the default location, /opt/mqm, use the **rpm -ivh** command to install each component that you require.

For example, to install all components to the default location use the following command:

```
rpm -ivh MQSeries*.rpm
```

If you are using Ubuntu, add the **--force-debian** attribute. For example, to install all components to the default location use the following command:

```
rpm --force-debian -ivh MQSeries*.rpm
```

You must include this option to prevent seeing warning messages from the version of RPM for your platform, which indicates that the RPM packages are not intended to be directly installed using RPM.

- To install to a non-default location use the **rpm --prefix** option. For each installation, all of the IBM MQ components that you require must be installed in the same location.

The installation path specified must either be an empty directory, the root of an unused file system, or a path that does not exist. The length of the path is limited to 256 bytes and must not contain spaces.

For example, to install the runtime and server components to /opt/customLocation on a 64-bit Linux system:

```
rpm --prefix /opt/customLocation -ivh MQSeriesRuntime-V.R.M-F.x86_64.rpm MQSeriesClient-V.R.M-
F.x86_64.rpm
```

where:

**V**

Represents the version of the product that you are installing

**R**

Represents the release of the product that you are installing

**M**

Represents the modification of the product that you are installing

**F**

Represents the fix pack level of the product that you are installing

## What to do next

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Testing communication between a client and a server on Linux” on page 149](#)

### Related tasks

[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the **rpm** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

## Installing IBM MQ on Linux Red Hat using yum

You can install IBM MQ on Linux Red Hat by using the yum installer.

### About this task

- Before you start the installation procedure, ensure that you have completed the necessary steps outlined in [“Preparing the system on Linux” on page 98](#).
- To install IBM MQ in a non default location, you must run the **crtmqpkg** command. This command requires that the system has the following commands installed:

- **pax** or **rpmbuild**
- **createrepo**
- **yum-utils**

These commands are not supplied as part of the product. You must get them from your Linux distribution supplier. The **rpmbuild** command is located in the **rpm-build** package.

### Procedure

1. Optional: Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between sudo and su commands in Linux](#).

2. Optional: If your installation media is a [downloadable installation image](#), obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the tar file:
  - a) For example, if you download part number CC7K6ML, you decompress the file by using the following command:

```
gunzip CC7K6ML.tar.gz
```

- b) Similarly, extract the installation files from the tar file by using the following command:

```
tar -xvf CC7K6ML.tar
```

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

3. Optional: If this is not the first installation on the system, or if you want to install IBM MQ to a non default location, run the **crtmqpkg** to create a unique set of packages to install on the system:

```
./crtmqpkg suffix installationPath
```

where:

- *suffix* specifies a name of your choosing that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.
- *installationPath* specifies the path where you want to install IBM MQ.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is located at `/var/tmp`. You must ensure that the system has enough free space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the `crtmqpkg` command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix installationPath
```

4. Set your current directory to the location of the installation packages. If you used the `crtmqpkg` command, this directory is the location that is specified when the `crtmqpkg` command operation completes successfully.

5. Configure the yum repository:

A sample repository file is available in the `MQServer` directory of the installation packages. You can use this sample to assist you in configuring the yum repository.

- a) Create or update the repository:

- If this is the first IBM MQ installation on the system, create a file with the suffix `.repo`, for example, `IBM_MQ.repo`, in the `/etc/yum.repos.d` directory.
- If this is an additional IBM MQ installation on the system, append the details of the additional installation to the appropriate `.repo` file in the `/etc/yum.repos.d` directory.

- b) Add the following contents to the repository file:

```
[IBM-MQ-v.r.m-architecture]
name=IBM MQ v.r.m architecture
baseurl=file:///installationFilesLocation
enabled=1
gpgcheck=0
```

- c) Replace the `installationFilesLocation` variable with the location of the installation files.
- d) Replace the `v.r.m` variable with the version, release, and modification number for the version of IBM MQ that you want to install.
- e) Replace the `architecture` variable with the architecture of the system you are installing on. This value is one of the following values:
  - `x86_64`
  - `ppc64le`
  - `s390x`

- f) Optional: Enable gpg key verification.

Replace `gpgcheck=0` with `gpgcheck=1` and add an additional `gpgkey=<uri>` line pointing to the certificate provided, for example:

```
gpgcheck=1
gpgkey=file:///directory/to/ibm_mq_public.pgp
```

- g) Optional: If you appended contents to the repository file, clear the repository cache by using the following command:

```
yum clean all
```

- h) Check that the IBM MQ repository is available by using the following command:

```
yum repolist
```

6. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a

language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

## 7. Install IBM MQ:

- To install all available components in the default location, use the following command:

```
yum -y install MQSeries*
```

- To install all available components in a non default location, use the following command:

```
yum -y install MQSeries*suffix*
```

where *suffix* specifies the suffix that was chosen when you ran **crtmqpkg** in step “3” on page 122.

- To install a subset of components, specify the components that you want to install. Any dependencies are automatically installed. To support the running of a queue manager, you must install at least the MQSeriesRuntime and the MQSeriesServer components. For example, to install the server component in the default location, use the following command:

```
yum -y install MQSeriesServer*
```

- To install an older version of IBM MQ when multiple versions are available in the repository file, use the following command:

```
yum -y install MQSeries*v.r.m-f
```

where *v.r.m-f* specifies the version, release, modification, and fix pack level to install.

## Results

You installed IBM MQ on your Linux system.

## What to do next

- If required, you can now set this installation to be the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where *MQ\_INSTALLATION\_PATH* represents the directory where IBM MQ is installed.

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. See [“Verifying an IBM MQ installation on Linux” on page 140](#), for more information.

- Only a user with a UID that is a member of the **mqm** group can issue administration commands. If you want to enable users to issue administration commands, they must be added to the **mqm** group. For more information, see [“Setting up the user and group on Linux” on page 99](#) and [Authority to administer IBM MQ on AIX, Linux, and Windows systems](#).

### Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

### Related tasks

[“Uninstalling or modifying IBM MQ on Linux Red Hat using yum” on page 153](#)

On Linux Red Hat, you can uninstall the IBM MQ server or client using the **yum** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

[Changing the primary installation](#)

### Related reference

[setmqinst](#)

## **Installing IBM MQ on Linux Ubuntu using Debian**

Installation tasks that are associated with installing IBM MQ on Linux systems using a Debian installer are grouped in this section.

### About this task

To install IBM MQ using a Debian installer, complete the following tasks.

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ” on page 294](#).

### Procedure

1. Check the system requirements.  
See [“Checking requirements on Linux” on page 94](#).
2. Plan your installation.  
As part of the planning process, you must choose which components to install and where to install them. See [“IBM MQ Debian components for Linux Ubuntu systems” on page 126](#).
3. Prepare your system for installation of IBM MQ.  
See [“Preparing the system on Linux” on page 98](#).
4. Install IBM MQ server.  
See [“Installing an IBM MQ server on Linux Ubuntu using Debian packages” on page 129](#).
5. Optional: Install an IBM MQ client.  
See [“Installing an IBM MQ client on Linux Ubuntu using Debian packages ” on page 135](#).
6. Verify your installation. See [“Verifying an IBM MQ installation on Linux” on page 140](#).

## **Overview of the Debian installer for IBM MQ on Linux Ubuntu**

An overview of the concepts and considerations for installing IBM MQ, on Linux Ubuntu, using the Debian installer.

### Installation tools

Use **apt**, **dpkg**, or a higher level installation tool, to install and uninstall the product. The installed product on disk appears identical to an rpm-installed copy.



**Attention:** The Debian installation tools have no provision for overriding the installation directory. This means that there is no *relocatable* or *multi-version support*. Therefore the product will be installed to /opt/mqm, but this can be set as the primary installation if you require.

## Package names

The package names have been changed to use an IBM MQ derived name.

For example, the Debian equivalent of the existing rpm server component, MQSeriesServer, is `ibmmq-server`.

On a single system, you can have a single version of IBM MQ installed by Debian, or you can achieve multi-version installation with Debian through the use of container based technologies, such as Docker.

## **IBM MQ Debian components for Linux Ubuntu systems**

You can select the components that you require when you install IBM MQ.

**Important:** For details of what each purchase of IBM MQ entitles you to install, see [IBM MQ license information](#).

Table 15 on page 126 shows the components that are available when installing an IBM MQ server or client on a Linux Ubuntu system using the Debian installer:

Component	Description	Server media	Client media	Debian package name
<b>Runtime</b>	Contains files that are common to both server and client installations. <b>Note:</b> <code>ibmmq-runtime</code> component must be installed.	✓	✓	<code>ibmmq-runtime</code>
<b>Server</b>	You can use the server to run queue managers on your system and connect to other systems over a network. Provides messaging and queuing services to applications, and support for IBM MQ client connections.	✓		<code>ibmmq-server</code>
<b>Standard Client</b>	The IBM MQ MQI client is a small subset of IBM MQ, without a queue manager, that uses the queue manager and queues on other (server) systems. It can be used only when the system it is on is connected to another system that is running a full server version of IBM MQ. The client and the server can be on the same system if required.	✓	✓	<code>ibmmq-client</code>
<b>SDK</b>	The SDK is required for compiling applications. It includes sample source files, and the bindings (files <code>.H</code> , <code>.LIB</code> , <code>.DLL</code> , and others), that you need to develop applications to run on IBM MQ.	✓	✓	<code>ibmmq-sdk</code>

Table 15. IBM MQ Debian components for Linux Ubuntu systems (continued)

Component	Description	Server media	Client media	Debian package name
<b>Sample programs</b>	The sample application programs are needed if you want to check your IBM MQ installation using the verification procedures.	✓	✓	ibmmq-samples
<b>Java messaging</b>	The files needed for messaging using Java (includes Java Message Service).	✓	✓	ibmmq-java
<b>Man pages</b>	AIX man pages, in U.S. English, for: control commands MQI calls MQSC commands	✓	✓	ibmmq-man
<b>Java JRE</b>	A Java Runtime Environment that is used by those parts of IBM MQ that are written in Java.	✓	✓	ibmmq-jre
<b>Message Catalogs</b>	For available languages, see the table of <a href="#">message catalogs</a> that follows.	✓	✓	
<b>IBM Global Security Kit (GSKit)</b>	IBM Global Security Kit (GSKit) V8 Certificate and TLS, Base Runtime.	✓	✓	ibmmq-gskit
<b>Telemetry Service</b>	<p>MQ Telemetry supports the connection of Internet Of Things (IOT) devices (that is, remote sensors, actuators and telemetry devices) that use the IBM MQ Telemetry Transport (MQTT) protocol. The telemetry service, which is also know as the MQXR service, enables a queue manager to act as an MQTT server, and communicate with MQTT client apps.</p> <p><b>Note:</b> The telemetry service is only available on Linux for x86-64 (64 bit) and Linux for IBM Z.</p> <p>The Eclipse Paho project, and <a href="#">MQTT.org</a>, have free downloads of the latest telemetry clients and samples for a range of programming languages. Use these resources to help you write the MQTT client apps that IOT devices use to communicate with MQTT servers.</p> <p>See also <a href="#">“Installation considerations for MQ Telemetry”</a> on page 251.</p>	✓		ibmmq-xrservice

Table 15. IBM MQ Debian components for Linux Ubuntu systems (continued)

Component	Description	Server media	Client media	Debian package name
<b>Managed File Transfer</b>	MQ Managed File Transfer transfers files between systems in a managed and auditable way, regardless of file size or the operating systems used. For information about the function of each component, see <a href="#">“Managed File Transfer product options”</a> on page 246.	✓		ibmmq-ftagent ibmmq-ftbase ibmmq-ftlogger ibmmq-ftservice ibmmq-fttools
<b>Advanced Message Security</b>	Provides a high level of protection for sensitive data flowing through the IBM MQ network, while not impacting the end applications. You must install this component on all IBM MQ installations that host queues you want to protect.  You must install the IBM Global Security Kit (GSKit) component on any IBM MQ installation that is used by a program that puts or gets messages to or from a protected queue, unless you are using only Java client connections.  You must install the <b>Java JRE</b> component to install this component.	✓		ibmmq-ams
<b>AMQP Service</b>	Install this component to make AMQP channels available. AMQP channels support AMQP 1.0 APIs. You can use AMQP channels to give AMQP applications access to the enterprise-level messaging facilities provided by IBM MQ.	✓		ibmmq-amqp
<b>REST API and IBM MQ Console</b>	Adds HTTP based administration for IBM MQ through the REST API and IBM MQ Console.	✓		ibmmq-web

**Notes:**

1. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
2. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).
3. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.  
**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.



Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

Message catalog language	Component name
Brazilian Portuguese	ibmmq-msg-pt
Czech	ibmmq-msg-cs
French	ibmmq-msg-fr
German	ibmmq-msg-de
Hungarian	ibmmq-msg-hu
Italian	ibmmq-msg-it
Japanese	ibmmq-msg-ja
Korean	ibmmq-msg-ko
Polish	ibmmq-msg-pl
Russian	ibmmq-msg-ru
Spanish	ibmmq-msg-es
Simplified Chinese	ibmmq-msg-zh-cn
Traditional Chinese	ibmmq-msg-zh-tw
U.S. English	not applicable

### Related concepts

[“IBM MQ components and features” on page 6](#)

You can select the components or features that you require when you install IBM MQ.

### **Installing an IBM MQ server on Linux Ubuntu using Debian packages**

You can install an IBM MQ server on a Linux Ubuntu system, using a Debian installer, in accordance with the system requirements web page.

### Before you begin

See [System Requirements for IBM MQ](#) for details of the supported software levels.

Before you start the installation procedure, make sure that you first complete the necessary steps that are outlined in [“Preparing the system on Linux” on page 98](#).

If you have installed IBM MQ 9.0.2, or earlier, on Ubuntu using rpm, you must uninstall all rpm versions of the product before installing the Debian version of the product.

You have the option to accept the license before or after product installation. See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information.

### About this task

Install the server by using a Debian installer to select the components that you want to install. The components and package names are listed in [“IBM MQ Debian components for Linux Ubuntu systems” on page 126](#).



**Attention:** Ensure that you download the Ubuntu version of the `tar.gz` package, before you install the product, as this version contains the `deb` files you need for the **apt-get** tool.

You can use various installers. This topic describes the use of the **apt-get** and **dpkg** installers.

### apt-get

You can use **apt-get** to install packages, and you do not need to install any dependent packages. **apt-get** installs dependency packages for the package that you require.

You must make your files accessible to **apt-get**, in order to use it.

To do this, issue the command, `chmod -R a+rX DIRNAME`, where `DIRNAME` is the directory into which you unpacked the `tar.gz` package.



**Attention:** If you do not make your files accessible to **apt-get**, you receive the following errors:

- N: Download is performed unsandboxed as root as file '/sw/9400deb/./InRelease' couldn't be accessed by user '\_apt'. - pkgAcquire::Run (13: Permission denied)
- E: Failed to fetch file:/sw/9400deb/./Packages File not found - /sw/9400deb/./Packages (2: No such file or directory)
- E: Some index files failed to download. They have been ignored, or old ones used instead.

where `/sw/9400deb` is the directory from which you are installing IBM MQ.

### dpkg

You can use **dpkg** to install individual packages, but you must ensure you install any dependencies as **dpkg** does not install any dependent packages for the package you require. Refer to the [Table 17 on page 130](#) table for information about the dependencies of each package.

To support the running of a queue manager, you must install at least the `ibmmq-runtime` and the `ibmmq-server` components.

<i>Table 17. Package component dependencies</i>		
<b>Package Name</b>	<b>Component Function</b>	<b>Package Dependencies</b>
<code>ibmmq-runtime</code>	Common function for all other components	None
<code>ibmmq-server</code>	Queue Manager	<code>ibmmq-runtime</code> <code>ibmmq-gskit</code>
<code>ibmmq-client</code>	C IBM MQ client libraries	<code>ibmmq-runtime</code> <code>ibmmq-gskit</code>
<code>ibmmq-java</code>	Java and JMS IBM MQ APIs	<code>ibmmq-runtime</code>
<code>ibmmq-jre</code>	Java Runtime Environment	<code>ibmmq-runtime</code>
<code>ibmmq-sdk</code>	Header files and libraries for non-Java APIs	<code>ibmmq-runtime</code>
<code>ibmmq-man</code>	UNIX man pages for IBM MQ	<code>ibmmq-runtime</code>
<code>ibmmq-samples</code>	IBM MQ application samples	<code>ibmmq-runtime</code>

Table 17. Package component dependencies (continued)

Package Name	Component Function	Package Dependencies
ibmmq-msg-cs ibmmq-msg-de ibmmq-msg-es ibmmq-msg-fr ibmmq-msg-hu ibmmq-msg-it ibmmq-msg-ja ibmmq-msg-ko ibmmq-msg-pl ibmmq-msg-pt ibmmq-msg-ru ibmmq-msg-zh-cn ibmmq-msg-zh-tw	Additional language message catalog files. English message catalog files are installed by default. For more information about these message catalogs, see <a href="#">“Displaying messages in your national language on Linux” on page 139</a>	ibmmq-runtime
ibmmq-gskit	IBM Global Security Kit (GSKit)	ibmmq-runtime
ibmmq-web	REST API and IBM MQ Console.	ibmmq-runtime ibmmq-server ibmmq-java ibmmq-jre
ibmmq-ftbase	Managed File Transfer component	ibmmq-runtime ibmmq-java ibmmq-jre
ibmmq-ftlogger	Managed File Transfer component	ibmmq-runtime ibmmq-server ibmmq-ftbase ibmmq-java ibmmq-jre
ibmmq-fttools ibmmq-ftagent	Managed File Transfer components	ibmmq-runtime ibmmq-ftbase ibmmq-java ibmmq-jre

Table 17. Package component dependencies (continued)

Package Name	Component Function	Package Dependencies
ibmmq-ftservice	Managed File Transfer component	ibmmq-runtime ibmmq-server ibmmq-ftagent ibmmq-ftbase ibmmq-java ibmmq-jre
ibmmq-amqp	Advanced Message Queuing Protocol component	ibmmq-runtime
ibmmq-xrservice	Telemetry Service component <b>Note:</b> The telemetry service is only available on Linux for x86-64 (64 bit) and Linux for IBM Z.	ibmmq-runtime
ibmmq-ams	Advanced Message Security component	ibmmq-runtime ibmmq-server

**Notes:**

1. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
2. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).
3. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.  
**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.  
Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.
4. From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

**Procedure**

1. Open a shell terminal. Log in as root, or with sufficient authority to run the following commands.  
You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).
2. Set your current directory to the location of the installation packages.  
The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script:

```
./mqlicense.sh
```

The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license.

If possible, `mqlicense.sh` opens an X-window to display the license.

If you need the license to be presented as text in the current shell, which can be read by a screen reader, type the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

4. Choose how to install the IBM MQ packages:

Either use the **apt** management tool to install the IBM MQ packages that you want, or use the **dpkg** command to install the IBM MQ packages that you want along with their dependency packages.

- To use the **apt-get** management tool to install the IBM MQ packages that you want along with their dependency packages:
  - a. Create a file with the suffix `.list`, for example, `IBM_MQ.list`, in the `/etc/apt/sources.list.d` directory.

This file should contain a deb entry for the location of the directory that contains the IBM MQ packages.

For example:

```
# Local directory containing IBM MQ packages
deb [trusted=yes] file:/var/tmp/mq ./
```

The inclusion of the `[trusted=yes]` statement (including the brackets) is optional and suppresses warnings and prompts during subsequent operations.

- b. Run the command **apt-get update** to add this directory, and the list of packages the directory contains, to the apt cache.

Refer to the Attention note in [“apt-get” on page 130](#) for possible errors you might receive.

You can now use apt to install IBM MQ. For example, you can install the complete product by issuing the following command:

```
apt-get install "ibmmq-*
```

You can install the server package and all its dependencies by issuing the following command:

```
apt-get install ibmmq-server
```



**Attention:** Do not run the `apt-get install ibmmq-*` command in the directory which holds the `.deb` files, unless you are using quotation characters in the shell.

If you are using tools such as aptitude or synaptic, the install packages can be found in the `misc/non-free` category.

- To use the **dpkg** command to install the IBM MQ packages that you want, issue the **dpkg** command for each IBM MQ package that you want to install. For example, issue the following command to install the run time package:

```
dpkg -i ibmmq-runtime_9.4.0.0_amd64.deb
```

**Important:** Although **dpkg** permits multiple package files in the same command, this will not work as expected because of IBM MQ inter-package dependencies. You must install the packages individually in the order shown below. You may find that using **apt-get** is a better option.

- ibmmq-runtime
- ibmmq-jre
- ibmmq-java
- ibmmq-gskit
- ibmmq-server
- ibmmq-web
- ibmmq-ftbase
- ibmmq-ftagent
- ibmmq-ftservice
- ibmmq-ftlogger
- ibmmq-fttools
- ibmmq-amqp
- ibmmq-ams
- ibmmq-xrservice
- ibmmq-client
- ibmmq-man
- ibmmq-msg\_ *language*
- ibmmq-samples
- ibmmq-sdk

## Results

You have installed the packages you require.

## What to do next

- If required, you can now set this installation to be the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

where *MQ\_INSTALLATION\_PATH* represents the directory where IBM MQ is installed.

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ . For more information, see [setmqenv](#) and [crtmqenv](#).
- If you want to confirm that the installation was successful, you can verify your installation. See [“Verifying an IBM MQ installation on Linux” on page 140](#), for more information.

## Related tasks

[“Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages” on page 155](#)

You can uninstall an IBM MQ server or client that was installed using the Debian package manager. You can also modify an installation by removing selected packages (components) currently installed on your system.

## **Installing an IBM MQ client on Linux Ubuntu using Debian packages**

You can install an IBM MQ client on a Linux Ubuntu system, using a Debian package, in accordance with the system requirements web page.

### **Before you begin**

See [System Requirements for IBM MQ](#) for details of the supported software levels.

Before you start the installation procedure, make sure that you have completed the necessary steps outlined in [“Preparing the system on Linux”](#) on page 98.

### **About this task**

Install the client by using a Debian installer to select the components that you want to install. The components and package names are listed in [“IBM MQ Debian components for Linux Ubuntu systems”](#) on page 126.

### **Procedure**

1. Open a shell terminal. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

2. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

3. You have the option of accepting the license before or after installing the product. To accept the license before installing, run the `mqlicense.sh` script:

```
./mqlicense.sh
```

The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license.

If possible, `mqlicense.sh` opens an X-window to display the license.

If you need the license to be presented as text in the current shell, which can be read by a screen reader, type the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux”](#) on page 107 for more information about license acceptance.

4. Install the IBM MQ client.

You can use any Debian installer. [“Installing an IBM MQ server on Linux Ubuntu using Debian packages”](#) on page 129 describes the use of the **apt-get** and **dpkg** packages to install a server.

At a minimum, you must install the `ibmmq-runtime` component.

If you are installing a subset of components, you must ensure that any dependencies are first installed, as listed in [Table 18](#) on page 136.

To install and use the package listed in the *Package Name* column, you must also install the components listed in the *Package Dependencies* column.

Table 18. Package component dependencies		
Package Name	Component Function	Package Dependencies
ibmmq-runtime	Common function for all other components	None
ibmmq-client	C IBM MQ client libraries	ibmmq-gskit ibmmq-runtime
ibmmq-java	Java and JMS IBM MQ APIs	ibmmq-runtime
ibmmq-jre	Java Runtime Environment	ibmmq-runtime
ibmmq-sdk	Header files and libraries for non-Java APIs	ibmmq-runtime
ibmmq-man	UNIX man pages for IBM MQ	ibmmq-runtime
ibmmq-samples	IBM MQ application samples	ibmmq-runtime
ibmmq-msg-cs ibmmq-msg-de ibmmq-msg-es ibmmq-msg-fr ibmmq-msg-hu ibmmq-msg-it ibmmq-msg-ja ibmmq-msg-ko ibmmq-msg-pl ibmmq-msg-pt ibmmq-msg-ru ibmmq-msg-zh-cn ibmmq-msg-zh-tw	Language specific message catalog files	ibmmq-runtime
ibmmq-gskit	IBM Global Security Kit (GSKit)	ibmmq-runtime ibmmq-jre

**Notes:**

- a. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
- b. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).
- c. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.  
**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.



Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

## Results

You have installed the packages you require.

## What to do next

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH/bin/setmqinst -i -p MQ_INSTALLATION_PATH
```

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Testing communication between a client and a server on Linux” on page 149](#)

### Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

[“Primary installation on AIX, Linux, and Windows” on page 19](#)

On systems that support multiple installations of IBM MQ ( AIX, Linux, and Windows ), the primary installation is the one to which IBM MQ system-wide locations refer. Having a primary installation is optional, but convenient.

### Related tasks

[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the **rpm** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

[Changing the primary installation](#)

### Related reference

[setmqinst](#)

## Linux Redistributable clients on Linux

The Linux x86-64 image is shipped in a `LinuxX64.tar.gz` file.

### File names

The archive or .zip file names describe the file contents and equivalent maintenance levels.

For IBM MQ 9.4 the client images are available under the following file names:

#### Long Term Support: 9.4.0 IBM MQ C redistributable client for Linux x86-64

9.4.0.0-IBM-MQC-Redist-LinuxX64.tar.gz

#### Long Term Support: 9.4.0 IBM MQ JMS and Java redistributable client

9.4.0.0-IBM-MQC-Redist-Java.zip

### Choosing the runtime files to distribute with an application

A script file named **genmqpkg** is provided by the redistributable client under the `bin` directory.

You can use the **genmqpkg** script to generate a smaller subset of files that are tailored to the needs of the application, for which the files are intended to be distributed.

You are asked a series of interactive Yes or No questions to determine the runtime requirements for an IBM MQ application.

Finally, **genmqpkg** asks you to supply a new target directory, where the script duplicates the required directories and files.

**Important:** A fully qualified path should be supplied to **genmqpkg**, as **genmqpkg** will not expand or evaluate shell variables.

**Important:** IBM support is only able to provide assistance with the full, unmodified set of files contained within the redistributable client packages.

## Other considerations

On Linux, the default data path of a non-installed client is:

### Linux x86-64

```
$HOME/IBM/MQ/data
```

You can change the default directory of the data path, by using the `MQ_OVERRIDE_DATA_PATH` environment variable.

**Note:** You must create the directory first, as the directory is not created automatically.

A redistributable client runtime co-exists with a full IBM MQ client or server installation, provided that they are installed in different locations.

**Important:** Unpacking a redistributable image into the same location as a full IBM MQ installation is not supported.

On Linux the `ccsid.tbl` used to define the supported CCSID conversions is traditionally expected to be found in the `UserData` directory structure, along with error logs, trace files, and so on.

The `UserData` directory structure is populated by unpacking the redistributable client, and so, if the file is not found in its usual location, the redistributable client falls back to locate the file in the `/lib` subdirectory of the installation.

## Classpath changes

The classpath used by **dspmqver**, **setmqenv**, and **crtmqenv** commands adds the `com.ibm.mq.allclient.jar` and `com.ibm.mq.jakarta.client.jar` to the environment, immediately following the `com.ibm.mq.jar`, and `com.ibm.mqjms.jar`.

An example of **dspmqver** output from the redistributable client on Linux:

```
Name:          IBM MQ
Version:       9.4.0.0
Level:        p940-940-L220415
BuildType:    IKAP - (Production)
Platform:     IBM MQ for Linux (x86-64 platform)
Mode:        64-bit
O/S:         Linux 2.6.32.59-0.7-default
InstName:     MQNI09200004
InstDesc:     IBM MQ V9.4.0.0 (Redistributable)
Primary:      No
InstPath:     /Development/johndoe/unzip/unpack
DataPath:     /u/johndoe/IBM/MQ/data
MaxCmdLevel: 940
```

## Related concepts

[“Redistributable IBM MQ clients” on page 27](#)

The IBM MQ redistributable client is a collection of runtime files that are provided in a .zip or .tar file that can be redistributed to third parties under redistributable license terms. This provides a simple way of distributing applications and the runtime files that they require in a single package.

## Linux **Converting a trial license on Linux**

Convert a trial license to a full license without reinstalling IBM MQ.

When the trial license expires, the "count-down" displayed by the **strmqm** command informs you the license has expired, and the command does not run.

### Before you begin

1. IBM MQ is installed with a trial license.
2. You have access to the installation media of a fully licensed copy of IBM MQ.

### About this task

Run the **setmqprd** command to convert a trial license to a full license.

If you do not want to apply a full license to your trial copy of IBM MQ, you can uninstall it at any time.

### Procedure

1. Obtain the full license from the fully licensed installation media.

The full license file is `amqpcert.lic`. On Linux, it is in the `/MediaRoot/licenses` directory on the installation media.

2. Run the **setmqprd** command from the installation that you are upgrading:

```
MQ_INSTALLATION_PATH/bin/setmqprd /MediaRoot/licenses/amqpcert.lic
```

### Related reference

[setmqprd](#)

## Linux **Displaying messages in your national language on Linux**

To display messages from a different national language message catalog, you must install the appropriate catalog and set the **LANG** environment variable.

### About this task

Messages in U.S. English are automatically installed with IBM MQ

Message catalogs for all languages are installed in `MQ_INSTALLATION_PATH/msg/language identifier`, where *language identifier* is one of the identifiers in [Table 19 on page 139](#).

If you require messages in a different language, perform the following steps:

### Procedure

1. Install the appropriate message catalog (see [“IBM MQ components and features” on page 6](#)).
2. To select messages in a different language, ensure the **LANG** environment variable is set to the identifier for the language you want to install:

Identifier	Language
cs_CZ	Czech

<i>Table 19. Language identifiers (continued)</i>	
<b>Identifier</b>	<b>Language</b>
de_DE	German
es_ES	Spanish
fr_FR	French
hu_HU	Hungarian
it_IT	Italian
ja_JP	Japanese
ko_KR	Korean
pl_PL	Polish
pt_BR	Brazilian Portuguese
ru_RU	Russian
zh_CN	Simplified Chinese
zh_TW	Traditional Chinese

## **Verifying an IBM MQ installation on Linux**

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on Linux systems.

### **About this task**

You can verify a local (stand-alone) server installation or a server-to-server installation of the IBM MQ server:

- A local server installation has no communication links with other IBM MQ installations.
- A server-to-server installation does have links to other installations.

You can also verify that your IBM MQ MQI client installation completed successfully and that the communication link is working.

### **Procedure**

- To verify a local server installation, see [“Verifying a local server installation using the command line on Linux”](#) on page 140.
- To verify a server-to-server installation, see [“Verifying a server-to-server installation using the command line on Linux”](#) on page 142.
- To verify a client installation, see [“Verifying a client installation on Linux”](#) on page 145.

## **Verifying a local server installation using the command line on Linux**

On Linux systems, you can verify a local installation by using the command line to create a simple configuration of one queue manager and one queue.

### **Before you begin**

To verify the installation, you must first install the samples package.

Before beginning the verification procedure, you might want to check that you have the latest fixes for your system. For more information about where to find the latest updates, see [“Checking requirements on Linux”](#) on page 94.

## About this task

Use the following steps to configure your default queue manager from the command line. After the queue manager is configured, use the `amqsput` sample program to put a message on the queue. You then use the `amqsget` sample program to get the message back from the queue.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. On a Linux system, log in as a user in the `mqm` group.
2. Set up your environment:
  - a) Set up environment variables for use with a particular installation by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- b) Check that the environment is set up correctly by entering the following command:

```
dspmqr
```

If the command completes successfully, and the expected version number and installation name are returned, the environment is set up correctly.

3. Create a queue manager called `QMA` by entering the following command:

```
crtmqm QMA
```

Messages indicate when the queue manager is created, and when the default IBM MQ objects are created.

4. Start the queue manager by entering the following command:

```
strmqm QMA
```

A message indicates when the queue manager starts.

5. Start MQSC by entering the following command:

```
runmqsc QMA
```

A message indicates when MQSC starts. MQSC has no command prompt.

6. Define a local queue called `QUEUE1` by entering the following command:

```
DEFINE QLOCAL (QUEUE1)
```

A message indicates when the queue is created.

7. Stop MQSC by entering the following command:

```
end
```

Messages are shown, followed by the command prompt.

**Note:** Subsequent steps require that the samples package is installed.

8. Change into the `MQ_INSTALLATION_PATH/samp/bin` directory, which contains the sample programs.

`MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.

9. Put a message on the queue by entering the following commands

```
./amqsput QUEUE1 QMA
```

The following messages are shown:

```
Sample AMQSPUT0 start  
target queue is QUEUE1
```

10. Type some message text on one or more lines, where each line is a different message. Enter a blank line to end the message input.

The following message is shown:

```
Sample AMQSPUT0 end
```

Your messages are now on the queue and the command prompt is shown.

11. Get the messages from the queue, by entering the following command:

```
./amqsget QUEUE1 QMA
```

The sample program starts, and your messages are displayed.

## Results

You have successfully verified your local installation.

## **Verifying a server-to-server installation using the command line on Linux**

You can verify a server-to-server installation using two servers, one as a sender and one as a receiver.

### Before you begin

- On Linux, IBM MQ supports TCP on all Linux platforms. On x86 platforms and Power platforms, SNA is also supported. If you want to use the SNA LU6.2 support on these platforms, you need the IBM Communications Server for Linux 6.2. The Communications Server is available as a PRPQ product from IBM. For more details, see [Communications Server](#).

If you are using TCP/IP, make sure that TCP/IP and IBM MQ are installed on both servers.

- The examples in this task use TCP/IP. If you do not use TCP, see [Setting up communication on AIX and Linux](#).
- Make sure that you are a member of the IBM MQ administrators group (**mqm**) on each server.
- Decide which installation is the sender server and which installation is the receiver server. The installations might be on the same system, or on different systems.

### About this task

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

### Procedure

1. On the **receiver** server:
  - a) On Linux, log in as a user in the mqm group.

- b) Check which ports are free, for example by running **netstat**. For more information about this command, see the documentation of your operating system.

If port 1414 is not in use, make a note of 1414 to use as the port number in step 2 h. Use the same number for the port for your listener later in the verification. If it is in use, note a port that is not in use; for example 1415.

- c) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- d) Create a queue manager called QMB by entering the following command at the command prompt:

```
crtmqm QMB
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- e) Start the queue manager by entering the following command:

```
strmqm QMB
```

A message tells you when the queue manager has started.

- f) Start MQSC by entering the following command:

```
runmqsc QMB
```

A message tells you that MQSC has started. MQSC has no command prompt.

- g) Define a local queue called RECEIVER.Q by entering the following command:

```
DEFINE QLOCAL (RECEIVER.Q)
```

A message tells you the queue has been created.

- h) Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT ( PORT_NUMBER )
```

Where *port\_number* is the name of the port the listener runs on. This number must be the same as the number used when defining your sender channel.

- i) Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```

**Note:** Do not start the listener in the background from any shell that automatically lowers the priority of background processes.

- j) Define a receiver channel by entering the following command:

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (RCVR) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

- k) End MQSC by typing:

```
end
```

Some messages are displayed, followed by the command prompt.

2. On the **sender** server:

- a) As the sender server is an AIX system, log in as a user in the mqm group.
- b) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Create a queue manager called QMA by entering the following command at the command prompt:

```
crtmqm QMA
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- d) Start the queue manager, by entering the following command:

```
strmqm QMA
```

A message tells you when the queue manager has started.

- e) Start MQSC by entering the following command:

```
runmqsc QMA
```

A message tells you that an MQSC session has started. MQSC had no command prompt.

- f) Define a local queue called QMB (to be used as a transmission queue) by entering the following command:

```
DEFINE QLOCAL (QMB) USAGE (XMITQ)
```

A message tells you when the queue has been created.

- g) Define a local definition of the remote queue with by entering the following command:

```
DEFINE QREMOTE (LOCAL.DEF.OF.REMOTE.QUEUE) RNAME (RECEIVER.Q) RQMNAME ('QMB') XMITQ (QMB)
```

- h) Define a sender channel by entering one of the following commands:

*con-name* is the TCP/IP address of the receiver system. If both installations are on the same system, the *con-name* is localhost. *port* is the port you noted in [1 b](#). If you do not specify a port, the default value of 1414 is used.

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (SDR) CONNAME ('CON-NAME(PORT)') XMITQ (QMB) TRPTYPE (TCP)
```

- i) Start the sender channel by entering the following command:

```
START CHANNEL(QMA.QMB)
```

The receiver channel on the receiver server starts automatically when the sender channel starts.

- j) Stop MQSC by entering the following command:

```
end
```

Some messages are displayed, followed by the command prompt.

- k) Change into the *MQ\_INSTALLATION\_PATH/samp/bin* directory.



This directory contains the sample programs. `MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.

- l) If both the sender server and receiver server are installations on the same system, check that the queue managers have been created on different installations by entering the following command:

```
dspmqr -o installation
```

If the queue managers are on the same installation, move either QMA to the sender installation or QMB to the receiver installation by using the **setmqm** command. For more information, see [setmqm](#).

- m) Put a message on the local definition of the remote queue, which in turn specifies the name of the remote queue. Enter the following command:

```
./amqsput LOCAL.DEF.OF.REMOTE.QUEUE QMA
```

A message tells you that `amqsput` has started.

- n) Type some message text on one or more lines, followed by a blank line.

A message tells you that `amqsput` has ended. Your message is now on the queue and the command prompt is displayed again.

### 3. On the **receiver** server:

- a) As your receiver server is an AIX system, change into the `MQ_INSTALLATION_PATH/samp/bin` directory.

This directory contains the sample programs. `MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.

- b) Get the message from the queue on the receiver by entering the following command:

```
./amqsget RECEIVER.Q QMB
```

The sample program starts, and your message is displayed. After a pause, the sample ends. Then the command prompt is displayed.

## Results

You have now successfully verified the server-to-server installation.

### **Verifying a client installation on Linux**

You can verify that your IBM MQ MQI client installation completed successfully and that the communication link is working.

## About this task

The verification procedure shows how to create a queue manager called `queue.manager.1`, a local queue called `QUEUE1`, and a server-connection channel called `CHANNEL1` on the server.

It shows how to create the client-connection channel on the IBM MQ MQI client workstation. It then shows how to use the sample programs to put a message onto a queue, and get the message from the queue.

The example does not address any client security issues. See [Setting up IBM MQ MQI client security](#) for details if you are concerned with IBM MQ MQI client security issues.

The verification procedure assumes that:

- The full IBM MQ server product has been installed on a server.
- The server installation is accessible on your network.
- The IBM MQ MQI client software has been installed on a client system.


- The IBM MQ sample programs have been installed.
- TCP/IP has been configured on the server and client systems. For more information, see [Configuring connections between the server and client](#).

## Procedure

1. Set up the server and client by using the command line.  
See [“Setting up the server and client using the command line on Linux” on page 146](#).
2. Test the communications between client and server.  
See [“Testing communication between a client and a server on Linux” on page 149](#).

## Related tasks

[“Installing an IBM MQ client on Linux using rpm” on page 119](#)  
Installing an IBM MQ client on a 64 bit Linux system.

 *Setting up the server and client using the command line on Linux*

You can use the command line to create the objects that you need to use to verify a client installation on Linux. On the server you create a queue manager, a local queue, a listener, and a server-connection channel. You must also apply security rules to allow the client to connect and make use of the queue defined. On the client you create a client-connection channel. After setting up the server and client, you can then use the sample programs to complete the verification procedure.

## Before you begin

Before starting this task, review the information in [“Verifying a client installation on Linux” on page 145](#).

## About this task


This task explains how to use the command line to set up the server and client so that you can verify your client installation.

## Procedure

1. Set up the server by following the instructions in [“Setting up the server using the command line on Linux” on page 146](#).
2. Set up the client by following instructions in [“Connecting to a queue manager, using the MQSERVER environment variable on Linux” on page 148](#).

## What to do next

Test the communications between client and server by following the instructions in [“Testing communication between a client and a server on Linux” on page 149](#).

 *Setting up the server using the command line on Linux*

Follow these instructions to create a queue manager, queue, and channel on the server. You can then use these objects to verify the installation.

## About this task

These instructions assume that no queue manager or other IBM MQ objects have been defined.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Create a user ID on the server that is not in the mqm group.  
This user ID must exist on the server and client. This is the user ID that the sample applications must be run as, otherwise a 2035 error is returned.
2. Log in as a user in the mqm group.
3. You must set various environment variables so that the installation can be used in the current shell.  
You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

4. Create a queue manager called `QUEUE.MANAGER.1` by entering the following command:

```
crtmqm QUEUE.MANAGER.1
```

You see messages telling you that the queue manager has been created.

5. Start the queue manager by entering the following command:

```
strmqm QUEUE.MANAGER.1
```

A message tells you when the queue manager has started.

6. Start MQSC by entering the following command:

```
runmqsc QUEUE.MANAGER.1
```

A message tells you that an MQSC session has started. MQSC has no command prompt.

7. Define a local queue called `QUEUE1` by entering the following command:

```
DEFINE QLOCAL(QUEUE1)
```

A message tells you when the queue has been created.

8. Allow the user ID that you created in step 1 to use `QUEUE1` by entering the following command:

```
SET AUTHREC PROFILE(QUEUE1) OBJTYPE(Queue) PRINCIPAL(' non_mqm_user ') AUTHADD(PUT,GET)
```

where *non\_mqm\_user* is the user ID created in step 1. A message tells you when the authorization has been set. You must also run the following command to give the user ID authority to connect:

```
SET AUTHREC OBJTYPE(QMGR) PRINCIPAL(' non_mqm_user ') AUTHADD(CONNECT)
```

If this command is not run, a 2305 stop error is returned.

9. Define a server-connection channel by entering the following command:

```
DEFINE CHANNEL (CHANNEL1) CHLTYPE (SVRCONN) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

10. Allow your client channel to connect to the queue manager and run under the user ID that you created in step 1, by entering the following MQSC command:

```
SET CHLAUTH(CHANNEL1) TYPE(ADDRESSMAP) ADDRESS(' client_ipaddr ') MCAUSER(' non_mqm_user ')
```

where *client\_ipaddr* is the IP address of the client system, and *non\_mqm\_user* is the user ID created in step 1. A message tells you when the rule has been set.

11. Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT (port_number)
```

where *port\_number* is the number of the port the listener is to run on. This number must be the same as the number used when defining your client-connection channel in [“Installing an IBM MQ client on Linux using rpm”](#) on page 119.

**Note:** If you omit the port parameter from the command, a default value of 1414 is used for the listener port. If you want to specify a port other than 1414, you must include the port parameter in the command, as shown.

12. Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```


13. Stop MQSC by entering:

```
end
```

You see some messages, followed by the command prompt.

## What to do next

Follow the instructions to set up the client. See [“Connecting to a queue manager, using the MQSERVER environment variable on Linux”](#) on page 148.

 *Connecting to a queue manager, using the MQSERVER environment variable on Linux*

When an IBM MQ application is run on the IBM MQ MQI client, it requires the name of the MQI channel, the communication type, and the address of the server to be used. Provide these parameters by defining the MQSERVER environment variable.

## Before you begin

Before you start this task, you must complete the task, [“Setting up the server using the command line on Linux”](#) on page 146, and save the following information:

- The host name or IP address of the server and port number that you specified when creating the listener.
- The channel name of the server-connection channel.

## About this task

This task describes how to connect an IBM MQ MQI client, by defining the MQSERVER environment variable on the client.

You can give the client access to the generated client channel definition table, `amqc1chl.tab` instead; see [Accessing client-connection channel definitions](#).

## Procedure

1. Log in as the userid that you created in Step 1 of [“Setting up the server using the command line on Linux”](#) on page 146.
2. Check the TCP/IP connection. From the client, enter one of the following commands:
  - `ping server-hostname`
  - `ping n.n.n.n`

n . n . n . n represents the network address. You can set the network address in IPv4 dotted decimal form, for example, 192 . 0 . 2 . 0. Alternatively, set the address in IPv6 hexadecimal form, for example 2001 : 0DB8 : 0204 : acff : fe97 : 2c34 : fde0 : 3485.

If the **ping** command fails, correct your TCP/IP configuration.

3. Set the MQSERVER environment variable. From the client, enter the following command:

```
export MQSERVER=CHANNEL1/TCP/'server-address (port)'
```

Where:

- *CHANNEL1* is the server-connection channel name.
- *server-address* is the TCP/IP host name of the server.
- *port* is the TCP/IP port number the server is listening on.

If you do not give a port number, IBM MQ uses the one specified in the *qm.ini* file, or the client configuration file. If no value is specified in these files, IBM MQ uses the port number identified in the TCP/IP services file for the service name *MQSeries*. If an *MQSeries* entry in the services file does not exist, a default value of 1414 is used. It is important that the port number used by the client and the port number used by the server listener program are the same.

## What to do next

Use the sample programs to test communication between the client and server; see [“Testing communication between a client and a server on Linux”](#) on page 149.

### *Testing communication between a client and a server on Linux*

On the IBM MQ MQI client workstation, use the *amqsputc* sample program to put a message on the queue at the server workstation. Use the *amqsgetc* sample program to get the message from the queue back to the client.

## Before you begin

Complete the previous topics in this section:

- Set up a queue manager, channels, and queue.
- Open a command window.
- Set system environment variables.

## About this task

Note that IBM MQ object definitions are case-sensitive. Text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

You must be logged in with the appropriate authority. For example, user *ivtid* in the *mqm* group.

## Procedure

1. Change to the *MQ\_INSTALLATION\_PATH/samp/bin* directory, which contains the sample programs.

*MQ\_INSTALLATION\_PATH* represents the high-level directory in which IBM MQ is installed.

2. You must set certain environment variables so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

3. Start the PUT program for QUEUE1 on QUEUE.MANAGER.1 by entering the following command:

```
./amqsputc QUEUE1 QUEUE.MANAGER.1
```

If the command is successful, the following messages are displayed:

```
Sample AMQSPUT0 start  
target queue is QUEUE1
```

**Tip:** You might get the error, MQRC\_NOT\_AUTHORIZED (2035). By default, channel authentication is enabled when a queue manager is created. Channel authentication prevents privileged users accessing a queue manager as an IBM MQ MQI client. For verifying the installation, you can either change the MCA user ID to a non-privileged user, or disable channel authentication. To disable channel authentication run the following MQSC command:

```
ALTER QMGR CHLAUTH(DISABLED)
```

When you finish the test, if you do not delete the queue manager, re-enable channel authentication:

```
ALTER QMGR CHLAUTH(ENABLED)
```

4. Type some message text, then press **Enter** twice.

The following message is displayed:

```
Sample AMQSPUT0 end
```

Your message is now on the queue that is on the server queue manager.

5. Start the GET program for QUEUE1 on QUEUE.MANAGER.1 by entering the following command:

```
./amqsgetc QUEUE1 QUEUE.MANAGER.1
```

The sample program starts, and your message is displayed. After a short pause (approximately 30 seconds), the sample ends and the command prompt is displayed again.

## Results

You have now successfully verified the client installation.

## What to do next

1. You must set various environment variables on the server so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

2. On the server, stop the queue manager by entering the following command:

```
endmqm QUEUE.MANAGER.1
```

3. On the server, delete the queue manager by entering the following command:

```
dltmqm QUEUE.MANAGER.1
```

## Uninstalling or modifying IBM MQ on Linux

You can uninstall an IBM MQ server or client. You can also modify an installation by removing selected packages (components) currently installed on your system.

### Procedure

- For information on how to uninstall or modify IBM MQ on Linux, see the following subtopics:
  - [“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)
  - [“Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages” on page 155](#)

## Uninstalling or modifying IBM MQ on Linux using rpm

On Linux, you can uninstall the IBM MQ server or client by using the **rpm** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

### Before you begin

Depending on which version of IBM MQ is installed, you might need to remove maintenance before you uninstall the base packages:

- If you are uninstalling a version of IBM MQ at IBM MQ 9.4.0 or later, you do not need to remove maintenance before you uninstall IBM MQ.
- If you are uninstalling a version of IBM MQ before IBM MQ 9.4.0, you must remove any maintenance that is applied to IBM MQ before you can uninstall. The procedure for removing maintenance changed at IBM MQ 9.4.0. Therefore, you must use the procedure that is detailed in earlier versions of the product documentation to remove the maintenance.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

### Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling or modifying, if you have not already done so.
2. For a server installation, end any IBM MQ activity that is associated with the installation you are uninstalling or modifying:
  - a) Log in as a user in the group mqm.
  - b) Set up your environment to work with the installation you want to uninstall or modify. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqs -o installation
```

- d) Stop all running queue managers that are associated with the installation that you want to uninstall or modify. Enter the following command for each queue manager:

```
endmqm QMgrName
```

- e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqlsr -m QMgrName
```

3. Log in as root.

4. Uninstall or modify IBM MQ by using the **rpm** command:

a) On a system with a single installation:

- Find out the names of the packages (components) currently installed on your system, by entering the following command:

```
rpm -qa | grep MQSeries
```

- Remove all components by appending all the package names to the **rpm** command arguments. For example:

```
rpm -qa | grep MQSeries | xargs rpm -ev
```

- Modify your installation by appending individual package names to the **rpm** command arguments. For example, to remove the runtime, Server and SDK components enter the following command:

```
rpm -ev MQSeriesRuntime MQSeriesServer MQSeriesSDK
```

- If you are using Ubuntu, add the **--force-debian** attribute. For example, to remove the runtime, Server and SDK components enter the following command:

```
rpm --force-debian -ev MQSeriesRuntime MQSeriesServer MQSeriesSDK
```

b) On a system with multiple installations:

- Find out the names of the packages (components) currently installed on your system, by entering the following command:

```
rpm -qa | grep suffix
```

where *suffix* is the unique name that is given to the packages when **crtmqpkg** was run at installation time. *suffix* is included in each of the package names that belong to a particular installation.

- Remove all components by appending all the package names to the **rpm** command arguments. For example, to remove all components from an installation with the suffix MQ94 enter the following command:

```
rpm -qa | grep '\<MQSeries.*MQ94\>' | xargs rpm -ev
```

- Modify your installation by appending individual package names to the **rpm** command arguments. For example, to remove the runtime, Server and SDK components from an installation with the suffix MQ94 enter the following command:

```
rpm -ev MQSeriesRuntime-MQ94 MQSeriesServer-MQ94 MQSeriesSDK-MQ94
```

- If you are using Ubuntu, add the **--force-debian** attribute. For example, to remove the runtime, Server and SDK components for an installation with the *suffix* MQ94, enter the following command:

```
rpm --force-debian -ev MQSeriesRuntime-MQ94 MQSeriesServer-MQ94 MQSeriesSDK-MQ94
```



## Results

After uninstallation, certain files under the directory trees `/var/mqm` and `/etc/opt/mqm` are not removed. These files contain user data and remain so subsequent installations can reuse the data. Most of the remaining files contain text, such as INI files, error logs, and FDC files. The directory tree `/var/mqm/shared` contains files that are shared across installations, including the executable shared libraries `libmqzsd.so` and `libmqzsd_r.so`.

## What to do next

- If the product successfully uninstalled, you can delete any files and directories that are contained in the installation directory.
- If no other IBM MQ installations exist on the system, and you are not planning to reinstall or migrate, you can delete the `/var/mqm` and `/etc/opt/mqm` directory trees, including the files `libmqzsd.so` and `libmqzsd_r.so`. Deleting these directories destroys all queue managers and their associated data.

## Uninstalling or modifying IBM MQ on Linux Red Hat using yum

On Linux Red Hat, you can uninstall the IBM MQ server or client using the `yum` command. You can also modify an installation by removing selected packages (components) currently installed on your system.

## Before you begin

**V 9.4.0** Depending on which version of IBM MQ is installed, you might need to remove maintenance before you uninstall the base packages:

- If you are uninstalling a version of IBM MQ at IBM MQ 9.4.0 or later, you do not need to remove maintenance before you uninstall IBM MQ.
- If you are uninstalling a version of IBM MQ before IBM MQ 9.4.0, you must remove any maintenance that is applied to IBM MQ before you can uninstall. The procedure for removing maintenance changed at IBM MQ 9.4.0. Therefore, you must use the procedure that is detailed in earlier versions of the product documentation to remove the maintenance.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

## Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling or modifying, if you have not already done so.
2. For a server installation, end any IBM MQ activity associated with the installation you are uninstalling or modifying:
  - a) Log in as a user in the group `mqm`.
  - b) Set up your environment to work with the installation you want to uninstall or modify. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqr -o installation
```

- d) Stop all running queue managers associated with the installation you want to uninstall or modify. Enter the following command for each queue manager:

```
endmqm QMgrName
```

- e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqclsr -m QMgrName
```

3. Log in as root.

4. Uninstall or modify IBM MQ using the **yum remove** command:

- On a system with a single installation:
  - Remove the installation by using the following command:

```
yum remove MQSeries*
```

- Modify the installation to add a component by using the following command:

```
yum install packageName
```

where *packageName* specifies the component you want to add.

- Modify the installation to remove a component by using the following command:

```
yum remove packageName
```

where *packageName* specifies the component you want to remove.

- On a system with a multiple installations:
  - Remove an installation by using the following command:

```
yum remove MQSeries*suffix*
```

where *suffix* specifies the suffix that uniquely identifies the installation.

- Modify the installation to add a component by using the following command:

```
yum install packageName*suffix*
```

where *packageName* specifies the component you want to add, and *suffix* specifies the suffix that uniquely identifies the installation.

- Modify the installation to remove a component by using the following command:

```
yum remove packageName*suffix*
```

where *packageName* specifies the component you want to remove, and *suffix* specifies the suffix that uniquely identifies the installation.

## Results

After uninstallation, certain files under the directory trees `/var/mqm` and `/etc/opt/mqm` are not removed. These files contain user data and remain so subsequent installations can reuse the data. Most of the remaining files contain text, such as INI files, error logs, and FDC files. The directory tree `/var/mqm/shared` contains files that are shared across installations, including the executable shared libraries `libmqzsd.so` and `libmqzsd_r.so`.

## What to do next

- If the product successfully uninstalled, you can delete any files and directories contained in the installation directory.
- If there are no other IBM MQ installations on the system, and you are not planning to reinstall or migrate, you can delete the `/var/mqm` and `/etc/opt/mqm` directory trees, including the files

libmqzsd.so and libmqzsd\_r.so. Deleting these directories destroys all queue managers and their associated data.

### Related tasks

[“Installing IBM MQ on Linux Red Hat using yum” on page 122](#)

You can install IBM MQ on Linux Red Hat by using the yum installer.

[“Upgrading an IBM MQ installation on Linux” on page 338](#)

You can upgrade an IBM MQ installation on Linux systems without uninstalling the earlier version.


[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the **rpm** command. You can also modify an installation by removing selected packages (components) currently installed on your system.

### **Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages**

You can uninstall an IBM MQ server or client that was installed using the Debian package manager. You can also modify an installation by removing selected packages (components) currently installed on your system.

### Before you begin

 Depending on which version of IBM MQ is installed, you might need to remove maintenance before you uninstall the base packages:

- If you are uninstalling a version of IBM MQ at IBM MQ 9.4.0 or later, you do not need to remove maintenance before you uninstall IBM MQ.
- If you are uninstalling a version of IBM MQ before IBM MQ 9.4.0, you must remove any maintenance that is applied to IBM MQ before you can uninstall. The procedure for removing maintenance changed at IBM MQ 9.4.0. Therefore, you must use the procedure that is detailed in earlier versions of the product documentation to remove the maintenance.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

### Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling or modifying, if you have not already done so.
2. For a server installation, end any IBM MQ activity associated with the installation you are uninstalling or modifying:
  - a) Log in as a user in the group mqm.
  - b) Set up your environment to work with the installation you want to uninstall or modify. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqs -o installation
```

- d) Stop all running queue managers associated with the installation you want to uninstall or modify. Enter the following command for each queue manager:

```
endmqm QMgrName
```

e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqclsr -m QMgrName
```

3. Log in as root.

4. Uninstall or modify IBM MQ using a Debian installation command:

- Using **apt**.

Issuing the command:

```
apt-get remove "ibmmq-*"
```

removes the product but leaves the package definition cached.

Issuing the command:

```
apt-get purge "ibmmq-*"
```

purges the cached definition of the product.

- Using **dpkg**.

Issuing the command:

```
dpkg -r packagename
```

removes the product but leaves the package definition cached.

Issuing the command:

```
dpkg -P packagename
```

purges the cached definition of the product.

## Results

After uninstallation, certain files under the directory trees `/var/mqm` and `/etc/opt/mqm` are not removed. These files contain user data and remain so subsequent installations can reuse the data. Most of the remaining files contain text, such as INI files, error logs, and FDC files. The directory tree `/var/mqm/shared` contains files that are shared across installations, including the executable shared libraries `libmqzsd.so` and `libmqzsd_r.so`.

## What to do next

- If the product successfully uninstalled, you can delete any files and directories contained in the installation directory.
- If there are no other IBM MQ installations on the system, and you are not planning to reinstall or migrate, you can delete the `/var/mqm` and `/etc/opt/mqm` directory trees, including the files `libmqzsd.so` and `libmqzsd_r.so`. Deleting these directories destroys all queue managers and their associated data.

## Related tasks

[“Removing a fix pack from IBM MQ on Linux Ubuntu using Debian packages” on page 157](#)

Follow these instructions to remove a fix pack, for example IBM MQ 9.4.0 Fix Pack 1, on Linux Ubuntu using Debian packages.

## **Removing a fix pack from IBM MQ on Linux Ubuntu using Debian packages**

Follow these instructions to remove a fix pack, for example IBM MQ 9.4.0 Fix Pack 1, on Linux Ubuntu using Debian packages.

### Before you begin

**Note:** The following instructions apply to a Linux Ubuntu system.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process of modifying IBM MQ.

### About this task

IBM MQ for Linux platforms use two different directory trees that are mutually exclusive. The two trees are for:

- The executable libraries and shared libraries, `/opt/mqm`.
- The data for the queue managers and other configuration files, `var/mqm`.

Because the directory trees are mutually exclusive, when you apply or remove maintenance only the files in `opt/mqm` are affected.

You must uninstall IBM MQ in the reverse order of installation. That is, remove any fix pack you have applied and then remove the base version of the product.

### Procedure

1. Stop all IBM MQ queue managers and clients associated with the installation that you are modifying, if you have not already done so.

For example, issue the following command:

```
$ endmqm -i TEST_94
```

You receive a message that the queue manager TEST\_94 is ending (that is, shutting down), followed by another message when shutdown has completed.

2. Issue the following command:

```
$ ps -ef | grep -i mq
```

You receive a message similar to this:

```
mqm 5492 5103 0 16:35 pts/0 00:00:00 ps -ef
```

Now that there is no IBM MQ activity on the system, you can uninstall the product.

3. Log in as root and issue the a command similar to the following, to find out the file sets for IBM MQ 9.4.0 Fix Pack 1.

```
+++R00T+++ ubuntuq1.fyre.ibm.com: /root
# apt list "ibmmq-*-u9301*"
Listing... Done
ibmmq-amqp-u9301/unknown,now 9.4.0.1 amd64 [installed]
ibmmq-ams-u9301/unknown,now 9.4.0.1 amd64 [installed]
...
ibmmq-web-u9301/unknown,now 9.4.0.1 amd64 [installed]
ibmmq-xrservice-u9201/unknown,now 9.4.0.1 amd64 [installed]
```

Note the presence in each line of the following text, `unknown, now`.

4. Use the following Debian command to uninstall the product.

This command removes the product, but leaves the package definition cached.

```
# apt remove "ibmmq-*-u9401*"
```

You receive messages similar to the following:

```
...
0 upgraded, 0 newly installed, 34 to remove and 78 not upgraded.
After this operation, 974 MB disk space will be freed.
Do you want to continue? [Y/n]
Y
...
Removing ibmmq-runtime-u9201 (9.4.0.1) ...
Entering prerm for "ibmmq-runtime-u9401" remove
Entering postrm for "ibmmq-runtime-u9401" remove
```

5. List the installed file sets again by issuing the command:

```
# apt list "ibmmq-*-u9401*"
```

You receive messages similar to the following:

```
ibmmq-amqp-u9201/unknown,now 9.4.0.1 amd64 [residual-config]
ibmmq-ams-u9201/unknown,now 9.4.0.1 amd64 [residual-config]
...
ibmmq-web-u9201/unknown,now 9.4.0.1 amd64 [residual-config]
ibmmq-xrservice-u9201/unknown,now 9.4.0.1 amd64 [residual-config]
```

Note the following statement at the end of each line, `residual-config`

6. Issue the following command to purge the cached definition of the product:

```
# apt purge "ibmmq-*-u9401*"
```

You receive messages similar to the following:

```
0 upgraded, 0 newly installed, 34 to remove and 78 not upgraded.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n]
Y
...
Purging configuration files for ibmmq-fttools-u9401 (9.4.0.1) ...
Entering postrm for "ibmmq-fttools-u9401" purge
```

7. List the installed file sets again by issuing the command:

```
# apt list "ibmmq-*-u9401*"
```

You receive messages similar to the following:

```
# apt list "ibmmq-*-u9401*"
Listing... Done
ibmmq-amqp-u9401/unknown 9.4.0.1 amd64
ibmmq-ams-u9401/unknown 9.4.0.1 amd64...
ibmmq-web-u9401/unknown 9.4.0.1 amd64
ibmmq-xrservice-u9401/unknown 9.4.0.1 amd64
```

Note the presence in each line of the following text, `unknown` instead of `unknown, now`.

8. Issue the command **dspmqrver** and you see that the version is

```
# dspmqrver
Name: IBM MQ
Version: 9.4.0.0
```

## Results

You have successfully uninstalled IBM MQ 9.4.0 Fix Pack 1.

## What to do next

You can uninstall the base product if required. For more information, see [“Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages” on page 155.](#)

### Related tasks

[“Removing maintenance level updates on Windows” on page 333](#)

From IBM MQ 9.4.0, you remove maintenance for server and client installations by uninstalling IBM MQ and then reinstalling an earlier level.

### Related reference

[endmqm \(end queue manager\)](#)

[dspmqver \(display version information\)](#)

## Windows Installing and uninstalling IBM MQ on Windows

Installation tasks that are associated with installing IBM MQ on Windows systems are grouped in this section.

### About this task

To prepare for installation and to install the IBM MQ components, complete the following tasks.

For information about how to uninstall IBM MQ, see [“Uninstalling IBM MQ on Windows” on page 231.](#)

If product fixes or updates are made available, see [“Applying maintenance to IBM MQ” on page 294.](#)

### Procedure

1. Check the system requirements.  
See [“Checking requirements on Windows” on page 169.](#)
2. Plan your installation.
  - As part of the planning process, you must choose which components to install and where to install them. See [“IBM MQ features for Windows systems” on page 159.](#)
  - You must also make some platform-specific choices. See [“Planning to install IBM MQ on Windows” on page 171.](#)
3. Install IBM MQ server.  
See [“Installing IBM MQ server on Windows” on page 177.](#)
4. Optional: Install an IBM MQ client.  
See [“Installing an IBM MQ client on Windows” on page 204.](#)
5. Verify your installation. See [“Verifying an IBM MQ installation on Windows” on page 221.](#)

## Windows IBM MQ features for Windows systems

You can select the features that you require when you install IBM MQ.

**Important:** For details of what each purchase of IBM MQ entitles you to install, see [IBM MQ license information.](#)

If you choose an interactive installation, before you install, you must decide what type of installation you require. For more information about the available types of installation and the features that are installed with each option, see [“Installation methods for Windows” on page 173.](#)

The following table shows the features that are available when installing an IBM MQ server or client on a Windows system.

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Server	Server	<p>You can use the server to run queue managers on your system and connect to other systems over a network. Provides messaging and queuing services to applications, and support for IBM MQ client connections.</p> <p>From IBM MQ 9.1, additional prerequisite checking is performed on this option. See <a href="#">Prerequisite checking</a> for more information.</p>	✓	
Managed File Transfer Service	MFT Service	<p>The Managed File Transfer Service install option installs a file transfer agent that has additional capabilities beyond those provided by the file transfer agent installed using the Managed File Transfer Agent install option. These additional capabilities are:-</p> <ul style="list-style-type: none"> <li>• Create protocol bridge agents which are used to send and receive files with legacy FTP, FTPS or SFTP servers</li> </ul> <p>The Managed File Transfer Service install option must be installed on systems where the IBM MQ Server install option is already installed.</p>	✓	



Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Managed File Transfer Logger	MFT Logger	The Managed File Transfer Logger install option installs a file transfer logger which connects to an IBM MQ queue manager, often the queue manager designated as the coordination queue manager. It logs file transfer audit related data to either a database or a file. It must be installed on systems where the IBM MQ Server install option is already installed.	✓	
Managed File Transfer Agent	MFT Agent	The Managed File Transfer Agent install option installs a file transfer agent which connects to an IBM MQ queue manager and transfers file data, as messages, to other file transfer agents. These must be installed either as part of the Managed File Transfer Agent or Managed File Transfer Service install options.	✓	

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Managed File Transfer Tools	MFT Tools	<p>The Managed File Transfer Tools install option installs command line tools that are used to interact with file transfer agents. You can use these tools to start file transfers, schedule file transfers and create resource monitors from the command line. The Managed File Transfer Tools can be installed and used on either a system where file transfer agents are installed, or on a system where no file transfer agents are installed.</p>	✓	
IBM MQ MQI client	Client	<p>The IBM MQ MQI client is a small subset of IBM MQ, without a queue manager, that uses the queue manager and queues on other (server) systems. It can be used only when the system it is on is connected to another system that is running a full server version of IBM MQ. The client and server can be on the same system if required.</p>	✓	✓

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Extended Messaging APIs	JavaMsg	<p>The files needed for messaging using Java. This feature includes support for JMS, XMS, .NET, and IBM MQ web services.</p> <p>From IBM MQ 9.1.0, this feature is named Extended Messaging APIs. In earlier versions of the product, it was named Java and .NET Messaging and Web Services.</p>	✓	✓
Web Administration	Web	<p>Adds HTTP based administration for IBM MQ through the REST API and IBM MQ Console. This feature also provides the messaging REST API, which you can use to perform simple point-to-point and publish messaging. You can publish messages to a topic, send messages to a queue, browse messages on a queue, and destructively get messages from a queue.</p> <p>If you want to install the Web Administration feature you must also install the Extended Messaging APIs (JavaMsg) feature.</p>	✓	

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Development Toolkit	Toolkit	This feature includes sample source files, and the bindings (files .H, .LIB, .DLL, and others), that you need to develop applications to run on IBM MQ. Bindings and samples are provided for the following languages: C, C++, Visual Basic, Cobol, and .NET (including C#). Java and Java Message Service support is included and samples are provided for MTS (COM+), and MQSC.	✓	✓

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Telemetry Service	XR Service	<p>MQ Telemetry supports the connection of Internet Of Things (IOT) devices (that is, remote sensors, actuators and telemetry devices) that use the IBM MQ Telemetry Transport (MQTT) protocol. The telemetry (MQXR) service enables a queue manager to act as an MQTT server, and communicate with MQTT client apps.</p> <p>A set of MQTT clients is available from the <a href="#">Eclipse Paho downloads page</a>. These sample clients help you write your own MQTT client apps that IOT devices use to communicate with MQTT servers.</p> <p>The XR Service install option must be installed on systems where the IBM MQ Server install option is already installed.</p> <p>See also <a href="#">“Installation considerations for MQ Telemetry”</a> on page 251.</p>	✓	

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
Advanced Message Security	AMS	<p>Provides a high level of protection for sensitive data flowing through the IBM MQ network, while not impacting the end applications. You must install this component on all IBM MQ installations that host queues you want to protect.</p> <p>You must install the IBM Global Security Kit (GSKit) component on any IBM MQ installation that is used by a program that puts or gets messages to or from a protected queue, unless you are using only Java client connections.</p> <p>The AMS install option must be installed on systems where the IBM MQ Server install option is already installed.</p>	✓	

Interactive displayed name	Non-interactive displayed name	Description	Server media	Client media
AMQP Service	AMQP	<p>Install this component to make AMQP channels available. AMQP channels support AMQP 1.0 APIs. You can use AMQP channels to give AMQP applications access to the enterprise-level messaging facilities provided by IBM MQ.</p> <p>The AMQP Service install option must be installed on systems where the IBM MQ Server install option is already installed.</p>	✓	
Java Runtime Environment	JRE	<p>The Java Runtime Environment (JRE) is a separate feature.</p> <p>The JRE feature installs a JRE that has been tailored for IBM MQ use, and is a required feature for all other features that use Java. That is:</p> <ul style="list-style-type: none"> <li>• IBM MQ Explorer</li> <li>• Web Administration</li> <li>• Telemetry Service</li> <li>• AMQP Service</li> <li>• Managed File Transfer</li> </ul> <p>Additional prerequisite checking is performed on this option. See <a href="#">Prerequisite checking</a> for more information.</p>	✓	✓

**Note:** From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

## Windows standard installation features

The following features are part of the Windows standard installation feature set. They are the features installed by the GUI installer for a "typical installation".

Interactive displayed name	Non-interactive displayed name	Notes
Server	Server	
Extended Messaging APIs	JavaMsg	Feature renamed at IBM MQ 9.1.0. It was previously named Java and .NET messaging and Web Services.
Web Administration	Web	Feature added at IBM MQ 9.1.0
Development Toolkit	Toolkit	
Java Runtime Environment	JRE	Feature added at IBM MQ 9.1.0. Prior to IBM MQ 9.1.0, the JRE feature was always installed.

When you install an IBM MQ server using **msiexec**, the features that are included in a *typical installation* are added to the list of features that you specify in the **ADDLOCAL** directive.

If you specify **ADDLOCAL=""** all these features will be installed.

If you do not want specific features added, you must add those specific features to the **REMOVE** directive.

For example, suppose that you specify the following settings for an **msiexec** installation:

```
ADDLOCAL="Client"
REMOVE="Web,Toolkit"
```

This results in the following features being installed:

```
Server,JavaMsg,JRE,Client
```

### Related concepts

["IBM MQ components and features" on page 6](#)

You can select the components or features that you require when you install IBM MQ.

["Planning considerations for installation on Multiplatforms" on page 14](#)

Before you install IBM MQ, you must choose which components to install and where to install them. You must also make some platform-specific choices.

### Related tasks

["Installing the server using the Launchpad" on page 178](#)

You can install IBM MQ server on Windows systems by using the Launchpad. This procedure can be used for installing a first or a subsequent installation.

["Installing the server using msiexec" on page 180](#)



IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

## **Windows** Checking requirements on Windows

Before you install IBM MQ on Windows, you must check for the latest information and system requirements.

### **About this task**

A summary of the tasks that you must complete to check system requirements are listed here with links to further information.

### **Procedure**

1. Check that you have the latest information, including information on hardware and software requirements.  
See [“Where to find product requirements and support information” on page 9](#).
2. Check that your systems meet the initial hardware and software requirements for Windows.  
See [“Hardware and software requirements on Windows systems” on page 169](#).
3. Check that your systems have sufficient disk space for the installation.  
See [Disk space requirements](#).
4. Check that you have the correct licenses.  
See [“License requirements” on page 8](#) and [IBM MQ license information](#).

### **Related concepts**

[“IBM MQ installation overview” on page 6](#)

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

### **Related tasks**

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Windows** Hardware and software requirements on Windows systems

Check that the server environment meets the prerequisites for installing IBM MQ for Windows and install any prerequisite software that is missing from your system.

Before you install IBM MQ, you must check that your system meets the hardware and software requirements.

You must also review the product readme file, which includes information about last-minute changes and known problems and workarounds. For the latest version of the product readme file, see the [IBM MQ, WebSphere MQ, and MQSeries product readmes web page](#).

### **Supported versions of Windows**

For a list of the supported versions of the Windows operating system, see the [System Requirements for IBM MQ website](#) and follow the links to the Detailed System Requirements report for Windows. There are separate reports for Long Term Support and Continuous Delivery.

Although IBM MQ 9.1, and later, no longer supports some earlier versions of the Windows operating system referred to in the documentation, these earlier versions of Windows might still be supported for an earlier version of IBM MQ installed in the same domain as an IBM MQ 9.1 or later installation.

## Changes to Windows features in Windows 10

The names of some of the Windows features have changed in Windows 10:

- *Windows Explorer* is *File Explorer*
- *My Computer* is called *This PC*
- The way in which you start the Control Panel is different
- The default browser is Microsoft Edge.

**Note:** The IBM MQ Console supports only the following browsers:

- Microsoft Edge
- Google Chrome
- Mozilla Firefox

## Storage requirements for IBM MQ server

The storage requirements depend on which components you install, and how much working space you need. The storage requirements also depend on the number of queues that you use, the number and size of the messages on the queues, and whether the messages are persistent. You also require archiving capacity on disk, tape, or other media. For more information, see [System Requirements for IBM MQ](#).

Disk storage is also required:

- Prerequisite software
- Optional software
- Your application programs

## Requirements for IBM MQ Explorer


From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

For more information about the requirements for the stand-alone IBM MQ Explorer, see [IBM MQ Explorer installation requirements](#).

For further information about Windows requirements, see [IBM MQ Explorer Requirements](#).

## Requirements for IBM MQ classes for .NET

The following prerequisites apply to IBM MQ classes for .NET:

- .NET Core 2.1 is a prerequisite to use IBM MQ classes for .NET Standard, for developing .NET Core applications.
- .NET Framework V4.7.1 is a prerequisite to use IBM MQ classes for .NET Standard, for developing .NET Framework applications.
-  From IBM MQ 9.4.0, for .NET 6 IBM MQ client libraries, that is libraries built using .NET 6 as the target framework, .NET 6 is a prerequisite.

## Installation directories used for Windows operating systems

The 64-bit IBM MQ server or client, by default, installs its program directories into the 64-bit installation location: C:\Program Files\IBM\MQ.



**Attention:** There is no separate 32-bit client installation package. The client installation package and redistributable client contain both 32-bit and 64-bit IBM MQ client libraries. The included

32-bit libraries can be used by 32-bit applications on supported platforms where 32-bit support is offered by the operating system.

The default data directory that is used by IBM MQ changed in IBM MQ 8.0 to C:\ProgramData\IBM\MQ. This change affects both servers, in 32 and 64 bits and clients in 64 bits. However, if there has been a previous installation of IBM MQ on the machine on which you are installing, the new installation continues to use the existing data directory location. For more information, see [“Program and data directory locations on Windows” on page 396](#).

## Installing prerequisite software

To install the prerequisite software that is provided in the IBM MQ server installation image, choose one of the following options:

- Navigate to the root of the server installation image, then double-click setup.exe. The IBM MQ Installation Launchpad window is displayed. From this window, click the **Software Prerequisites** option. Use this option to check what prerequisite software is already installed, then install any missing software.
- Navigate to the Prereqs folder of the server installation image. Select the folder for the software item to be installed, then start the installation program.

### Related concepts

[“Hardware and software requirements on Linux systems” on page 95](#)

Before you install IBM MQ, check that your system meets the hardware and operating system software requirements for the particular components you intend to install.

[“Hardware and software requirements on IBM i systems” on page 63](#)

Check that the server environment meets the prerequisites for installing IBM MQ for IBM i.

### Related tasks

[“Checking requirements on Windows” on page 169](#)

Before you install IBM MQ on Windows, you must check for the latest information and system requirements.

### Related reference

[IBM MQ Explorer Requirements](#)

## Planning to install IBM MQ on Windows

Before you install IBM MQ on Windows, you must choose which components to install and where to install them. You must also make some platform-specific choices.

## About this task

The following steps provide links to additional information to help you with planning your installation of IBM MQ on Windows.

As part of your planning activities, make sure that you review the information on hardware and software requirements for the platform on which you are planning to install IBM MQ. For more information, see [“Checking requirements on Windows” on page 169](#).

## Procedure

1. Decide which IBM MQ components and features to install.

See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).

**Important:** Ensure that your enterprise has the correct license, or licenses, for the components that you are going to install. For more information, see [“License requirements” on page 8](#) and [IBM MQ license information](#).

2. Review the options for naming your installation.

In some cases, you can choose an installation name to use instead of the default name. See [“Installation name on AIX, Linux, and Windows” on page 14](#).

3. Review the options and restrictions for choosing an installation location for IBM MQ.  
For more information, see [“Installation location on Multiplatforms” on page 15](#).
4. If you plan to install multiple copies of IBM MQ, see [“Multiple installations on AIX, Linux, and Windows” on page 17](#).
5. If you already have a primary installation, or plan to have one, see [“Primary installation on AIX, Linux, and Windows” on page 19](#).
6. Make sure that the communications protocol needed for server-to-server verification is installed and configured on both systems that you plan to use.  
For more information, see [“Server-to-server links on AIX, Linux, and Windows” on page 26](#).
7. Determine whether you need to install the Java runtime environment (JRE).  
If you are not using Java in your messaging applications, and you are not using portions of IBM MQ that are written in Java, you have the option to not install the JRE (or to remove the JRE if it was already installed).



**Attention:** If you choose not to install the JRE, or to remove the JRE if it was already installed:

- You must use the **runmqakm** command to manage key repositories. The **runmqktool** command is not available.
- Use of the **runmqras** command fails unless a JRE at version 7, or later, is available on the system path.

For more information, see [runmqakm and runmqktool commands on AIX, Linux, and Windows](#).

#### **Windows** *Additional Windows features prerequisite checking*

There are two Windows installation features that have additional prerequisite checking enabled in the Windows IBM MQ installer from IBM MQ 9.1. These are the `Server` feature and the `Java Runtime Environment (JRE)` feature. These features are required by other features and installing those features, without these prerequisite checks, would cause those features to be unusable.

If you perform a Graphical User Interface installation, and select the **custom install** option, you can deselect the `JRE` or `Server` features.



**Attention:** Dialog panels prevent you from completing the installation, until you have resolved any issues.

If you perform a silent installation, and you elect to **REMOVE** the `Server` or `JRE` features while installing any other features that require those features, the `Server` and `JRE` features, as appropriate, will be added to your selected installation features.

Table 20 on page 172 describes how the selection of certain installation features requires the `Server` or `JRE` to be added automatically.

<i>Table 20. Installation features requiring either the Server or JRE feature</i>		
<b>Feature</b>	<b>Required by</b>	<b>Non-interactive name</b>
Server	Web Administration	Web
JRE	Telemetry Service Managed File Transfer Service Managed File Transfer Agent Managed File Transfer Logger Managed File Transfer Tools AMQP Service Web Administration	XR Service MFT Service MFT Agent MFT Logger MFT Tools AMQP Service Web

To check whether the JRE or Server features have been installed, look in the [INSTALLDIR]\swidtag directory. If the:

- `ibm.com_IBM_MQ-9.0.x.swidtag` file is present, the Server has been installed
- `IBM_MQ_JRE-1.8.0.mqtag` file is present, the JRE has been installed.

If this is not what you require, consult the installation log.

**Important:** Each of the JRE and Server features are part of the set of Windows standard IBM MQ installation features. To remove the JRE (or the Server) when installing silently, add the feature to the **REMOVE** directive, do not merely omit it from the **ADDLOCAL** directive. See [“Windows standard installation features” on page 168](#) for further details.

## **Installation methods for Windows**

When you install IBM MQ on Windows, there are several different installation types to choose from. This topic also describes how you can clear the installation settings of your enterprise, including the use of the **ResetMQ** command script.

If you are migrating from an earlier version of IBM MQ, see [“Planning to migrate IBM MQ to a later version on Windows” on page 393](#). To modify an existing installation, see [“Modifying a server installation” on page 202](#).

### **Interactive or non-interactive installation**

IBM MQ for Windows is installed using the Microsoft Installer (MSI). You can use the Installation Launchpad to invoke MSI, this process is called an attended or interactive installation. Alternatively, you can invoke MSI directly for a silent installation, without using the IBM MQ Installation Launchpad. This means that you can install IBM MQ on a system without interaction. This process is called unattended, silent, or non-interactive installation, and is useful for installing IBM MQ over a network on a remote system.

For a list of interactive and non-interactive features, see [“IBM MQ features for Windows systems” on page 159](#).

### **Interactive installation**

If you choose an interactive installation, before you install, you must decide what type of installation you require. [Table 21 on page 174](#) shows the installation types available, and the features that are installed with each option. For the prerequisites required for each feature, see [System Requirements for IBM MQ](#).

The installation types are:

- Typical installation
- Compact installation
- Custom Installation

You can also:

- Specify the installation location, name, and description.
- Have multiple installations on the same computer.

See [“Primary installation on AIX, Linux, and Windows” on page 19](#) for important information about these features, including whether to designate your installation as the *primary installation*.

Installation type	Server Features installed	Client Features installed	Comments
Typical	<ul style="list-style-type: none"> <li>• Server</li> <li>• Development Toolkit</li> <li>• Extended Messaging APIs</li> <li>• Web Administration</li> </ul>	<ul style="list-style-type: none"> <li>• MQI Client</li> <li>• Development Toolkit</li> <li>• Extended Messaging APIs</li> </ul>	<p>The default option. Features are installed to default locations with a default installation name.</p> <p>Extended Messaging APIs (known as Java and .NET Messaging and Web Services before IBM MQ 9.1) includes IBM MQ classes for .NET, support for the Microsoft Windows Communication Foundation (WCF) for use with Microsoft.NET 3.</p>
Compact	<ul style="list-style-type: none"> <li>• Server only</li> </ul>	<ul style="list-style-type: none"> <li>• MQI Client only</li> </ul>	<p>The feature is installed to the default location with a default installation name.</p>
Custom	<p>By default, the following features are preselected:</p> <ul style="list-style-type: none"> <li>• Server</li> <li>• Development Toolkit</li> <li>• Extended Messaging APIs</li> <li>• Web Administration</li> </ul> <p>A custom installation can also install:</p> <ul style="list-style-type: none"> <li>• Telemetry Service</li> <li>• Advanced Message Security</li> <li>• Managed File Transfer Service</li> <li>• Managed File Transfer Logger</li> <li>• Managed File Transfer Agent</li> <li>• Managed File Transfer Tools</li> <li>• MQI Client</li> </ul>	<p>By default, the following features are preselected:</p> <ul style="list-style-type: none"> <li>• MQI Client</li> <li>• Development Toolkit</li> <li>• Extended Messaging APIs</li> </ul>	<p>A server custom installation can be used if you want to install the IBM MQ MQI client from within the server image.</p> <p>All the available features are listed and you can select which ones to install, and where to install them. You can also name and provide a description for the installation.</p> <p>Use a custom installation when you want to specify that the installation is primary.</p> <p>Extended Messaging APIs (known as Java and .NET Messaging and Web Services before IBM MQ 9.1) includes IBM MQ classes for .NET, support for the Microsoft Windows Communication Foundation (WCF) for use with Microsoft.NET 3 or later.</p>

If Microsoft.NET is not installed before IBM MQ and you add it, rerun **setmqinst -i -n Installationname** if this is a primary installation.

The following table describes which level of .NET is required for which function:

IBM MQ function	.NET version required
IBM MQ classes for .NET. For more information, see: <a href="#">Installing IBM MQ classes for .NET</a>	Microsoft .NET 6.0

Table 22. Required levels of Microsoft.NET (continued)

IBM MQ function	.NET version required
<p>The IBM MQ custom channel for WCF. For more information, see <a href="#">Developing WCF applications with IBM MQ</a>.</p> <p>To build the sample solution files, either the Microsoft.NET 4.7.2 or later SDK, or Microsoft Visual Studio 2015 is needed. For more information, see: <a href="#">Software requirements for the WCF custom channel for IBM MQ</a></p>	<p>.NET framework 4.7.2 or later</p>

For instructions on how to install IBM MQ on Windows systems, see [Installing IBM MQ Server on Windows systems](#) and [“Installing an IBM MQ client on Windows”](#) on page 204.

## Non-interactive installation

If you choose a non-interactive installation the system on which you want to install must be able to access the IBM MQ image, or a copy of the files, and you must be able to access the system.

If you are running with User Account Control (UAC) enabled, you must invoke the non-interactive installation from an elevated command prompt. Elevate a command prompt by using a right-click to start the command prompt and choose **Run as administrator**. If you try to silently install from a non-elevated command prompt, the installation fails with an error of AMQ4353 in the installation log.

There are several ways to invoke MSI:

- Using the `msiexec` command with command-line parameters.
- Using the `msiexec` command with a parameter that specifies a response file. The response file contains the parameters that you normally supply during an interactive installation. See [“Installing the server using msiexec”](#) on page 180.
- Use the `MQParms` command with command-line parameters, a parameter file, or both. The parameter file can contain many more parameters than a response file. See [“Installing the server using the MQParms command”](#) on page 189.

## Special domain ID

If the system belongs to a Windows domain you may need a special domain ID for the IBM MQ service, see [“Considerations when installing IBM MQ server on Windows”](#) on page 176 for more information.

## Clearing IBM MQ installation settings

When you install IBM MQ on Windows, various values, such as the location of the data directory for IBM MQ, are stored in the registry.

In addition, the data directory contains configuration files that are read at installation time. To provide a trouble free re-installation experience, these values and files persist even after the last IBM MQ installation has been removed from the machine.

This is designed to assist you, and

- Allows you to easily uninstall and reinstall
- Ensures that you do not lose any previously defined queue managers in the process.

However in some cases this feature can be an annoyance. For example, if you want to:

- Move the data directory
- Pick up the default data directory for the new release that you want to install. For more information, see [“Program and data directory locations on Windows”](#) on page 396.

- Install as if installing on a new machine, for example, for test purposes.
- Remove IBM MQ permanently.

To assist you in these situations, IBM MQ supplies a Windows command file, on the root directory of the installation media, called **ResetMQ.cmd**.

To run the command, enter the following:

```
ResetMQ.cmd [LOSEDATA] [NOPROMPT]
```



**Attention:** The parameters **LOSEDATA** and **NOPROMPT** are optional. If you supply either, or both, of these parameters, the following action results:

**LOSEDATA**

Existing queue managers become unusable. However, the data remains on disk.

**NOPROMPT**

Configuration information is permanently removed without further prompting.

You can run this command only after the last IBM MQ installation has been removed.

**Important:** You should use this script with caution. The command, even without specifying the optional parameter **LOSEDATA**, can irrecoverably remove queue manager configuration.

**Related concepts**

[“Considerations when installing IBM MQ server on Windows” on page 176](#)

There are some considerations relating to security that you should take into account when installing an IBM MQ server on Windows. There are some additional considerations relating to the object naming rules and logging.

**Windows** *Considerations when installing IBM MQ server on Windows*

There are some considerations relating to security that you should take into account when installing an IBM MQ server on Windows. There are some additional considerations relating to the object naming rules and logging.

**Security considerations when installing IBM MQ server on a Windows system**

- If you are installing IBM MQ on a Windows domain network running Active Directory Server, you probably need to obtain a special domain account from your domain administrator. For further information, and the details that the domain administrator needs to set up this special account, see [“Configuring IBM MQ with the Prepare IBM MQ Wizard” on page 195](#) and [“Creating and setting up Windows domain accounts for IBM MQ” on page 199](#).
- When you are installing IBM MQ server on a Windows system you must have local administrator authority. In order to administer any queue manager on that system, or to run any of the IBM MQ control commands your user ID must belong to the *local* mqm or Administrators group . If the local mqm group does not exist on the local system, it is created automatically when IBM MQ is installed. A user ID can either belong to the local mqm group directly, or belong indirectly through the inclusion of global groups in the local mqm group. For more information, see [Authority to administer IBM MQ on UNIX, Linux, and Windows](#).
- Windows versions with a User Account Control (UAC) feature restricts the actions users can perform on certain operating system facilities, even if they are members of the Administrators group. If your user ID is in the Administrators group but not the mqm group you must use an elevated command prompt to issue IBM MQ admin commands such as **crtmqm**, otherwise the error AMQ7077 is generated. To open an elevated command prompt, right-click the start menu item, or icon, for the command prompt, and select **Run as administrator**.
- Some commands can be run without being a member of the mqm group (see [Authority to administer IBM MQ on UNIX, Linux, and Windows](#)).



- As with other versions of Windows, the object authority manager (OAM) gives members of the Administrators group the authority to access all IBM MQ objects even when User Account Control is enabled.
- If you intend to administer queue managers on a remote system, your user ID must be authorized on the target system. If you need to perform any of these operations on a queue manager when connected remotely to a Windows machine, you must have the `Create global objects` user access. Administrators have the `Create global objects` user access by default, so if you are an administrator you can create and start queue managers when connected remotely without altering your user rights. For more information, see [Authorizing users to use IBM MQ remotely](#).
- If you use the highly secure template, you must apply it before installing IBM MQ. If you apply the highly secure template to a machine on which IBM MQ is already installed, all the permissions you have set on the IBM MQ files and directories are removed (see [Applying security template files on Windows](#)).

## Naming considerations

Windows has some rules regarding the naming of objects created and used by IBM MQ. These naming considerations apply to IBM MQ 8.0 or later.

- Ensure that the machine name does not contain any spaces. IBM MQ does not support machine names that include spaces. If you install IBM MQ on such a machine, you cannot create any queue managers.
- For IBM MQ authorizations, names of user IDs and groups must be no longer than 64 characters (spaces are not allowed).
- An IBM MQ for Windows server does not support the connection of an IBM MQ MQI client if the client is running under a user ID that contains the @ character, for example, abc@d. Similarly, the client user ID should not be the same as local group.
- A user account that is used to run the IBM MQ Windows service is set up by default during the installation process; the default user ID is `MUSR_MQADMIN`. This account is reserved for use by IBM MQ. For more information, see [Configuring user accounts for IBM MQ](#) and [Local and domain user accounts for the IBM MQ Windows service](#).
- When an IBM MQ client connects to a queue manager on the server, the username under which the client runs must not be same as the domain or machine name. If the user has the same name as the domain or machine, the connection fails with return code 2035(MQRC\_NOT\_AUTHORIZED).

## Logging

You can set up logging during installation which assists you in troubleshooting any problems you might have with the installation.

Logging is enabled by default from the Launchpad. You can also enable complete logging, for more information, see [How to enable Windows Installer logging](#).

## Digital signatures

The IBM MQ programs and installation image are digitally signed on Windows to confirm that they are genuine and unmodified. The SHA-256 with RSA algorithm is used to sign the IBM MQ product.

## Installing IBM MQ server on Windows

On Windows, IBM MQ is installed by using the Microsoft Installer (MSI). You can either use the Installation Launchpad to invoke MSI or alternatively, you can invoke MSI directly.

## About this task

To install IBM MQ server on Windows systems, you can choose either to install interactively with the Launchpad or to install by using MSI technology directly. MSI provides both an interactive installation and a non interactive installation.

For more information on installation options, see [“Installation methods for Windows” on page 173](#).

## Procedure

- To install IBM MQ server by using the Launchpad, see [“Installing the server using the Launchpad” on page 178](#).
- To install IBM MQ server on by using the MSI technology directly, see [“Installing the server using msiexec” on page 180](#).

## Related concepts

[“Modifying a server installation” on page 202](#)

You can modify an IBM MQ server installation interactively using the launchpad or non-interactively using msiexec.

## Related tasks

[“Configuring user accounts for IBM MQ” on page 195](#)

After installing IBM MQ server, you must configure the IBM MQ service before you can start any queue managers.

[“Uninstalling IBM MQ on Windows” on page 231](#)

You can uninstall the IBM MQ MQI clients and servers on Windows systems by using the control panel, the command line ( **msiexec** ), **MQParms**, or by using the installation media, in which case you can optionally remove queue managers as well.

## **Installing the server using the Launchpad**

You can install IBM MQ server on Windows systems by using the Launchpad. This procedure can be used for installing a first or a subsequent installation.

## About this task

You can use the Launchpad to make a compact, typical, or custom installation of IBM MQ. You can reuse the launchpad multiple times to install further installations. It automatically selects the next available installation name, instance, and location to use. To view all the installation types and the features that are installed with each option, see [“Installation methods for Windows” on page 173](#).

Note that if you have previously uninstalled IBM MQ from your system (see [“Uninstalling IBM MQ on Windows” on page 231](#)), some configuration information might remain, and some default values might be changed.

From IBM MQ 9.3.0, a new **Confirm License Entitlement** panel in the Windows interactive installer is presented after feature selection if you have chosen to install any IBM MQ Advanced features (MQ Telemetry Service, Advanced Message Security, or Managed File Transfer Service), or if you are upgrading from an installation that already has these features.

This panel simply warns you that these features are considered IBM MQ Advanced functionality and should only be installed if you have entitlement to IBM MQ Advanced. This warning reduces the risk of users installing IBM MQ Advanced features on a machine in error.

**Note:** The **Confirm License Entitlement** panel applies to production server builds and not to clients, beta builds, trial builds or developer (non-warranty) builds.

## Procedure

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate Setup.exe in the base directory of the IBM MQ installation image.

- From a network location, this location might be `m:\instmq5\Setup.exe`
- From a local file system directory, this location might be `C:\instmq5\Setup.exe`

### 3. Start the installation process.

Either run Setup . exe from a command prompt, or double-click Setup . exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

### 4. Follow the instructions on screen. Review, and if necessary, modify the software requirements and network configuration.

### 5. On the **IBM MQ Installation** tab of the Launchpad, select the installation language, and then click **Launch IBM MQ Installer** to start the IBM MQ installation wizard.

### 6. Use the IBM MQ installation wizard to install the software.

If you select any IBM MQ Advanced features and the **Confirm License Entitlement** panel then appears:

- If you do have an IBM MQ Advanced license, simply select **Yes (I have an MQ Advanced license)** and **Next** to continue with the installation.
- If you do not have an IBM MQ Advanced license and do not intend to purchase one, click **Back** and change your feature selections.

Depending on your system the installation process can take several minutes. At the end of the installation process, the IBM MQ Setup window displays the message **Installation Wizard Completed Successfully**.

When this message appears, click **Finish**.

## Results

You have successfully installed IBM MQ. The Prepare IBM MQ wizard starts automatically, displaying the **Welcome to the Prepare IBM MQ Wizard** page.

## What to do next

Use the Prepare IBM MQ Wizard to configure IBM MQ with a user account for your network. You must run the wizard to configure the IBM MQ Service before you can start any queue managers. For more information, see [“Configuring IBM MQ with the Prepare IBM MQ Wizard”](#) on page 195.

- If you have chosen this installation to be the primary installation on the system, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH\bin\setmqinst -i -p MQ_INSTALLATION_PATH
```

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the **setmqenv** or **crtmqenv** command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Verifying an IBM MQ installation on Windows”](#) on page 221.

## Related concepts

[“Modifying a server installation”](#) on page 202

You can modify an IBM MQ server installation interactively using the launchpad or non-interactively using `msiexec`.

### Related tasks

[“Installing the server using msiexec” on page 180](#)

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

[“Configuring user accounts for IBM MQ” on page 195](#)

After installing IBM MQ server, you must configure the IBM MQ service before you can start any queue managers.

[“Uninstalling IBM MQ on Windows” on page 231](#)

You can uninstall the IBM MQ MQI clients and servers on Windows systems by using the control panel, the command line (`msiexec`), `MQParms`, or by using the installation media, in which case you can optionally remove queue managers as well.

### **Installing the server using msiexec**

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

### Before you begin

If you are running IBM MQ on Windows systems with User Account Control (UAC) enabled, you must invoke the installation with elevated privileges. If you are using the Command prompt or IBM MQ Explorer, you elevate privileges by using a right-click to start the program and selecting Run as administrator. If you try to run `msiexec` without using elevated privileges, the installation fails with an error of AMQ4353 in the installation log.

### About this task

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation. An interactive installation displays panels and ask questions.

The `msiexec` command uses parameters to give MSI some or all of the information that can also be specified through panels during an interactive installation. This means that a user can create a reusable automated or semi-automated installation configuration. Parameters can be given through the command line, a transform file, a response file, or a combination of the three.

Some parameters can only be provided on the command line and not in a response file. For more information about these parameters, see [Table 23 on page 182 in “Specifying command line parameters for server installation with msiexec” on page 182](#).

There are also a number of parameters can be used either on the command line or in a response file. For more information about these parameters, see [Table 25 on page 185 in “Creating and using a response file for server installation” on page 185](#). If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.

### Procedure

1. For multiple silent installations, for each version that is to be installed, find an MSI instance ID that is available to use for that installation.  
For more information, see [“Choosing MSI Instance IDs for multiple client installations” on page 206](#).
2. To install using `msiexec`, at the command line, enter the `msiexec` command in the following format:

```
msiexec parameters [USEINI="response-file"] [TRANSFORMS="transform_file"]
```

where:

### **parameters**

are either command-line parameters preceded by a / character, or property=value pairs. If you are using both forms of parameter, always put the command-line parameters first. For more information, see [“Specifying command line parameters for server installation with msiexec” on page 182](#), which contains a link to the website that lists all the command line parameters that are available.

For an unattended installation, you must include the **/q** or **/qn** parameter in the command line. Without this parameter, the installation is interactive.

**Note:** You must include the **/i** parameter and the file location of the IBM MQ installer package.

### **response-file**

is the full path and file name of the file that contains the [Response] stanza and the required property=value pairs, for example C:\MyResponseFile.ini. An example response file, Response.ini, is supplied with IBM MQ. This file contains default installation parameters. For more information, see [“Creating and using a response file for server installation” on page 185](#).

### **transform\_file**

is the full path and file name of a transform file. For more information, see [“Using transforms with msiexec for server installation” on page 184](#) and [“Choosing MSI Instance IDs for multiple server installations” on page 181](#).

**Note:** For a silent installation to succeed, the AGREETOLICENSE="yes" property must be defined either on the command line or in the response file.

## **Results**

After the command has been entered, the command prompt immediately reappears. IBM MQ is installing as a background process. If you have entered parameters to produce a log, check this file to see how the installation is progressing. If the installation completes successfully, you see the message Installation operation completed successfully in the log file.

### **Windows** *Choosing MSI Instance IDs for multiple server installations*

For multiple silent installations, for each version that is installed you must find an MSI instance ID that is available to use for that installation.

## **About this task**

In order to support silent, or non-interactive, multiple installations, you need to find out whether the instance ID you want to use is already in use or not and choose the appropriate one. For each installation media (for example, each client and server), Instance ID 1 is the default ID which is used for single installations. If you want to install alongside Instance ID 1 you need to specify which instance you want to use. If you have already installed instance 1, 2, and 3 then you need to find out what the next available instance is, for instance, Instance ID 4. Similarly, if instance 2 has been removed, you need to find out that there is a gap that can be reused. You can find out which Instance ID is currently in use by using the **dspmqinst** command.

## **Procedure**

1. Type **dspmqinst** to find a free MSI Instance in the media being installed by reviewing the MSIMedia and MSIInstanceId values for the versions already installed. For example:

```
InstName: Installation1
InstDesc:
Identifier: 1
InstPath: C:\Program Files\IBM\MQ
Version: 9.0.0.0
Primary: Yes
State: Available
MSIProdCode: {74F6B169-7CE6-4EFB-8A03-2AA7B2DBB57C}
MSIMedia: 9.0 Server
MSIInstanceId: 1
```

2. If MSI Instance ID 1 is in use and you want to use MSI Instance ID 2, the following parameters must be added to the msiexec call:

```
MSINEWINSTANCE=1 TRANSFORMS=":instanceId7.mst;1033.mst"
```

## What to do next

For multiple installations, the **INSTALLATIONNAME** or **PGMFOLDER** must be supplied as an additional parameter on any non-interactive installation command. Supplying the **INSTALLATIONNAME** or **PGMFOLDER** ensures that you do not work with the wrong installation in case you omit or incorrectly specify the **TRANSFORMS** parameter.

**Windows** *Specifying command line parameters for server installation with msiexec*

You can specify either standard **msiexec** command line parameters preceded by a / character, or property=value pairs, or a combination of both.

## About this task

The **msiexec** command can accept the following types of parameter on the command line:

### Standard command line parameters, preceded by a / character

For more information about the **msiexec** command line parameters, see the [MSDN Command-Line Options web page](#).

For an unattended installation, you must include the **/q** or **/qn** parameter in the command line. Without this parameter, the installation is interactive.

**Note:** You must include the **/i** parameter and the file location of the IBM MQ installer package.

### Property=value pair parameters entered on the command line

All the parameters that are available for use in a response file can also be used on the command line. For more information about these parameters, see [Table 25 on page 185](#) in “[Creating and using a response file for server installation](#)” on page 185.

There are some extra property=value pair parameters, shown in the following table, that are only for use on the command line:

Property	Values	Meaning
USEINI	<i>path \ file_name</i>	Use the specified response file. See “ <a href="#">Creating and using a response file for server installation</a> ” on page 185
SAVEINI	<i>path \ file_name</i>	Generate a response file during installation. The file contains those parameters selected for this installation that a user might make during an interactive installation.
ONLYINI	1 yes  ""	1, yes or any value other than null. End the installation before updating the target system, but after generating a response file, if this is specified.  "". Continue the installation and update the target system (the default).

Table 23. Parameters that can be used on the command line only (msiexec property=value parameters) (continued)

Property	Values	Meaning
TRANSFORMS	:InstanceId x.mst  <i>path</i> \ <i>file_name</i>   :InstanceId x.mst; <i>path</i> \ <i>file_name</i>	The :InstanceId x.mst value is only required for a subsequent installation of IBM MQ. The <i>path</i> \ <i>file_name</i> specifies what transform (.mst) files must be applied to the product. For example, "1033.mst" specifies the supplied U.S. English transform file.
MSINewInstan CE	1	This property is only required for subsequent installations of IBM MQ

When using the property=value pair parameters note that:

- Property strings must be in uppercase.
- Value strings are not case-sensitive, except for feature names. You can enclose value strings in double quotation marks. If a value string includes a blank, enclose the blank value string in double quotation marks.
- For a property that can take more than one value, use the format:

```
ADDLOCAL="Server,Client"
```

- For properties taking paths and file names, for example, **PGMFOLDER**, you must supply the paths as absolute paths and not relative paths; that is as C:\folder\file and not ".\folder\file".

When using property=value pair and command line parameters with the **msiexec** command, enter command line parameters first.

If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.

## Procedure

- For a single installation of IBM MQ, specify the **msiexec** command as shown in the following typical example.

All parameters, separated by one or more spaces, must be typed on the same line as the **msiexec** call.

```
msiexec
/i "path\MSI\IBM MQ.msi"
/l*v c:\install.log
/q
TRANSFORMS="1033.mst"
AGREETOLICENSE="yes"
ADDLOCAL="Server"
```

- If you are installing a second copy of IBM MQ, specify the **msiexec** command as shown in the following typical example.

All parameters, separated by one or more spaces, must be typed on the same line as the **msiexec** call.

```
msiexec
/i "path\MSI\IBM MQ.msi"
/l*v c:\install.log
/q
TRANSFORMS=":InstanceId2.mst;1033.mst"
AGREETOLICENSE="yes"
```

```
ADDLOCAL="Server"  
MSINewInstance=1
```

where /l\*v c:\install.log writes installation log to file c:\install.log.

### **Windows** *Using transforms with msiexec for server installation*

MSI can use transforms to modify an installation. During IBM MQ installation, transforms can be used to support different national languages.

## About this task

IBM MQ is supplied with transform files in the \MSI folder of the Server image. These files are also embedded in the IBM MQ Windows installer package, IBM MQ.msi.

Table 24 on page 184 shows the locale identifier, language, and the transform file name to use in the **msiexec** command line.

Language	Transform File name	Value
U.S. English	1033.mst	1033
German	1031.mst	1031
French	1036.mst	1036
Spanish	1034.mst	1034
Italian	1040.mst	1040
Brazilian Portuguese	1046.mst	1046
Japanese	1041.mst	1041
Korean	1042.mst	1042
Simplified Chinese	2052.mst	2052
Traditional Chinese	1028.mst	1028
Czech	1029.mst	1029
Russian	1049.mst	1049
Hungarian	1038.mst	1038
Polish	1045.mst	1045

You can also specify the required language by using the **MQLANGUAGE** property with the **MQParms** command. For information about the msiexec property=value parameters, see [“MQParms parameter file - server installation” on page 190](#).

## Procedure

On the **msiexec** command line, specify the required language by using the **TRANSFORMS** property in a property=value pair as shown in the following example:

```
TRANSFORMS="1033.mst"
```

The quotation marks surrounding the value are optional.

You can also specify the full path and file name of the transform file. Again, the quotation marks surrounding the value are optional. For example:



```
TRANSFORMS="D:\Msi\1033.mst"
```

You might need to merge transforms to install multiple installations of the same version, for example:

```
TRANSFORMS=":InstanceId2.mst;D:\Msi\1033.mst"
```

### Windows *Creating and using a response file for server installation*

You can use the **msiexec** command with a parameter that specifies additional properties that are defined in a response file. There are three ways of creating a response file for a server installation.

## About this task

A response file is an ASCII text file with a format like a Windows .ini file, that contains the stanza [Response]. The [Response] stanza contains some or all the parameters that would normally be specified as part of an interactive installation. The parameters are given in a property=value pair format. Any other stanzas in the response file are ignored by **msiexec**.

An example response file, Response.ini, is supplied with IBM MQ. It contains the default installation parameters.

You can combine the use of a response file with msiexec command-line parameters described in [“Specifying command line parameters for server installation with msiexec” on page 182](#).

Table 25 on page 185 shows the parameters that are available for use in a response file. These parameters can also be used on the command line. If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.

Property	Values	Meaning
PGMFOLDER <sup>“1” on page 187</sup>	path	Folder for the IBM MQ program files. For example, c:\mqm.
DATFOLDER	path	Folder for the IBM MQ data files. For example, c:\mqm\data. <b>Note:</b> Multiple installations of IBM MQ all use the same <b>DATFOLDER</b> .
LOGFOLDER	path	Folder for the IBM MQ queue manager log files. For example, c:\mqm\log. <b>Note:</b> Multiple installations of IBM MQ all use the same <b>LOGFOLDER</b> .
USERCHOICE	0 no	If the command line or response file specifies parameters to install features, a dialog can be displayed to prompt the user to accept the preselected options, or review and possibly change them.  0 or no. Suppresses display of the dialog. Anything else. Dialog is displayed. Not used for a silent installation.

Table 25. Parameters that can be used in a response file (continued)

Property	Values	Meaning
AGREETOLICENSE <a href="#">“2” on page 188</a>	yes	Accept the terms of the license. Set to yes before a silent installation.  If the installation is not silent, this parameter is ignored.
KEEPQMDATA	<b>keep</b>   delete	If the Server feature is to be uninstalled, whether to delete any existing queue managers.  delete removes any existing queue managers.  keep, or any other value, keeps them.  <b>Note:</b> This property is only valid on a final server uninstallation. Otherwise this property is ignored.
LAUNCHWIZ	0 1 yes no  ""	0 or no. Do not launch the <a href="#">Prepare IBM MQ Wizard</a> after IBM MQ is installed.  1 or yes. Launch the <a href="#">Prepare IBM MQ Wizard</a> if the Server feature is installed.  "". Launch the <a href="#">Prepare IBM MQ Wizard</a> to install the Server (the default).  If this option is to launch the <a href="#">Prepare IBM MQ Wizard</a> , you can specify the WIZPARMFILE, either in this file, or on the command line.  The <a href="#">Prepare IBM MQ Wizard</a> must be run to make your IBM MQ installation operational. If you choose not to launch it here, you must run it before using IBM MQ.
WIZPARMFILE	<i>path \file_name</i>	When specified, the file that contains the parameters to pass to the <a href="#">Prepare IBM MQ Wizard</a> when it is launched. These are in the [Services].
ADDLOCAL	<i>feature, feature, All  ""</i>	A comma-separated list of features to install locally. For a list of valid feature names, see <a href="#">“IBM MQ features for Windows systems” on page 159</a> .  All installs all features  "" installs the typical features. If you do not want a feature use REMOVE=" <i>feature</i> "  <b>Note:</b> If this is a new installation, the typical features <a href="#">“3” on page 188</a> are installed by default irrespective of the feature list provided in the <b>ADDLOCAL</b> property. If you do not want a feature, use REMOVE=" <i>feature</i> " to specify that feature.

Table 25. Parameters that can be used in a response file (continued)

Property	Values	Meaning
REMOVE	<i>feature, feature,  All </i> ""	A comma-separated list of features to remove. For a list of valid feature names, see “IBM MQ features for Windows systems” on page 159. <sup>“4”</sup> on page 188  All uninstalls all features "" uninstalls no features (the default).
STARTSERVICE	0 no  ""	0 or no. Do not start the IBM MQ Service at the end of installation.  "" (the default). Start the IBM MQ Service at the end of installation if it was running at the start, or if this is a new installation.  Anything else. Start the Service at the end of the installation.  Ignored if the server feature is not installed.  If you do not start the IBM MQ Service, IBM MQ will not be operational and queue managers will not start. You must run the <a href="#">Prepare IBM MQ Wizard</a> for the service to be correctly configured.  This parameter is only valid if LAUNCHWIZ is set to no.
STARTTASKBAR	0 no  ""	0 or no. Do not start the IBM MQ taskbar application at the end of installation.  "" (the default). Start the IBM MQ taskbar application at the end of installation if it was running at the start, or if this is a new installation.  Anything else. Start the taskbar application at the end of the installation.  Ignored if the server feature is not installed.  This parameter is only valid if LAUNCHWIZ is set to no.
INSTALLATIONDESC	"Description of installation"	Sets the installation description from the command line. Subject to the documented installation description length limitations
INSTALLATIONNAME <sup>“1”</sup> on page 187	INSTALLATIONName	Sets the installation name from the command line. Subject to the documented installation name character and length limitations.
MAKEPRIMARY	0 1  ""	Makes the installation primary, if possible, or removes the primary flag. 1 = Make primary, 0 = Make non-primary, - use default algorithm

**Notes:**

1. For multiple installations, the **INSTALLATIONNAME** or **PGMFOLDER** must be supplied as an additional parameter on any non-interactive installation command. Supplying the **INSTALLATIONNAME** or

**PGMFOLDER** ensures that you do not work with the wrong installation in case you omit or incorrectly specify the **TRANSFORMS** parameter.

2. For a silent installation to succeed, the `AGREETOLICENSE="yes"` property must be defined either on the command line or in the response file.
3. For a new installation, the typical features that are installed by default, irrespective of the feature list provided in the **ADDLOCAL** property, include the following features. If they are NOT required, they must be added to the **REMOVE** list.
  - Server
  - MQ Explorer
  - Extended Messaging APIs (was Java and .NET Messaging and Web Services before IBM MQ 9.1.0)
  - Web Administration
  - Development Toolkit
  - Java Runtime Environment
4. When specifying which features to remove with the **REMOVE** parameter:
  - If you want to silently uninstall the Server feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying `REMOVE="Web, Server"`.
  - If you want to silently uninstall the Java Runtime Environment (JRE) feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying `REMOVE="Web, JRE"`.

## Procedure

1. Create a response file for installation in one of the following ways:
  - Copy and edit the file `Response.ini` that is supplied in the IBM MQ Windows Server install image, using an ASCII file editor.
  - Create your own response file using an ASCII file editor.
  - Use the **msiexec** command with the **SAVEINI** (and optionally, the **ONLYINI**) command line parameters to generate a response file that contains the same installation options as shown in the following example:

```
msiexec /i "path\IBM MQ.msi" /q SAVEINI="response_file"  
TRANSFORMS="1033.mst" AGREETOLICENSE="yes"
```

2. To run the **msiexec** command with a response file, specify the full path and file name of the response file with the **USEINI** parameter as shown in the following example:

```
msiexec /i "path\MSI\IBM  
MQ.msi" /! *v c:\install.log TRANSFORMS= "1033.mst" USEINI= "C:\MQ\Responsefile"
```

In the response file, all text is in English, and comments begin with a ; character.

## Example

The following example shows a typical response file:

```
[Response]  
PGMFOLDER="c:\mqm"  
DATAFOLDER="c:\mqm\data"  
LOGFOLDER="c:\mqm\log"  
AGREETOLICENSE="yes"  
LAUNCHWIZ=""  
WIZPARMFILE="d:\MQParms.ini"  
ADDLOCAL="Server,Client"  
REMOVE="Toolkit"
```

You can use the **MQParms** command to invoke installation or uninstallation of the IBM MQ server.

## Before you begin

The **MQParms** command can use parameters on a command line, or those specified in a parameter file. The parameter file is an ASCII text file that contains the parameter values that you want to set for the installation. The **MQParms** command takes the specified parameters and generates the corresponding **msiexec** command line.

This means that you can save all the parameters that you want to use with the **msiexec** command in a single file.

If you are running IBM MQ on Windows systems with User Account Control (UAC) enabled, you must invoke the installation with elevated privileges. If you are using the Command prompt or IBM MQ Explorer elevate privileges by using a right-click to start the program and selecting **Run as administrator**. If you try to run the MQParms program without using elevated privileges, the installation fails with an error of AMQ4353 in the installation log.

For silent operations, this must include the **/q** or **/qn** parameter, either on the command line, or in the [MSI] stanza of the parameter file. You must also set the AGREETOLICENSE parameter to "yes".

You can specify many more parameters in the parameter file that you use with the MQParms command than you can in the response file that you use directly with the **msiexec** command. Also, as well as parameters that the IBM MQ installation uses, you can specify parameters that can be used by the [Prepare IBM MQ Wizard](#).

If you do not complete the Prepare IBM MQ Wizard directly after IBM MQ installations or if for any reason your machine is rebooted between completing IBM MQ installation and completing the Prepare IBM MQ Wizard, ensure that the wizard is run with Administrator privilege afterward, otherwise the installation is incomplete, and might fail. You might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the wizard to continue

An example of the file MQParms.ini is supplied with IBM MQ. This file contains default installation parameters.

There are two ways to create a parameter file for installation:

- Copy and edit the file MQParms.ini that is supplied with the product, using an ASCII file editor.
- Create your own parameter file using an ASCII file editor.

## About this task

To invoke installation using the **MQParms** command:

### Procedure

1. From a command line, change to the root folder of the IBM MQ Server install image (that is, the location of the file MQParms.exe).
2. Enter the following command:

```
MQParms parameter_file parameters ]
```

where:

#### **parameter\_file**

is the file that contains the required parameter values. If this file is not in the same folder as MQParms.exe, specify the full path and file name. If you do not specify a parameter file, the default is MQParms.ini. For silent installation, the MQParms\_silent.ini parameter file can be used. For further details, see [“MQParms parameter file - server installation”](#) on page 190.

## parameters

are one or more command-line parameters, for a list of these, see the [MSDN Command-Line Options web page](#).

### Example

A typical example of an **MQParms** command is:

```
MQParms "c:\MyParamsFile.ini" /l*v c:\install.log
```

A typical example of an **MQParms** command when you are installing a second copy of IBM MQ is:

```
MQParms "c:\MyParamsFile.ini" /l*v c:\install.log TRANSFORMS=":InstanceId2.mst;1033.mst"  
MSINewInstance=1
```

Alternatively, TRANSFORMS and MSINewInstance can be specified in the MSI stanza of the parameter file.

If you specify a parameter both on the command line and in the parameter file, the setting on the command line takes precedence.

If you specify a parameter file, you might want to run the encryption utility before you use the **MQParms** command (see [“Encrypting a parameter file” on page 193](#)).

If you do not specify /i, /x, /a, or /j, **MQParms** defaults to standard installation using the IBM MQ Windows Installer package, IBM MQ.msi. That is, it generates the following part of the command line:

```
/i " current_folder \MSI\IBM MQ.msi"
```

If you do not specify a WIZPARMFILE parameter, **MQParms** defaults to the current parameter file. That is, it generates the following part of the command:

```
WIZPARMFILE=" current_folder \ current_parameter_file "
```

### **MQParms parameter file - server installation**

A parameter file is an ASCII text file that contains sections (stanzas) with parameters that can be used by the **MQParms** command. Typically, this is an initialization file such as MQParms.ini.

The **MQParms** command takes parameters from the following stanzas in the file:

#### [MSI]

Contains general properties related to how the **MQParms** command runs and to the installation of IBM MQ.

The properties that you can set in this stanza are listed in [“Installing the server using msiexec” on page 180](#), and [Table 26 on page 191](#).

#### [Services]

Contains properties related to IBM MQ account configuration, in particular, the user account required for IBM MQ Services. If you are installing IBM MQ on a network where the domain controller is on a Windows 2003 or later server, you probably need details of a special domain account. For more information, see [“Configuring IBM MQ with the Prepare IBM MQ Wizard” on page 195](#) and [“Creating and setting up Windows domain accounts for IBM MQ” on page 199](#).

The properties that you can set in this stanza are listed in [Table 28 on page 192](#).

**MQParms** ignores any other stanzas in the file.

The stanza parameters are in the form property=value, where property is always interpreted as uppercase, but value is case sensitive. If a value string includes a blank, it must be enclosed in double

quotation marks. Most other values can be enclosed in double quotation marks. Some properties can take more than one value, for example:

```
ADDLOCAL="Server,Client"
```

To clear a property, set its value to an empty string, for example:

```
REINSTALL=""
```

The following tables show the properties that you can set. The default is shown in bold.

For the [MSI] stanza, you can enter standard MSI command line options and properties. For example:

```
- /q
- ADDLOCAL="server"
- REBOOT=Suppress
```

Refer to [Table 26 on page 191](#), [Table 27 on page 192](#), and [Table 28 on page 192](#) for the properties used to install IBM MQ.

[Table 26 on page 191](#) shows additional properties in the stanza that affect how the MQPARMS command runs, but that do not affect the installation.

Property	Values	Description
MQPLOG	<i>path</i>   <i>file_name</i>	<b>MQParms</b> generates a text log file with the specified name and location.
MQPLANGUAGE	<b>system</b>  user  <i>transform_value</i>  existing	The installation language.  system. Install using the language of the default system locale (the default).  user. Install using the language of the default locale of the user.  <i>transform_value</i> . Install using the language specified by this value. See <a href="#">Table 27 on page 192</a> .  existing. If IBM MQ already exists on the system, the same language will be used by default, otherwise system is used.
MQPSMS	<b>0</b>  no	<b>0</b> or no. <b>MQParms</b> does not wait for the <b>msiexec</b> command to end (the default).  Any other value. <b>MQParms</b> waits for the <b>msiexec</b> command to end.
MQPINUSE	<b>0</b>  1	If MQPINUSE is set to <b>1</b> , <b>MQParms</b> continues installing even if IBM MQ files are in use. If this option is used a reboot will be required to complete the installation.

Table 27. Valid values for the MQPLANGUAGE property

Language	Valid values		
U.S. English	English	en_us	1033
German	German	de_de	1031
French	French	fr_fr	1036
Spanish	Spanish	es_es	1034
Italian	Italian	it_it	1040
Brazilian Portuguese	Brazilian Portuguese	pt_br	1046
Japanese	Japanese	ja_jp	1041
Korean	Korean	ko_kr	1042
Simplified Chinese	Simplified Chinese	zh_cn	2052
Traditional Chinese	Traditional Chinese	zh_tw	1028
Czech	Czech	cs_cz	1029
Russian	Russian	ru_ru	1049
Hungarian	Hungarian	hu_hu	1038
Polish	Polish	pl_pl	1045

For the [Services] stanza, you can enter parameters in property=value format. You might want to encrypt the values in this stanza. See [“Encrypting a parameter file”](#) on page 193.

Table 28. Properties used in the Services stanza

Property	Values	Description
USERTYPE	<b>local</b>   domain   onlydomain	<p>The type of user account to use:</p> <p><b>local</b> Creates a local user account.</p> <p><b>domain</b> Creates a local user account. If this does not have the required security authorities, it uses the domain user account specified by DOMAINNAME, USERNAME, and PASSWORD.</p> <p><b>onlydomain</b> Does not create a local user account, but immediately uses the domain user account specified by DOMAINNAME, USERNAME and PASSWORD. If any of these three properties are missing, a USERTYPE of local is assumed.</p> <p>The properties DOMAINNAME, USERNAME, and PASSWORD are required if USERTYPE is set to onlydomain.</p>
DOMAINNAME	<i>domain_name</i> <sup>1</sup>	<p>The domain for the domain user account.</p> <p>Required if USERTYPE is set to domain or onlydomain.</p>



Table 28. Properties used in the Services stanza (continued)

Property	Values	Description
USERNAME	<i>user_name</i> <sup>1</sup>	The user name for the domain user account. Required if USERTYPE is set to domain or onlydomain..
PASSWORD	<i>password</i> <sup>1</sup>	The password for the domain user account. Required if USERTYPE is set to domain or onlydomain.

1. Do not enclose this value in double quotation marks.

A typical example of a parameter file is:

```
[MSI]
MQPLANGUAGE=1033
MQPLOG=%temp%\MQParms.log
MQPSMS=no
ADDLOCAL=Server
/m miffile
REMOVE=""
/l*v c:\install.log

[Services]
USERTYPE=domain
DOMAINNAME=mqm*df349edfcab12
USERNAME=mqm*a087ed4b9e9c
PASSWORD=mqm*d7eba3463bd0a3
```

### Windows *Encrypting a parameter file*

If the DOMAINNAME, USERNAME, and PASSWORD values in the [Services] stanza of a parameter file are not already encrypted, you can encrypt them by running the setmqipw utility.

### About this task

Use the setmqipw utility to encrypt the DOMAINNAME, USERNAME, and PASSWORD values in the [Services] stanza of a parameter file, if they are not already encrypted. (These values might be encrypted if you have run the utility before.) setmqipw will also encrypt the QMGRPASSWORD and CLIENTPASSWORD values in the [SSLMigration] stanza of a parameter file.

This encryption means that, if you need a special domain account to configure IBM MQ (see [“Configuring IBM MQ with the Prepare IBM MQ Wizard”](#) on page 195 and [“Creating and setting up Windows domain accounts for IBM MQ”](#) on page 199), or you need to keep key database passwords secret, details are kept secure. Otherwise, these values, including the domain account password, flow across the network as clear text. You do not have to use this utility, but it is useful if security in your network is an issue.

To run the script:

### Procedure

1. From a command line, change to the folder that contains your parameter file.
2. Enter the following command:

```
CD_drive:\setmqipw
```

**Note:** You can run the command from a different folder, by entering the following command, where *parameter\_file* is the full path and file name of the parameter file:

```
CD_drive:\setmqipw parameter_file
```

## Results

If you view the resulting parameter file, the encrypted values start with the string `mqm*`. Do not use this prefix for any other values; passwords or names that begin with this prefix are not supported.

The utility creates a log file, `setmqipw.log`, in the current directory. This file contains messages related to the encryption process. When encryption is successful, messages are similar to:

```
Encryption complete
Configuration file closed
Processing complete
```

## What to do next

After you encrypt the parameter file, you can use it in the normal way with the `MQPARMS` command (see [“Installing the server using the MQPARMS command”](#) on page 189).

### **Checking for problems after installing**

There are some optional tasks that you can use to check the installation if you believe there was a problem, or to verify installation messages after an unattended (silent) installation for example.

## About this task

Use these steps as a guide to check the following files for messages:

## Procedure

1. Check `MSI nnnnn.LOG`. This file is in your user Temp folder. It is an application log that contains English messages written during installation. The log includes a message indicating whether the installation was successful and complete.

This file is created if you have set up default logging.

2. If you used the launchpad to install IBM MQ, check `MQv9_Install_YYYY-MM-DDTHH-MM-SS.log` in your user Temp folder, where:

### **YYYY**

This is the year that you installed IBM MQ

### **MM**

This is the month that you installed IBM MQ, for example this would be 09 if you installed in September

### **DD**

This is the day that you installed IBM MQ

### **HH-MM-SS**

This is the time at which IBM MQ was installed

You can get to your user Temp directory by entering the following command at the command prompt:

```
cd %TEMP%
```

3. Check `amqmjpse.txt`. This file is in the IBM MQ data files folder (default `C:\ProgramData\IBM\MQ`). It is an application log that contains English messages written during installation by the Prepare IBM MQ Wizard.

## What to do next

Verify your installation, as described in [“Verifying an IBM MQ installation on Windows”](#) on page 221.

### **Configuring user accounts for IBM MQ**

After installing IBM MQ server, you must configure the IBM MQ service before you can start any queue managers.

## About this task

When you install IBM MQ using the graphical user interface, you are guided through several screens that help you to apply the relevant options and settings. You use the Launchpad to check software requirements, specify network information, and then start the IBM MQ installation wizard and use it to install the software.

After the installation of IBM MQ completes, you can use the Prepare IBM MQ Wizard to configure IBM MQ before starting any queue managers.

If you are setting up IBM MQ for use with the Microsoft Cluster Service (MSCS), see [Supporting the Microsoft Cluster Service \(MSCS\)](#).

### **Configuring IBM MQ with the Prepare IBM MQ Wizard**

The Prepare IBM MQ Wizard helps you to configure IBM MQ with a user account for your network. You must run the wizard to configure the IBM MQ Service before you can start any queue managers.

## Before you begin

When IBM MQ is running, it must check that only authorized users can access queue managers or queues. Whenever any user attempts such access, IBM MQ uses its own local account to query information about the user.

Most networked Windows systems are members of a Windows domain where user accounts, other security principals, and security groups are maintained and managed by a directory service, Active Directory, running on a number of domain controllers. IBM MQ checks that only authorized users can access queue managers or queues.

In such networks, IBM MQ queue manager processes access the Active Directory information to find the security group membership of any users attempting to use IBM MQ resources. The accounts under which IBM MQ services run must be authorized to look up such information from the directory. In most Windows domains, local accounts defined at individual Windows servers cannot access directory information, so the IBM MQ services must run under a domain account that has the appropriate permission.

If the Windows server is not a member of a Windows domain or the domain has a reduced security or functional level, then the IBM MQ services can run under a local account that was created during installation.

If a special domain account is needed for your installation of IBM MQ, the Prepare IBM MQ Wizard asks you to enter details of this account (domain, user name, and password), so make sure that you have this information available before you start this task. Ask your domain administrator to set up an account, if one does not already exist, and provide you with the necessary details. For more information about configuring a domain account, see [“Creating and setting up Windows domain accounts for IBM MQ”](#) on page 199.

**Important:** If a domain account is needed and you install IBM MQ without a special account (or without entering its details), many or all parts of IBM MQ will not work, depending on the particular user accounts involved. Also, IBM MQ connections to queue managers that run under domain accounts on other systems might fail. The account can be changed by running the Prepare IBM MQ Wizard and specifying the details of the account to be used.

For information about the user rights required to take advantage of the Active Directory support, see [Local and domain user accounts for the IBM MQ Windows service](#).

For information about the user rights required to take advantage of the Kerberos authentication support, see [Securing](#).

## About this task

The Prepare IBM MQ Wizard window is displayed when the IBM MQ installation completes. You can also run the wizard at any time from the **Start** menu.

You can use the Prepare IBM MQ Wizard (AMQMJPSE.EXE) with the following parameters:

<i>Table 29. Startup parameters that can be used for the Prepare IBM MQ Wizard</i>			
<b>Parameter Name</b>	<b>Parameter description</b>	<b>How parameter is used</b>	<b>Default action if parameter not supplied</b>
-l <i>file</i>	Create log file	<p>The Prepare IBM MQ Wizard appends to a log file with the program actions and results.</p> <p>This parameter specifies the file name to use for this log. If the path is not provided, the IBM MQ Data directory is assumed. If the file name is not provided, amqmpjse.txt is assumed.</p>	Append to log file amqmpjse.txt in IBM MQ Data directory.
-r	Reset MQSeriesService user account	<p>When the Prepare IBM MQ Wizard is first run it creates a local user account MUSR_MQADMIN, with specific settings and permissions. The MQSeriesService component is configured to run under this account. Depending on the LAN configuration, the wizard might reconfigure the MQSeriesService component to run under a domain user account instead.</p> <p>When this parameter is specified, the local user account MUSR_MQADMIN is re-created with all the default settings and permissions. The MQSeriesService component is configured to run under this account.</p>	User account not reset.
-s	silent installation mode	Process silently. Nothing is displayed and there is no user input.	Not silent mode.
-p <i>file</i>	User parameters from file	<p>Load and use parameters from the parameter file. If the path is not provided, the IBM MQ Data directory is assumed. If the file name is not provided, AMQMJPSE.INI is assumed.</p> <p>The following stanzas are loaded:</p> <p>[Services] [SSLMigration]</p>	<p>When in silent mode, the parameter file AMQMJPSE.INI is loaded from IBM MQ Data directory.</p> <p>When not in silent mode, a parameter file is not used.</p>

Table 29. Startup parameters that can be used for the Prepare IBM MQ Wizard (continued)

Parameter Name	Parameter description	How parameter is used	Default action if parameter not supplied
-m <i>file</i>	Generate a Microsoft System Management Server (SMS) status .MIF file.	When the Prepare IBM MQ Wizard closes, generate a status .MIF file with the specified name. If the path is not provided, the Data directory is assumed. If the file name is not provided, AMQMJPSE.MIF is assumed.  The file ISMIF32.DLL (installed as part of SMS) must be in the path.  The InstallStatus field in the file will contain either Success or Failed.	.MIF file not created.

On Windows systems, you must carry out this task under a Windows administrator account, or domain administrator account in case your workstation is a member of a Windows domain.

On Windows systems with User Account Control (UAC) enabled, if you do not complete the Prepare IBM MQ Wizard directly after IBM MQ is installed, or if for any reason your machine is rebooted between completing IBM MQ installation and completing the Prepare IBM MQ Wizard, you must accept the Windows prompt when it appears to allow the wizard to run as elevated.

## Procedure

- When the IBM MQ installation completes, the Prepare IBM MQ Wizard window is displayed with a welcome message.  
To continue, click **Next**.
- If you have run the Prepare IBM MQ Wizard before, this step is skipped. Otherwise, the Prepare IBM MQ Wizard window displays a progress bar with the following message:  
Status: Setting up IBM MQ Configuration  
Wait until the progress bar completes.
- The Prepare IBM MQ Wizard window displays a progress bar with the following message:  
Status: Setting up the IBM MQ Service.  
Wait until the progress bar completes.
- IBM MQ attempts to detect whether you must configure IBM MQ for use with Windows Active Directory Server or Windows domain users. Depending on the results of the detection, IBM MQ does one of the following things:
  - If IBM MQ detects that you need to configure IBM MQ for Windows Active Directory Server or Windows domain users, the Prepare IBM MQ Wizard window displays a message that starts:  
  
IBM MQ does not have the authority to query information about your user account  
  
Click **Next**, and go to step [5](#).
  - If you are not installing on a Windows Active Directory Server or Windows domain server and IBM MQ cannot detect whether you need to configure IBM MQ for Windows Active Directory Server or Windows domain users, the Prepare IBM MQ Wizard window displays the following message:  
  
Are any of the domain controllers in your network running Windows 2000 or later domain server?  
  
If you select Yes, click **Next**, then go to step [5](#).  
If you select No, click **Next**, then go to step [9](#).

If you select **Don't know**, you cannot continue. Select one of the other options, or click **Cancel** and contact your domain administrator.

- If IBM MQ detects that you do not need to configure IBM MQ for Windows Active Directory Server or Windows domain users, go to step 9.

5. The Prepare IBM MQ Wizard window displays the following message:

Do you need to configure IBM MQ for users defined on Windows 2000 or later domain controllers?

If you select Yes, click **Next**, then go to step 6.

If you select No, click **Next**, then go to step 9.

If you select Don't know, you cannot continue. Select one of the other options, or click **Cancel** and contact your domain administrator. For more information about domain accounts, see [“Creating and setting up Windows domain accounts for IBM MQ” on page 199](#).

6. Give the domain user that you obtained from your domain administrator the access to run as a service.

- a) Click **Start > Run...**, type the command **secpol.msc** and click **OK**.
- b) Open **Security Settings > Local Policies > User Rights Assignments**. In the list of policies, right-click **Log on as a service > Properties**.
- c) Click **Add User or Group...** and type the name of the user you obtained from your domain administrator, then click **Check Names**
- d) If prompted by a Windows Security window, type the user name and password of an account user or administrator with sufficient authority, and click **OK > Apply > OK**. Close the Local Security Policy window.

7. In the next window, enter the Domain and user ID of the domain user account that you obtained from your domain administrator. Either enter the Password for this account, or select the option **This account does not have a password**. Click **Next**.

8. The Prepare IBM MQ Wizard window displays a progress bar with the following message:

Status: Configuring IBM MQ with the special domain user account

Wait until the progress bar completes. If there are any problems with the domain user account, a further window is displayed. Follow the advice on this window before you continue with this procedure.

9. The Prepare IBM MQ Wizard window displays a progress bar with the following message:

Status: Starting IBM MQ services

Wait until the progress bar completes.

10. Next, select the options that you require.

The Prepare IBM MQ Wizard window displays the following message:

You have completed the Prepare IBM MQ Wizard

Select the options that you require, then click **Finish**. Select one or more from the following list:

- **Remove the shortcut to this wizard from the desktop**

This option is available only if you have previously attempted installation, but you canceled the procedure from the Prepare IBM MQ Wizard and you created a desktop shortcut to this wizard. Select this option to remove the shortcut. You do not need it now that you have completed the Prepare IBM MQ Wizard.

- **Launch IBM MQ Explorer**

The IBM MQ Explorer allows you to view and administer your IBM MQ network. You can use the items in the Welcome to IBM MQ Explorer **Content** view page to explore the facilities in IBM MQ. This page is launched the first time that the IBM MQ Explorer is launched. The Welcome page can be viewed at any time from the IBM MQ Explorer by clicking **IBM MQ** in the **Navigator** view.

- **Launch Notepad to view the release notes**

The release notes contain information about installing IBM MQ and also late-breaking news that is available after the published documentation is produced.

## What to do next

Optionally, follow the procedure described in [Checking for problems after installing](#).

For information on how to verify an installation, see [Verifying an IBM MQ installation on Windows](#).

### Related concepts

[User rights required for an IBM MQ Windows Service](#)

### Related tasks

**Windows** [Creating and setting up Windows domain accounts for IBM MQ](#)

This information is for Domain Administrators. Use this information to create and set up a special domain account for the IBM MQ service. Do this if IBM MQ is to be installed on a Windows domain where local accounts do not have the authority to query the group membership of the domain user accounts.

**Windows** [Creating and setting up Windows domain accounts for IBM MQ](#)

This information is for Domain Administrators. Use this information to create and set up a special domain account for the IBM MQ service. Do this if IBM MQ is to be installed on a Windows domain where local accounts do not have the authority to query the group membership of the domain user accounts.

## About this task

After you add a local user to the mqm group, that user can administer IBM MQ on the system. This task describes how to do the same using Windows domain user IDs.

There is an IBM MQ component for checking Windows privileges. This component runs as a Windows service under a local user account created by IBM MQ at installation. This component checks that the account under which the IBM MQ services are run has the following privileges:

- The account has the ability to query group memberships of domain accounts.
- The account has the authority to administer IBM MQ.

If the account does not have the ability to query group memberships, the access checks made by the services fail.

Windows domain controllers running Windows Active Directory can be set up so that local accounts do not have the authority to query the group membership of the domain user accounts. This prevents IBM MQ from completing its checks, and access fails. If you are using Windows on a domain controller that has been set up in this way, you must instead use a special domain user account with the required permissions.

Each installation of IBM MQ on the network must be configured to run its service under a domain user account that has the required authority to check that users who are defined on the domains are authorized to access queue managers or queues. Typically, this special account has the IBM MQ administrator rights through membership of the domain group DOMAIN\Domain mqm. The domain group is automatically nested by the installation program under the local mqm group of the system on which IBM MQ is being installed.

### Important:

1. By default, Windows 10 version 1607 or later, and Windows Server 2016 or later, are more restrictive than earlier versions of Windows. These later versions restrict clients allowed to make remote calls to the Security Accounts Manager (SAM), and could prevent IBM MQ queue managers from starting. Access to SAM is critical for the functioning of IBM MQ when IBM MQ is configured as a domain account.
2. The IBM MQ installer must be given the user ID and password details of the special domain user account. The installer can then use this information to configure the IBM MQ service after the product



is installed. If an installer continues and configures IBM MQ without a special account, many or all parts of IBM MQ will not work, depending upon the particular user accounts involved, as follows:

- IBM MQ connections to queue managers running under Windows domain accounts on other computers might fail.
- Typical errors include AMQ8066: Local mqm group not found and AMQ8079: Access was denied when attempting to retrieve group membership information for user 'abc@xyz'.

You must repeat steps “1” on page 200 and “8” on page 201 of the following procedure for each domain that has user names that will administer IBM MQ. This creates an account for IBM MQ on each domain.

## Procedure

**Create a domain group with a special name that is known to IBM MQ (see “4” on page 200) and give members of this group the authority to query the group membership of any account.**

1. Log on to the domain controller as an account with domain administrator authority.
2. From the Start menu, open Active Directory Users and Computers.
3. Find the domain name in the navigation pane, right-click it and select **New Group**.
4. Type a group name into the **Group name** field.

**Note:** The preferred group name is Domain mqm. Type it exactly as shown.

- Calling the group Domain mqm modifies the behavior of the Prepare IBM MQ Wizard on a domain workstation or server. It causes the Prepare IBM MQ Wizard automatically to add the group Domain mqm to the local mqm group on each new installation of IBM MQ in the domain.
  - You can install workstations or servers in a domain with no Domain mqm global group. If you do so, you must define a group with the same properties as Domain mqm group. You must make that group, or the users that are members of it, members of the local mqm group wherever IBM MQ is installed in a domain. You can place domain users into multiple groups. Create multiple domain groups, each group corresponding to a set of installations that you want to manage separately. Split domain users, according to the installations they manage, into different domain groups. Add each domain group or groups to the local mqm group of different IBM MQ installations. Only domain users in the domain groups that are members of a specific local mqm group can create, administer, and run queue managers for that installation.
  - The domain user that you nominate when installing IBM MQ on a workstation or server in a domain must be a member of the Domain mqm group, or of an alternative group you defined with same properties as the Domain mqm group.
5. Leave **Global** clicked as the **Group scope**, or change it to **Universal**. Leave **Security** clicked as the **Group type**. Click **OK**.
  6. Follow these steps to assign permissions to the group based on the Windows version of the domain controller:

On Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Windows Server 2019, and Windows Server 2022:

    - a. In the Server Manager, click **Tools** then select **Active Directory Users and Computers** from the list box.
    - b. Select **View > Advanced Features**.
    - c. Expand your domain name, then click **Users**.
    - d. In the **Users** window, right-click **Domain mqm > Properties**.
    - e. On the **Security** tab, click **Advanced > Add...**
    - f. Click **Select principle**, then type Domain mqm and click **Check names > OK**.

The **Name** field is prefilled with the string Domain mqm (*domain name*\Domain mqm).
    - g. In the **Applies to** list, select **Descendant User Objects**.



- h. In the **Permissions** list, select the **Read group membership** and **Read groupMembershipSAM** check boxes.
- i. Click **OK > Apply > OK > OK**.

On Windows Server 2008 and Windows 2008 R2:

- a. In the Server Manager navigation tree, click **Users**.
- b. In the Server Manager action bar, click **View > Advanced features**.
- c. In the **Users** window, right-click **Domain mqm > Properties**.
- d. On the **Security** tab, click **Advanced > Add**, then type Domain mqm and click **Check names > OK**.  
The **Name** field is prefilled with the string Domain mqm (*domain name\*Domain mqm)
- e. Click **Properties**. In the **Apply to** list, select **Descendant User Objects**.
- f. In the **Permissions** list, select the **Read group membership** and **Read groupMembershipSAM** check boxes.
- g. Click **OK > Apply > OK > OK**.

#### **Create one or more accounts, and add them to the group.**

7. Open **Active Directory Users and Computers**.
8. Create one or more user accounts with names of your choosing.

In the **Server Manager** navigation tree, right click **Users** to create a new user account.

9. Add each new account to the group Domain mqm or a group that is a member of the local mqm group.



**Attention:** You cannot use a user domain named mqm on Windows.

#### **Create an account for IBM MQ on each domain.**

10. Repeat step sections [“1” on page 200](#) and [“8” on page 201](#) for each domain that has user names that will administer IBM MQ.

#### **Use the accounts to configure each installation of IBM MQ.**

11. Either use the same domain user account (as created in Step [“1” on page 200](#)) for each installation of IBM MQ, or create a separate account for each one, adding each to the Domain mqm group (or a group that is a member of the local mqm group).
12. When you have created the account or accounts, give one to each person configuring an installation of IBM MQ. They must enter the account details (domain name, user name, and password) into the Prepare IBM MQ Wizard. Give them the account that exists on the same domain as their installing userid.
13. When you install IBM MQ on any system on the domain, the IBM MQ installation program detects the existence of the Domain mqm group on the LAN, and automatically adds it to the local mqm group. (The local mqm group is created during installation; all user accounts in it have authority to manage IBM MQ). Thus all members of the "Domain mqm" group will have authority to manage IBM MQ on this system.
14. However, you do still need to provide a domain user account (as created in Step [“1” on page 200](#)) for each installation, and configure IBM MQ to use it when making its queries. The account details must be entered into the Prepare IBM MQ Wizard that runs automatically at the end of installation (the wizard can also be run at any time from the **start** menu).

#### **Set the password expiry periods.**

15. Choices:
  - If you use just one account for all users of IBM MQ, consider making the password of the account never expire, otherwise all instances of IBM MQ will stop working at the same time when the password expires.
  - If you give each user of IBM MQ their own user account you will have more user accounts to create and manage, but only one instance of IBM MQ will stop working at a time when the password expires.

If you set the password to expire, warn the users that they will see a message from IBM MQ each time it expires - the message warns that the password has expired, and describes how to reset it.

### Use a Windows domain account as the user ID for the IBM MQ service.

16. Click **Start > Run...**

Type the command `secpol.msc` then click **OK**.

17. Open **Security Settings > Local Policies > User Rights Assignments**.

In the list of policies, right-click **Log on as a service > Properties**.

18. Click **Add User or Group...**

Type the name of the user you obtained from your domain administrator, and click **Check Names**.

19. If prompted by a Windows Security window, type the user name and password of an account user or administrator with sufficient authority, then click **OK > Apply > OK**.

Close the Local Security Policy window.

**Note:** User Account Control (UAC) is enabled by default. The UAC feature restricts the actions users can perform on certain operating system facilities, even if they are members of the Administrators group. You must take appropriate steps to overcome this restriction.

### Related tasks

**Windows** [Configuring IBM MQ with the Prepare IBM MQ Wizard](#)

The Prepare IBM MQ Wizard helps you to configure IBM MQ with a user account for your network. You must run the wizard to configure the IBM MQ Service before you can start any queue managers.

**Windows** [Modifying a server installation](#)

You can modify an IBM MQ server installation interactively using the launchpad or non-interactively using `msiexec`.

### Related tasks

[“Modifying a server installation using the Installation Launchpad” on page 202](#)

You can interactively remove or install IBM MQ features on Windows by using IBM MQ Installation Launchpad.

[“Modifying a server installation silently using msiexec” on page 203](#)

You can silently remove or install IBM MQ features on Windows by using `msiexec`.

**Windows** [Modifying a server installation using the Installation Launchpad](#)

You can interactively remove or install IBM MQ features on Windows by using IBM MQ Installation Launchpad.

## Before you begin

To modify an installation, some features of IBM MQ must already be installed.

## About this task

To use the IBM MQ Installation Launchpad to remove or install IBM MQ features, you download the installation image for your version of IBM MQ then run the `Setup.exe` program.

## Procedure

1. Download the compressed file that contains the installation image, then uncompress it into a temporary directory.
2. Navigate to that directory, then double-click **Setup.exe** to start the installation process.

The **IBM MQ Installation Launchpad** window is displayed.

3. Click the **IBM MQ Installation** option.
4. Click **Launch IBM MQ Installer**. Wait until the IBM MQ Setup window is displayed with a welcome message.

5. If you have multiple installations on your system, you must choose the installation you want to modify. Do this by selecting the **Maintain or upgrade an existing instance** option and choosing the appropriate instance.
6. Click **Next** to continue. The Program Maintenance panel is displayed.
7. Select **Modify**, then click **Next**.  
The Features panel is displayed.
8. Click the **+** symbol next to a feature to show any dependent features (subfeatures).
9. To change the installation of a feature:
  - a) Click the symbol next to the feature name to display a menu.
  - b) Select the required option from:
    - Install this feature
    - Install this feature and all its subfeatures (if any)
    - Do not install this feature (remove if already installed)

The symbol next to the feature name changes to show the current installation option.
10. Stop the web server before removing the web feature.  
If you do not do this, you receive an error message.
11. When your selections are complete, click **Next**. IBM MQ installation begins.

## What to do next

After modifying the installation, you might need to run **setmqenv** again as described in *What to do next* in [“Installing IBM MQ server on Windows” on page 177](#).

**Windows** *Modifying a server installation silently using msixexec*

You can silently remove or install IBM MQ features on Windows by using **msixexec**.

## About this task

You can silently modify an installation by using the **msixexec** command with the **ADDLOCAL** and **REMOVE** parameters.

## Procedure

- To silently modify an installation using **msixexec**, set the **ADDLOCAL** parameter to include the features you want to add, and set the **REMOVE** parameter to the features you want to remove.

For example, if you use `ADDLOCAL="JavaMsg"` and `REMOVE=""` it modifies the installation to include the Extended Messaging and APIs (JavaMsg) feature but does not remove any currently installed features.

```
msixexec /i {product code} /q ADDLOCAL="JavaMsg" REMOVE="" INSTALLATIONNAME="Installation1"
```

where *product\_code* is the value shown for MSIProdCode in the output of the following command:

```
dspmqinst -n installation_name
```

An example of a product code is `{0730749B-080D-4A2E-B63D-85CF09AE0EF0}`.

**Important:** When specifying which features to remove with the **REMOVE** parameter:

- If you want to silently uninstall the Server feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying `REMOVE="Web, Server"`.

- If you want to silently uninstall the Java Runtime Environment (JRE) feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying REMOVE="Web , JRE".

### Related concepts

[“IBM MQ features for Windows systems” on page 159](#)

You can select the features that you require when you install IBM MQ.

### Related tasks

[“Installing the server using msiexec” on page 180](#)

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

[“Uninstalling IBM MQ using msiexec” on page 234](#)

You can uninstall IBM MQ by running the **msiexec** command from the command line to remove all currently installed features, or selected features.

## Installing an IBM MQ client on Windows

This topic describes how to install IBM MQ client on Windows systems. This procedure can be used for installing a first or a subsequent installation.

### Before you begin

To install an IBM MQ client, you must be logged on to Windows as an administrator.

### About this task

Follow these instructions to perform an interactive compact, typical, or custom installation of IBM MQ. To view all the installation types and the features that are installed with each option consult [Features installed with each type of interactive installation](#).



**Attention:** If you are using **msiexec** to install the client, the installation is automatically set to be the primary installation.

### Procedure

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate Setup .exe in the Windows directory of the IBM MQ installation image.

- From a network location, this location might be `m:\instmq\Windows\Setup.exe`
- From a local file system directory, this location might be `C:\instmq\Windows\Setup.exe`

3. Start the installation process.

Either run Setup .exe from a command prompt, or double-click Setup .exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

4. Follow the instructions on screen.

### Results

A new sample IBM MQ MQI client configuration file is created in the IBM MQ installation directory (for example `C:\Program Files\IBM\MQ\`), by the IBM MQ MQI client package, during installation, but only

if this file does not exist. This file contains the `ClientExitPath` stanza. An example `mqclient.ini` file is shown in [IBM MQ MQI client configuration file, mqclient.ini](#).

**Note:**

If you are using a common configuration file for multiple clients, either in the IBM MQ installation directory or in another location using the `MQCLNTCF` environment variable, you must grant read access to all user identifiers under which the IBM MQ client applications run. If the file cannot be read, the failure is traced and the search logic continues as if the file had not existed.

## What to do next

- If you have chosen this installation to be the primary installation on the system, when using `setup.exe`, you must now set it as the primary installation. Enter the following command at the command prompt:

```
MQ_INSTALLATION_PATH\bin\setmqinst -i -p MQ_INSTALLATION_PATH
```

You can have only one primary installation on a system. If there is already a primary installation on the system, you must unset it before you can set another installation as the primary installation. For more information, see [Changing the primary installation](#).

- You might want to set up the environment to work with this installation. You can use the `setmqenv` or `crtmqenv` command to set various environment variables for a particular installation of IBM MQ. For more information, see [setmqenv](#) and [crtmqenv](#).
- For instructions on how to verify your installation, see [“Testing communication between a client and a server on Windows”](#) on page 230.

### Related concepts

[“Modifying a client installation using Add/Remove Programs”](#) on page 216

On some versions of Windows, you can modify an installation by using Add/Remove Programs.

### Related tasks

[“Installing a client using msixec”](#) on page 205

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

[“Installing a client using the MQParms command”](#) on page 212

You can use the `MQParms` command to invoke installation or uninstallation of an IBM MQ client.

[“Uninstalling IBM MQ on Windows”](#) on page 231

You can uninstall the IBM MQ MQI clients and servers on Windows systems by using the control panel, the command line (`msiexec`), `MQParms`, or by using the installation media, in which case you can optionally remove queue managers as well.

## **Installing a client using msiexec**

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

### About this task

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation. An interactive installation displays panels and ask questions.

The `msiexec` command uses parameters to give MSI some or all of the information that can also be specified through panels during an interactive installation. This means that a user can create a reusable automated or semi-automated installation configuration. Parameters can be given through the command line, a transform file, a response file, or a combination of the three.

Some parameters can only be provided on the command line and not in a response file. For more information about these parameters, see [Table 30 on page 208 in “Specifying command line parameters for client installation with msiexec” on page 207.](#)

There are also a number of parameters can be used either on the command line or in a response file. For more information about these parameters, see [Table 32 on page 210 in “Creating and using a response file for client installation” on page 210.](#) If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.

## Procedure

1. For multiple silent installations, for each version that is to be installed, find an MSI instance ID that is available to use for that installation.  
For more information, see [“Choosing MSI Instance IDs for multiple server installations” on page 181.](#)
2. To install using **msiexec**, at the command line, enter the **msiexec** command in the following format:

```
msiexec parameters [USEINI="response-file"] [TRANSFORMS="transform_file"]
```

where:

### **parameters**

are either command line parameters preceded by a / character, or property=value pairs (if using both forms of parameter always put the command-line parameters first). For further information, see [“Specifying command line parameters for client installation with msiexec” on page 207.](#)

For an unattended installation, you must include the **/q** or **/qn** parameter in the command line. Without this parameter, the installation is interactive.

**Note:** You must include the **/i** parameter and the file location of the IBM MQ installer package.

### **response-file**

is the full path and file name of the file that contains the [Response] stanza and the required property=value pairs, for example C:\MyResponseFile.ini. An example response file, Response.ini, is supplied with IBM MQ. This file contains default installation parameters. For further information, see [“Creating and using a response file for client installation” on page 210.](#)

### **transform\_file**

is the full path and file name of a transform file. For further information, see [“Using transforms with msiexec for client installation” on page 209](#) and [“Choosing MSI Instance IDs for multiple server installations” on page 181.](#)

**Note:** For a silent installation to succeed, the AGREETOLICENSE="yes" property must be defined either on the command line or in the response file.

## Results

After the command has been entered, the command prompt immediately reappears. IBM MQ is installing as a background process. If you have entered parameters to produce a log, check this file to see how the installation is progressing. If the installation completes successfully, you see the message `Installation operation completed successfully` in the log file.

### **Windows** *Choosing MSI Instance IDs for multiple client installations*

For multiple silent installations, for each version that is installed you must find an MSI instance ID that is available to use for that installation.

## About this task

In order to support silent, or non-interactive, multiple installations, you need to find out whether the instance ID you want to use is already in use or not and choose the appropriate one. For each installation media (for example, each client and server), Instance ID 1 is the default ID which is used for single installations. If you want to install alongside Instance ID 1 you need to specify which instance you want

to use. If you have already installed instance 1, 2, and 3 then you need to find out what the next available instance is, for instance, Instance ID 4. Similarly, if instance 2 has been removed, you need to find out that there is a gap that can be reused. You can find out which Instance ID is currently in use by using the **dspmqinst** command.

## Procedure

1. Type **dspmqinst** to find a free MSI Instance in the media being installed by reviewing the MSIMedia and MSIInstanceId values for the versions already installed. For example:

```
InstName: Installation1
InstDesc:
Identifier: 1
InstPath: C:\Program Files\IBM\MQ
Version: 9.0.0.0
Primary: Yes
State: Available
MSIProdCode: {74F6B169-7CE6-4EFB-8A03-2AA7B2DBB57C}
MSIMedia: 9.0 Server
MSIInstanceId: 1
```

2. If MSI Instance ID 1 is in use and you want to use MSI Instance ID 2, the following parameters must be added to the msiexec call:

```
MSINewInstance=1 TRANSFORMS=":instanceId7.mst;1033.mst"
```

## What to do next

For multiple installations, the **INSTALLATIONNAME** or **PGMFOLDER** must be supplied as an additional parameter on any non-interactive installation command. Supplying the **INSTALLATIONNAME** or **PGMFOLDER** ensures that you do not work with the wrong installation in case you omit or incorrectly specify the **TRANSFORMS** parameter.

**Windows** *Specifying command line parameters for client installation with msiexec*

You can specify either standard **msiexec** command line parameters preceded by a / character, or property=value pairs, or a combination of both.

## About this task

The **msiexec** command can accept the following types of parameters on the command line:

### Standard command line parameters, preceded by a / character

For more information about the **msiexec** command line parameters, see the [MSDN Command-Line Options web page](#).

For an unattended installation, you must include the **/q** or **/qn** parameter in the command line. Without this parameter, the installation is interactive.

**Note:** You must include the **/i** parameter and the file location of the IBM MQ installer package.

### Property=value pair parameters on the command line

All the parameters that are available for use in a response file can be used on the command line. For more information about these parameters, see [Table 32 on page 210](#) in “[Creating and using a response file for client installation](#)” on page 210.

There are some extra property=value pair parameters, shown in the following table that are only for use on the command line:

<i>Table 30. Parameters that can be used on the command line only (msiexec property=value parameters)</i>		
<b>Property</b>	<b>Values</b>	<b>Meaning</b>
USEINI	<i>path \ file_name</i>	Use the specified response file. See “Creating and using a response file for client installation” on page 210
SAVEINI	<i>path \ file_name</i>	Generate a response file during installation. The file contains those parameters selected for this installation that a user might make during an interactive installation.
ONLYINI	1 yes  ""	1, yes or any value other than null. End the installation before updating the target system, but after generating a response file, if this is specified.  "". Continue the installation and update the target system (the default).
TRANSFORMS	:InstanceId x.mst  <i>path \ file_name</i>   :InstanceId x.mst; <i>path \ file_name</i>	The :InstanceId x.mst value is only required for a subsequent installation of IBM MQ. The <i>path \ file_name</i> specifies what transform (.mst) files must be applied to the product. For example, "1033.mst" specifies the supplied U.S. English transform file.
MSINewInstanCE	1	This property is only required for subsequent installations of IBM MQ.
REMOVEFEATURES	yes	Required with value "yes" for a silent installation, otherwise ignored. Allows obsolete features, no longer part of IBM MQ, to be deleted.

When using the property=value pair parameters note that:

- Property strings must be in uppercase.
- Value strings are not case-sensitive, except for feature names. You can enclose value strings in double quotation marks. If a value string includes a blank, enclose the blank value string in double quotation marks.
- For a property that can take more than one value, use the format:

```
ADDLOCAL="Server,Client"
```

- For properties taking paths and file names, for example **PGMFOLDER**, you must supply the paths as absolute paths and not relative; that is, C:\folder\file and not .\folder\file.

When using property=value pair and command line parameters with the **msiexec** command, enter command line parameters first.

If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.



## Procedure

- For a single installation of IBM MQ, specify the **msiexec** command as shown in the following typical example.

```
msiexec /i "path\MSI\IBM MQ.msi" /l*v c:\install.log  
/q TRANSFORMS="1033.mst" AGREETOLICENSE="yes" ADDLOCAL="Client"
```

- If you are installing a second copy of IBM MQ, specify the **msiexec** command as shown in the following typical example.

```
msiexec /i "path\MSI\IBM MQ.msi" /l*v c:\install.log  
/q TRANSFORMS=":InstanceId2.mst;1033.mst" AGREETOLICENSE="yes"  
ADDLOCAL="Client" MSINewInstance=1
```

### *Using transforms with msiexec for client installation*

MSI can use transforms to modify an installation. During IBM MQ installation, transforms can be used to support different national languages.

## About this task

IBM MQ is supplied with transform files in the \MSI folder of the client image. These files are also embedded in the IBM MQ Windows installer package, IBM MQ.msi.

Table 31 on page 209 shows the locale identifier, language, and the transform file name to use in the **msiexec** command line.

Language	Transform File name	Value
U.S. English	1033.mst	1033
German	1031.mst	1031
French	1036.mst	1036
Spanish	1034.mst	1034
Italian	1040.mst	1040
Brazilian Portuguese	1046.mst	1046
Japanese	1041.mst	1041
Korean	1042.mst	1042
Simplified Chinese	2052.mst	2052
Traditional Chinese	1028.mst	1028
Czech	1029.mst	1029
Russian	1049.mst	1049
Hungarian	1038.mst	1038
Polish	1045.mst	1045

You can also specify the required language by using the MQLANGUAGE property with the **MQParms** command. For information about the msiexec property=value parameters, see [“MQParms parameter file - client installation”](#) on page 214.

## Procedure

On the **msiexec** command line, you can specify the required language by using the **TRANSFORMS** property in a property=value pair as shown in the following example:

```
TRANSFORMS="1033.mst"
```

The quotation marks surrounding the value are optional.

You can also specify the full path and file name of the transform file. Again, the quotation marks surrounding the value are optional. For example:

```
TRANSFORMS="D:\Msi\1033.mst"
```

Table 31 on page 209 shows the locale identifier, language, and the transform file name to use in the **msiexec** command line.

You might need to merge transforms to install multiple installations of the same version, for example:

```
TRANSFORMS=":InstanceId2.mst;D:\Msi\1033.mst"
```

### *Creating and using a response file for client installation*

You can use the **msiexec** command with a parameter that specifies additional properties that are defined in a response file. There are three ways of creating a response file for a client installation.

## About this task

A response file is an ASCII text file, with a format like a Windows `.ini` file, that contains the stanza [Response]. The [Response] stanza contains some or all the parameters that would normally be specified as part of an interactive installation. The parameters are given in a property=value pair format. Any other stanzas in the response file are ignored by **msiexec**.

An example response file, `Response.ini`, is supplied with IBM MQ. It contains the default installation parameters.

You can combine the use of a response file with the **msiexec** command line parameters described in [“Specifying command line parameters for client installation with msiexec”](#) on page 207.

Table 32 on page 210 shows the parameters that are available for use in a response file. These parameters can also be used on the command line. If a parameter is specified both on the command line and in a response file, the setting on the command line takes precedence.

Property	Values	Meaning
PGMFOLDER <a href="#">“1” on page 212</a>	<i>path</i>	Folder for the IBM MQ program files. For example, <code>c:\mqm</code> .
DATFOLDER	<i>path</i>	Folder for the IBM MQ data files. For example, <code>c:\mqm\data</code> .

Table 32. Parameters that can be used in a response file (continued)

Property	Values	Meaning
USERCHOICE	0 no	<p>If the command line or response file specifies parameters to install features, a dialog can be displayed to prompt you to accept the preselected options, or review and possibly change them.</p> <p>0 or no. Suppresses display of the dialog.</p> <p>Anything else. Dialog is displayed and you can amend the options.</p> <p>Not used for a silent installation.</p>
AGREETOLICENSE <a href="#">“2” on page 212</a>	yes	<p>Accept the terms of the license. Set to yes before a silent installation.</p> <p>If the installation is not silent, this parameter is ignored.</p>
ADDLOCAL	<i>feature, feature, All  ""</i>	<p>A comma-separated list of features to install locally. For a list of valid feature names, see <a href="#">“IBM MQ features for Windows systems” on page 159</a>.</p> <p>All installs all features</p> <p>"" installs the typical features. If you do not want a feature use REMOVE="<i>feature</i>"</p> <p><b>Note:</b> If this is a new installation the typical features (Client, Java, .NET Messaging, and Development Toolkit) are installed by default irrespective of the feature list provided in the ADDLOCAL property. If you do not want a feature use REMOVE="<i>feature</i>"</p>
REMOVE	<i>feature, feature,  All  ""</i>	<p>A comma-separated list of features to remove. For a list of valid feature names, see <a href="#">“IBM MQ features for Windows systems” on page 159</a>.</p> <p>All uninstalls all features</p> <p>"" uninstalls no features (the default).</p>
INSTALLATIONDESC	"Description of installation"	Sets the installation description from the command line. Subject to the documented installation description length limitations
INSTALLATIONNAME <a href="#">“1” on page 212</a>	[INSTALLATION0,]Name	Sets the installation name from the command line. Subject to the documented installation name character and length limitations.
MAKEPRIMARY	0 1  ""	<p>Makes the installation primary, if possible, or removes the primary flag. 1 = Make primary, 0 = Make non-primary, - use default algorithm</p> <p><b>Note:</b> This option is ignored if another IBM MQ installation is present and set as the primary.</p>

**Notes:**

1. For multiple installations, the **INSTALLATIONNAME** or **PGMFOLDER** must be supplied as an additional parameter on any non-interactive installation command. Supplying the **INSTALLATIONNAME** or **PGMFOLDER** ensures that you do not work with the wrong installation in case you omit or incorrectly specify the **TRANSFORMS** parameter.
2. For a silent installation to succeed, the **AGREETOLICENSE="yes"** property must be defined either on the command line or in the response file.

## Procedure

1. Create a response file for installation in one of the following ways:
  - Copy and edit the file `Response.ini` that is supplied on the IBM MQ Windows Server install image, using an ASCII file editor.
  - Create your own response file using an ASCII file editor.
  - Use the **msiexec** command with the **SAVEINI** (and optionally, the **ONLYINI**) command line parameters to generate a response file that contains the same installation options as shown in the following example:

```
msiexec /i "path\IBM MQ.msi" /q SAVEINI="response_file"  
TRANSFORMS="1033.mst" AGREETOLICENSE="yes"
```

2. To run the **msiexec** command with a response file, specify the full path and file name of the response file with the **USEINI** parameter as shown in the following example:

```
msiexec /i "path\MSI\IBM MQ.msi" /l*v c:\install.log  
TRANSFORMS="1033.mst" USEINI="C:\MQ\Responsefile"
```

In the response file, all text is in English, and comments begin with a ; character.

## Example

The following example shows a typical response file:

```
[Response]  
PGMFOLDER="c:\mqm"  
DATFOLDER="c:\mqm\data"  
AGREETOLICENSE="yes"  
ADDLOCAL="Client"  
REMOVE="Toolkit"
```

### *Installing a client using the MQParms command*

You can use the **MQParms** command to invoke installation or uninstallation of an IBM MQ client.

## Before you begin

The **MQParms** command can use parameters on a command line, or those specified in a parameter file. The parameter file is an ASCII text file that contains the parameter values that you want to set for the installation. The **MQParms** command takes the specified parameters and generates the corresponding **msiexec** command line.

This means that you can save all the parameters that you want to use with the **msiexec** command in a single file.

If you are running IBM MQ on Windows systems with User Account Control (UAC) enabled, you must invoke the installation with elevated privileges. If you are using the Command prompt or IBM MQ Explorer elevate privileges by using a right-click to start the program and selecting **Run as administrator**. If you try to run the **MQParms** program without using elevated privileges, the installation fails with an error of AMQ4353 in the installation log.

For silent operations, this must include the **/q** or **/qn** parameter, either on the command line, or in the [MSI] stanza of the parameter file. You must also set the AGREETOLICENSE parameter to "yes".

You can specify many more parameters in the parameter file that you use with the MQPARMS command than you can in the response file that you use directly with the **msiexec** command. Also, as well as parameters that the IBM MQ installation uses, you can specify parameters that can be used by the [Prepare IBM MQ Wizard](#).

If you do not complete the Prepare IBM MQ Wizard directly after IBM MQ installations or if for any reason your machine is rebooted between completing IBM MQ installation and completing the Prepare IBM MQ Wizard, ensure that the wizard is run with Administrator privilege afterward, otherwise the installation is incomplete, and might fail. You might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the wizard to continue

An example of the file MQPARMS.INI is supplied with IBM MQ. This file contains default installation parameters.

There are two ways to create a parameter file for installation:

- Copy and edit the file MQPARMS.INI that is supplied with the product, using an ASCII file editor.
- Create your own parameter file using an ASCII file editor.

## About this task

To invoke installation using the MQPARMS command:

## Procedure

1. From a command line, change to the root folder of the IBM MQ installation media (that is, the location of the file MQPARMS.EXE).
2. Enter the following command:

```
MQPARMS [ parameter_file ] [ parameters ]
```

where:

### **parameter\_file**

is the file that contains the required parameter values. If this file is not in the same folder as MQPARMS.EXE, specify the full path and file name. If you do not specify a parameter file, the default is MQPARMS.INI. For further details, see [“MQPARMS parameter file - client installation”](#) on page 214.

### **parameters**

are one or more command-line parameters, for a list of these, see the [MSDN Command-Line Options web page](#).

## Example

A typical example of an MQPARMS command is:

```
MQPARMS "c:\MyParamsFile.ini" /l*v c:\install.log
```

If you specify a parameter both on the command line and in the parameter file, the setting on the command line takes precedence.

If you do not specify **/i**, **/x**, **/a**, or **/j**, MQPARMS defaults to standard installation using the IBM MQ Windows Installer package, IBM MQ.MSI. That is, it generates the following part of the command line:

```
/i " current_folder \MSI\IBM MQ.msi"
```

## Windows MQParms parameter file - client installation

A parameter file is an ASCII text file that contains sections (stanzas) with parameters that can be used by the **MQParms** command. Typically, this is an initialization file such as `MQParms.ini`.

The **MQParms** command takes parameters from the following stanzas in the file:

### [MSI]

Contains general properties related to how the **MQParms** command runs and to the installation of IBM MQ.

The properties that you can set in this stanza are listed in [“Installing a client using msiexec” on page 205](#), and [Table 33 on page 214](#).

MQParms ignores any other stanzas in the file.

The stanza parameters are in the form `property=value`, where `property` is always interpreted as uppercase, but `value` is case sensitive. If a value string includes a blank, it must be enclosed in double quotation marks. Most other values can be enclosed in double quotation marks. Some properties can take more than one value, for example:

```
ADDLOCAL="Server,Client"
```

To clear a property, set its value to an empty string, for example:

```
REINSTALL=""
```

The following tables show the properties that you can set. The default is shown in bold.

For the [MSI] stanza, you can enter standard MSI command line options and properties. For example:

```
- /q  
- ADDLOCAL="client"  
- REBOOT=Suppress
```

Refer to [Table 33 on page 214](#), and [Table 34 on page 215](#) for the properties used to install IBM MQ.

[Table 33 on page 214](#) shows additional properties in the stanza that affect how the **MQParms** command runs, but that do not affect the installation.

Property	Values	Description
MQPLOG	<i>path</i>   <i>file_name</i>	<b>MQParms</b> generates a text log file with the specified name and location.
MQPLANGUAGE	<b>system</b>   <i>user</i>   <i>transform_value</i>   <i>existing</i>	The installation language.  <b>system</b> . Install using the language of the default system locale (the default).  <i>user</i> . Install using the language of the default locale of the user.  <i>transform_value</i> . Install using the language specified by this value. See <a href="#">Table 34 on page 215</a> .  <i>existing</i> . If MQ already exists on the system, the same language will be used by default, otherwise system is used.

Table 33. Properties used by MQParms in the MSI stanza (continued)

Property	Values	Description
MQPSMS	0  no	0 or no. <b>MQParms</b> does not wait for the <code>msiexec</code> command to end (the default). Any other value. <b>MQParms</b> waits for the <code>msiexec</code> command to end.
MQPINUSE	0  1	If MQPINUSE is set to 1, <b>MQParms</b> continues installing even if IBM MQ files are in use. If this option is used a reboot will be required to complete the installation.

Table 34. Valid values for the MQPLANGUAGE property

Language	Valid values		
U.S. English	English	en_us	1033
German	German	de_de	1031
French	French	fr_fr	1036
Spanish	Spanish	es_es	1034
Italian	Italian	it_it	1040
Brazilian Portuguese		pt_br	1046
Japanese	Japanese	ja_jp	1041
Korean	Korean	ko_kr	1042
Simplified Chinese		zh_cn	2052
Traditional Chinese		zh_tw	1028
Czech	Czech	cs_cz	1029
Russian	Russian	ru_ru	1049
Hungarian	Hungarian	hu_hu	1038
Polish	Polish	pl_pl	1045

A typical example of a parameter file is:

```
[MSI]
MQPLANGUAGE=1033
MQPLOG=%temp%\MQParms.log
MQPSMS=no
ADDLOCAL=CLIENT
/m miffile
REMOVE=""
/l*v c:\install.log
```

## Windows *Modifying a client installation on Windows*

You modify the installation when an IBM MQ for Windows client is installed and you want to remove or install some IBM MQ client features.

### Procedure

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate Setup.exe in the Windows directory of the IBM MQ installation image.

- From a network location, this location might be `m:\instmq5\Windows\Setup.exe`
- From a local file system directory, this location might be `C:\instmq5\Windows\Setup.exe`

3. Start the installation process.

Either run Setup.exe from a command prompt, or double-click Setup.exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

4. Click **Next** to continue.

5. Select **Modify**, then click **Next**.

The Features panel is displayed.

6. To change the installation of a feature, complete the following steps:

- a) Click the symbol next to the feature name to display a menu.
- b) Select the required option from:
  - Install this feature
  - Install this feature and all its subfeatures (if any)
  - Do not install this feature (remove if already installed).

The symbol next to the feature name changes to show the current installation option.

7. When your selections are complete, click **Next**.

The IBM MQ Setup window displays a summary of the installation you selected.

8. To continue, click **Modify** then wait until the progress bar is complete.

When the IBM MQ client is successfully installed, the IBM MQ Setup window displays the following message: Installation Wizard Completed Successfully

9. Click **Finish** to close the window.

## Windows *Modifying a client installation using Add/Remove Programs*

On some versions of Windows, you can modify an installation by using Add/Remove Programs.

For Windows 7 follow these steps.

1. From the Windows taskbar, select **Start > Control Panel**.
2. Select **Add/Remove Programs**.
3. Select **IBM MQ**.
4. Select **Change**.

The IBM MQ Setup window with the Program Maintenance panel is displayed.

5. Select **Modify**, then click **Next**.

The Features panel is displayed.



6. To change the installation of a feature:
  - a. Click the symbol next to the feature name to display a menu.
  - b. Select the required option from:
    - Install this feature
    - Install this feature and all its subfeatures (if any)
    - Do not install this feature (remove if already installed).

The symbol next to the feature name changes to show the current installation option.

7. When your selections are complete, click **Next**.
8. The IBM MQ Setup window displays a summary of the installation you selected.

To continue, click **Modify**.

9. Wait until the progress bar is complete.

When the IBM MQ client is successfully installed, the IBM MQ Setup window displays the following message:

Installation Wizard Completed Successfully

Click **Finish** to close the window.

10. For Windows 8, the **Add/Remove Programs** option uninstalls the whole product.

You need to run the `setup.exe` file from the original installation media to make any modifications to the installation.

#### **Windows** *Modifying a client installation silently using msiexec*

You can use `msiexec` to modify an IBM MQ client installation.

To silently modify an IBM MQ client installation using `msiexec`, follow the instructions on the installation pages, but set the `ADDLOCAL` parameter to include the features you want to add, and set the `REMOVE` parameter to the features you want to remove.

For example if you used `ADDLOCAL="JavaMsg"` and `REMOVE=""` it would modify the installation to include the Java Messaging and Web Services feature.

The instructions for `msiexec` begin here: [“Installing a client using msiexec” on page 205](#)

#### **Windows** *Modifying a client installation silently using MQParms*

You can use the **MQParms** command to modify an IBM MQ client installation.

To silently modify an IBM MQ client installation using **MQParms**, follow the instructions on the installation pages, but set the `ADDLOCAL` parameter to include the features you want to add, and set the `REMOVE` parameter to the features you want to remove.

For example if you used `ADDLOCAL="JavaMsg"` and `REMOVE=""` it would modify the installation to include the Java Messaging and Web Services feature.

For details of the **MQParms** command, see [“Installing a client using the MQParms command” on page 212](#).

#### **Windows** **Converting a trial license on Windows**

Convert a trial license to a full license without reinstalling IBM MQ.

When the trial license expires, the "count-down" displayed by the `strmqm` command informs you the license has expired, and the command does not run.

### **Before you begin**

1. IBM MQ is installed with a trial license.

2. You have access to the installation media of a fully licensed copy of IBM MQ.

## About this task

Run the **setmqprd** command to convert a trial license to a full license.

If you do not want to apply a full license to your trial copy of IBM MQ, you can uninstall it at any time.

## Procedure

1. Obtain the full license from the fully licensed installation media.

The full license file is `amqpcert.lic`. On Windows it is in the `\MediaRoot\licenses` directory on the installation media. It is installed into the `bin` directory on the IBM MQ installation path.

2. Run the **setmqprd** command from the installation that you are upgrading:

```
MQ_INSTALLATION_PATH\bin\setmqprd \MediaRoot\licenses\amqpcert.lic
```

## Related reference

[setmqprd](#)

## Displaying messages in your national language on Windows systems

To display messages from a different national language message catalog, you must either set the **MQS\_FORCE\_NTLANGID** environment variable, or change a regional setting.

## About this task

Messages in U.S. English are automatically installed with IBM MQ

Messages in the national languages that IBM MQ supports are automatically installed. Messages are displayed in the national language, based on the following order:

1. The value of the **MQS\_FORCE\_NTLANGID** environment variable, if set.
2. The regional format of the user that is displaying the message, if the language specified by the regional format is supported by IBM MQ.
3. The Administrative system locale if the language specified by the system locale is supported by IBM MQ.
4. US English, if no other supported language can be determined.

**Note:** The queue manager is usually launched by a service on the machine, and hence is running under its own user account (for example `MUSR_MQADMIN`) or a specific domain account provided during install time. See [Local and domain user accounts for the IBM MQ Windows service](#) for more information.

If you require messages in a language other than the one associated with the regional format of a user account, perform the following steps:

## Procedure

1. Globally set the **MQS\_FORCE\_NTLANGID** environment variable, to the language identifier of the desired language, for messages displayed by the queue manager.

You should set the **MQS\_FORCE\_NTLANGID** system wide. Otherwise, every user displaying messages needs to have the environment variable set individually.

The language identifier values, represented in hexadecimal notation, are listed in the following Microsoft document: [Language Identifier Constants and Strings](#)

2. Reboot machines where queue managers are running as a service, for the environment variable to take effect.

## Windows Redistributable clients on Windows

The Windows 64-bit image is shipped in a Win64.zip file.

### File names

The archive or .zip file names describe the file contents and equivalent maintenance levels.

For IBM MQ 9.4 the client images are available under the following file names:

#### Long Term Support: 9.4.0 IBM MQ C and .NET redistributable client for Windows x64

9.4.0.0-IBM-MQC-Redist-Win64.zip

#### Long Term Support: 9.4.0 IBM MQ JMS and Java redistributable client

9.4.0.0-IBM-MQC-Redist-Java.zip

### Choosing the runtime files to distribute with an application

A script file named **genmqpkg** is provided by the redistributable client under the bin directory.

You can use the **genmqpkg** script to generate a smaller subset of files that are tailored to the needs of the application, for which the files are intended to be distributed. You are asked a series of interactive Yes or No questions to determine the runtime requirements for an IBM MQ application.

Finally, **genmqpkg** asks you to supply a new target directory, where the script duplicates the required directories and files.

**Important:** IBM support is only able to provide assistance with the full, unmodified set of files contained within the redistributable client packages.

### Other considerations

On Windows, the default data path of a non-installed client is %HOMEDRIVE%\%HOMEPATH%\IBM\MQ\data.

You can change the default directory of the data path, by using the MQ\_OVERRIDE\_DATA\_PATH environment variable.

**Note:** You must create the directory first, as the directory is not created automatically.

A redistributable client runtime co-exists with a full IBM MQ client or server installation, provided that they are installed in different locations.

**Important:** Unpacking a redistributable image into the same location as a full IBM MQ installation is not supported.

### Classpath changes

The classpath used by **dspmqver**, **setmqenv**, and **crtmqenv** commands adds the `com.ibm.mq.allclient.jar` and `com.ibm.mq.jakarta.client.jar` to the environment, immediately following the `com.ibm.mq.jar`, and `com.ibm.mqjms.jar`.

An example of **dspmqver** output from the redistributable client on Windows:

```
Name: IBM MQ
Version: 9.4.0.0
Level: p940-940-L220415
BuildType: IKAP - (Production)
Platform: IBM MQ for Windows (x64 platform)
Mode: 64-bit
O/S: Windows 10 Professional x64 Edition, Build 7601: SP1
InstName: MQNI09200004
InstDesc: IBM MQ V9.4.0.0 (Redistributable)
Primary: No
InstPath: C:\Users\johndoe\Desktop\Redist
```

## Related concepts

[“Redistributable IBM MQ clients” on page 27](#)

The IBM MQ redistributable client is a collection of runtime files that are provided in a .zip or .tar file that can be redistributed to third parties under redistributable license terms. This provides a simple way of distributing applications and the runtime files that they require in a single package.

## Windows .NET application runtime - Windows only

Considerations when using the .NET application.

The runtime DLL files laid down in the *redistributable* images on Windows for .NET applications are normally registered with the global assembly cache (GAC) by a user with system administrator privileges, when installing the primary installation. However, this severely limits the benefits of redistribution.

The *redistributable* package on the Windows platform does not provide any tooling to register DLLs with the GAC, so .NET applications have to locate the appropriate assemblies by other means. There are two options that work in this situation.

## Probing

After checking the GAC, the .NET runtime attempts to locate required assemblies through probing. The first location checked is the application base, which is the root location where the application is being run. See the information on *How the Runtime Locates Assemblies* on the Microsoft Web site for more information.

Note that when using this approach, the maintenance level of the assemblies used when building the .NET application must match those used at runtime - for example an application built at IBM MQ 8.0.0 Fix Pack 4 must be run with the IBM MQ 8.0.0 Fix Pack 4 redistributable client runtime.

Using this approach, a .NET application placed in the \bin directory alongside the IBM MQ assemblies picks up assemblies from a primary IBM MQ installation (if one exists), falling back to the redistributable copies.

1. Compile the .NET application under a full IBM MQ installation, that is `csc \t:exe \r:System.dll \r:amqmdnet.dll \lib: \out:nmqwrlld.exe nmqwrlld.cs`.
2. Copy the exe file in the redistributable client .zip file into the \bin directory.

## DEVPATH environment variable

An alternative, that allows your application to be built, distributed, extracted and run as previously, is to use DEVPATH to locate the required assemblies. Unlike with the probing approach, this option overrides any matching assemblies from the GAC. However it is for this reason that Microsoft discourages its use in a production environment.

This approach can be effective where there is a possibility that a full IBM MQ installation is installed on the client. However, there is a good reason to always use the redistributable assemblies.

1. Compile the .NET application under a full IBM MQ installation, that is `csc \t:exe \r:System.dll \r:amqmdnet.dll \lib: \out:nmqwrlld.exe nmqwrlld.cs`
2. Copy the .exe file into, or alongside, the redistributable client .zip file.
3. In the same directory as the .exe file, create an application configuration file with the name of the .exe file suffixed by .config, that is `nmqwrlld.exe.config` with the following contents:

```
<configuration>
  <runtime>
    <developmentMode developerInstallation="true" />
  </runtime>
</configuration>
```

4. Call `setmqenv -s` and set the `DEVPATH` environment variable to specify the `\bin` directory from the redistributable image before running the application, that is:

```
set DEVPATH=%MQ_INSTALLATION_PATH%\bin
```

## Starting and stopping trace for the .NET redistributable managed client

There are several different ways to enable trace for IBM MQ .NET applications. For more information, see [Tracing IBM MQ .NET applications](#).

You normally need to use the trace facility only at the request of IBM Support.

## More information on .NET

For more information on .NET, see [Writing and deploying IBM MQ .NET programs](#).

### Related concepts

[“Redistributable IBM MQ clients” on page 27](#)

The IBM MQ redistributable client is a collection of runtime files that are provided in a .zip or .tar file that can be redistributed to third parties under redistributable license terms. This provides a simple way of distributing applications and the runtime files that they require in a single package.

## **Verifying an IBM MQ installation on Windows**

The topics in this section provide instructions on how to verify a server or a client installation of IBM MQ on Windows systems.

### About this task

You can verify a local (stand-alone) server installation or a server-to-server installation of the IBM MQ server:

- A local server installation has no communication links with other IBM MQ installations.
- A server-to-server installation does have links to other installations.

You can also verify that your IBM MQ MQI client installation completed successfully and that the communication link is working.

### Procedure

- To verify a local server installation, see [“Verifying a local server installation using the command line on Windows” on page 221](#).
- To verify a server-to-server installation, see [“Verifying a server-to-server installation using the command line on Windows” on page 223](#).
- To verify a client installation, see [“Verifying a client installation on Windows” on page 226](#).

## **Verifying a local server installation using the command line on Windows**

On Windows systems, you can verify a local installation by using the command line to create a simple configuration of one queue manager and one queue.

### Before you begin

To verify the installation, you must first install the samples package.

Before beginning the verification procedure, you might want to check that you have the latest fixes for your system. For more information about where to find the latest updates, see [“Checking requirements on Windows” on page 169](#).

## About this task

Use the following steps to configure your default queue manager from the command line. After the queue manager is configured, use the `amqsput` sample program to put a message on the queue. You then use the `amqsget` sample program to get the message back from the queue.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Set up your environment:

- a) Set up environment variables for use with a particular installation by entering the following command:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- b) Check that the environment is set up correctly by entering the following command:

```
dspmqr
```

If the command completes successfully, and the expected version number and installation name are returned, the environment is set up correctly.

2. Create a queue manager called QMA by entering the following command:

```
crtmqm QMA
```

Messages indicate when the queue manager is created, and when the default IBM MQ objects are created.

3. Start the queue manager by entering the following command:

```
strmqm QMA
```

A message indicates when the queue manager starts.

4. Start MQSC by entering the following command:

```
runmqsc QMA
```

A message indicates when MQSC starts. MQSC has no command prompt.

5. Define a local queue called QUEUE1 by entering the following command:

```
DEFINE QLOCAL (QUEUE1)
```

A message indicates when the queue is created.

6. Stop MQSC by entering the following command:

```
end
```

Messages are shown, followed by the command prompt.

**Note:** Subsequent steps require that the samples package is installed.

7. Put a message on the queue by entering the following command:

```
amqsput QUEUE1 QMA
```

The following messages are shown:

```
Sample AMQSPUT0 start  
target queue is QUEUE1
```

8. Type some message text on one or more lines, where each line is a different message. Enter a blank line to end the message input.

The following message is shown:

```
Sample AMQSPUT0 end
```

Your messages are now on the queue and the command prompt is shown.

9. Get the messages from the queue, by entering the following command:

```
amqsget QUEUE1 QMA
```

The sample program starts, and your messages are displayed.

## Results

You have successfully verified your local installation.

## **Verifying a server-to-server installation using the command line on Windows**

You can verify a server-to-server installation using two servers, one as a sender and one as a receiver.

### Before you begin

- On Windows, IBM MQ supports TCP, SNA, NetBios, and SPX.
  - The examples in this task use TCP/IP. If you do not use TCP, see [Setting up communication for Windows](#).
- Make sure that you are a member of the IBM MQ administrators group (**mqm**) on each server.
- Decide which installation is the sender server and which installation is the receiver server. The installations might be on the same system, or on different systems.

### About this task

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

### Procedure

1. On the **receiver** server:
  - a) Check which ports are free, for example by running **netstat**. For more information about this command, see the documentation of your operating system.
    - If port 1414 is not in use, make a note of 1414 to use as the port number in step 2 g. Use the same number for the port for your listener later in the verification. If it is in use, note a port that is not in use; for example 1415.
  - b) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

- c) Create a queue manager called QMB by entering the following command at the command prompt:

```
crtmqm QMB
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- d) Start the queue manager by entering the following command:

```
strmqm QMB
```

A message tells you when the queue manager has started.

- e) Start MQSC by entering the following command:

```
runmqsc QMB
```

A message tells you that MQSC has started. MQSC has no command prompt.

- f) Define a local queue called RECEIVER.Q by entering the following command:

```
DEFINE QLOCAL (RECEIVER.Q)
```

A message tells you the queue has been created.

- g) Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT ( PORT_NUMBER )
```

Where *port\_number* is the name of the port the listener runs on. This number must be the same as the number used when defining your sender channel.

- h) Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```

**Note:** Do not start the listener in the background from any shell that automatically lowers the priority of background processes.

- i) Define a receiver channel by entering the following command:

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (RCVR) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

- j) End MQSC by typing:

```
end
```

Some messages are displayed, followed by the command prompt.

2. On the **sender** server:

- a) Set up the environment for the installation you are using by entering the following command at the command prompt:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```



where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- b) Create a queue manager called QMA by entering the following command at the command prompt:

```
crtmqm QMA
```

Messages tell you that the queue manager has been created, and that the default IBM MQ objects have been created.

- c) Start the queue manager, by entering the following command:

```
strmqm QMA
```

A message tells you when the queue manager has started.

- d) Start MQSC by entering the following command:

```
runmqsc QMA
```

A message tells you that an MQSC session has started. MQSC had no command prompt.

- e) Define a local queue called QMB (to be used as a transmission queue) by entering the following command:

```
DEFINE QLOCAL (QMB) USAGE (XMITQ)
```

A message tells you when the queue has been created.

- f) Define a local definition of the remote queue by entering the following command:

```
DEFINE QREMOTE (LOCAL.DEF.OF.REMOTE.QUEUE) RNAME (RECEIVER.Q) RQMNAME ('QMB') XMITQ (QMB)
```

- g) Define a sender channel by entering the following command:

```
DEFINE CHANNEL (QMA.QMB) CHLTYPE (SDR) CONNAME ('CON-NAME(PORT)') XMITQ (QMB) TRPTYPE (TCP)
```

*con-name* is the TCP/IP address of the receiver system. If both installations are on the same system, the *con-name* is `localhost`. *port* is the port you noted in [1 a](#). If you do not specify a port, the default value of 1414 is used.

- h) Start the sender channel by entering the following command:

```
START CHANNEL(QMA.QMB)
```

The receiver channel on the receiver server starts automatically when the sender channel starts.

- i) Stop MQSC by entering the following command:

```
end
```

Some messages are displayed, followed by the command prompt.

- j) If both the sender server and receiver server are installations on the same system, check that the queue managers have been created on different installations by entering the following command:

```
dspmqr -o installation
```

If the queue managers are on the same installation, move either QMA to the sender installation or QMB to the receiver installation by using the **setmqm** command. For more information, see [setmqm](#).

- k) Put a message on the local definition of the remote queue, which in turn specifies the name of the remote queue. Enter the following command:

```
amqsput LOCAL.DEF.OF.REMOTE.QUEUE QMA
```

A message tells you that amqsput has started.

- l) Type some message text on one or more lines, followed by a blank line.

A message tells you that amqsput has ended. Your message is now on the queue and the command prompt is displayed again.

3. On the **receiver** server:

- a) Get the message from the queue on the receiver by entering the following command:

```
amqsget RECEIVER.Q QMB
```

The sample program starts, and your message is displayed. After a pause, the sample ends. Then the command prompt is displayed.

## Results

You have now successfully verified the server-to-server installation.

### **Windows** *Verifying a client installation on Windows*

You can verify that your IBM MQ MQI client installation completed successfully and that the communication link is working.

## About this task

The verification procedure shows how to create a queue manager called `queue.manager.1`, a local queue called `QUEUE1`, and a server-connection channel called `CHANNEL1` on the server.

It shows how to create the client-connection channel on the IBM MQ MQI client workstation. It then shows how to use the sample programs to put a message onto a queue, and get the message from the queue.

The example does not address any client security issues. See [Setting up IBM MQ MQI client security](#) for details if you are concerned with IBM MQ MQI client security issues.

The verification procedure assumes that:

- The full IBM MQ server product has been installed on a server.
- The server installation is accessible on your network.
- The IBM MQ MQI client software has been installed on a client system.
- The IBM MQ sample programs have been installed.
- TCP/IP has been configured on the server and client systems. For more information, see [Configuring connections between the server and client](#).

## Procedure

1. Set up the server and client by using the command line.

For more information, see [“Setting up the server and client using the command line on Windows” on page 227](#).

2. Test the communications between client and server.

For more information, see [“Testing communication between a client and a server on Windows” on page 230](#).

## Related tasks

[“Installing an IBM MQ client on Windows” on page 204](#)

This topic describes how to install IBM MQ client on Windows systems. This procedure can be used for installing a first or a subsequent installation.

### **Windows** *Setting up the server and client using the command line on Windows*

You can use the command line to create the objects that you need to use to verify a client installation on Linux. On the server you create a queue manager, a local queue, a listener, and a server-connection channel. You must also apply security rules to allow the client to connect and make use of the queue defined. On the client you create a client-connection channel. After setting up the server and client, you can then use the sample programs to complete the verification procedure.

## **Before you begin**

Before starting this task, review the information in [“Verifying a client installation on Windows” on page 226](#).

## **About this task**

This task explains how to use the command line to set up the server and client so that you can verify your client installation.

## **Procedure**

1. Set up the server by following the instructions in [“Setting up the server using the command line on Windows” on page 227](#).
2. Set up the client by following instructions in [“Connecting to a queue manager, using the MQSERVER environment variable on Windows” on page 229](#).

## **What to do next**

Test the communications between client and server by following the instructions in [“Testing communication between a client and a server on Windows” on page 230](#).

### **Windows** *Setting up the server using the command line on Windows*

Follow these instructions to create a queue manager, queue, and channel on the server. You can then use these objects to verify the installation.

## **About this task**

These instructions assume that no queue manager or other IBM MQ objects have been defined.

IBM MQ object definitions are case-sensitive. Any text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## **Procedure**

1. Create a user ID on the server that is not in the mqm group.  
This user ID must exist on the server and client. This is the user ID that the sample applications must be run as, otherwise a 2035 error is returned.
2. You must set various environment variables so that the installation can be used in the current shell.  
You can set the environment variables by entering the following command:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed

3. Create a queue manager called `QUEUE.MANAGER.1` by entering the following command:

```
crtmqm QUEUE.MANAGER.1
```

You see messages telling you that the queue manager has been created.

4. Start the queue manager by entering the following command:

```
strmqm QUEUE.MANAGER.1
```

A message tells you when the queue manager has started.

5. Start MQSC by entering the following command:

```
runmqsc QUEUE.MANAGER.1
```

A message tells you that an MQSC session has started. MQSC has no command prompt.

6. Define a local queue called QUEUE1 by entering the following command:

```
DEFINE QLOCAL(QUEUE1)
```

A message tells you when the queue has been created.

7. Allow the user ID that you created in step 1 to use QUEUE1 by entering the following command:

```
SET AUTHREC PROFILE(QUEUE1) OBJTYPE(Queue) PRINCIPAL(' non_mqm_user ') AUTHADD(put,get)
```

where *non\_mqm\_user* is the user ID created in step 1. A message tells you when the authorization has been set. You must also run the following command to give the user ID authority to connect:

```
SET AUTHREC OBJTYPE(QMGR) PRINCIPAL(' non_mqm_user ') AUTHADD(CONNECT)
```

If this command is not run, a 2305 stop error is returned.

8. Define a server-connection channel by entering the following command:

```
DEFINE CHANNEL (CHANNEL1) CHLTYPE (SVRCONN) TRPTYPE (TCP)
```

A message tells you when the channel has been created.

9. Allow your client channel to connect to the queue manager and run under the user ID that you created in step 1, by entering the following MQSC command:

```
SET CHLAUTH(CHANNEL1) TYPE(ADDRESSMAP) ADDRESS(' client_ipaddr ') MCAUSER(' non_mqm_user ')
```

where *client\_ipaddr* is the IP address of the client system, and *non\_mqm\_user* is the user ID created in step 1. A message tells you when the rule has been set.

10. Define a listener by entering the following command:

```
DEFINE LISTENER (LISTENER1) TRPTYPE (TCP) CONTROL (QMGR) PORT (port_number)
```

where *port\_number* is the number of the port the listener is to run on. This number must be the same as the number used when defining your client-connection channel in [“Installing an IBM MQ client on Windows”](#) on page 204.

**Note:** If you omit the port parameter from the command, a default value of 1414 is used for the listener port. If you want to specify a port other than 1414, you must include the port parameter in the command, as shown.

11. Start the listener by entering the following command:

```
START LISTENER (LISTENER1)
```

12. Stop MQSC by entering:

```
end
```

You see some messages, followed by the command prompt.

## What to do next

Follow the instructions to set up the client. See [“Connecting to a queue manager, using the MQSERVER environment variable on Windows”](#) on page 229.

### Windows

*Connecting to a queue manager, using the MQSERVER environment variable on Windows*  
When an IBM MQ application is run on the IBM MQ MQI client, it requires the name of the MQI channel, the communication type, and the address of the server to be used. Provide these parameters by defining the MQSERVER environment variable.

## Before you begin

Before you start this task, you must complete the task, [“Setting up the server using the command line on Windows”](#) on page 227, and save the following information:

- The host name or IP address of the server and port number that you specified when creating the listener.
- The channel name of the server-connection channel.

## About this task

This task describes how to connect an IBM MQ MQI client, by defining the MQSERVER environment variable on the client.

You can give the client access to the generated client channel definition table, `amqc1chl1.tab` instead; see [Accessing client-connection channel definitions](#).

Alternatively, on Windows, if Active Directory support is enabled, the client discovers the client-connection information dynamically from the Active Directory.

## Procedure

1. Log in as the userid that you created in Step 1 of [“Setting up the server using the command line on Windows”](#) on page 227.

2. Check the TCP/IP connection. From the client, enter one of the following commands:

- `ping server-hostname`
- `ping n.n.n.n`

`n.n.n.n` represents the network address. You can set the network address in IPv4 dotted decimal form, for example, `192.0.2.0`. Alternatively, set the address in IPv6 hexadecimal form, for example `2001:0DB8:0204:acff:fe97:2c34:fde0:3485`.

If the **ping** command fails, correct your TCP/IP configuration.

3. Set the MQSERVER environment variable. From the client, enter the following command:

```
SET MQSERVER=CHANNEL1/TCP/server-address(port)
```

Where:

- `CHANNEL1` is the server-connection channel name.

- *server-address* is the TCP/IP host name of the server.
- *port* is the TCP/IP port number the server is listening on.

If you do not give a port number, IBM MQ uses the one specified in the `qm.ini` file, or the client configuration file. If no value is specified in these files, IBM MQ uses the port number identified in the TCP/IP services file for the service name `MQSeries`. If an `MQSeries` entry in the services file does not exist, a default value of 1414 is used. It is important that the port number used by the client and the port number used by the server listener program are the same.

## What to do next

Use the sample programs to test communication between the client and server; see [“Testing communication between a client and a server on Windows”](#) on page 230.

### **Windows** *Testing communication between a client and a server on Windows*

On the IBM MQ MQI client workstation, use the `amqsputc` sample program to put a message on the queue at the server workstation. Use the `amqsgetc` sample program to get the message from the queue back to the client.

## Before you begin

Complete the previous topics in this section:

- Set up a queue manager, channels, and queue.
- Open a command window.
- Set system environment variables.

## About this task

Note that IBM MQ object definitions are case-sensitive. Text entered as an MQSC command in lowercase is converted automatically to uppercase unless you enclose it in single quotation marks. Make sure that you type the examples exactly as shown.

## Procedure

1. Change into the `MQ_INSTALLATION_PATH\Tools\C\Samples\Bin` directory for 32 bit systems or the `MQ_INSTALLATION_PATH\Tools\C\Samples\Bin64` directory for 64 bit systems.  
`MQ_INSTALLATION_PATH` represents the high-level directory in which IBM MQ is installed.
2. You must set certain environment variables so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where `MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed

3. Start the PUT program for `QUEUE1` on `QUEUE.MANAGER.1` by entering the following command:

```
amqsputc QUEUE1 QUEUE.MANAGER.1
```

If the command is successful, the following messages are displayed:

```
Sample AMQSPUT0 start target queue is QUEUE1
```

**Tip:** You might get the error, `MQRC_NOT_AUTHORIZED (2035)`. By default, channel authentication is enabled when a queue manager is created. Channel authentication prevents privileged users accessing a queue manager as an IBM MQ MQI client. For verifying the installation, you can either

change the MCA user ID to a non-privileged user, or disable channel authentication. To disable channel authentication run the following MQSC command:

```
ALTER QMGR CHLAUTH(DISABLED)
```

When you finish the test, if you do not delete the queue manager, re-enable channel authentication:

```
ALTER QMGR CHLAUTH(ENABLED)
```

4. Type some message text, then press **Enter** twice.

The following message is displayed:

```
Sample AMQSPUT0 end
```

Your message is now on the queue that is on the server queue manager.

5. Start the GET program for QUEUE1 on QUEUE.MANAGER.1 by entering the following command:

```
amqsgetc QUEUE1 QUEUE.MANAGER.1
```

The sample program starts, and your message is displayed. After a short pause (approximately 30 seconds), the sample ends and the command prompt is displayed again.

## Results

You have now successfully verified the client installation.

## What to do next

1. You must set various environment variables on the server so that the installation can be used in the current shell. You can set the environment variables by entering the following command:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* refers to the location where IBM MQ is installed.

2. On the server, stop the queue manager by entering the following command:

```
endmqm QUEUE.MANAGER.1
```

3. On the server, delete the queue manager by entering the following command:

```
dltmqm QUEUE.MANAGER.1
```

## Windows Uninstalling IBM MQ on Windows

You can uninstall the IBM MQ MQI clients and servers on Windows systems by using the control panel, the command line (**msiexec**), **MQParms**, or by using the installation media, in which case you can optionally remove queue managers as well.

## Before you begin

By default, uninstallation logging is not enabled on Windows. To ensure that you receive an uninstallation log, carry out the following procedure:

1. In a command prompt, open the registry editor by issuing the command **regedit**.
2. Create, or edit, the appropriate registry key:  
HKEY\_LOCAL\_MACHINE\Software\Policies\Microsoft\Windows\Installer

3. Under this registry key add the following information:

**Name**

Logging

**Data type**

REG\_SZ

**Value**

voicewarmup

4. Save the updated registry key.

## Procedure

The first part of the procedure ensures that there are no IBM MQ programs or processes running:

1. If you are running IBM MQ with the Microsoft Cluster Service (MSCS), remove the queue managers from MSCS control before uninstalling IBM MQ. Perform the following steps for each queue manager currently under MSCS control :
  - a) Take the queue manager resource offline.
  - b) Destroy the resource instance.
  - c) Migrate the queue manager files back from shared drives. This step is shown as optional in [Removing a queue manager from MSCS control](#). However, it is mandatory in this case.
2. Stop all IBM MQ applications associated with the installation you are uninstalling.
3. Close all Managed File Transfer agents.

If you have a Managed File Transfer Agent running, close it by using the **fteStopAgent** command; see [fteStopAgent \(stop a Managed File Transfer Agent\)](#).
4. For a server installation, end all IBM MQ activity:

- a) Log in as a user in the group mqm.
- b) Stop all running queue managers and listeners by using the IBM MQ Explorer, or by entering the following commands:
  - i) Set up your environment to work with the installation you want to uninstall by entering the following command:

```
MQ_INSTALLATION_PATH\bin\setmqenv -s
```

where *MQ\_INSTALLATION\_PATH* is the location where IBM MQ is installed.

- ii) For each queue manager, enter the following command to stop the queue manager:

```
endmqm queue_manager_name
```

- iii) For each queue manager, enter the following command to stop any listeners associated with the queue manager:

```
endmqlsr -m queue_manager_name
```

5. Stop IBM MQ.

To do this right-click the **IBM MQ** icon in the system tray, then select **Stop IBM MQ**.

6. Close all IBM MQ windows.

7. Stop any monitoring service.

When all processes associated with IBM MQ are no longer running, you can uninstall IBM MQ:

8. Uninstall IBM MQ by using one of the following methods:

- Use the Windows Control Panel. This process is described in: [“Uninstalling IBM MQ using the control panel”](#) on page 233. This method does not remove the queue manager data.



- Use the command line by running the **msiexec** command as described in: [“Uninstalling IBM MQ using msiexec” on page 234](#). This method does not remove the queue manager data.
- Use the appropriate parameters with **MQParms**. This process is described in [“Uninstalling IBM MQ using MQParms” on page 236](#). This method does not remove the queue manager data.
- Use the installation media, by selecting the appropriate option as described in: [“Uninstalling IBM MQ on Windows using the installation media” on page 236](#). The option to remove queue manager data is displayed in the **Removing Server feature** panel, if appropriate.

If you have to cancel the uninstallation process before it is finished, you might have to reconfigure IBM MQ with the Prepare IBM MQ wizard because the rollback of the deletion of the IBM MQ service is unable to set the service's user account password. Use the following command to reconfigure IBM MQ:

```
MQ_INSTALLATION_PATH\bin\amqmjps.exe -r
```

For more information about the Prepare IBM MQ Wizard, see [“Configuring IBM MQ with the Prepare IBM MQ Wizard” on page 195](#).

9. Check the Windows event log and restart the system if necessary.

If event ID 10005 is written to the Windows event log, you must restart the system to complete the uninstallation process.

10. If you are uninstalling the last or only installation of IBM MQ, you can remove all the information about previous installations that is retained on the system, if you want to. You should use the **ResetMQ.cmd** for this purpose; see [“Clearing IBM MQ installation settings” on page 175](#) for more information.

The following registry values remain after uninstallation:

- My Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\IBM\WebSphere MQ\LogDefaultPath
- My Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\IBM\WebSphere MQ\WorkPath
- My Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\WOW6432Node\IBM\WebSphere MQ\LogDefaultPath
- My Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\WOW6432Node\IBM\WebSphere MQ\WorkPath

Data folders will also remain and are located at `MQ_DATA_PATH\Config`, where `MQ_DATA_PATH` is the location of the IBM MQ data directory. Most of the remaining files contain text such as INI files, error logs, and FDC files. The executable shared library `mqsds.dll` also remains.

If a client is installed on a system where the `LogDefaultPath` registry value remains from a previous server installation, a client installation will attempt to create this directory if it does not already exist. If this behavior is not wanted, remove the `LogDefaultPath` registry value before installing the client.

## **Uninstalling IBM MQ using the control panel**

You can uninstall IBM MQ by using the control panel to remove all currently installed features.

### **Before you begin**

Start the uninstalling process by following the steps described in [“Uninstalling IBM MQ on Windows” on page 231](#).

If you no longer require the queue managers that are on the system, delete them by using the IBM MQ Explorer or the **dltmqm** command.

### **Procedure**

1. From the Windows taskbar, open the control panel by clicking **Start > Settings > Control Panel**, or **Start > Control Panel**.

2. Open **Programs and Features**.
3. Click **IBM MQ (*installation\_name*)**, where *installation\_name* is the name of the installation you want to remove.
4. Click **Remove** or **Uninstall** and click **Yes** to confirm.  
If User Account Control (UAC) is enabled, accept the Windows prompt to allow the uninstallation to run as elevated. The program then begins and runs to completion.

## What to do next

Complete the steps that you started in [“Uninstalling IBM MQ on Windows” on page 231](#).

### **Uninstalling IBM MQ using msixec**

You can uninstall IBM MQ by running the **msixec** command from the command line to remove all currently installed features, or selected features.

## Before you begin

This task describes one of several uninstallation options that you can choose from when uninstalling IBM MQ as described in [“Uninstalling IBM MQ on Windows” on page 231](#). Before starting this task, refer to [“Uninstalling IBM MQ on Windows” on page 231](#) for more information.

If you no longer require the queue managers that are on the system, delete them by using the [IBM MQ Explorer](#) or the **dltmqm** command.

## About this task

You can use the **msixec** command to uninstall IBM MQ either by running the **msixec** command with a parameter that calls a response file, or by entering the required **msixec** parameters on the command line.

**Important:** When specifying which features to remove with the **REMOVE** parameter:

- If you want to silently uninstall the Server feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying **REMOVE="Web, Server"**.
- If you want to silently uninstall the Java Runtime Environment (JRE) feature, and the Web Administration (Web) feature is installed, you must also silently uninstall the Web feature at the same time by specifying **REMOVE="Web, JRE"**.

If you are running IBM MQ on Windows with User Account Control (UAC) enabled, you must invoke the silent uninstallation from an elevated command prompt. Elevate a command prompt by using a right-click to start the command prompt and choose **Run as administrator**.

In all of the examples of commands shown, the variable names used are as follows:

- *installation\_name* is the name of the installation you want to remove.
- *product\_code* is the value shown for MSIProdCode in the output of the following command:

```
dspmqinst -n installation_name
```

An example of a product code is {0730749B-080D-4A2E-B63D-85CF09AE0EF0}.

## Procedure

- To silently uninstall IBM MQ by running the **msixec** command with a parameter that calls a response file:
  - a) Set which features to uninstall, and whether to keep existing queue managers in the response file.

A response file is an ASCII text file that contains the parameter values that you want to set for the uninstallation. The response file has a format similar to a Windows `.ini` file, and contains the stanza `[Response]`. This stanza contains parameters that the `msiexec` command can use, in the form of `property = value` pairs. The `msiexec` command ignores any other stanzas in the file. This is an example of a simple uninstallation `[Response]` stanza:

```
[Response] REMOVE="ALL"
```

For more information about how to create a response file, including which parameters you can specify, see [“Creating and using a response file for server installation”](#) on page 185.

- b) To silently uninstall IBM MQ using the response file, enter the following command: `msiexec /x {product_code} /! *v "c:\removal.log" /q USEINI="response_file" INSTALLATIONNAME="installation_name"`
- To uninstall IBM MQ by entering the required `msiexec` parameters on the command line, enter one of the following commands:
  - To invoke an interactive uninstallation giving you the option to remove queue manager data (providing there are no other IBM MQ installations remaining):

```
msiexec /x {product_code} /! *v "c:\removal.log" REMOVE="All"
INSTALLATIONNAME="installation_name"
```

If you are running IBM MQ on a Windows system with User Account Control (UAC) enabled, you might see **Open File - Security Warning** dialog boxes during uninstallation that list International Business Machines Limited as the publisher. Click **Run** to allow the uninstallation to continue.

- To invoke a silent uninstallation that does not remove any queue manager data:

```
msiexec /x {product_code} /! *v "c:\removal.log" /q REMOVE="All"
INSTALLATIONNAME="installation_name"
```

- To invoke a silent uninstallation and remove any queue manager data (only valid when removing the final server installation):

```
msiexec /x {product_code} /! *v "c:\removal.log" /q REMOVE="All" KEEPQMDATA="delete"
INSTALLATIONNAME="installation_name"
```

- To monitor the progress of the uninstalling process and not remove any queue manager data:

```
msiexec /x {product_code} /! *v "c:\removal.log" INSTALLATIONNAME="installation_name"
```

If you are running IBM MQ on a Windows system with User Account Control (UAC) enabled, you might see **Open File - Security Warning** dialog boxes during uninstallation that list International Business Machines Limited as the publisher. Click **Run** to allow the uninstallation to continue.

- To invoke a silent uninstallation and not remove any queue manager data:

```
msiexec /x {product_code} /! *v "c:\removal.log" /q INSTALLATIONNAME="installation_name"
```

## Results

After the command is entered, the command prompt immediately reappears and IBM MQ is uninstalled as a background process. If you entered parameters to produce a log, check this file to see how the uninstallation is progressing. If the uninstallation finishes successfully, you see the message `Removal completed successfully` in the log file.

## What to do next

Complete the steps that you started in [“Uninstalling IBM MQ on Windows”](#) on page 231.

## Related concepts

[“IBM MQ features for Windows systems” on page 159](#)

You can select the features that you require when you install IBM MQ.

## Related tasks

[“Installing the server using msixec” on page 180](#)

IBM MQ on Windows uses the MSI technology to install software. MSI provides both an interactive installation and a non interactive installation.

[“Modifying a server installation silently using msixec” on page 203](#)

You can silently remove or install IBM MQ features on Windows by using **msiexec**.

## **Uninstalling IBM MQ using MQParms**

You can uninstall IBM MQ by running the **MQParms** command from the command line to remove all currently installed features.

## Before you begin

Start the uninstalling process by following the steps described in [“Uninstalling IBM MQ on Windows” on page 231](#).

## Procedure

1. Follow the instructions on the MQParms installation pages to uninstall IBM MQ non-interactively. See: [“Installing the server using the MQParms command” on page 189](#).
  - a) Set the ADDLOCAL parameter to empty (ADDLOCAL="").
  - b) Set the REMOVE parameter to "ALL" (REMOVE="ALL").
2. If you have multiple versions of IBM MQ installed on your system, specify the product code that identifies the installation you want to remove.

Type the following command:

```
MQParms.exe parameter_file/i "{product_code}"
```

where

- *parameter\_file* is the file that contains the required parameter values. If this file is not in the same folder as MQParms.exe, specify the full path and file name. If you do not specify a parameter file, the default is MQParms.ini.
- *product\_code* is the value shown for MSIProdCode in the output of the following command:

```
dspmqinst -n installation_name
```

where *installation\_name* is the name of the installation you want to remove. An example of a product code is {0730749B-080D-4A2E-B63D-85CF09AE0EF0}.

## What to do next

Complete the steps that you started in [“Uninstalling IBM MQ on Windows” on page 231](#).

## **Uninstalling IBM MQ on Windows using the installation media**

You can uninstall IBM MQ by using the installation media to remove all currently installed features and optionally remove existing queue managers and their data.

## Before you begin

Start the uninstalling process by following the steps described in [“Uninstalling IBM MQ on Windows” on page 231](#).

## Procedure

1. Download the compressed file that contains the installation image, then uncompress it into a temporary directory.
2. Navigate to that directory, then double-click Setup . exe to start the installation process.  
The IBM MQ Installation Launchpad window is displayed.
3. Click **IBM MQ Installation**.
4. Click **Launch IBM MQ Installer** and click **Next** until the IBM MQ Program Maintenance panel is displayed with a welcome message.  
If this panel is not displayed, IBM MQ for Windows is not currently installed.
5. Click **Maintain or upgrade an existing instance** and if there is more than one installation of IBM MQ on the system, select which installation you want to remove. Click **Next** and in the Program Maintenance panel, click **Remove**, then **Next**.
6. If you are uninstalling the last or only server, and there are any queue managers on the system, the Removing Server feature panel is shown.  
Click one of the following options:
  - **Keep**: keep existing queue managers and their objects.
  - **Remove**: remove existing queue managers and their objects.Click **Next**.  
The Remove IBM MQ panel is displayed, with a summary of the installation to be removed.
7. Click **Remove** to continue.  
If there are any messages that state that locked files are found, ensure that there are no IBM MQ programs running; see [“Uninstalling IBM MQ on Windows” on page 231](#).  
When IBM MQ has been uninstalled, a message indicates completion.
8. Click **Finish**.

## What to do next

Complete the steps that you started in [“Uninstalling IBM MQ on Windows” on page 231](#).

Multi


MQ Adv.

## Installing IBM MQ Advanced for Multiplatforms

Installation tasks associated with IBM MQ Advanced for Multiplatforms are grouped in this section.


### About this task

IBM MQ Advanced is a single license entitlement that, in addition to IBM MQ itself, provides entitlement to:

- Advanced Message Security
- Managed File Transfer
- MQ Telemetry
-  Replicated data queue managers (RDQM)

For more information, see [IBM MQ license information](#).

## Procedure

- [“Installing and uninstalling AMS on Multiplatforms” on page 238](#).
- [“Installing Managed File Transfer ” on page 245](#).
- [“Installing MQ Telemetry” on page 250](#).
- 

[“Installing RDQM \(replicated data queue managers\)” on page 256.](#)

#### **Related tasks**

[“Installing IBM MQ Advanced for z/OS” on page 280](#)

Installation of IBM MQ Advanced for z/OS consists of installation of the Managed File Transfer (MFT) feature and the Connector Pack component. The Advanced Message Security (AMS) feature does not require installation. You can choose to just install the MFT feature, just the Connector Pack component, or both.

[“Installing IBM MQ Advanced for z/OS Value Unit Edition” on page 283](#)

IBM MQ Advanced for z/OS Value Unit Edition (VUE) is a bundling of the IBM MQ for z/OS VUE and IBM MQ Advanced for z/OS products.

#### **Related reference**

[DISPLAYQMGR ADVCAP](#)

[MQCMD\\_INQUIRE\\_Q\\_MGR MQIA\\_ADVANCED\\_CAPABILITY](#)

**Multi**

## **Installing and uninstalling AMS on Multiplatforms**

Installation and uninstallation, by platform, for Advanced Message Security (AMS) on Multiplatforms.

### **About this task**

Advanced Message Security is a separately installed component of IBM MQ and is another option on the IBM MQ installer. Make sure that you purchase a license for using IBM MQ Advanced before the installation (see [IBM MQ license information](#)).

### **Procedure**

- [“Installing AMS on Multiplatforms” on page 238](#)
- [“Uninstalling AMS on Multiplatforms” on page 242](#)

**Multi**

## **Installing AMS on Multiplatforms**

Use the information for your platform to guide you through installing the Advanced Message Security (AMS) component.

### **Before you begin**

Make sure the following IBM MQ components are installed in your environment:

- MQSeriesRuntime
- MQSeriesServer

### **About this task**

For information about installing Advanced Message Security follow the guidance for the appropriate platform.

### **Procedure**

- [“Installing Advanced Message Security on AIX” on page 239](#)
- [“Installing Advanced Message Security on IBM i” on page 239](#)
- [“Installing Advanced Message Security on Linux” on page 240](#)
- [“Installing AMS on Windows using the Launchpad” on page 241](#)

### *Installing Advanced Message Security on AIX*

You can install Advanced Message Security component on AIX platforms using either system management interface tool (SMIT) or the command line.

#### *Installing using SMIT*

### **Procedure**

1. Log on as root.
2. Change the directory to the location of the installation packages.
3. Start the system management interface tool (SMIT).  
The system management menu is displayed.
4. Select the required SMIT window using the following sequence:

```
Software Installation and Maintenance
Install and Update Software
Install Software
```

5. Enter the directory location of the installation package.
6. Press F4 to list the software in the **SOFTWARE name** option.
7. Select the `mqm.ams.rte` and press Enter.
8. Accept the default setting for the remaining options and press Enter.

### **Results**

Advanced Message Security has been installed successfully.

#### *Installing using command line*

### **Procedure**

1. Log on as root.
2. Set your current directory to the location of the installation file. The location might be a network location, or a local file system directory.
3. Run the following command:

```
installp -a -c -Y -d. mqm.ams.rte
```

Note the period, signifying the current directory, following the **-d** parameter.

### **Results**

Advanced Message Security component has been installed successfully.

### **IBM i** *Installing Advanced Message Security on IBM i*

You can install Advanced Message Security component on IBM i.

### **Procedure**

Install AMS using the command:

```
RSTLICPGM LICPGM(5724H72) DEV(installation device) OPTION(2) OUTPUT(*PRINT)
```

where the parameters of **RSTLICPGM** are:

#### **LICPGM(5724H72)**

The product identifier for IBM MQ for IBM i.

### DEV(installation device)

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### OPTION(2)

Install Advanced Message Security for IBM i

### OUTPUT(\*PRINT)

The output is printed with the spooled output of the job.

## Results


The AMS component has been installed successfully.

Once AMS is installed on an IBM MQ server installation, any:

- Queue managers that are subsequently started enable security policy management features.
- Applications that connect to the queue manager enable interceptors.

## What to do next

See [Setting up certificates and the keystore configuration file on IBM i](#) for details on setting up your security policy.

 *Installing Advanced Message Security on Linux*  
You can install Advanced Message Security on Linux platforms.

## Procedure

1. Log on as root.
2. Set your current directory to the location of the installation file. The location might be a network share, or a local file system directory.
3. Optional: If this installation is not the first installation on the system, run the **crtmqpkg** command to create a unique set of packages to install on the system.

Before you can run the **crtmqpkg** command on Linux, you must have the **pax** and **rpmbuild** commands installed. These commands are not supplied as part of the product. You must get them from your Linux distribution supplier. The **rpmbuild** command is located in the **rpm-build** package.

a) Enter the following command:

```
./crtmqpkg suffix
```

where *suffix* is a name of your choosing, that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

**Note:** This command creates a full copy of the installation packages in a subdirectory of `/var/tmp`. You must ensure that the system has enough space before running the command.

- b) Set your current directory to the location specified when the **crtmqpkg** command completes. This directory is a subdirectory of `/var/tmp/mq_rpms`, in which the unique set of packages is created. The packages have the *suffix* value contained within the filename. For example, using a suffix of "1":

```
./crtmqpkg 1
```



there is a subdirectory named `/var/tmp/mq_rpms/1/i386` and the packages are renamed, for example:

```
From: MQSeriesAMS-V.R.M-F.i386.rpm
To: MQSeriesAMS_1-V.R.M-F.i386.rpm
```

where:

**V**

Represents the version of the product that you are installing

**R**

Represents the release of the product that you are installing

**M**

Represents the modification of the product that you are installing

**F**

Represents the fix pack level of the product that you are installing

4. In the command line, issue the following command:

This example shows a minimum installation:

```
rpm -iv package_name
```

where *package\_name* is one of the following:

- MQSeriesAMS-V.R.M-F.i386.rpm
- MQSeriesAMS-V.R.M-F.x86\_64.rpm
- MQSeriesAMS-V.R.M-F.ppc.rpm
- MQSeriesAMS-V.R.M-F.s390.rpm

## Results

Advanced Message Security has been installed successfully.

**Windows** *Installing AMS on Windows using the Launchpad*

Access the IBM MQ installation image. Run the Launchpad. Follow the instructions on screen to install the Advanced Message Security component (AMS) on Windows.

## Procedure

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate Setup.exe in the base directory of the IBM MQ installation image.

- From a network location, this location might be `m:\instmq\Setup.exe`
- From a local file system directory, this location might be `C:\instmq\Setup.exe`

3. Start the installation process.

Either run Setup.exe from a command prompt, or double-click Setup.exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

4. Follow the instructions on screen.

Use the information for your platform to uninstall the Advanced Message Security (AMS) component.

## Procedure

- [“Uninstalling AMS on AIX” on page 242](#)
- [“Uninstalling AMS on Linux” on page 243](#)
- [“Uninstalling AMS on Windows” on page 244](#)

## Related tasks

[“Installing AMS on Multiplatforms” on page 238](#)

Use the information for your platform to guide you through installing the Advanced Message Security (AMS) component.

On AIX platforms, you can remove Advanced Message Security component either using SMIT or the command line.

## Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling.
2. For a server installation, end any IBM MQ activity associated with the installation you are uninstalling:
  - a) Log in as a user in the group mqm.
  - b) Set up your environment to work with the installation you want to uninstall. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv
```

where `. MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqr -o installation
```

- d) Stop all running queue managers associated with the installation you want to uninstall. Enter the following command for each queue manager:

```
endmqm QMgrName
```

- e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqclr -m QMgrName
```

3. Log in as root.
4. Uninstall AMS component using either **installp** or **smit**. If AMS component was installed in a non-default location, you must use **installp** to uninstall.

- Uninstall using **installp** by entering one of the following commands:
  - For an installation in the default location `/usr/mqm`

```
installp -u mqm.ams.rte
```

- For an installation in a non-default location:

```
installp -R
usil -u mqm.ams.rte
```

where *usil* is the path of the User Specified Installation Location (USIL) specified when the product was installed.

- Uninstall using **smit**:

- a. Select the required **smit** window using the following sequence:

```
Software Installation and Maintenance
Software Maintenance and Utilities
Remove Installed Software
```

- b. List the software in the **SOFTWARE name** field:

- i) Enter **.**

- ii) Press **F4**

- c. Select the file sets to uninstall from the list (those beginning with mqm), and press **Enter**. There is an option at this stage to do a preview. Leave the option set to the default value of **Yes** to preview the file sets you are uninstalling, or select **No** to not preview these file sets.

- d. Press **Enter** on the **Remove Installed Software** panel, it asks whether you are sure, press **Enter**.

## Results

The Advanced Message Security component has been uninstalled.

### *Uninstalling AMS on Linux*

Use the `rpm` command to remove Advanced Message Security component on Linux platforms.

## Procedure

1. Stop all IBM MQ applications associated with the installation you are uninstalling.
2. For a server installation, end any IBM MQ activity associated with the installation you are uninstalling:
  - a) Log in as a user in the group mqm.
  - b) Set up your environment to work with the installation you want to uninstall. Enter the following command:

```
. MQ_INSTALLATION_PATH/bin/setmqenv
```

where `. MQ_INSTALLATION_PATH` refers to the location where IBM MQ is installed.

- c) Display the state of all queue managers on the system. Enter the following command:

```
dspmqr -o installation
```

- d) Stop all running queue managers associated with the installation you want to uninstall. Enter the following command for each queue manager:

```
endmqm QMgrName
```

- e) Stop any listeners associated with the queue managers. Enter the following command for each queue manager:

```
endmqclr -m QMgrName
```

3. Log in as root.

4. Run the following command:

```
rpm -e package_name
```

where *package\_name* is MQSeriesAMS-V.R.M-F

**V**

Represents the version of the product that you are uninstalling

**R**

Represents the release of the product that you are uninstalling

**M**

Represents the modification of the product that you are uninstalling

**F**

Represents the fix pack level of the product that you are uninstalling

## Results

The Advanced Message Security component has been uninstalled.

### Windows *Uninstalling AMS on Windows*

You can uninstall Advanced Message Security component using the GUI uninstallation wizard, or a command-line interface.

*Using the installation wizard*

## Procedure

1. Download the compressed file that contains the installation image, then uncompress it into a temporary directory.
2. Navigate to that directory, then double-click `setup.exe` to start the installation process. The IBM MQ Installation Launchpad window is displayed.
3. Click the **IBM MQ Installation**.
4. Click **Launch IBM MQ Installer**. Click **Next** until the IBM MQ Program Maintenance panel is displayed with a welcome message.

If this panel is not displayed, IBM WebSphere MQ for Windows 7.5 is not installed on this machine. When presented with the option, select to remove/maintain or upgrade.

5. Select **Maintain or upgrade an existing instance**, then click **Next**.
6. If there are any existing queue managers, the Removing Server feature panel is displayed.

Click one of the following options, then click **Next**:

- **Keep** - keep existing queue managers and their objects.
- **Remove** - remove existing queue managers and their objects.

The Program Maintenance panel is displayed, with a summary of the installation to be removed.

7. Click **Modify** and click **Next**.
8. On the list of available IBM MQ features, click Advanced Message Security, select **Do not install this feature (remove if already intalled)**, and click **Next**.

The Ready to modify IBM MQ panel appears with the summary of your changes.

9. Click **Modify** and **Next** on the following panel to continue.

## Results

Selected features of Advanced Message Security component have been removed.

## MQ Adv. Installing Managed File Transfer



Managed File Transfer is installed as a component of IBM MQ on AIX, Linux, and Windows, and on z/OS. Managed File Transfer remains as a separate product on IBM i.

### Before you begin

Before you install Managed File Transfer, check that your system meets both the hardware and software requirements of the product. See [System Requirements for IBM MQ](#).

For all platforms, you must have one IBM MQ queue manager available in your Managed File Transfer network to use as the coordination queue manager.

**Note:** If you are migrating or upgrading an existing IBM MQ installation, you must update database logger instances before other parts of the Managed File Transfer network so that these instances can correctly process the latest versions of the transfer log messages that they receive.

The following steps describe installing Managed File Transfer as a component of IBM MQ on AIX, Linux, and Windows.  For IBM MQ for z/OS, see [“Installing IBM MQ Advanced for z/OS”](#) on page 280.  For IBM MQ for IBM i, see [“Installing Managed File Transfer on IBM i”](#) on page 73.

### Procedure

1. Decide which Managed File Transfer components to install.

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. These options are Managed File Transfer Agent, Managed File Transfer Service, Managed File Transfer Logger, or Managed File Transfer Tools.




To decide which components to install, review the product options and topology information in the following topics:

- [Managed File Transfer product options](#)
- [Managed File Transfer topology overview](#)

2. Install IBM MQ, including Managed File Transfer components.

For information about which specific components to install for your platform, including Managed File Transfer, see [“IBM MQ components and features”](#) on page 6.

For more information about installing IBM MQ on AIX, Linux, and Windows, see the appropriate information for your platform:

-  [“Installing and uninstalling IBM MQ on AIX”](#) on page 32
-  [“Installing and uninstalling IBM MQ on Linux”](#) on page 94
-  [“Installing and uninstalling IBM MQ on Windows”](#) on page 159

### Related concepts

[Managed File Transfer](#)

[Managed File Transfer topology overview](#)

### Related reference

[“Installed MFT command sets”](#) on page 249

The following table shows which Managed File Transfer commands are installed with each component.

## **Managed File Transfer product options**

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. These options are Managed File Transfer Agent, Managed File Transfer Service, Managed File Transfer Logger, or Managed File Transfer Tools.

### **Managed File Transfer Agent**

A file transfer agent connects to an IBM MQ queue manager, and transfers file data, as messages, to other file transfer agents.

You install an agent through either the Managed File Transfer Agent or Managed File Transfer Service installation options.

The Managed File Transfer Agent option installs an agent that has the following capabilities:

- Make client or bindings mode connections to queue managers.

**Note:** When the file transfer agent and queue manager are on the same system, consider using the bindings mode connections.

- Transfer files to and from other Managed File Transfer agents.
- Transfer files to and from Connect:Direct® nodes.

The Managed File Transfer Service option, described in the next section, installs a file transfer agent that also has additional capability to transfer files to and from legacy FTP, FTPS, or SFTP protocol servers.

### **Managed File Transfer Service**

The Managed File Transfer Service option installs an agent that has the following capabilities:

- Make client or bindings mode connections to queue managers.

**Note:** When the file transfer agent and queue manager are on the same system, consider using the bindings mode connections.

- Transfer files to and from other Managed File Transfer agents.
- Transfer files to and from Connect:Direct nodes.
- Create protocol bridge agents that transfer files to and from legacy SFTP, FTP, or FTPS protocol servers.

Some capabilities are available on only a subset of supported platforms. For more information, see IBM MQ System Requirements.

A Managed File Transfer Service can only be installed on systems where the IBM MQ Server option is already installed.

### **Managed File Transfer Logger**

A file transfer logger connects to an MQ queue manager, often the queue manager that is designated as the coordination queue manager, and logs audit-related file transfer data to either a database or a file. A logger can only be installed on systems where the IBM MQ Server installation option is already installed.

### **Managed File Transfer Tools**



The Managed File Transfer Tools are command line tools that you use to interact with file transfer agents. The tools allow you to start file transfers, schedule file transfers and create resource monitors from the command line. The Managed File Transfer Tools need not be installed on the same system as the file transfer agents that they interact with.

## Managed File Transfer Base



On AIX and Linux platforms, there is an additional Managed File Transfer Base installation component. This component contains files common to all of the installation options. You must install the Managed File Transfer Base component before installing any of the Agent, Logger, Service, or Tools components.

For more information about the IBM MQ components that are required for each product option on AIX and Linux platforms, see the following topics:

-  [“Required MFT components on AIX” on page 247](#)
-  [“Required MFT components on Linux” on page 248](#)

### Related concepts

[Managed File Transfer introduction](#)

[Managed File Transfer topology overview](#)

### *Required MFT components on AIX*

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. On AIX systems, these options are Managed File Transfer Agent, Managed File Transfer Logger, Managed File Transfer Service, and Managed File Transfer Tools, and each option requires specific components.

## Managed File Transfer Agent

mqm.base.runtime

mqm.java.rte

mqm.jre.rte

mqm.ft.base

mqm.ft.agent

## Managed File Transfer Logger

mqm.base.runtime

mqm.server.rte

mqm.java.rte

mqm.jre.rte

mqm.ft.base

mqm.ft.logger

## Managed File Transfer Service

mqm.base.runtime

mqm.server.rte

mqm.java.rte

mqm.jre.rte

mqm.ft.base

mqm.ft.agent

mqm.ft.service

## Managed File Transfer Tools

mqm.base.runtime

mqm.java.rte

mqm.jre.rte

mqm.ft.base

mqm.ft.tools

 *Required MFT components on Linux*

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. On Linux systems, these options are Managed File Transfer Agent, Managed File Transfer Logger, Managed File Transfer Service, and Managed File Transfer Tools, and each option requires specific components.

## Managed File Transfer Agent

MQSeriesRuntime

MQSeriesJava

MQSeriesJRE

MQSeriesFTBase

MQSeriesFTAgent

## Managed File Transfer Logger

MQSeriesRuntime

MQSeriesServer

MQSeriesJava

MQSeriesJRE

MQSeriesFTBase

MQSeriesFTLogger

## Managed File Transfer Service

MQSeriesRuntime

MQSeriesServer

MQSeriesJava

MQSeriesJRE

MQSeriesFTBase

MQSeriesFTAgent

MQSeriesFTService

## Managed File Transfer Tools

MQSeriesRuntime

MQSeriesJava

MQSeriesJRE

MQSeriesFTBase



**Installed MFT command sets**

The following table shows which Managed File Transfer commands are installed with each component.

Table 35. Managed File Transfer commands available in each command set

Command	Agent command set	Service command set	Tools command set	Logger command set	Redistributable Managed File Transfer package set
fteAnt			✓		✓
fteBundleConfiguration			✓ (AIX, Linux, and Windows only)		✓
fteCancelTransfer			✓		✓
fteChangeDefaultConfigurationOptions	✓	✓	✓	✓	✓
fteCleanAgent	✓	✓			✓
fteCreateAgent	✓	✓			✓
fteCreateBridgeAgent		✓			✓
fteCreateCDAgent	✓ (AIX, Linux, and Windows only)	✓ (AIX, Linux, and Windows only)			
fteCreateEnvironment					✓
fteCreateLogger				✓	✓ <a href="#">“1” on page 250</a>
fteCreateMonitor			✓		✓
fteCreateTemplate			✓		✓
fteCreateTransfer			✓		✓
fteDefine			✓ (AIX, Linux, and Windows only)		✓
fteDelete			✓ (AIX, Linux, and Windows only)		✓
fteDeleteAgent	✓	✓			✓
fteDeleteLogger				✓	✓ <a href="#">“1” on page 250</a>
fteDeleteMonitor			✓		✓
fteDeleteScheduledTransfer			✓		✓
fteDeleteTemplates			✓		✓
fteDisplayVersion	✓	✓		✓	✓
fteListAgents	✓	✓	✓	✓	✓
fteListMonitors			✓		✓

Table 35. Managed File Transfer commands available in each command set (continued)

Command	Agent command set	Service command set	Tools command set	Logger command set	Redistributable Managed File Transfer package set
fteListScheduledTransfers			✓		✓
fteListTemplates			✓		✓
fteModifyAgent	✓ (Windows only)	✓ (Windows only)			✓
fteModifyLogger				✓ (Windows only)	✓ "1" on page 250
fteObfuscate	✓	✓		✓	✓
ftePingAgent			✓		✓
fteRAS		✓			✓
fteSetAgentLogLevel	✓				✓
fteSetAgentTraceLevel	✓	✓			✓
fteSetLoggerTraceLevel				✓	✓ "1" on page 250
fteSetupCommands	✓	✓	✓	✓	✓
fteSetupCoordination	✓	✓	✓	✓	✓
fteShowAgentDetails	✓	✓	✓	✓	✓
fteShowLoggerDetails				✓	✓ "1" on page 250
fteStartAgent	✓	✓			✓
fteStartLogger				✓	✓ "1" on page 250
fteStopAgent	✓	✓			✓
fteStopLogger				✓	✓ "1" on page 250

**Notes:**

1. From IBM MQ 9.3.0, the Redistributable Managed File Transfer package also includes the Redistributable Managed File Transfer Logger. For more information, see [Downloading and configuring Redistributable Managed File Transfer components](#).

**Windows Linux MQ Adv. AIX Installing MQ Telemetry**

Installation tasks associated with MQ Telemetry are grouped in this section.

**About this task**

MQ Telemetry is installed as part of the IBM MQ server installation.



MQ Telemetry is a separately installed component of IBM MQ and is another option on the IBM MQ installer. Make sure that you purchase a license for using IBM MQ Advanced before the installation (see [IBM MQ license information](#)).

## Procedure

- Install IBM MQ, including MQ Telemetry.

For information about which specific components to install for your platform, including MQ Telemetry, see [“IBM MQ components and features”](#) on page 6.

For more information about installing IBM MQ on AIX, Linux, or Windows, see the appropriate information for your platform:

-  [“Installing and uninstalling IBM MQ on AIX”](#) on page 32
-  [“Installing and uninstalling IBM MQ on Linux”](#) on page 94
-  [“Installing and uninstalling IBM MQ on Windows”](#) on page 159

## Installation considerations for MQ Telemetry

MQ Telemetry is a component of the main IBM MQ product. You can choose to install MQ Telemetry when you first install IBM MQ, or when you modify an existing IBM MQ installation.

## MQ Telemetry overview

See [Introduction to MQ Telemetry](#) for general details about MQ Telemetry.

## Support for IBM MQ Explorer

You can use IBM MQ Explorer to configure and manage the MQ Telemetry runtime component. For a queue manager to accept connections from a telemetry device, one or more telemetry channels are needed. To enable MQTT, there is a `define sample` configuration wizard that can be run from IBM MQ Explorer. The wizard runs through a series of steps including defining and starting the telemetry (MQXR) service, setting up the default transmission queue, and configuring a telemetry channel. For more information about using the `define sample` configuration wizard, and any implications, see [“Verifying the installation of MQ Telemetry by using IBM MQ Explorer”](#) on page 252.

The IBM MQ Explorer support provides the following capabilities:

- Telemetry node and content panel - providing welcome information, `define sample` configuration wizard, run MQTT client utility, Help on MQ Telemetry, and status information about the MQ Telemetry Service.
- `Define sample` configuration wizard - quickly configures a queue manager to support MQTT.
- New Telemetry Channel wizard - gathers information required to create a telemetry channel object.
- Telemetry Channels node and content panel - displays telemetry channels in the IBM MQ Explorer Content view.
- Telemetry Channel Status node and content panel - displays telemetry channel status in the IBM MQ Explorer Content view.
- MQTT Client Utility - provides a simple GUI for publishing and subscribing to topics.
- Help on MQ Telemetry.

You can install the MQ Telemetry runtime component on one system and configure and manage it using the IBM MQ Explorer installed on another system. However, the components can be installed only on systems with the appropriate prerequisites. For information about these prerequisites, see [System Requirements for IBM MQ](#).

## MQ Telemetry client libraries and SDK

To help you write messaging applications for MQTT networks, you can install and use a set of free example MQTT clients from the [Eclipse Paho downloads page](#).

## Related concepts

[MQ Telemetry](#)

[Telemetry use cases](#)

### **Related tasks**

[Administering MQ Telemetry](#)

[Developing applications for MQ Telemetry](#)

[Troubleshooting MQ Telemetry problems](#)

### **Related reference**

[MQ Telemetry reference](#)

## ***Verifying the installation of MQ Telemetry***

There are three ways to verify the installation of MQ Telemetry. Any can be used, regardless of whether MQ Telemetry was installed as a custom installation of IBM MQ, or added to an existing installation of IBM MQ.

### **About this task**

Within IBM MQ you can verify the installation of MQ Telemetry either by using IBM MQ Explorer, or by using the command line.

You can also verify the installation by using the MQTT messaging client for JavaScript in a browser that supports the RFC 6455 (WebSocket) standard. A version of this client is installed with MQ Telemetry, and the latest version is freely available from the [Eclipse Paho downloads page](#). To verify the MQ Telemetry installation you do not need the latest version of the client.

### **Procedure**

- Verify your installation in one of the following ways:
  - By using IBM MQ Explorer as described in [“Verifying the installation of MQ Telemetry by using IBM MQ Explorer”](#) on page 252.
  - By using the command line as described in [“Verifying the installation of MQ Telemetry using the command line”](#) on page 254.

 *Verifying the installation of MQ Telemetry by using IBM MQ Explorer*

Use the Define sample configuration wizard and the MQTT client utility in IBM MQ Explorer to verify that the MQ Telemetry components have installed. Also check that publish/subscribe works correctly.

### **Before you begin**

The MQ Telemetry runtime and support for IBM MQ Explorer must be installed. The telemetry folder is part of a queue manager. To view the telemetry folder, you must start a queue manager.

Before running the define sample configuration wizard on an existing queue manager, review the information provided by the wizard about the configuration changes that are made. The changes might have implications for the configuration of the existing queue manager. Alternatively, run the sample configuration wizard on a newly created queue manager to avoid changing any security settings.

### **About this task**

To configure MQ Telemetry there is a define sample configuration wizard that can be run from IBM MQ Explorer. The wizard runs through a series of steps, including defining and starting the telemetry (MQXR) service, setting up the default transmission queue, and configuring a telemetry channel.

If you would prefer to do this manually, see [Configuring a queue manager for telemetry on Linux and AIX](#). For Windows, see [Configuring a queue manager for telemetry on Windows](#).

You can open the define sample configuration wizard from the MQ Telemetry Welcome page in IBM MQ Explorer. The wizard determines which steps are required based on the current configuration.

For example, the following actions might be specified by the wizard:

- Define the telemetry (MQXR) service.
- Start the telemetry (MQXR) service.
- Define the telemetry transmit queue.
- Set the default transmit queue of the queue manager to `SYSTEM.MQTT.TRANSMIT.QUEUE`.

If telemetry is already configured for this queue manager, the link to open the wizard is replaced with static text. The text confirms that the sample configuration has been set up.

After the configuration has finished, you can use IBM MQ Explorer to open the MQTT client utility. Use the MQTT client utility to verify that MQ Telemetry is set up correctly.

The following items summarize the main goals that can be achieved using the MQTT client utility:

- Validation of a basic or custom MQ Telemetry configuration by connecting, subscribing to topics and publishing messages.
- Showcases the main features of MQTT protocol.
- Provides a simple tool to aid in debugging MQ Telemetry applications.

You can find additional information within the IBM MQ Explorer by using the **Help** menu or pressing the **F1** key.

## Procedure

### 1. Start IBM MQ Explorer.

On Windows and Linux systems, you can start IBM MQ Explorer by using the system menu, the `MQExplorer` executable file, the `mqexplorer` command, or the `strmqcfig` command.

### 2. Open the **Welcome to MQ Telemetry** page.

- To use an existing queue manager, click on IBM MQ\Queue Managers\*qMgrName*\Telemetry folder to open the **Welcome to MQ Telemetry** page.
- If, for the reasons mentioned, you decide to use a new queue manager,
  - a. Click **Queue Managers > New > Queue Manager**.
  - b. Type `MQTTVerification` as the **Queue manager name > Next > Next > Next**.
  - c. Change the default port in **Listen on port number**, if the port is in use > **Finish**.
  - d. When the queue manager starts, click on IBM MQ\Queue Managers\MQTTVerification\Telemetry folder to open the **Welcome to MQ Telemetry** page.

### 3. From the **Welcome to MQ Telemetry** page in IBM MQ Explorer, click **Define sample configuration**.

If this link is not present, and instead you see the text, "The sample configuration has been set up for this queue manager", then telemetry has already been configured. Proceed to step ["6" on page 253](#).

If you clicked **Define sample configuration**, the page opens, and lists actions that are to be performed as part of the sample configuration.

### 4. Leave **Launch MQTT client utility** checked, if you want to automatically start the MQTT client utility. The check box is selected by default.

### 5. Click **Finish**.

### 6. Click **Connect**.

In the MQTT client utility panel, ensure that the host and port names are correct.

If you did not automatically start the MQTT client utility panel in step 4, you can start it either by using a direct link from the **Welcome to MQ Telemetry** panel, or by right-clicking a NON-TLS channel, which allows you to control the channel it runs on.

The client history records a Connected event.

### 7. Click **Subscribe**.

The client history records a Subscribed event.

8. Click **Publish**.

The client history records a Published and Received event.

## Results

If the publish/subscribe finishes successfully, the MQ Telemetry installation is verified.

If you encounter problems during the installation process, view the error log:

- On Windows, the default location for this log is, *IBM MQ data directory\qmgrs\qMgrName\mqxr*
- On AIX and Linux, the default location for this log is, */var/mqm/qmgrs/qMgrName/mqxr/*

*Verifying the installation of MQ Telemetry using the command line*

Follow these instructions to run scripts and a sample application to verify that the MQ Telemetry components have installed, and are able to publish and subscribe.

## Before you begin

### Note:

This task uses the `mqttv3app` sample Java application, and the associated Java client library. These resources were previously available in the IBM Messaging Telemetry Clients SupportPac, and the detailed instructions in this task assume that you have a copy of this SupportPac.

The IBM Messaging Telemetry Clients SupportPac is no longer available. Free downloads of the latest telemetry clients and samples, for a range of programming languages, continue to be available from the [Eclipse Paho](#) project, and from [MQTT.org](#).

The telemetry (MQXR) service must be started to run the sample programs. The user ID must be a member of the `mqm` group.

The `SampleMQM` script creates and uses a queue manager called `MQXR_SAMPLE_QM`. Therefore, do not run unaltered on a system that already has a `MQXR_SAMPLE_QM` queue manager. Any changes made might have implications for the configuration of the existing queue manager.

There are two commands to run the `mqttv3app` sample Java application. The first command creates a subscription, then waits for a message. The second command publishes to that subscription. Therefore the commands must be entered into different command lines or shell windows.

## About this task

To perform verification on a server or device without a GUI, scripts are provided in the `samples` directory. The `SampleMQM` script performs the required steps to configure MQ Telemetry. The `mqttv3app` sample Java application can then be run to validate the basic or custom MQ Telemetry configuration by connecting, subscribing to topics, and publishing messages. The `CleanupMQM` sample script can be run to delete the queue manager created by the `SampleMQM` script.

The following items summarize the main goals that can be achieved using this verification procedure:

- Validate a basic or custom MQ Telemetry configuration by connecting, subscribing to topics and publishing messages.
- Showcase the main features of the MQTT protocol.
- Provide a simple tool to aid in debugging MQ Telemetry applications.

## Procedure

1. Decompress the IBM Messaging Telemetry Clients SupportPac into a directory of your own choosing.

This task uses the `mqttv3app` sample Java application, and the associated `mqttv3` Java client library. If you have the earlier (MA9B) version of the SupportPac, the sample applications and client libraries

are in the *CLIENTPACKDIR*/SDK/clients/java directory, where *CLIENTPACKDIR* is the directory in which you decompressed the client pack.

**Note:** The later (MA9C) version of the IBM Messaging Telemetry Clients SupportPac does not have the /SDK/ directory, and does not include a compiled copy of the mqttv3app sample application. If you have this version of the SupportPac, you need to compile the application manually, then create the /SDK/ directory and contents. For the latest information about available clients and samples, see [IBM MQ Telemetry Transport sample programs](#).

## 2. Configure MQ Telemetry.

The SampleMQM script runs through a series of steps, including creating the MQXR\_SAMPLE\_QM queue manager, defining and starting the telemetry (MQXR) service, setting up the default transmission queue, and configuring a telemetry channel.

For information about performing this manually, see [Configuring a queue manager for telemetry on Linux and AIX](#), or [Configuring a queue manager for telemetry on Windows](#).

- On Windows systems, enter the following command in a command line:

```
MQINSTDIR\mqxr\samples\SampleMQM.bat
```

- On AIX or Linux systems, enter the following command in a shell window:

```
MQINSTDIR/mqxr/samples/SampleMQM.sh
```

where *MQINSTDIR* is the installation directory for this installation of IBM MQ.

A queue manager called MQXR\_SAMPLE\_QM is created, and MQ Telemetry is configured.

## 3. Run the mqttv3app sample Java application to create a subscription.

- On Windows systems, enter the following commands in a command line:

```
java -cp
"CLIENTPACKDIR\SDK\clients\java\org.eclipse.paho.sample.mqttv3app.jar;
CLIENTPACKDIR\SDK\clients\java\org.eclipse.paho.client.mqttv3.jar"
org.eclipse.paho.sample.mqttv3app.Sample -a subscribe
```

- On AIX or Linux systems, enter the following commands in a shell window:

```
java -cp
CLIENTPACKDIR/SDK/clients/java/org.eclipse.paho.sample.mqttv3app.jar:
CLIENTPACKDIR/SDK/clients/java/org.eclipse.paho.client.mqttv3.jar
org.eclipse.paho.sample.mqttv3app.Sample -a subscribe
```

The subscription is created, and waits to receive a message.

## 4. Run the mqttv3app sample Java application to publish to the subscription.

- On Windows systems, enter the following command in a second command line:

```
java -cp
"CLIENTPACKDIR\SDK\clients\java\org.eclipse.paho.sample.mqttv3app.jar;
CLIENTPACKDIR\SDK\clients\java\org.eclipse.paho.client.mqttv3.jar"
org.eclipse.paho.sample.mqttv3app.Sample -m "Hello from an MQTT v3 application"
```

- On AIX or Linux systems, enter the following command in a second shell window:

```
java -cp
CLIENTPACKDIR/SDK/clients/java/org.eclipse.paho.sample.mqttv3app.jar:
CLIENTPACKDIR/SDK/clients/java/org.eclipse.paho.client.mqttv3.jar
org.eclipse.paho.sample.mqttv3app.Sample -m "Hello from an MQTT v3 application"
```

The message Hello from an MQTT v3 application, that you typed into the second command line or shell window, is published by that application and received by the application in the first window. The application in the first window shows it on the screen.

5. Press **Enter** in the first command line or shell window to end the subscribing application.
6. Remove the queue manager created by the SampleMQM script.

- On Windows systems, enter the following command in a command line:

```
MQINSTDIR\mqxr\samples\CleanupMQM.bat
```

- On AIX or Linux systems, enter the following command in a shell window:

```
MQINSTDIR/mqxr/samples/CleanupMQM.sh
```

## Results

If the scripts finished, and messages can be sent and received, the MQ Telemetry installation is verified.

## What to do next

If you encounter any problems during the verification process, see [MQ Telemetry troubleshooting](#). You can also view the error log:

- On Windows systems, the default location for the queue manager log is `MQINSTDIR\qmgrs\MQXR_SAMPLE_QM\mqxr`
- On AIX and Linux systems, the default location for the queue manager log is `/var/mqm/qmgrs/MQXR_SAMPLE_QM/mqxr/`

## Linux > MQ Adv. Installing RDQM (replicated data queue managers)

Installation tasks associated with RDQM are grouped in this section. RDQM is available on x86-64 for RHEL 8 (8.8 or later) and RHEL 9 (9.2 or later).

### Before you begin

RDQM requires that the `mqm` user has the same UID on each node and that the `mqm` group has the same GID on each node. You should create the `mqm` IDs before running the installation procedure, using the **groupadd** and **useradd** commands to set the UID and GID the same on each node. See [“Setting up the user and group on Linux”](#) on page 99.

Pacemaker is one of the prerequisites for RDQM. Pacemaker requires that certain Linux packages are installed on the system. The list for supported levels of RHEL 8 and RHEL 9 assumes that a minimal set of system packages has been installed that includes the mandatory and default packages from the mandatory groups of the Server environment group.

The prerequisites for supported levels of RHEL 8 (Pacemaker 2) are:

- cifs-utils
- libtool-ltdl
- libxslt
- net-snmp-libs
- nfs-utils
- perl-TimeDate
- psmisc
- python36
- python3-lxml

**V 9.4.0** The prerequisites for supported levels of RHEL 9 (Pacemaker 2) are:

- libxslt
- net-snmp-libs
- nfs-utils
- nfs-utils-coreos



- perl-TimeDate
- python3-lxml
- python-unversioned-command

These packages in turn have their own requirements (which are not listed here). When Pacemaker is installed, it reports any missing packages that also need to be installed before installation can complete successfully.

**Note:** The Pacemaker component of RDQM requires a user named `hacluster` and a group named `haclient`. By default, these use a uid and gid of 189, although it is possible to specify a different uid and gid if required. The installation of Pacemaker creates the user and group if they do not exist.

## About this task

To install support for RDQM (replicated data queue managers), you complete the following tasks:

1. Install DRBD on each node.
2. Install Pacemaker on each node.
3. Install IBM MQ on each node.
4. Install RDQM on each node.

The DRBD and Pacemaker RPM packages are supplied on the IBM MQ media. You should install the versions supplied with IBM MQ. Do not download your own versions. To ensure that the packages supplied with RDQM are used, add the following line to the definition of any yum repository that could supply alternatives, such as the AppStream repository in RHEL 8 or RHEL 9:

```
exclude=cluster* corosync* drbd kmod-drbd libqb* pacemaker* resource-agents*
```

For supported levels of RHEL 8, components are found under the `Advanced/RDQM/PreReqs/e18/` directory. For supported levels of RHEL 9, components are found under the `Advanced/RDQM/PreReqs/e19/` directory.



**Attention:** If you are using UEFI secure boot, you might need to enroll the key for the DRBD kernel module. See [https://linbit.com/drbd-user-guide/drbd-guide-9\\_0-en/#s-linbit-packages](https://linbit.com/drbd-user-guide/drbd-guide-9_0-en/#s-linbit-packages). If UEFI secure boot is in use and the key is not enrolled, you will see the following error message.

```
modprobe: ERROR: could not insert 'drbd': Required key not available
```

The DRBD and Pacemaker packages are signed with the LINBIT GPG key. Use the following command to import the public LINBIT GPG key:

```
rpm --import https://packages.linbit.com/package-signing-pubkey.asc
```

Without this step, an RPM install of these packages issues the following warnings:

```
warning: rpm-name: Header V4 DSA/SHA1 Signature, key ID 282b6e23: NOKEY"
```

You can have multiple IBM MQ installations on each server, but only one of these installations should be an RDQM installation.



**Attention:** You should retain the installation media, in case there is a need to revert to this level, after upgrading to a later level.

## Procedure

Complete the following steps on each node:

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

2. Change into the directory containing the installation image.
3. Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqmkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.10 system, running the helper script **Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver** returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0-553-1.x86_64.rpm
```

4. Install the appropriate DRBD kernel module that you identified in step 1. For example, for RHEL 8.10 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-drbd-9.0.23_4.18.0-553-1.x86_64.rpm
```

5. Install the required DRBD utilities. For example, for RHEL 8.10 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

6. Install Pacemaker. For example, for RHEL 8.10 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

The Pacemaker installer reports any missing packages that also need to be installed before the install can complete successfully.

7. Accept the IBM MQ license:

```
./mqlicense.sh
```

8. Install IBM MQ. This is like a standard IBM MQ install. At the minimum, you must install the following:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*
```

9. Install RDQM:

```
yum install Advanced/RDQM/MQSeriesRDQM*
```

## What to do next

You can now configure the Pacemaker cluster and replicated data queue managers, or you can configure disaster recovery replicated data queue managers. See [RDQM high availability](#) or [RDQM disaster recovery](#).

### Related concepts

[“Migrating replicated data queue managers” on page 497](#)

When you need to migrate replicated data queue managers (RDQMs), you must upgrade all nodes in a sequence. Do not try to operate with the nodes at different levels.

### Related tasks

[“Applying maintenance level updates for RDQM” on page 316](#)

There are different procedures for applying maintenance level updates to a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.


[“Removing maintenance level updates for RDQM” on page 320](#)

There are different procedures for removing maintenance level updates to a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

## **Uninstalling RDQM (replicated data queue managers) if no longer required**

How to uninstall RDQM if it is no longer required.

### Before you begin

 Depending on which version of IBM MQ is installed, you might need to remove maintenance before you uninstall the base packages:

- If you are uninstalling a version of IBM MQ at IBM MQ 9.4.0 or later, you do not need to remove maintenance before you uninstall IBM MQ.
- If you are uninstalling a version of IBM MQ before IBM MQ 9.4.0, you must remove any maintenance that is applied to IBM MQ before you can uninstall. The procedure for removing maintenance changed at IBM MQ 9.4.0. Therefore, you must use the procedure that is detailed in earlier versions of the product documentation to remove the maintenance.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

### About this task

There are different procedures for uninstalling a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

**Important:** The following commands are intended as an example of those that would be issued on a system with a single IBM MQ installation. On systems with multiple IBM MQ installations, or where there are other packages installed whose name includes either "drbd" or "linbit", the commands must be updated to ensure that only the packages associated with this IBM MQ installation are removed.

For details of how to uninstall IBM MQ on a system with multiple MQ installations please see [“Uninstalling or modifying IBM MQ on Linux using rpm”](#) on page 151.

### Procedure

- To uninstall HA RDQM support if it is no longer required:
  - a) Delete the RDQM HA queue managers in the HA group, see [Deleting an HA RDQM](#).
  - b) Delete the RDQM HA group, see [Deleting the Pacemaker cluster \(HA group\)](#).
  - c) Log in as root or switch to superuser using the **su** command.
  - d) If you configured a firewall, run the script `MQ_INSTALLATION_PATH/samp/rdqm/firewall/unconfigure.sh` on each node to undo the firewall configuration. You must run this script as root.
  - e) To uninstall IBM MQ and RDQM:

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

Alternatively, to uninstall RDQM but leave the IBM MQ installation:

```
rpm -qa | grep MQSeriesRDQM | xargs yum -y remove
```

- f) Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

- g) Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

- To uninstall DR RDQM support if it is no longer required:
  - a) Delete all queue managers on all nodes, see [Deleting a DR RDQM](#).
  - b) Log in as root or switch to superuser using the **su** command.
  - c) If you configured a firewall, run the script `MQ_INSTALLATION_PATH/samp/rdqm/firewalld/unconfigure.sh` on each node to undo the firewall configuration. You must run this script as root.
  - d) To uninstall IBM MQ and RDQM:

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

Alternatively, to uninstall RDQM but leave the IBM MQ installation:

```
rpm -qa | grep MQSeriesRDQM | xargs yum -y remove
```

- e) Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

- f) Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

- To uninstall DR/HA RDQM support if it is no longer required:
  - a) Delete the RDQM HA queue managers in both HA groups on main and recovery sites, see [Deleting a DR/HA RDQM](#).
  - b) Delete each RDQM HA group, see [Deleting the Pacemaker cluster \(HA group\)](#).
  - c) Log in as root or switch to superuser using the **su** command.
  - d) If you configured a firewall, run the script `MQ_INSTALLATION_PATH/samp/rdqm/firewalld/unconfigure.sh` on each node to undo the firewall configuration. You must run this script as root.
  - e) To uninstall IBM MQ and RDQM:

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

Alternatively, to uninstall RDQM but leave the IBM MQ installation:

```
rpm -qa | grep MQSeriesRDQM | xargs yum -y remove
```

- f) Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

- g) Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

## Related reference

[rdqmadm \(administer replicated data queue manager cluster\)](#)

## Linux > MQ Adv. **Uninstalling RDQM (replicated data queue managers) and upgrading**

How to uninstall RDQM in preparation for upgrading IBM MQ and RDQM.

### Before you begin

**V 9.4.0** Depending on which version of IBM MQ is installed, you might need to remove maintenance before you uninstall the base packages:

- If you are uninstalling a version of IBM MQ at IBM MQ 9.4.0 or later, you do not need to remove maintenance before you uninstall IBM MQ.
- If you are uninstalling a version of IBM MQ before IBM MQ 9.4.0, you must remove any maintenance that is applied to IBM MQ before you can uninstall. The procedure for removing maintenance changed at IBM MQ 9.4.0. Therefore, you must use the procedure that is detailed in earlier versions of the product documentation to remove the maintenance.

**Important:** You must stop all IBM MQ queue managers, other objects, and applications, before you begin the process to uninstall or modify IBM MQ.

**Note:** If you are upgrading the OS RHEL version, you need to follow a different upgrade procedure. See [“Applying OS updates with RDQM” on page 265](#) for upgrading RHEL within a version, or [“Migrating an RDQM configuration from RHEL 8 to RHEL 9” on page 496](#) for updating versions.

### About this task

This topic describes upgrading RDQM between versions. To apply maintenance level updates to RDQM, see [“Applying maintenance level updates for RDQM” on page 316](#). There are different procedures for uninstalling and then upgrading a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

For HA configurations, complete steps on each node in the HA group in turn. Processing can continue on other nodes while this is in progress.

For all configurations, if the upgrade is to a level of IBM MQ that is at a higher command level then, after a queue manager has been started at the higher level, it cannot run on a node that has not yet been upgraded. You should plan the sequence of upgrades accordingly.

**Important:** The following commands are intended as an example of those that would be issued on a system with a single IBM MQ installation. On systems with multiple IBM MQ installations, or where there are other packages installed whose name includes either "drbd" or "linbit", the commands must be updated to ensure that only the packages associated with this IBM MQ installation are removed.

For details of how to uninstall IBM MQ on a system with multiple MQ installations please see [“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#).

### Procedure

- Uninstall HA RDQM support and upgrade RDQM and IBM MQ.
  - a) Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- b) Log in as root or switch to superuser using the **su** command.
- c) Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

- d) Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

e) Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

f) Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

g) Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).

h) Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- Uninstall DR RDQM and IBM MQ and upgrade RDQM and IBM MQ.

a) Upgrade the DR secondary node:

- a. Log in as root or switch to superuser using the **su** command.
- b. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

c. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

d. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

e. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

f. Install the new levels of IBM MQ and RDQM, see [Installing RDQM \(replicated data queue managers\)](#).

b) On the DR primary node, do one of the following steps:

- End the DR queue managers, or
- Perform a managed failover of the DR queue managers to the DR secondary node.

c) Upgrade the DR primary node:

- a. Log in as root or switch to superuser using the **su** command.

b. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

c. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

d. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

e. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

f. Install the new levels of IBM MQ and RDQM, see [Installing RDQM \(replicated data queue managers\)](#).

- d) On the DR primary node, do one of the following steps:
  - Start the DR queue managers (if you previously ended them), or
  - Perform a managed failover of the DR queue managers back to the DR primary node.
- Uninstall DR/HA RDQM and IBM MQ and upgrade RDQM and IBM MQ.
  - a) Upgrade the HA group on your recovery site (presuming that the DR/HA RDQMs are running on the main site). Complete the following steps on each node in the group in turn.
    - a. Log in as root or switch to superuser using the **su** command.
    - b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

c. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

d. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

e. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

f. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

g. Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).

h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- b) On the HA group at the main site, either stop your queue managers, or perform a managed failover to the HA group that you have just upgraded on the recovery site.
- c) Upgrade the HA group on your main site. Complete the following steps on each node in the group in turn.

a. Log in as root or switch to superuser using the **su** command.

b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

c. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

d. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

e. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

f. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp  
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

g. Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).

h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- d) You can now either start your queue managers (if you previously stopped them) or fail them back over to the main site from the recovery site.

### Related reference

[rdqmadm \(administer replicated data queue manager cluster\)](#)



## Linux > MQ Adv. **Installing RDQM alongside other IBM MQ installations**

You can install RDQM alongside other installations of IBM MQ although there can only be one RDQM installation.

### About this task

When installing multiple instances of IBM MQ on Linux with RPM, you must ensure that each installation is made from packages with unique names. To create unique packages, you run the **crtmqpkg** command:

```
crtmqpkg PACKAGE_SUFFIX
```

Where *PACKAGE\_SUFFIX* is a string added to package files to make them unique.

To install RDQM alongside existing IBM MQ installations, you must run **crtmqpkg** twice, once for the main IBM MQ package and once for the RDQM component that has a separate `xpm` file under the Advanced/RDQM subdirectory. For both commands, you should specify the same *PACKAGE\_SUFFIX*. When you run **crtmqpkg** for the RDQM package, you supply `RPMDIR` and `SPECDIR` arguments to specify where the RDQM package files reside.

#### Note:

- By default, the **crtmqpkg** command writes to the `/var/tmp` directory. To use a different location, you can set the `TMPDIR` environment variable before you run the **crtmqpkg** command.
- Before you can run the **crtmqpkg** command on Linux, you must have the **pax** and **rpmbuild** commands installed. These commands are not supplied as part of the product. You must get them from your Linux distribution supplier. The **rpmbuild** command is located in the **rpm-build** package.

### Procedure

To create unique installation packages for RDQM:

1. Decompress the downloaded software to your installation directory, see [“Installing the first IBM MQ installation on Linux using the rpm command”](#) on page 112.
2. From your installation directory, create unique packages for the IBM MQ components:

```
./crtmqpkg RDQM
```

3. From your installation directory, create unique packages for the RDQM components:

```
RPMDIR=install_directory_path/MQServer/Advanced/RDQM SPECDIR=install_directory_path/MQServer/Advanced/RDQM/iepackage ./crtmqpkg RDQM
```

Where *install\_directory\_path* is the full path to your installation directory.

4. Install IBM MQ with RDQM using the packages you created in this task. Note that, as you are installing an additional instance of IBM MQ, you will need to use the `--prefix` option with `rpm` to specify a non-default installation location.
  - a) Change to the directory containing the unique packages that were created, for example:

```
cd /var/tmp/mq_rpms/RDQM/x86_64
```

- b) Install IBM MQ and RDQM:

```
rpm -ivh --prefix /opt/customLocation MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime* MQSeriesRDQM*
```

## Linux > MQ Adv. **Applying OS updates with RDQM**

RDQM uses a DRBD kernel module which must be compatible with the current OS kernel level.

**Note:** You should only apply RHEL updates within a version, for example from 9.2 to 9.3. You should not update versions, for example, from RHEL 8 to RHEL 9. For updating a version, see [“Migrating an RDQM configuration from RHEL 8 to RHEL 9”](#) on page 496.

If OS updates are made which update the OS kernel level then a new DRBD kernel module might be required. See <https://ibm.biz/mqrdqmkernelmods> for guidance on compatibility between DRBD kernels and OS kernels.

Typically, a DRBD kernel update is required when the OS kernel branch is updated. For example, from RHEL 9.2 (5.14.0-284.11.1) to RHEL 9.3 (5.14.0-362.18.1).

In this case, follow the procedure [“Update DRBD kernel module before nodes are rebooted into a new kernel”](#) on page 266.



If you have already rebooted nodes into a new kernel, and find that RDQM does not run, follow the procedure [“Update DRBD kernel module after a node has rebooted into a new kernel”](#) on page 268.

The `rdqmstatus` command gives information about the OS kernel level and DRBD kernel module level, see [Viewing RDQM and HA group status](#), [Viewing DR RDQM status](#), and [Viewing DR/HA RDQM and HA group status](#).

### Related tasks

[“Applying maintenance level updates for RDQM”](#) on page 316

There are different procedures for applying maintenance level updates to a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

  *Update DRBD kernel module before nodes are rebooted into a new kernel*

If an OS update requires a DRBD kernel update, you should follow this procedure before you reboot the nodes into the new OS kernel.

### About this task

**Note:** You should only apply RHEL updates within a version, for example from 9.2 to 9.3. You should not update versions, for example, from RHEL 8 to RHEL 9.

There are different procedures for updating the DRBD kernel module for a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

For HA configurations, complete the steps on each node in the HA group in turn. Processing can continue on other nodes while the update is in progress.

### Procedure

- To update the DRBD kernel module before a node is rebooted into a new kernel for RDQM HA:
  - a) Log in as root, or with sufficient authority to run the following commands.

You can do this by adding `sudo` before the commands, or by changing to the root user in the shell with the `su` command. For more information, see [Exploring the differences between `sudo` and `su` commands in Linux](#). This information also applies to UNIX systems in general.

- b) Suspend the node from the HA group:

```
rdqmadm -s
```

- c) Update the OS. For example:

```
yum update
```

- d) Determine which DRBD kernel module is compatible with the new kernel level (see <https://ibm.biz/mqrdqmkernelmods> for guidance on which kernel module is compatible). For example, for moving to RHEL 9.2 (5.14.0-284.11.1) with IBM MQ 9.4, the required kernel module is `kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64`.

- e) Update the DRBD kernel module with the one you identified in step 4. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64.rpm
```

- f) Reboot the node. This will reboot to the new kernel level:

```
sudo reboot
```

g) Resume the node in the HA group:

```
rdqmadm -r
```

You can now repeat this procedure for the next node in the HA group.

- To update the DRBD kernel module before nodes are rebooted into a new kernel for RDQM DR:

a) Update the OS and the DRBD kernel module on the DR secondary node:

a. Log in as root, or with sufficient authority to run the following commands.

b. Update the OS. For example:

```
yum update
```

c. Determine which DRBD kernel module is compatible with the new kernel level (see <https://ibm.biz/mqrdqmkernelmods> for guidance on which kernel module is compatible). For example, for moving to RHEL 9.2 (5.14.0-284.11.1) with IBM MQ 9.4, the required kernel module is `kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64`.

d. Update the DRBD kernel module with the one you identified in step c. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64.rpm
```

e. Reboot the node. This will reboot to the new kernel level:

```
sudo reboot
```

b) On the DR primary node, complete one of the following steps:

– End the DR queue managers, or

– Perform a managed failover of the DR queue managers to the DR secondary node.

c) Update the OS and the DRBD kernel module on DR primary node:

a. Log in as root, or with sufficient authority to run the following commands.

b. Update the OS. For example:

```
yum update
```

c. Determine which DRBD kernel module is compatible with the new kernel level (see <https://ibm.biz/mqrdqmkernelmods> for guidance on which kernel module is compatible). For example, for moving to RHEL 9.2 (5.14.0-284.11.1) with IBM MQ 9.4, the required kernel module is `kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64`.

d. Update the DRBD kernel module with the one you identified in step c. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64.rpm
```

e. Reboot the node. This will reboot to the new kernel level:

```
sudo reboot
```

d) On the DR primary node, complete one of the following steps:

– Start the DR queue managers, or

– Perform a managed failover of the DR queue managers to the DR primary node.

- To update the DRBD kernel module before nodes are rebooted into a new kernel for RDQM DR/HA:

a) Update the OS and the DRBD kernel module on your recovery site. Complete the following steps on each node in the group in turn.

a. Log in as root, or with sufficient authority to run the following commands.

b. Suspend the node from the HA group:

```
rdqmadm -s
```

c. Update the OS. For example:

```
yum update
```

d. Determine which DRBD kernel module is compatible with the new kernel level (see <https://ibm.biz/mqrdqmkernelmods> for guidance on which kernel module is compatible). For example, for moving to RHEL 9.2 (5.14.0-284.11.1) with IBM MQ 9.4, the required kernel module is `kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64`.

e. Update the DRBD kernel module with the one you identified in step d. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64.rpm
```

f. Reboot the node. This will reboot to the new kernel level:

```
sudo reboot
```

g. Resume the node in the HA group:

```
rdqmadm -r
```

You can now repeat this procedure for the next node in the HA group.

b) Update the OS and the DRBD kernel module on your main site. Complete the following steps on each node in the group in turn.

a. Log in as root, or with sufficient authority to run the following commands.

b. Suspend the node from the HA group:

```
rdqmadm -s
```

c. Update the OS. For example:

```
yum update
```

d. Determine which DRBD kernel module is compatible with the new kernel level (see <https://ibm.biz/mqrdqmkernelmods> for guidance on which kernel module is compatible). For example, for moving to RHEL 9.2 (5.14.0-284.11.1) with IBM MQ 9.4, the required kernel module is `kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64`.

e. Update the DRBD kernel module with the one you identified in step d. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_5.14.0_284.11.1-1.x86_64.rpm
```

f. Reboot the node. This will reboot to the new kernel level:

```
sudo reboot
```

g. Resume the node in the HA group:

```
rdqmadm -r
```

You can now repeat this procedure for the next node in the HA group.

  *Update DRBD kernel module after a node has rebooted into a new kernel*

If a node was rebooted to a new OS kernel level and the DRBD kernel module is now incompatible with the current OS kernel level then RDQM might fail to start correctly on the node.

## About this task

**Note:** You should only apply RHEL updates within a version, for example from 9.2 to 9.3. You should not update versions, for example, from RHEL 8 to RHEL 9.

For example, if a node was rebooted into a RHEL 9.3 (5.14.0-362.18.1) kernel with a RHEL 9.2 (5.14.0-284.11.1.) DRBD kernel module installed, RDQM does not start. The command `rdqmstatus -m qmname` shows an HA status of Unknown for an HA or DR/HA queue manager, and a DR status of Unknown for a DR queue manager.

The queue manager will not run on this node until the issue is resolved.

The kernel level of the OS and the installed DRBD kernel module level can be displayed by using the following command:

```
$ rdqmstatus
```

The output includes kernel information as shown in the following example:

```
Node:                               mqhavm07.exampleco.com
OS kernel version:                   5.14.0-362.18.1
DRBD OS kernel version:              5.14.0-362.18.1
DRBD version:                        9.2.7
DRBD kernel module status:           Loaded
```

To recover from this situation, complete the following procedure in turn on each node that has been rebooted into a new kernel.

## Procedure

1. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

2. Determine which DRBD kernel module is now needed for the system. See <https://ibm.biz/mqrdqkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories.

For example, on a RHEL 8.9 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.2.7+ptf.14.gdc5453714_4.18.0_513.5.1-1.x86_64.rpm
```

3. Update the DRBD kernel module to the one that you identified in step 2. For example:

```
yum install kmod-drbd-9.2.7+ptf.14.gdc5453714_4.18.0_513.5.1-1.x86_64.rpm
```

4. Reboot the node:

```
sudo reboot
```

## Installing IBM MQ for z/OS

Installation tasks that are associated with installing IBM MQ on z/OS systems are grouped in this section.

### About this task

IBM MQ for z/OS uses the standard z/OS installation procedure. It is supplied with a Program Directory that contains specific instructions for installing the program on a z/OS system. You must follow the instructions in the appropriate Program Directory. For download links for the Program Directories, see [IBM MQ for z/OS Program Directory PDF files](#).

The Program Directory includes not only details of the installation process, but also information about the prerequisite products and their service or maintenance levels.

SMP/E, used for installation on the z/OS platform, validates the service levels and prerequisite and corequisite products, and maintains the SMP/E history records to record the installation of IBM MQ for

z/OS. It loads the IBM MQ for z/OS libraries and checks that the loads have been successful. You then have to customize the product to your own requirements.

Before you install and customize IBM MQ for z/OS, you must decide the following:

- Whether you are going to install one of the optional national language features. See [National language support](#).
- Which communications protocol and distributed queuing facility you are going to use. See [Communications protocol and distributed queuing](#).
- What your naming convention for IBM MQ objects will be. See [Naming conventions](#).
- What command prefix string (CPF) you are going to use for each queue manager. See [Using command prefix strings](#).
- When upgrading from a previous Continuous Delivery release through the installation of PTFs, decide whether any USERMODs that have been applied to IBM MQ for z/OS will still be required. Remove the USERMODs before installation of the Continuous Delivery PTFs, or use the SMP/E BYPASS(ID) option on APPLY. If neither of these actions is performed, an SMP/E MODID ERROR GIM38201E will be received.

The PTFs for the latest Continuous Delivery release can be determined by using [SMP/E FIXCAT HOLDDATA category IBM.MQ.V9RMn](#), where *R* is the release number, and *n* is the modification level. For example, category IBM.MQ.V9R0M2 identifies fixes that upgrade IBM MQ for z/OS 9.0 Continuous Delivery to modification level 2.

You also need to plan how much storage you require in your z/OS system to accommodate IBM MQ; [Planning your storage and performance requirements on z/OS](#) helps you plan the amount of storage required.

## Procedure

1. Check that your system hardware, and software levels meet the minimum requirements.  
See [“Checking requirements on z/OS” on page 272](#).
2. Plan your installation  
See [“Planning to install IBM MQ for z/OS” on page 273](#).
3. Install and configure IBM MQ for z/OS, by following the instructions detailed in the Program Directory.  
See also the information in the subtopics for further guidance.

## z/OS installation overview

IBM MQ functions are provided as a number of different products, which are installed together to provide the capability required.

**Note:** From IBM MQ for z/OS 9.2, the Managed File Transfer for z/OS binary libraries are provided as part of the base IBM MQ for z/OS installation.

[“Changes caused by making IBM MQ Managed File Transfer for z/OS part of the base product installation” on page 281](#), lists the major points this change makes to the installation process from earlier versions of the product.

The different products are:

### **IBM MQ for z/OS**

Provides IBM MQ capability, connectivity on and off the z/OS platform, and excellent integration with z/OS software, such as CICS®, IMS, WebSphere Application Server, and Db2. Licensed under a Monthly License Charge (MLC) model.

### **IBM MQ for z/OS Value Unit Edition (VUE)**

Same functionality as IBM MQ for z/OS; licensed under a One Time Charge (OTC) model. Can coexist and interact with IBM MQ MLC offerings in other LPARs.

Note that, from an installation perspective, the same FMIDs as for IBM MQ for z/OS are installed, then the **QMGRPROD** attribute must be set to VUE, which changes product usage recording for billing purposes.

### IBM MQ Advanced for z/OS

Managed File Transfer (MFT) and Advanced Message Security (AMS) features, plus the Connector Pack. IBM MQ Advanced for z/OS does not include entitlement to run queue managers and so one of IBM MQ for z/OS or IBM MQ for z/OS VUE is a prerequisite.

The Advanced Message Security feature does not require installation. Both the Managed File Transfer feature and the Connector Pack component are installed via separate FMIDs.

### IBM MQ Advanced for z/OS Value Unit Edition

Bundling of IBM MQ for z/OS VUE and IBM MQ Advanced for z/OS.

From an installation perspective, the same FMIDs as IBM MQ for z/OS VUE and IBM MQ Advanced for z/OS are installed. Once installed, the **QMGRPROD** attribute must be set to ADVANCEDVUE, which changes product usage recording for billing purposes.

## Features

The features are:

### Advanced Message Security (AMS)

Provides end to end encryption of messages throughout the IBM MQ network. Data is encrypted at rest, in memory, and when being transmitted over the network.

### Managed File Transfer (MFT)

Provides the ability to integrate file data into an IBM MQ network, while providing reliable auditing, management and recovery.

## Connector Pack component

The Connector Pack component provides the following capabilities:

- The [IBM Aspera® faspio Gateway](#), which can improve the speed of transfer of IBM MQ data in lossy, high latency, networks.
- The [IBM MQ Kafka Connector](#), which allows data to flow between IBM MQ and Kafka topologies.

## Enablement

Enablement of IBM MQ for z/OS VUE or IBM MQ Advanced for z/OS VUE requires setting the **QMGRPROD** attribute; enablement of Advanced Message Security requires setting the **AMSPROD** attribute.

For more information, see [“Product usage recording with IBM MQ for z/OS products”](#) on page 277.

**Note:** Enablement modules for these capabilities are no longer provided.

## Licensing models

The two different licensing models, together with their associated bundles, are shown in the following table:

Licensing Model	Product Name	Feature	Product ID
MLC	IBM MQ for z/OS		5655-MQ9
OTC	IBM MQ for z/OS Value Unit Edition (VUE)		5655-VU9
OTC		Advanced Message Security( AMS)	See Note “1” on <a href="#">page 272</a> for more information.

Licensing Model	Product Name	Feature	Product ID
OTC		Managed File Transfer (MFT)	See Note “1” on page 272 for more information.
OTC	IBM MQ Advanced for z/OS	Advanced Message Security( AMS) Managed File Transfer (MFT)	5655-AV9
OTC	IBM MQ Advanced for z/OS Value Unit Edition	(all included)	5655-AV1

**Note:**

1. As per the 9th July, 2019 announcement letter, 5655-AM9 IBM MQ Advanced Message Security for z/OS and 5655-MF9 IBM MQ Managed File Transfer for z/OS are withdrawn from sale. Existing customers can continue to use these products and will continue to receive fixes and future functional updates (if a valid subscription and support contract is in place). The capabilities will continue to be available to new and existing customers with IBM MQ Advanced for z/OS and IBM MQ Advanced for z/OS VUE.

**Installation**

Program Directories provide instructions for SMP/E installation of the program materials on to a target system. For download links for the Program Directories, see [IBM MQ for z/OS Program Directory PDF files](#).

The [Customizing IBM MQ for z/OS](#) topics guide you through customization of the code, and creating customized execution units, for example the queue manager and file transfer agents.

**Related concepts**

“Managed File Transfer product options” on page 246

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. These options are Managed File Transfer Agent, Managed File Transfer Service, Managed File Transfer Logger, or Managed File Transfer Tools.

**Related tasks**

“Maintaining and migrating IBM MQ” on page 290

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[Installing Advanced Message Security](#)

Use the information for your platform to guide you through installing the Advanced Message Security (AMS) component.

**z/OS Checking requirements on z/OS**

Before you install IBM MQ on z/OS, you must check for the latest information and system requirements.

**About this task**

A summary of the tasks that you must complete to check system requirements is listed here with links to further information.

**Procedure**

1. Check that you have the latest information, including information on hardware and software requirements.



See [“Where to find product requirements and support information”](#) on page 9.

2. Check that your systems meet the hardware and software requirements for IBM MQ on z/OS.

Before attempting to install and run IBM MQ for z/OS, ensure that your system hardware, and software levels meet the minimum requirements. You can check the minimum required levels on the [System Requirements for IBM MQ](#) website. Follow the links for the version of IBM MQ that you are installing in and select the appropriate Detailed System Requirements report for z/OS. There are separate reports for Long Term Support and Continuous Delivery.

3. Check that you have the correct licenses.

See [“License requirements”](#) on page 8 and [IBM MQ license information](#).

## **Planning to install IBM MQ for z/OS**

To install the IBM MQ product your hardware, and software environment must meet minimum requirement levels. You must also consider the national language features, communications protocols, and naming conventions to be used.

### **National language support**

You can choose one of the following national languages for the IBM MQ operator messages and the IBM MQ operations and control panels (including the character sets used). Each language is identified by one of the following language letters:

#### **C**

Simplified Chinese

#### **E**

U.S. English (mixed case)

#### **F**

French

#### **K**

Japanese

#### **U**

U.S. English (uppercase)

The samples, IBM MQ commands, and utility control statements are available only in mixed case U.S. English.

### **Communications protocol and distributed queuing**

The distributed queuing facility provided with the base product feature of IBM MQ can either use APPC (LU 6.2), TCP/IP from IBM, or any TCP product which supports the z/OS Unix Sockets API. The distributed queuing facility is also known as the channel initiator and the mover.

You must perform the following tasks to enable distributed queuing:

- Choose which communications interface to use. This can be either, or both, of the following:
  - APPC (LU 6.2)
  - TCP/IP
- Customize the distributed queuing facility and define the IBM MQ objects required.
- Define access security.
- Set up your communications. This includes setting up your TCPIP.DATA data set if you are using TCP/IP, LU names, and side information if you are using APPC. This is described in [Setting up communication for z/OS](#).

## Naming conventions

It is advisable to establish a set of naming conventions when planning your IBM MQ systems. The names you choose will probably be used on different platforms, so you should follow the convention for IBM MQ, not for the particular platform.

IBM MQ allows both uppercase and lowercase letters in names, and the names are case sensitive. However, some z/OS consoles fold names to uppercase, so do not use lowercase letters for names unless you are sure that this will not happen.

You can also use numeric characters and the period (.), forward slash (/), underscore (\_) and percent (%) characters. The percent sign is a special character to Security Server (previously known as RACF®), so do not use it in names if you are using Security Server as your External Security Manager. Do not use leading or trailing underscore characters if you are planning to use the Operations and Control panels.

For more information, see [Rules for naming IBM MQ objects](#).

### Choosing names for queue managers and queue sharing groups

Each queue manager and queue sharing group within a network must have a unique name. Do not use the same name for a queue manager and a queue sharing group. On z/OS the names of queue managers and queue sharing groups can be up to four characters long. Each Db2 system and data-sharing group within the network must also have a unique name.

The names of queue manager and queue sharing groups can use only uppercase alphabetic characters, numeric characters, and dollar sign (\$), number sign (#) or at sign (@); they must not start with a numeric character. Queue sharing group names that are less than four characters long are padded internally with at signs, so do not use names ending in the at sign.

The queue manager name is the same as the z/OS subsystem name. You might identify each subsystem as a queue manager by giving it the name QM *xx* (where *xx* is a unique identifier), or you might choose a naming convention like ADDX, where A signifies the geographic area, DD signifies the company division, and X is a unique identifier.

You might want to use your naming convention to distinguish between queue managers and queue sharing groups. For example, you might identify each queue sharing group by giving it the name QG *xx* (where *xx* is the unique identifier).

### Choosing names for objects

Queues, processes, name lists, clusters, and topics can have names up to 48 characters long. Channels can have names up to 20 characters long and storage classes can have names up to 8 characters long.

If possible, choose meaningful names within any constraints of your local conventions. Any structure or hierarchy within names is ignored by IBM MQ, however, hierarchical names can be useful for system management. You can also specify a description of the object when you define it to give more information about its purpose.

Each object must have a unique name within its object type. However, each object type has a separate namespace, so you can define objects of different types with the same name. For example, if a queue has an associated process definition, it is a good idea to give the queue and the process the same name. It is also a good idea to give a transmission queue the same name as its destination queue manager.

You could also use the naming convention to identify whether the object definition is private or a global. For example, you could call a namelist `project_group.global` to indicate that the definition is stored on the shared repository.

### Application queues

Choosing names that describe the function of each queue helps you to manage these queues more easily. For example, you might call a queue for inquiries about the company payroll `payroll_inquiry`. The reply-to queue for responses to the inquiries might be called `payroll_inquiry_reply`.

You can use a prefix to group related queues. This means that you can specify groups of queues for administration tasks like managing security and using the dead-letter queue handler. For example, all the queues that belong to the payroll application might be prefixed by `payroll_`. You can then define a single security profile to protect all queues with names beginning with this prefix.

You can also use your naming convention to indicate that a queue is a shared queue. For example, if the payroll inquiry queue was a shared queue, you might call it `payroll_inquiry.shared`.

## Storage classes and coupling facility structures

The character set you can use when naming storage classes and coupling facility structures is limited to uppercase alphabetic and numeric characters. You should be systematic when choosing names for these objects.

Storage class names can be up to 8 characters long, and must begin with an alphabetic character. You will probably not define many storage classes, so a simple name is sufficient. For example, a storage class for IMS bridge queues could be called `IMS`.

Coupling facility structure names can be up to 12 characters long, and must begin with an alphabetic character. You could use the name to indicate something about the shared queues associated with the coupling facility structure (that they all belong to one suite of applications for example). Remember that in the coupling facility, the structure names are the IBM MQ name prefixed by the name of the queue sharing group (padded to four characters with `@` symbols).

## Choosing names for channels

To help you manage channels, it is a good idea if the channel name includes the names of the source and target queue managers. For example, a channel transmitting messages from a queue manager called `QM27` to a queue manager called `QM11` might be called `QM27/QM11`.

If your network supports both TCP and SNA, you might also want to include the transport type in the channel name, for example `QM27/QM11_TCP`. You could also indicate whether the channel is a shared channel, for example `QM27/QM11_TCP.shared`.

Remember that channel names cannot be longer than 20 characters. If you are communicating with a queue manager on a different platform, where the name of the queue manager might contain more than 4 characters, you might not be able to include the whole name in the name of the channel.

## Using command prefix strings

Each instance of IBM MQ that you install must have its own *command prefix* string (CPF). You use the CPF to identify the z/OS subsystem that commands are intended for. It also identifies the z/OS subsystem from which messages sent to the console originate.

You can issue all MQSC commands from an authorized console by inserting the CPF before the command. If you enter commands through the system command input queue (for example, using `CSQUTIL`), or use the IBM MQ operations and control panels, you do not use the CPF.

To start a subsystem called `CSQ1` with CPF that is `+CSQ1`, issue the command `+CSQ1 START QMGR` from the operator console (the space between the CPF and the command is optional).

The CPF also identifies the subsystem that is returning operator messages. The following example shows `+CSQ1` as the CPF between the message number and the message text.

```
CSQ9022I +CSQ1 CSQNCDSP ' DISPLAY CMDSERV' NORMAL COMPLETION
```

See [Defining command prefix strings \(CPFs\)](#) for information about defining command prefix strings.

## **Customizing IBM MQ and its adapters**

IBM MQ requires some customization after installation to meet the individual and special requirements of your system, and to use your system resources in the most effective way.

For a list of tasks that you must perform when you customize your system, see [Setting up IBM MQ for z/OS](#).

### **Using queue sharing groups**

If you want to use queue sharing groups, you do not have to set them up when you install IBM MQ, you can do this at any time.

For details of how to manage your queue sharing groups when you have set them up, see [Managing queue sharing groups](#).

## **Verifying your installation of IBM MQ for z/OS**

After the installation and customization has been completed, you can use the installation verification programs (IVPs) supplied with IBM MQ for z/OS to verify that the installation has been completed successfully.

The IVPs supplied are assembler language programs and you should run them after you have customized IBM MQ for z/OS to suit your needs. They are described in [Running the basic installation verification program](#).

## **Macros intended for customer use**

The macros identified in this topic are provided as programming interfaces for customers in support of features that are specific to IBM MQ for z/OS.

The 'C' include files, COBOL copy files, PL/I include files and assembler macros that are provided as programming interfaces for customers in support of features that apply across many IBM MQ platforms are described in the [Constants](#) section of the documentation.

**Note:** Do not use as programming interfaces any IBM MQ macros other than those interfaces identified in this topic or in [Constants](#).

### **General-use programming interface macros**

The following assembler macros are provided to enable you to write programs that use the services of IBM MQ. The macros are supplied in library `th1qua1.SCSQMACS`.

- CMQXCALA
- CMQXCFBA
- CMQXCFCFA
- CMQXCFLA
- CMQXCDFFA
- CMQXCINA
- CMQXCVCA

### **Product-sensitive programming interface macros**

The following assembler macros are provided to enable you to write programs that use the services of IBM MQ. The macros are supplied in library `th1qua1.SCSQMACS`. Product-sensitive interfaces are open to change between different releases of the product.

- CSQBDEF
- CSQDQEST
- CSQDQIST
- CSQDQJST
- CSQDQLST
- CSQDQMAC
- CSQDQMST
- CSQDQPST
- CSQDQSST
- CSQDQWHC
- CSQDQWHS
- CSQDQ5ST
- CSQDWQ
- CSQDWTAS
- CSQQDEFX
- CSQQLITX

## Product usage recording with IBM MQ for z/OS products

z/OS can measure how much processing time is spent in doing work on behalf of the various processes that make up the IBM MQ product. This is known as product usage recording.

Product usage recording works as follows:

- When the IBM MQ for z/OS product is started, it identifies itself to z/OS and requests that the *System Management Facilities (SMF)* mechanism within z/OS is to automatically measure how much processor time it uses.
- When enabled, the z/OS usage measurement facility collects usage figures for each hour of the day, and generates usage records that are added to a report file on disk.
- At the end of one full month, these usage records are collected by a program, which generates a report of product usage for the month. This report is used to determine the charge for the IBM MQ for z/OS product.

For more information about product usage recording and the Sub-Capacity Reporting Tool (SCRT), see [Preparing to use the Sub-Capacity Reporting Tool](#). For information about the MULCCAPT parameter see, [Using CSQ6SYSP](#).

As IBM MQ for z/OS is available under several different product IDs (PIDs) you need to ensure that it registers itself to z/OS with the PIDs that you are entitled to, which will ensure that you are charged correctly.

This needs to be done for each of the different parts of the IBM MQ for z/OS product that you might be running:

- Queue manager and channel initiator
- Advanced message security (AMS)
- Managed file transfer (MFT)
- mqweb server

This topic describes how you do this.

## IBM MQ for z/OS product IDs

Product	Product ID
IBM MQ for z/OS	5655-MQ9
IBM MQ for z/OS Value Unit Edition (VUE)	5655-VU9
IBM MQ Advanced for z/OS	5655-AV9
IBM MQ Advanced for z/OS VUE	5655-AV1

**Note:** From IBM MQ for z/OS 9.1.3, the older IBM MQ Advanced Message Security for z/OS and IBM MQ Managed File Transfer for z/OS products are no longer available separately and are instead features of IBM MQ Advanced for z/OS and IBM MQ Advanced for z/OS VUE.

## Associating the queue manager and channel initiator with a PID

The queue manager and channel initiator address spaces are associated with a specific PID using the QMGRPROD attribute. The following table shows how the value of the QMGRPROD attribute maps to a product and PID:

QMGRPROD value	Product	Product ID
MQ	IBM MQ for z/OS	5655-MQ9
VUE	IBM MQ for z/OS VUE	5655-VU9
ADVANCEDVUE	IBM MQ Advanced for z/OS VUE	5655-AV1

The product and PID used by the queue manager address space are output at start up in the [CSQY036I](#) message. Note that the channel initiator does not output an equivalent message, but it uses the same PID.

Prior to IBM MQ for z/OS 9.1.3, VUE mode for both IBM MQ for z/OS VUE and IBM MQ Advanced for z/OS VUE could optionally be enabled using an enablement module. From IBM MQ for z/OS 9.1.3 that enablement module is no longer shipped, and you must use the QMGRPROD attribute.

There are three distinct methods of setting the QMGRPROD attribute:

1. In the [CSQ6USGP](#) macro, which is part of the IBM MQ system parameter module. This is the approach you should use for setting QMGRPROD permanently.
2. As a parameter on the [START QMGR](#) command. This needs to be set for each use of the command.
3. As a parameter on the JCL used to start the queue manager address space. See [Using MQSC to start and stop a queue manager on z/OS](#) for more information.

The second and third approaches can be useful the first few times that QMGRPROD is used, or for test systems, and will override the values set by CSQ6USGP.

## Associating AMS with a PID

The AMS address space is associated with a specific product using the AMSPROD attribute. The table below shows how the value of the AMSPROD attribute maps to a particular product:

AMSPROD value	Product	Product ID
AMS	IBM MQ Advanced Message Security for z/OS	5655-AM9
ADVANCED	IBM MQ Advanced for z/OS	5655-AV9
ADVANCEDVUE	IBM MQ Advanced for z/OS VUE	5655-AV1

Prior to IBM MQ for z/OS 9.1.3, an enablement module was required for the AMS address space to start up. From IBM MQ for z/OS 9.1.3 that enablement module is no longer shipped. Instead, if your enterprise wants to use Advanced Message Security, you must ensure that AMSPROD is set to one of AMS, ADVANCED, or ADVANCEDVUE depending on what product you are entitled to. If SPLCAP(YES) is set in CSQ6SYSP, indicating that the queue manager is to be enabled for AMS, but AMSPROD is not set, then from IBM MQ for z/OS 9.1.3, the queue manager will not start and message CSQY024I will be output.

The product and PID used by the AMS address space are output at start up in the CSQ0619I message.

There are three distinct methods of setting the AMSPROD attribute:

1. In the CSQ6USGP macro, which is part of the IBM MQ system parameter module. This is the approach you should use for setting AMSPROD permanently.
2. As a parameter on the START QMGR command. This needs to be set for each use of the command.
3. As a parameter on the JCL used to start the queue manager address space. See [Using MQSC to start and stop a queue manager on z/OS](#) for more information.

The second and third approaches can be useful the first few times that AMSPROD is used, or for test systems, and will override the values set by CSQ6USGP.

## Associating Managed File Transfer with a PID

MFT processes are associated with a specific PID using the [fteSetProductId](#) command.

## Associating the mqweb server with a PID

From IBM MQ for z/OS 9.2.0 the mqweb server, that hosts the IBM MQ Console and REST API, is associated with the PID provided when it is created using the [crtmqweb](#) command.

Once an mqweb server has been created you can change its PID using the [setmqweb pid pid](#) command.

mqweb servers that were created prior to version 9.2.0 will, by default, use the IBM MQ for z/OS PID. You can use the **setmqweb pid** command to change the PID that they run under if necessary.

You should not use the older manual approach for setting the mqweb server PID, which involved copying properties files.

The PID used by the mqweb server is output at start up in the messages .log using the CWWKB0108I message.

For IBM MQ for z/OS, this looks like:

```
CWWKB0108I: IBM CORP product MQM MVS/ESA version V9 R2.0 successfully registered with z/OS.
```

For IBM MQ for z/OS VUE, this looks like:

```
CWWKB0108I: IBM CORP product MQ z/OS VUE version NOTUSAGE successfully registered with z/OS.
```

For IBM MQ for z/OS Advanced VUE, this looks like:

```
CWWKB0108I: IBM CORP product MQ z/OS Adv VUE version NOTUSAGE successfully registered with z/OS.
```

## Default PIDs

In most cases, if a specific PID is not selected, a default PID is used for:

- The queue manager and channel initiator, which is IBM MQ for z/OS
- mqweb servers created prior to version 9.2.0, which is IBM MQ for z/OS
- The AMS address space, which is IBM MQ Advanced Message Security for z/OS
- MFT processes, which is IBM MQ Managed File Transfer for z/OS

## Sample scenarios

### You have IBM MQ for z/OS

QMGRPROD does not need to be changed, the default PID of 5665-MQ9 is used.

### You have installed a new IBM MQ Advanced for z/OS Value Unit Edition queue manager, and want to enable AMS

In CSQ6USGP, set QMGRPROD=ADVANCEDVUE and AMSPROD=ADVANCEDVUE; the 5655-AV1 PID is used.

### Related reference

[IBM MQ license information](#)

[IBM MQ product identifiers and export information](#)

## Installing and enabling IBM MQ for z/OS Value Unit Edition

IBM MQ for z/OS Value Unit Edition (VUE) provides all the function and capability of base IBM MQ for z/OS, in a format that offers a one-time-charge (OTC) price metric

The OTC price metric provides an alternative pricing model for IBM MQ for z/OS workloads.

VUE can connect to other supported versions of IBM MQ for z/OS for workload federation and systems management.

The VUE feature allows connections from IBM MQ clients, that run on other platforms.

## Enabling VUE

VUE uses the same code as IBM MQ for z/OS. From IBM MQ for z/OS 9.1.3 there is no separate enablement module to be installed.

If your enterprise has purchased VUE, you can enable it by setting the QMGRPROD attribute to VUE. See [product usage recording with IBM MQ for z/OS products](#) for more information about how to set QMGRPROD.

## Characteristics of a VUE-enabled queue manager

A VUE-enabled queue manager has all the function and capability of the base queue manager. Additionally, clients will be enabled during channel initiator startup.

A VUE-enabled queue manager records usage information in SMF89 records with the product name and identifier for VUE instead of those for the IBM MQ product.

A VUE-enabled queue manager can:

- Connect to other queue managers and clients in a network, according to the connectivity capabilities of the base queue manager installation.
- Participate in a queue sharing group with other queue managers provided the base queue manager versions are able to interoperate, regardless of whether other members are standard or VUE function queue managers.

## Installing IBM MQ Advanced for z/OS

Installation of IBM MQ Advanced for z/OS consists of installation of the Managed File Transfer (MFT) feature and the Connector Pack component. The Advanced Message Security (AMS) feature does not require installation. You can choose to just install the MFT feature, just the Connector Pack component, or both.

## Before you begin

Install either the [IBM MQ for z/OS](#) or [IBM MQ for z/OS VUE](#) products.



## About this task

Use this topic to understand how you install IBM MQ Advanced for z/OS on your system.

**Important:** You should only make use of the IBM MQ Advanced Message Security for z/OS feature if you have entitlement to one of the IBM MQ Advanced for z/OS, IBM MQ Advanced for z/OS VUE, or IBM MQ Advanced Message Security for z/OS products.

You should only install and make use of the Managed File Transfer for z/OS feature if you have entitlement to one of the IBM MQ Advanced for z/OS, IBM MQ Advanced for z/OS VUE, or IBM MQ Managed File Transfer for z/OS products.

For information about licensing, see [IBM MQ license information](#) and [IBM MQ for z/OS product identifiers](#).

## Procedure

1. If you want to use Advanced Message Security, then no installation is required.  
For more information on enabling and configuring AMS, see [Configuring Advanced Message Security for z/OS](#).
2. If you want to use Managed File Transfer, first plan your Managed File Transfer installation.  
For more information, see [Planning for Managed File Transfer](#).  
You should then install the Managed File Transfer feature by following the instructions detailed in the IBM MQ Advanced for z/OS Program Directory. For download links for the IBM MQ Advanced for z/OS Program Directory, see [IBM MQ for z/OS Program Directory PDF files](#).
3. If you want to make use of the function in the Connector Pack component, install it by following the instructions detailed in the IBM MQ Advanced for z/OS Program Directory.

## What to do next

When you have installed the product, follow the instructions in the Program Directory for activating it.

### Related tasks

[Configuring Managed File Transfer for z/OS](#)

[Planning for Managed File Transfer](#)

## **Changes caused by making IBM MQ Managed File Transfer for z/OS part of the base product installation**

Making Managed File Transfer for z/OS part of the base IBM MQ for z/OS product installation simplifies the installation process, and causes some important changes detailed in this topic.

From IBM MQ for z/OS 9.2.0, IBM MQ Managed File Transfer for z/OS is part of the base product installation. The major changes made are as follows:

1. Existing "full product" Managed File Transfer for z/OS (MFT) FMID HMF9110 replaced with subordinate "part of product" MFT FMID: JMS9xx7 where xx depends on exactly what is installed. For example JMS9207 (IBM MQ 9.2.0 LTS) or JMS9CD7 (IBM MQ 9.2.0 CD)

**Note:** In this context JMS has no connection with [Jakarta Messaging 3.0](#) or Java Message Service 2.0.

2. MFT moved from current component ID of 5655MF900 to base product component ID of 5655MQ900.
3. Installation customization job CSQ8ASYJ updated to allow optional install of MFT component and customization of related JCL.



**Attention:** By default, this customization is not performed, to prevent accidental installation by users who are not entitled to MFT.

4. Two additional JCL scripts have been included:
  - CSQ8I7AL for allocation of necessary libraries for MFT, and
  - CSQ8M7DD for allocation of DDEFs for MFT.

5. MFT has always required an installation of the z/OS UNIX System Services Component FMID. By default, this installed into /usr/lpp/mqm/V9R2M0 (or similar for different versions), where:

- R is the number of the release
- M is the number of the modification

MFT used to be installed into a separate directory structure, and by default, this was /usr/lpp/mqmft/V9R1Mn/. Under that directory there were three separate directories:

- mqft: the bulk of the MFT install
- bin: the various fte\* scripts for launching MFT processes
- java: two jar files containing prerequisites for MFT (com.ibm.mq.allclient.jar (JMS 2.0) or com.ibm.mq.jakarta.client.jar (Jakarta Messaging 3.0), and jta.jar)

From IBM MQ for z/OS 9.2, MFT installs directly into the /usr/lpp/mqm/V9R2Mn directory that first gets installed by the z/OS UNIX System Services (z/OS UNIX) component FMID.

In addition to the contents of the existing mqft directory being installed, the bin directory is now installed underneath the mqft directory. TheMFT java directory is no longer installed.

**Note:** The merging of the directory structures means that there is now a tight version link between the version of MFT and the version of IBM MQ. That is, if you install Managed File Transfer for z/OS, it needs to be in an IBM MQ for z/OS 9.2 installation.

6. The following MFT related data sets and their contents have been removed:

- SBFGINST
- ABFGINST

From IBM MQ for z/OS 9.2, MFT uses the IBM MQ for z/OS installation JCL in ACSQINST and SCSQINST.

7. The following MFT related data sets have been kept, but renamed to use the CSQ prefix:

**A|SBFGCMDS renamed to A|SCSQFCMD**

JCL for running MFT agents and other tasks.

**Note:** The 44 JCL members, all named BFG\*, contained in the renamed SCSQFCMD data set have **not** been renamed.

**ABFGOMSH renamed to ACSQOFSH**

Part of install process (shell script for extracting ACSQOFPX).

**ABFGOMPX renamed to ACSQOFPX**

Part of install process (MFT z/OS UNIX files)

8. Installation packaging changes:

- The BFG8MPX1.pax file has been renamed to CSQ8FPX1.pax.
- The BFG8MSH1 shell script that is used to extract the CSQ8FPX1.pax file is renamed to CSQ8FSH1.
- The DDEF pointing to the MFT z/OS UNIX location has been renamed from SBFGMxxx to SCSQFxxx.

**Related concepts**

[“Managed File Transfer product options” on page 246](#)

Managed File Transfer can be installed as four different options, depending on your operating system and overall setup. These options are Managed File Transfer Agent, Managed File Transfer Service, Managed File Transfer Logger, or Managed File Transfer Tools.

**Related tasks**

[“Maintaining and migrating IBM MQ” on page 290](#)

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[“Installing AMS on Multiplatforms” on page 238](#)

Use the information for your platform to guide you through installing the Advanced Message Security (AMS) component.

## **Installing IBM MQ Advanced for z/OS Value Unit Edition**

IBM MQ Advanced for z/OS Value Unit Edition (VUE) is a bundling of the IBM MQ for z/OS VUE and IBM MQ Advanced for z/OS products.

### **About this task**

Use this topic to understand how you install IBM MQ Advanced for z/OS VUE on your system.

### **Procedure**

- Install IBM MQ for z/OS Value Unit Edition.  
For more information, see [“Installing and enabling IBM MQ for z/OS Value Unit Edition” on page 280](#).
- Install IBM MQ Advanced for z/OS capabilities if required.  
For more information, see [“Installing IBM MQ Advanced for z/OS” on page 280](#).  
For download links for the IBM MQ Advanced for z/OS Value Unit Edition Program Directory, see [IBM MQ for z/OS Program Directory PDF files](#).

### **Related tasks**

[“Installing IBM MQ Advanced for Multiplatforms” on page 237](#)

Installation tasks associated with IBM MQ Advanced for Multiplatforms are grouped in this section.

### **Related reference**

[DISPLAYQMGR ADVCAP](#)

[MQCMD\\_INQUIRE\\_Q\\_MGR MQIA\\_ADVANCED\\_CAPABILITY](#)

## **Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows**

You can install IBM MQ Explorer from a stand-alone download that is available from Fix Central.

### **About this task**

You can download the stand-alone IBM MQ Explorer (formerly the MS0T SupportPac) from Fix Central and install it as a stand-alone application, running on Linux x86\_64 or Windows, on as many machines as you require, either on its own or alongside an installation of IBM MQ of the same version. However, you can only have a single installation of the stand-alone IBM MQ Explorer on a given machine, regardless of version.

From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central.

## **Installing the stand-alone IBM MQ Explorer on Linux**

On Linux, you can install the stand-alone IBM MQ Explorer by using the graphical user interface. Alternatively, you can install with either a silent or a console installation.

### **Before you begin**

Before you install the stand-alone IBM MQ Explorer, review the requirements information in [IBM MQ Explorer installation requirements](#).

If you already have a previous version of IBM MQ Explorer installed, uninstall that version with the supplied uninstaller before installing the new version. For more information, see [“Uninstalling the stand-alone IBM MQ Explorer on Linux” on page 285](#).

If you try to reinstall IBM MQ Explorer and you previously uninstalled it by deleting the files rather than by using the supplied uninstaller, the message `IBM MQ Explorer is already installed` appears. If this situation occurs, you need to complete some additional steps to return to a clean system before you can reinstall the stand-alone IBM MQ Explorer as described in [“Uninstalling the stand-alone IBM MQ Explorer on Linux” on page 285](#).

**Note:** In addition to the space used by the installed program, the installer uses space in the `/tmp` file system. Allow at least 600 MB, which will be freed after the installation is complete.

To use somewhere other than `/tmp`, export the `IATEMPDIR` environment variable as shown in the following example:

```
export IATEMPDIR=/var/tmp
```

You must export the environment variable before you run the `./Setup.bin` command.

In addition, allow 400 MB on a file system of your choosing for the `tar.gz` installation image and the contents of the image after the file is decompressed.

## About this task

After you download the stand-alone IBM MQ Explorer from Fix Central and decompress the files, you can install IBM MQ Explorer in any of the following ways:

- By using the installation wizard.
- By installing silently, with a response file.
- By installing with a console (text-based) installation.

If you require an accessible version of the installer, then use the silent installation mode to install IBM MQ Explorer. A response file is used to configure a silent installation. An example response file, `silent_install.resp` is provided in the same directory as the IBM MQ Explorer setup program. You can modify this example file as required by using a text editor.

## Procedure

1. Download the Linux version of stand-alone IBM MQ Explorer.

Follow this link to [Fix Central](#), then select the Linux version of the download package.

2. Create an installation directory on the target system.
3. Decompress the `tar.gz` file that you downloaded, for example, `9.4.0.0-IBM-MQ-Explorer-LinuxX64.tar.gz`, to this directory.
4. Install IBM MQ Explorer in one of the following ways:
  - To install by using the installation wizard:
    - a. Log in as root and navigate to the directory where you decompressed the files.
    - b. Run the command `./Setup.bin` (as root) and follow the onscreen instructions.
    - c. Start IBM MQ Explorer either by using the system menu entry, or by using the `MQExplorer` executable file in the installation directory.
  - To install silently, by using a response file:

- a. Use a text editor to modify the example response file, `silent_install.resp`, as required. Make your changes in line with the comments in the file.

**Note:** Before running a silent install, the **LICENSE\_ACCEPTED** property in the response file must be set to `TRUE` to indicate that you agree to the terms of the product license. (The license can be found in the `license` folder of the product `.zip` file).

b. Start the silent installation by using the following command:

```
./Setup.bin -f silent_install.resp
```

The installation then proceeds without any feedback.

- To install by using a console (text-based) installation, launch the installer by using the following command:

```
./Setup.bin -i console
```

**Note:** If you see the following error message, this might be because you have the **DISPLAY** environment variable set but do not have a valid X configuration:

Unable to load and to prepare the installer in console or silent mode.

If you do see this message, unset your **DISPLAY** environment variable and retry the operation in console mode.

## What to do next

After IBM MQ Explorer has been installed, you can run it from the system menu or by using the **MQExplorer** command. For more information, see [Launching IBM MQ Explorer](#).

### Related tasks

[Launching IBM MQ Explorer](#)

## Uninstalling the stand-alone IBM MQ Explorer on Linux

On Linux, you uninstall the stand-alone IBM MQ Explorer by running the provided uninstaller.

### About this task

On Linux, you uninstall the stand-alone IBM MQ Explorer by running the **Change IBM MQ Explorer V9.4 Installation** application.

If you remove the IBM MQ Explorer by deleting the files rather than using the provided uninstaller, you will be unable to reinstall the product at a later date unless you first carry out some additional steps to return to a clean system. If you do try to reinstall IBM MQ Explorer after you previously uninstalled it by deleting the files, the message `IBM MQ Explorer is already installed` appears.

### Procedure

- To uninstall IBM MQ Explorer with the provided uninstaller, go to the installation directory and then go in the directory named `'_IBM MQ Explorer V9.4_installation'`, then run (as root) the application named **Change IBM MQ Explorer V9.4 Installation**.
- If you need to get back to a clean system because you want to reinstall IBM MQ Explorer after uninstalling it by deleting the files rather than using the **Change IBM MQ Explorer V9.4 Installation** application, complete the following steps:
  - a) Locate and edit the file `.com.zerog.registry.xml`.

The `.com.zerog.registry.xml` file is found either in the `/var` directory or alternatively in the user's home directory. Make a backup of this file then edit it by deleting the section that begins with the XML tag: `<product name="IBM MQ Explorer '` or `<product name="IBM WebSphere MQ Explorer '` and ends with the next `</product>` tag. Save the file.
  - b) Delete the directory `/etc/opt/ibm/MQ_Explorer` and/or `/etc/opt/ibm/WebSphere_MQ_Explorer`.

You should now be able to reinstall IBM MQ Explorer as described in [“Installing the stand-alone IBM MQ Explorer on Linux”](#) on page 283.

## Installing the stand-alone IBM MQ Explorer on Windows

On Windows, you can install the stand-alone IBM MQ Explorer by using the graphical user interface. Alternatively, you can install IBM MQ Explorer with either a silent or a console installation.

### Before you begin

Before you install the stand-alone IBM MQ Explorer, review the requirements information in [IBM MQ Explorer installation requirements](#).

If you already have a previous version of IBM MQ Explorer installed, uninstall that version before you proceed with the installation of the new version.

### About this task

After you download the stand-alone IBM MQ Explorer from Fix Central and decompress the files, you can install IBM MQ Explorer in any of the following ways:

- By using the installation wizard.
- By installing silently, with a response file.
- By installing with a console (text-based) installation.

If you require an accessible version of the installer, then use the silent installation mode to install IBM MQ Explorer. A response file is used to configure a silent installation. An example response file, `silent_install.resp` is provided in the same directory as the IBM MQ Explorer setup program. You can modify this example file as required by using a text editor.

**Note:** If you silently install the stand-alone IBM MQ Explorer on a Windows system with User Account Control (UAC) enabled, you must also remove it silently and not by using **Programs and Features** in the Control Panel.

### Procedure

1. Download the Windows version of the stand-alone IBM MQ Explorer.

Follow this link to [Fix Central](#) and select the Windows version of the download package.

2. Create an installation directory on the target system.
3. Decompress the .zip file that you downloaded, for example, `9.4.0.0-IBM-MQ-Explorer-Win64.zip`, to this directory.
4. Install IBM MQ Explorer in one of the following ways:

- To install by using the installation wizard:
  - a. Double-click **Setup.exe** and follow the onscreen instructions.
  - b. Start the IBM MQ Explorer either by using the **Start** menu entry, or by using the `MQExplorer` executable file in the installation directory.
- To install silently, by using a response file:
  - a. Use a text editor to modify the example response file, `silent_install.resp`, as required. Make your changes in line with the comments in the file.

**Note:** Before installing silently, the **LICENSE\_ACCEPTED** property in the response file must be sent to TRUE to indicate that you agree to the terms of the product license. (The license can be found in the `license` folder of the product .zip file).

- b. Start the silent installation by using the following command:

```
Setup.exe -f silent_install.resp
```

The installation then proceeds without any feedback.

- To install by using a console (text-based) installation, start the installer by using the following command:

```
Setup.exe -i console
```

## What to do next

After IBM MQ Explorer has been installed, you can run it from the Windows start menu or by using the **MQExplorer** command. For more information, see [Launching IBM MQ Explorer](#).

### Related tasks

[Launching IBM MQ Explorer](#)

## Uninstalling the stand-alone IBM MQ Explorer on Windows

On Windows, you can either uninstall the stand-alone IBM MQ Explorer by using the Control Panel or by performing a silent uninstallation.

### About this task

On Windows, you can uninstall the stand-alone IBM MQ Explorer by using either **Add or Remove Programs** or **Programs and Features**, unless you installed IBM MQ Explorer silently on a Windows system with User Account Control (UAC). On Windows UAC platforms, if you performed a silent installation, you must also perform the uninstallation silently,

If you see the following error message it is most likely because you are trying to use **Programs and Features** to uninstall an installation of the stand-alone IBM MQ Explorer that was installed silently

You do not have sufficient access to uninstall IBM MQ Explorer 9.4.  
Please contact your system administrator.

.

### Procedure

- To uninstall the stand-alone IBM MQ Explorer by using the Control Panel, use either **Add or Remove Programs** or **Programs and Features** as appropriate.
- To perform a silent uninstallation, go to the directory named `_IBM MQ Explorer V9.4_installation` in the installation directory and run the following command:

```
"Change IBM MQ Explorer V9.4 Installation.exe" -i silent
```

## Installing and uninstalling IBM MQ Internet Pass-Thru

This section contains tasks to install any uninstall IBM MQ Internet Pass-Thru (MQIPT).

### About this task

MQIPT is an optional component of IBM MQ that can be used to implement messaging solutions between remote sites across the internet. For more information about MQIPT, see [IBM MQ Internet Pass-Thru](#)

If you are upgrading from a previous version of MQIPT, or applying maintenance to an MQIPT installation, see [“Migrating IBM MQ Internet Pass-Thru”](#) on page 515.

### Related tasks

[Configuring IBM MQ Internet Pass-Thru](#)

## Installing MQIPT

IBM MQ Internet Pass-Thru (MQIPT) is available on AIX, Linux, and Windows. You can install MQIPT wherever you want on your computer, and can have several installations on the same system.

### About this task

Each installation can be used and maintained separately. For example, you can have different fix pack levels of MQIPT installed in different locations if you choose.

The installation location is not fixed. MQIPT can be installed anywhere on the system. It is not necessary to set the system **PATH** or **CLASSPATH** environment variables to refer to MQIPT.

You might choose to add the MQIPT bin directory to the **PATH** environment variable for convenience, but it is not mandatory to do so.

You can also install MQIPT alongside previous versions of MQIPT.

### Procedure

To install MQIPT, complete the following steps:

1. Download the MQIPT package for the platform that you require from [IBM Fix Central for IBM MQ](#). The MQIPT packages for IBM MQ 9.4.x are available under the following names:

Platform	Archive file
AIX	9.4.x.0-IBM-MQIPT-AIXPPC64.tar.Z
Linux for x86-64	9.4.x.0-IBM-MQIPT-LinuxX64.tar.gz
Linux for IBM Z®	9.4.x.0-IBM-MQIPT-LinuxS390X.tar.gz
Linux on Power Systems - Little Endian	9.4.x.0-IBM-MQIPT-LinuxPPC64LE.tar.gz
Windows (64 bit)	9.4.x.0-IBM-MQIPT-Win64.zip

2. Choose the location where you want MQIPT to be installed.

Create a new directory where you want MQIPT to be installed.

For example, on AIX and Linux, you might use the following command:

```
mkdir /opt/mqipt/installation1
```

When you unpack the MQIPT installation archive file, a directory called mqipt is created, and the installation files are placed in this directory. On Windows, the MQIPT installation archive file also contains a directory called META-INF that contains files relating to code signature verification.

3. Unpack the installation archive file into the MQIPT directory by using an appropriate tool for your platform.

**Note:** The **tar** command on AIX and Linux systems must be run as the root user when installing MQIPT. Failure to run the **tar** command as root is likely to result in "permission denied" errors.

For example, on a Linux platform, you might use the following commands, if the archive file was downloaded to the /tmp directory:

```
cd /opt/mqipt/installation1
su root
tar xzvf /tmp/9.4.0.0-IBM-MQIPT-LinuxX64.tar.gz
```

4. To increase security, set the file permissions for the installed files so that they are read-only:



- ▶ Linux
▶ AIX
 On AIX and Linux systems, you can use the **chmod** command. For example:

```
chmod -R a-w /opt/mqipt/installation1/mqipt
```

- ▶ Windows
 On Windows platforms, right-click the installation directory and select **Properties**. You can change the file permissions on the **Security** tab.
5. If you subsequently receive error message MQCPE080 Unable to determine MQIPT installation directory, set the **MQIPT\_PATH** environment variable to the absolute path of the MQIPT installation directory.

You do not normally have to set the **PATH** or **CLASSPATH** environment variables for MQIPT because the installation includes a Java runtime environment (JRE). However, under some circumstances (for example, if you use symbolic links), MQIPT commands are unable to determine the installation directory. This can be corrected by setting the **MQIPT\_PATH** environment variable.

For example, if your installation directory is /opt/mqipt/installation1/mqipt, you might use the following commands:

```
MQIPT_PATH=/opt/mqipt/installation1/mqipt
export MQIPT_PATH
```

6. ▶ Windows On Windows platforms, create MQIPT icons on the Start menu.

Run the following command from an administrator command prompt:

```
C:\mqipt_path\bin\mqiptIcons -install installation_name
```

where

- *mqipt\_path* is the directory where MQIPT is installed.
- *installation\_name* is a name that you choose to distinguish this installation from any other. The name is appended to the name of the MQIPT icons.

## What to do next

Follow the scenarios in [Getting started with IBM MQ Internet Pass-Thru](#) to verify that MQIPT is installed correctly, and to configure MQIPT in simple scenarios.

For information on configuring and administering MQIPT, see [Administering and configuring IBM MQ Internet Pass-Thru](#).

## Uninstalling MQIPT

Follow this procedure to uninstall MQIPT.

### Procedure

1. Make appropriate backups in case you later have to restore any data. See [Making backups](#) for details.
2. Prevent the system from trying to start MQIPT automatically, if the MQIPT service has been installed.

- ▶ Linux
▶ AIX
 On AIX and Linux, remove the MQIPT service by changing to the bin directory in the MQIPT installation path, and issuing the following command:

```
./mqiptService -remove
```

- ▶ Windows
 On Windows, follow these steps to stop and remove the MQIPT service:
  - a. Stop MQIPT from the Windows services panel.

- b. Open an administration command prompt, go to the `bin` directory in the MQIPT installation path, and enter the command:

```
mqiptService -remove
```

**Note:** Only the installation of MQIPT that installed the service can be used to remove it. Attempting to remove the service using a different installation causes error MQCPE083.

3. **Windows** On Windows platforms, remove the MQIPT icons from the **Start** menu by clicking the MQIPT icon, **Remove these icons** on the **Start** menu.
4. Delete the directory where MQIPT is currently installed.  
You will need to have root access to the system in order to delete the MQIPT installation directory.

Linux

V 9.4.0

## Installing the stand-alone IBM MQ Web Server

From IBM MQ 9.4.0, you can install the stand-alone IBM MQ Web Server from a download that is available from Fix Central.

### About this task

The IBM MQ Web Server runs the IBM MQ Console and REST API. You can download the stand-alone IBM MQ Web Server from Fix Central and install it as a stand-alone application on as many systems as you require.

The stand-alone IBM MQ Web Server is available only on the following platforms:

- Linux for x86-64
- Linux on Power Systems - Little Endian
- Linux for IBM Z

**Note:** You can also install the IBM MQ Console and REST API as an optional component of an IBM MQ installation. For more information about the installation options for the IBM MQ component that runs the IBM MQ Console and REST API, see [The IBM MQ Console and REST API](#).

### Procedure

1. Download the stand-alone IBM MQ Web Server installation file.  
Follow this link to Fix Central. Select the correct version of the download package for your system. The download package is a `tar.gz` file, for example `9.4.0.0-IBM-MQ-Web-Server-LinuxX64.tar.gz`.
2. Create an installation directory on the target system.
3. Decompress the `tar.gz` file that you downloaded to the installation directory.

### What to do next

Configure the `mqweb` server to run the IBM MQ Console and REST API. For more information, see [Configuring the stand-alone IBM MQ Web Server](#).

## Maintaining and migrating IBM MQ

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

### About this task



**Attention:** The information in this section applies to both Continuous Delivery (CD) and Long Term Support (LTS) releases.

Any information that applies specifically to an LTS or CD release is marked with the appropriate icon.

IBM MQ uses the terms *maintenance*, *upgrade* and *migration* as follows:

**Maintenance is the application of a fix pack, cumulative security update (CSU), interim fix or Program Temporary Fix (PTF).**

Maintenance has one main characteristic. Those fixes, whether they are applied by using a maintenance installation tool, or installed by using a manufacturing refresh on top of an installation, are at the same command level as the existing code. No migration is required after applying maintenance. The installation can be restored to its previous level and any changed queue managers or applications will continue to work at the restored code level. However, you should test applications with the new level of IBM MQ code.

For more information, see [“Applying maintenance to IBM MQ” on page 294.](#)

**Upgrading is the process of taking an existing IBM MQ installation and upgrading to a new level of code.**

Unless you are upgrading the fix level of IBM MQ, but not its command level, an upgrade must be followed by migration. Upgrades can be backed out, as long as no migration has taken place. The process of removing an upgrade varies by platform and how the upgrade was applied. Upgrades that change the command level of IBM MQ require queue manager migration before applications can reconnect.

For more information, see [“Upgrading IBM MQ” on page 337.](#)

**Migration is the process of updating queue manager data to match a newer level of code.**

Migration occurs the first time a queue manager is started with the newer level of code, and always follows an upgrade that changes the queue manager command level, both automatic and manual changes. Migration is the transformation of queue manager data, applications, and the environment that the queue manager runs in. Once migration has occurred, the queue manager can no longer be started by an earlier code level. On most platforms, queue manager migration is not reversible:

- ▶ **Multi** Migration cannot be reversed on IBM MQ for [Multiplatforms](#). This restriction applies whether your enterprise uses the Long Term Support (LTS) release or Continuous Delivery (CD) release model.
- ▶ **z/OS** IBM MQ for z/OS queue managers can only be backwards migrated from an LTS release to an earlier LTS release. This statement also applies to those CD releases that have the same VRM as an LTS release, for example IBM MQ 9.3.0 CD. See [IBM MQ release types and versioning](#).

For more information, see [“Migrating IBM MQ” on page 353.](#)

**Related concepts**

[“Characteristics of upgrades and fixes” on page 292](#)

For IBM MQ, the term upgrade applies to upgrading an existing installation of the product to a new level of code. The term fix applies to a change the maintenance level of an existing installation.

**Related reference**




▶ **z/OS** [IBM MQ for z/OS Program Directory PDF files](#)

## Where to find more information about maintaining and migrating

Where to look for more information, for example if you are getting started with migrating and maintaining IBM MQ.

### Getting started with maintaining and migrating IBM MQ


If you are not familiar with IBM MQ migration, start by reading the [“Migration concepts and methods” on page 357](#) section. Use these topics to find out more about the concepts that you must understand before planning migration tasks, including the difference between maintenance, migration, and upgrading and which migration paths are supported.

   For tutorials to help you with installing and upgrading, see [A collection of tutorials for installing and upgrading IBM MQ on AIX, Linux, and Windows](#). The tutorials cover:

- Preparing a host for IBM MQ.
- Downloading the IBM MQ code.
- Installing and uninstalling the IBM MQ code, and applying fix packs.
- Upgrading from one version of IBM MQ to another, and moving a queue manager from one host to another.

## New features and changes in this release

For information about new features and changes in this release, see the following information:

-  [What's new and changed in IBM MQ 9.4.0](#)

## New features and changes in earlier releases

Some new features and changes from earlier releases might have an impact on planning your migration because they affect the behavior of existing applications or the automation of management tasks. For information on where to find details of these changes in the product documentation for earlier releases, see [What was new and changed in earlier releases](#).

## System requirements and prerequisites

You can use the Software Product Compatibility Reports (SPCR) tool to find information on supported operating systems, system requirements, prerequisites, and optional supported software for IBM MQ. For more information about the SPCR tool and links to reports for each supported platform, see the [System Requirements for IBM MQ](#) web page.

For information about limitations and known problems for the current and earlier versions of IBM MQ, see the appropriate product readme file, which is available from the [IBM MQ, WebSphere MQ, and MQSeries product readmes](#) web page.

### Related concepts

[IBM MQ 9.4 in the IBM Documentation Offline app](#)

[IBM MQ 9.4 PDF files for product documentation and Program Directories](#)

## Characteristics of upgrades and fixes

For IBM MQ, the term upgrade applies to upgrading an existing installation of the product to a new level of code. The term fix applies to a change the maintenance level of an existing installation.

### Characteristics of fixes

The application of a fix pack, cumulative security update (CSU), or interim fix on Multiplatforms, or a program temporary fix (PTF) on z/OS is called a fix. You apply fixes by using a maintenance installation tool.



On the following platforms, fixes that are applied by using a maintenance installation tool can be rolled back completely if no queue manager migration has taken place:

-  AIX
-  Windows
-  z/OS

and IBM MQ is returned to its previous code level.



On all other platforms you must reinstall the product.



**Attention:**   On z/OS Continuous Delivery releases, certain PTFs will increase the modification level, and therefore, should be considered an upgrade.


## Characteristics of different types of upgrade

An upgrade can take one of three different forms:

1. Installation of new code on top of existing code. You might be able to roll back an upgrade applied in this way; it depends on the platform. Generally speaking, you cannot roll back the installation of new code. To restore the old code level, you must retain the old installation media, and any fixes you applied.
2. Removal of the old level of code, followed by installation of the new level. The installers on very few platforms require you to remove an old installation first. Needless to say, to restore the old code level, you must reinstall it and any fixes.
3. Side by side installation.
  -  On z/OS you can install different code levels alongside each other on the same server. In the JCL to start a subsystem, you select the code level to use.
  -  On AIX, Linux, and Windows, you associate a queue manager with an installation, and start the queue manager. In IBM MQ, running multiple queue managers at different command levels on the same server is termed queue manager coexistence.

You must not infer from this, that you can select different installations to run a queue manager at different times. Once a queue manager has been run, it is subject to the rules regarding reverting to earlier or later command levels.

**Note:** The term upgrade does not imply that an IBM MQ installation can be directly upgraded from one level to another. On some platforms, an upgrade requires that you remove the previous IBM MQ installation. You can retain any queue managers that you have created.

 On z/OS, reversibility of an upgrade has two parts; backout of the installation to the previous code level, and reversion of any queue managers that have been started at the new code level, to work with the previous code level again. See [“Upgrade and migration of IBM MQ on z/OS” on page 471](#) for more information.

The rules regarding the reversibility of an queue manager to run on a previous code level is dependent on the platform.

On the following platforms, changes in version, release, or modification level are not fully reversible, but changes in fix level are reversible under certain conditions.

-  AIX
-  Linux
-  Windows
-  IBM i

An irreversible upgrade implies that you must back up the queue managers, or your system, before upgrading, to be able to restore your queue managers. Taking a backup of a queue manager requires you to stop the queue manager. If you do not take a backup, you are not able to restore IBM MQ to its previous level. Any changes you make on the new level cannot be restored onto the backup system. Changes include the creation or deletion of persistent messages, and changes to queue managers, channels, topics, and queues.

### Related concepts

[“Upgrade and migration of IBM MQ on z/OS” on page 471](#)

You can install new releases of IBM MQ to upgrade IBM MQ to a new release, version or modification (VRM) level. Running a queue manager at a higher level to the one it previously ran on requires migration.

### **Related tasks**

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

[“Upgrading IBM MQ” on page 337](#)

Upgrading is the process of taking an existing IBM MQ installation and upgrading to a new level of code.

[“Migrating IBM MQ” on page 353](#)

Migration is the conversion of programs and data to work with a new code level of IBM MQ. Some types of migration are required, and some are optional. Queue manager migration is never required after applying a maintenance level update, that does not change the command level. Some types of migration are automatic, and some are manual. Queue manager migration is typically automatic and required after releases and manual and optional after a maintenance level upgrade that introduces a new function. Application migration is typically manual and optional.

## **Applying maintenance to IBM MQ**

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

### **Before you begin**

This task assumes that you understand the difference between Long Term Support and Continuous Delivery releases, and the maintenance delivery model that applies in each case. For more information, see [IBM MQ Release Types and versioning](#).

### **About this task**

#### **About applying maintenance**

Maintenance deliveries for a particular version/release are cumulative, from the initial release. You can apply any higher numbered fix pack or cumulative security update (CSU) of the same version/release to upgrade directly to that version level. You do not have to apply the intervening fixes.

You can also refresh the full version of IBM MQ by installing a manufacturing refresh that is available online or on physical media. The result of installing a manufacturing refresh is the same as applying a maintenance delivery to an earlier fix level of IBM MQ. However, on platforms other than Windows and Linux, there is one important difference: Fix packs and CSUs are applied using a maintenance procedure, manufacturing refreshes are installed using an installation procedure. You can "unapply" a fix pack or CSU to return to the previous fix level you had installed. You can only uninstall a manufacturing refresh, which removes IBM MQ from your system.

In addition to manufacturing refreshes and maintenance deliveries, you might occasionally be directed by the IBM Support team to apply an interim fix. Interim fixes are also known as emergency or test fixes, and are used to apply urgent updates that cannot wait for the next maintenance delivery. Interim fixes are known by a unique fix name, which will include the target version and platform, and other identifying context, such as a support case reference or APAR number. When you apply a new CSU, fix pack, or manufacturing refresh, all interim fixes are removed. The documentation with maintenance delivery or manufacturing refresh includes a "fix list" page, stating which APAR fixes are included in the deliverable. This list tells you if the APARs associated with the interim fixes that you have applied have been fixed in the latest maintenance. If they have not, check to see if there are new interim fixes, at the new level, for the APARs that concern you. If there are not, consult IBM Support. They might tell you to reapply the interim fix, or they might supply a new interim fix.

You get manufacturing refreshes, maintenance deliveries and interim fixes through Passport Advantage and Fix Central. See [“Where to find downloadable installation images” on page 10](#).

- Manufacturing refreshes are available through Passport Advantage.

- Fix packs and CSUs are available through Fix Central.
- Interim fixes are typically provided directly by the IBM Support team through a support case, and occasionally provided through Fix Central.

### About removing maintenance

An important characteristic of applying maintenance is that it must be reversible. Reversibility implies two things:

1. The previous level of code is fully restored.
2. Changes that are made to IBM MQ objects are compatible. Changes are things like the creation or deletion of persistent messages, changes to queue managers, channels, topics, and queues. New and modified objects continue to work correctly with the restored level of code.

The reversibility of a maintenance package limits the extent of functional changes that are included in a maintenance package. No irreversible changes are included in a maintenance package. But, reversibility has limits. A maintenance package might include new programming and administrative interfaces. If you build new or modified applications to use the new interfaces, those applications do not work if the maintenance package is removed.




On a smaller scale, a fix pack, CSU, or interim fix might introduce a new configuration parameter to solve a problem. If you remove the fix pack, CSU, or interim fix, although the new interface introduced by the change is not available any more, IBM MQ works with any objects that have been changed by the configuration parameter. For example, a new Java system property might introduce a parameter to set a code page for queue manager data conversion. The fix does not change any existing persistent queue manager state information. It can be removed, and the queue manager continues to work as before, but without the capability introduced in the fix.

On different platforms, you employ different mechanisms to install and maintain software releases. Installing a release at a new maintenance level, and applying maintenance level updates to update an earlier release to the same maintenance level, have different results.

When you update the maintenance or fix level of IBM MQ by applying a regular maintenance level update, you can reverse the update by removing the fix. When you update the maintenance or fix level of IBM MQ by applying a maintenance level update containing a new function, you can reverse that update and all previously reversible updates until a queue manager associated with the installation enables the new function.

Maintenance levels and fix levels are both supplied from Fix Central. For information on where to find direct links to specific fix packs, CSUs, and other IBM MQ resources on Fix Central, see [IBM MQ downloads](#).

### Procedure

- To check the IBM MQ maintenance level:
  - Type the command **dspmquer**, or **DSPMQMVER** on IBM i. The returned messages include the three-digit VRM or, if maintenance has been applied, the four-digit VRMF.
  - Use the REST API GET method.
  -   View the [queue manager property panel in IBM MQ Explorer](#).
  -  Look at the CSQY000I message in the queue manager job log. This message is issued when the queue manager starts, and shows the release level and release type.
- To apply or remove maintenance level updates, follow the appropriate links for the platforms that your enterprise uses.

### Related concepts

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is



particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

### Related tasks

[Backing up and restoring a queue manager](#)

## Applying and removing maintenance on AIX

Maintenance tasks associated with AIX are grouped in this section.

### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## Applying maintenance level updates on AIX

You apply maintenance level updates to IBM MQ for AIX by using **installp**.

### Before you begin

1. Ensure that you have enough disk space to apply maintenance level updates. A maintenance level update requires hard disk space for installation. In addition, the installation process might require a similar amount of disk space to save the previous level. For example, a 16 MB update might require 32 MB of space. The additional space allows a maintenance level update to be removed, and the previous level to be restored automatically.
2. If you are running on a server with multiple IBM MQ installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

### About this task

Stop applications using the installation and use the **installp** command, to install maintenance level updates to clients and servers. Alternatively, if the installation is in the default installation location, you can use the *System Management Interface Tool*, SMIT.

**Important:** You cannot go back from a later version of the product to a prior version of the product, for example from IBM MQ 9.4 to IBM MQ 9.3.

You can apply and remove maintenance from an IBM MQ MQI client that is not installed on the same server as a queue manager. You do not have to stop any queue managers or logon as administrator. Because you do not have to stop any queue managers, do not do steps [“1” on page 296](#) to [“4” on page 297](#) in the following maintenance procedure.

Major full versions of the base product are COMMITTED by default. Fix packs on a full base version can be in APPLIED state, and you can go back one release level.

If you need the ability to revert to an earlier version, you should perform a side-by-side migration, and migrate your queue managers to the later version at any time. See [“Migrating on AIX and Linux: side-by-side” on page 431](#) for further information.

However, if you start a queue manager under IBM MQ 8.0 or later, that queue manager is automatically migrated, and cannot be downgraded to the previous version.

### Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.



If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their SYSTEM.FTE.STATE queues should contain no messages.

3. Stop the mqweb server that is associated with the IBM MQ installation:

- a) Check whether the mqweb server is running by entering the following command:

```
dspmweb status
```

- b) Stop the mqweb server by entering the following command:

```
endmqweb
```

4. End all the activity of queue managers associated with the IBM MQ installation.

- a) Run the **dspmqr** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmqr -o installation -o status  
dspmqr -a
```

**dspmqr -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

**dspmqr -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.

```
➔ endmqm -C -w -i -p QmgrName ➔
```

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “Applying maintenance level updates to multi-instance queue managers on Linux” on page 315 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- d) Stop any listeners associated with the queue managers, using the command:

```
endmqlsr -m QMgrName
```

5. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

6. Install the update in one of the following ways:

- Update the whole installation in the default location:

```
installp -agXYd . all
```

- Update selected filesets in the default location:

```
installp -agXYd . list of file sets
```

- Update the whole product in a non-default location using the -R flag:

```
installp -R USIL_Directory -agXYd . all
```

- Update selected filesets in a non-default location using the -R flag:

```
installp -R USIL_Directory -agXYd . list of file sets
```

*USIL\_Directory* is the installation parent directory. IBM MQ is installed underneath the directory. For example, if /USIL1 is specified, the IBM MQ product files are located in /USIL1/usr/mqm. /USIL1/usr/mqm is known as the *MQ\_INSTALLATION\_PATH*.

### Related tasks

[Stopping a queue manager](#)

### Related reference

[dspmq](#)

## **Reverting to the previous maintenance level on AIX**

You can revert to a previous maintenance level by using the *System Management Interface Tool (SMIT)*.

### Before you begin

If you are running on a server with multiple IBM MQ installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

### About this task

You can back out maintenance level updates and restore your system to the previous maintenance or installation level, for any component of IBM MQ for AIX that is in the **APPLIED** state.

IBM MQ for AIX uses the following directory trees that are mutually exclusive, which are, for the :

- Executable libraries and shared libraries, is /usr/mqm
- Data for the queue managers and other configuration files, is var/mqm.

Because the directory trees are mutually exclusive, when you apply or remove maintenance only the files in *usr/mqm* are affected.

The procedure detailed within this topic removes all the maintenance level updates installed. See [“Uninstalling a single maintenance level update on AIX” on page 301](#) for details on removing a single maintenance level update from your system.

You can apply and remove maintenance from an IBM MQ MQI client that is not installed on the same server as a queue manager. You do not have to stop any queue managers or logon as administrator. Because you do not have to stop any queue managers, do not do steps “1” on page 299 to “3” on page 299 in the following maintenance procedure.

Use the following command to display the current state of the IBM MQ for AIX filesets:

```
lsllp [ -R usil ] -l "mqm*"
```

To back out a maintenance update, as the user root, issue the command:

```
installp [ -R usil ] -r "mqm*"
```

Otherwise:

## Procedure

1. Log in as a user in group mqm.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their SYSTEM.FTE.STATE queues should contain no messages.

3. End all the activity of queue managers associated with the IBM MQ installation.
  - a) Run the **dspmq** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmq -o installation -o status
dspmq -a
```

**dspmq -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

**dspmq -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.

► **endmqm** { **-c** | **-w** | **-i** | **-p** } *QmgrName* ►

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different

installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “Applying maintenance level updates to multi-instance queue managers on Linux” on page 315 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

d) Stop any listeners associated with the queue managers, using the command:

```
endmqlsr -m QMgrName
```

4. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#). This information also applies to UNIX systems in general.

5. Open the appropriate **smit** panel using this sequence:

```
Software Installation and Maintenance
Software Maintenance and Utilities
Reject Applied Software Updates (Use Previous Version)
```

Alternatively, use a fast path command, `smit[ty] install_update`.

6. Complete the **SOFTWARE** name field.

Enter `mqm*` to restore all applicable file set updates to your installation.

**Note:** If an option to restore only selected file set updates for IBM MQ for AIX appears, avoid it. The option results in all applicable file set updates for the maintenance level update being restored.

7. Click **Enter** to reject the current maintenance level and reinstate the previous maintenance or installation level.

- a) Accept displayed default values for all other fields
- b) Dismiss the confirmation message

The reject process starts. While the command runs, it displays progress messages terminating with an **Install Summary** table.

- a) Check the table to see which components of IBM MQ for AIX have been rejected

### Related tasks

[Stopping a queue manager](#)

[“Applying maintenance level updates to multi-instance queue managers on AIX” on page 305](#)  
On AIX, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

### Related reference

[dspmq](#)

[DISPLAY LSSTATUS](#)

[endmqm \(end queue manager\)](#)

[endmqlsr \(end listener\)](#)

You can remove a single maintenance level update by using the **installp** command.

## About this task

For example, you have installed IBM MQ for AIX 9.1.0.0 base, the IBM MQ for AIX 9.1.0.7 fix pack and the IBM MQ for AIX 9.1.0.8 fix pack.

You want to remove the 9.1.0.8 fix pack and leave the 9.1.0.7 fix pack.

Look at the **installp** command in the AIX manual, and specifically the information on the **-r** (reject) parameter.

The AIX manual lists a number of options for the **installp -r** parameter, and the one that is relevant is the **-f ListFile** option.

The description of the **-f ListFile** option includes the following statement: *Output from the installp -l command is suitable for input to this flag.*

You need to obtain a text file using the **installp -l** command. The AIX manual shows the following invocation for **installp -l** parameter:

```
installp { -l | -L } [ -eLogFile ] [ -d Device ] [ -B ] [ -I ] [ -q ] [-E ]
[ -zBlockSize ] [ -O { [ s ] [ u ] } ]
```

**Note:** The principles apply to a User Specified Installation Location (USIL) by using the **-R usil-directory** option, and to other IBM MQ fix packs.

See [Life cycle for a USIL in AIX for non-default installations of MQ](#) for more information on a USIL.

Carry out the following procedure to remove the latest 9.1.0.8 fix pack, and leave the base IBM MQ for AIX 9.1.0.0 and 9.1.0.7 fix packs in place.

## Procedure

1. Issue the following command, `# ls1pp -la "mqm*"`:

You see the following output:

```
+-----+
INSTALL ROOT PATH = /
+-----+
Fileset Level State Description
+-----+
Path: /usr/lib/objrepos
mqm.amqp.rte      9.1.0.0 COMMITTED IBM MQ AMQP Service
                  9.1.0.7 APPLIED IBM MQ AMQP Service
                  9.1.0.8 APPLIED IBM MQ AMQP Service
mqm.ams.rte      9.1.0.0 COMMITTED IBM MQ Advanced - Advanced Message Security
                  9.1.0.7 APPLIED IBM MQ Advanced - Advanced Message Security
                  9.1.0.8 APPLIED IBM MQ Advanced - Advanced Message Security
mqm.base.runtime 9.1.0.0 COMMITTED IBM MQ Runtime for Client and Server
                  9.1.0.7 APPLIED IBM MQ Runtime for Client and Server
                  9.1.0.8 APPLIED IBM MQ Runtime for Client and Server
```

2. Go to the original directory where the IBM MQ for AIX tar .Z file with the fix pack code, that was downloaded, was stored in the machine and unpacked; for example, `cd /downloads/mq9108`. Expand `9.1.0-IBM-MQ-AixPPC64-FP0008.tar.Z` and you see:

```
+++ROOT+++ aglet: /downloads/mq9108
# ls
.toc mqm.msg.Zh_CN.9.1.0.8.U202341
9.1.0-IBM-MQ-AixPPC64-FP0008.tar mqm.msg.Zh_TW.9.1.0.8.U202343
mq9108.installpl.txt mqm.msg.cs_CZ.9.1.0.8.U202327
mqm.amqp.rte.9.1.0.8.U202313 mqm.msg.de_DE.9.1.0.8.U202328
mqm.ams.rte.9.1.0.8.U202312 mqm.msg.en_US.9.1.0.8.U202329
mqm.base.runtime.9.1.0.8.U202314 mqm.msg.es_ES.9.1.0.8.U202330
mqm.base.samples.9.1.0.8.U202315 mqm.msg.fr_FR.9.1.0.8.U202331
```

```
mqm.base.sdk.9.1.0.8.U202316 mqm.msg.hu_HU.9.1.0.8.U202332
mqm.client.rte.9.1.0.8.U202317 mqm.msg.it_IT.9.1.0.8.U202333
mqm.ft.agent.9.1.0.8.U202318 mqm.msg.ja_JP.9.1.0.8.U202334
mqm.ft.base.9.1.0.8.U202319 mqm.msg.ko_KR.9.1.0.8.U202336
mqm.ft.logger.9.1.0.8.U202320 mqm.msg.pl_PL.9.1.0.8.U202337
mqm.ft.service.9.1.0.8.U202321 mqm.msg.pt_BR.9.1.0.8.U202338
mqm.ft.tools.9.1.0.8.U202322 mqm.msg.ru_RU.9.1.0.8.U202339
mqm.gskit.rte.9.1.0.8.U202323 mqm.msg.zh_CN.9.1.0.8.U202340
mqm.java.rte.9.1.0.8.U202324 mqm.msg.zh_TW.9.1.0.8.U202342
mqm.jre.rte.9.1.0.8.U202325 mqm.server.rte.9.1.0.8.U202344
mqm.man.en_US.data.9.1.0.8.U202326 mqm.web.rte.9.1.0.8.U202346
mqm.msg.Ja_JP.9.1.0.8.U202335 mqm.xr.service.9.1.0.8.U202345
```

- Issue the following command to obtain the text file `mq9108.installpl.txt`, to be used later in the procedure: `# installp -l -d /downloads/mq9108 > mq9108.installpl.txt`

The output text file looks like the following text.

**Note:** Only the first few lines are shown here.

```
Fileset Name Level I/U Q Content
=====
mqm.amqp.rte 9.1.0.8 S N usr (R)
# IBM MQ AMQP Service
mqm.ams.rte 9.1.0.8 S N usr (R)
# IBM MQ Advanced - Advanced Message Security
mqm.base.runtime 9.1.0.8 S N usr,root (R)
# IBM MQ Runtime for Client and Server
mqm.base.samples 9.1.0.8 S N usr (R)
# IBM MQ Samples
```

- Use the output file from Step “3” on page 302 as input to the following command: `# installp -r -f mq9108.installpl.txt`

```
Verifying selections...
done
Verifying requisites...done
Results...
SUCCESSSES
-----
Filesets listed in this section passed pre-reject verification
and will be rejected.
Selected Filesets
-----Page 5 of 5
mqm.amqp.rte 9.1.0.8 # IBM MQ AMQP Service
mqm.ams.rte 9.1.0.8 # IBM MQ Advanced - Advanced M...
mqm.base.runtime 9.1.0.8 # IBM MQ Runtime for Client an...
...
-----+
Installation Summary
-----+
Name          Level  Part      Event Result
-----+
mqm.amqp.rte  9.1.0.8  USR REJECT SUCCESS
mqm.ams.rte   9.1.0.8  USR REJECT SUCCESS
mqm.base.runtime 9.1.0.8  ROOT REJECT SUCCESS
```



**Attention:** Note the following:

- There will be around 30-40 blank lines following “*Verifying selections...*” and it took some time. you need to wait until the command produces meaningful output.
- The output in the preceding text shows only a few lines of the final summary at the end and the result column shows SUCCESS.

- Issue the command `# ls1pp -la "mqm*"` again, and you see that the ones for 9.1.0.8 are no longer included:

You see the following output:

```
+-----+
INSTALL ROOT PATH = /
+-----+
Fileset Level State Description
-----+
```

```

Path: /usr/lib/objrepos
mqm.amqp.rte      9.1.0.0 COMMITTED IBM MQ AMQP Service
                 9.1.0.7 APPLIED IBM MQ AMQP Service
mqm.ams.rte      9.1.0.0 COMMITTED IBM MQ Advanced - Advanced Message Security
                 9.1.0.7 APPLIED IBM MQ Advanced - Advanced Message Security
mqm.base.runtime 9.1.0.0 COMMITTED IBM MQ Runtime for Client and Server
                 9.1.0.7 APPLIED IBM MQ Runtime for Client and Server

```

## Related tasks

“Reverting to the previous maintenance level on AIX” on page 298

You can revert to a previous maintenance level by using the *System Management Interface Tool (SMIT)*.

## Staging maintenance level updates on AIX

On AIX, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

## Before you begin

The steps in this task are based on an example scenario in which it is assumed that you have two copies of IBM MQ named `Inst_1` and `Inst_2`, and a number of applications and two queue managers, `QM1` and `QM2`, running on a server. To set up your configuration for this scenario, complete the following steps:

1. Install two copies of IBM MQ. In this example, they are named `Inst_1` and `Inst_2`.
2. Make `Inst_1` primary by running **setmqinst**.
3. Associate all the queue managers on the server with `Inst_1` by running **setmqm**.
4. Start all the queue managers on the server.

**Note:** From 1Q 2023, for Multiplatforms, there are two types of maintenance:

- Fix packs, which contain roll-ups of all defects fixed since the previous fix pack delivery (or GA). Fix packs are produced exclusively for Long Term Support (LTS) releases during their normal support lifecycle.
- Cumulative security updates (CSUs), which are smaller updates and contain security patches released since the previous maintenance (GA). CSUs are produced for LTS releases (including releases in extended support), and also for the latest IBM MQ Continuous Delivery (CD) release, as required to deliver relevant security patches.

For maintenance releases in or after 1Q 2023, the fourth digit in the VRMF represents either a fix pack number or a CSU number. Both types of maintenance are mutually cumulative (that is, they contain everything included in older CSUs and fix packs), and both are installed using the same mechanisms for applying maintenance. Both types of maintenance update the F-digit of the VRMF to a higher number than any previous maintenance: fix packs use "F" values divisible by 5, CSUs use "F" values not divisible by 5.

For maintenance releases before 1Q 2023, the fourth digit in the VRMF always represents the fix pack level. For example, the first fix pack of the IBM MQ 9.3.0 LTS release is numbered 9.3.0.1.

For more information, see [Changes to IBM MQ's maintenance delivery model](#).

## About this task

You can install multiple copies of IBM MQ on a server to stage the release of IBM MQ maintenance level updates. For example, as in the scenario that is described in the task steps, by using two installations to roll out maintenance level updates, you maintain two maintenance levels on a server, with the aim of getting all queue managers and applications to the production maintenance level before replacing the previous level of maintenance with the next level.

Which installation an application uses is driven by the queue manager that an application connects to. The **setmqm** command associates a queue manager with an installation. You can associate a queue manager with a different installation as long as the installation is at the same or higher command level. In this scenario, all the installations are at the same command level. You can associate or reassociate a

queue manager with either of the installations running any of the fix packs or cumulative security updates (CSUs).

In this scenario, an application links to the primary installation. When it connects to a queue manager, IBM MQ switches the linkage to the installation associated with the queue manager; see [“Multi-installation queue manager coexistence on AIX, Linux, and Windows”](#) on page 376.

For applications built with the link options described in the product documentation, the simplest way to configure the link library search path for IBM MQ applications is to make an installation primary. Only if it is important to pick up a fix in the IBM MQ link library itself, must you review the search path. Either you must make the installation with the IBM MQ link library fix primary, or make a local adjustment for the application, perhaps by running the **setmqenv** command.

Running commands is a different matter. Commands are always run from the primary installation, or the installation you have selected by running the **setmqenv** command. If you run a command from the wrong installation, the command fails. For example, if QM1 is associated with Inst\_1, running the command `Inst_2_Installation_path/bin/stmqm QM1` fails.

## Procedure

Apply the first maintenance level update to Inst\_2.

1. Download the first fix pack or cumulative security update (CSU) for the version of your product when it is released.

See [“Where to find downloadable installation images”](#) on page 10.

2. Apply the fix pack or cumulative security update (CSU) that you downloaded to Inst\_2.

For more information, see [“Applying maintenance level updates on AIX”](#) on page 296.

3. Verify Inst\_2.

4. Transfer the queue managers to Inst\_2 one at a time.

- a) Stop QM1 and the applications connected to it.

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

**Note:** [“Applying maintenance level updates to multi-instance queue managers on AIX”](#) on page 305 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- b) Set up the local environment to the installation Inst\_2.

```
. Inst_2_INSTALLATION_PATH/bin/setmqenv -s
```

- c) Associate the queue manager with Inst\_2.

```
setmqm -m QM1 -n Inst_2
```

- d) Start QM1.

```
stmqm QM1
```

- e) Repeat substeps [c](#) and [d](#) for QM2.

5. Set Inst\_2 primary.

```
Inst_2_INSTALLATION_PATH/bin/setmqinst -i -n Inst_2
```

Apply the second maintenance level update to Inst\_1.

6. Download the next fix pack or cumulative security update (CSU), for the version of your product when it is released.

For more information, see [“Where to find downloadable installation images”](#) on page 10.

7. Apply the fix pack or cumulative security update (CSU), that you have just downloaded to Inst\_1.

8. Verify Inst\_1.



9. Transfer the queue managers to Inst\_1 one at a time.

Follow the procedure in step [“4” on page 304](#), replacing Inst\_2 by Inst\_1 in the instructions.

10. Set Inst\_1 primary.

```
Inst_1_INSTALLATION_PATH/bin/setmqinst -i -n Inst_1
```

For subsequent maintenance updates, alternate between Inst\_2 and Inst\_1.

11. Alternate between repeating steps [“1” on page 304](#) to [“5” on page 304](#) for Inst\_2 and steps [“6” on page 304](#) to [“10” on page 305](#) for Inst\_1.

### Related concepts

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

## **Applying maintenance level updates to multi-instance queue managers on AIX**

On AIX, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

### Before you begin

Before starting this task, read through the prerequisites described in *Before you begin* in [“Applying maintenance level updates on AIX” on page 296](#).

Before starting this task, see that the maintenance is applied to the IBM MQ installation on a server and not to individual queue managers. Before you apply maintenance, you must stop all the queue managers, and any IBM MQ service, on a server.

If you want a queue manager to keep running while maintenance is applied, you must configure it as a multi-instance queue manager, and have a standby instance running on another server. If the queue manager that you want to keep running is an existing single instance queue manager, you must convert it to a multi-instance queue manager. For prerequisites and guidance how to create a multi-instance queue manager, see [Multi-instance queue managers](#).

If you are running multi-instance queue managers, you then can apply a maintenance update to a running queue manager by switching the active instance to a different server.

Typically, active and standby installations are maintained at the same maintenance level. Consult the maintenance instructions for each update. Consult the instructions to see if it is possible to run the active and standby instances at different maintenance levels. Check whether fail over from higher to lower, or only lower to higher maintenance level is possible.

The instructions for applying a maintenance update might require you to stop a multi-instance queue manager completely.

If you have a primary server for running active queue manager instances, and a secondary server that runs standby instances, you have a choice of updating the primary or secondary server first. If you update the secondary server first, you must switch back to the primary server when both servers have been updated.

If you have active and standby instances on several servers, you must plan in what order you update the servers to minimize the disruption caused by ending the active instances on each server you update.

## About this task

Combine the steps in this task with the maintenance update procedure for applying maintenance to an IBM MQ server installation.

## Procedure

1. Where the maintenance update procedure instructs you to stop all running queue managers, or quiesce IBM MQ do the following instead:

See: [“Applying and removing maintenance on AIX” on page 296](#)

- a) If the queue manager is running as standby:

- End the standby with the **endmqm** -x *QMGrName* command.

- b) If the queue manager is running as the active instance:

End the instance and transfer control to the standby instance with the **endmqm** command. For example, **endmqm** -*shutdown\_option* -s *QMGrName*, where *shutdown\_option* is an optional parameter specifying the type of shutdown. For more information, see [endmqm](#).

If there is no standby instance running, the command fails, and you must start a standby instance on a different server.

- c) If a queue manager is running as a single instance queue manager, you have no alternative but to stop the queue manager before applying the maintenance update.

When you complete this step, no queue manager instances are left running on the server you intend to update.

2. Continue with the maintenance update procedure, following the step to issue the **endmqm** command, or quiesce IBM MQ and apply maintenance to the IBM MQ server.
3. When you have completed the maintenance update, restart all the queue managers on the IBM MQ server, permitting standby instances:

Use the following command:

```
strmqm -x QmgrName
```

4. Repeat the procedure on the standby server, to update its maintenance level.
5. If necessary, switch the active instances back to the primary servers:

Use the **endmqm** -*shutdown\_option* -s *QMGrName* command, and the restart the instances using the **strmqm** -x *QmgrName* command.

## Applying and removing maintenance on IBM i

Maintenance tasks associated with IBM i platforms are grouped in this section.

## Procedure

- To apply maintenance level updates, see [“Applying maintenance level updates on IBM i” on page 307](#).
- To restore a queue manager to the previous version of the product from the latest version, see [“Restoring a queue manager to a previous release on IBM i” on page 309](#).

- For information on how to use multi-instance queue managers to reduce the outage caused by applying maintenance updates, see [“Applying maintenance updates to multi-instance queue managers on IBM i”](#) on page 310.

### Related tasks

“Applying maintenance to IBM MQ” on page 294

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

### **Applying maintenance level updates on IBM i**

You apply maintenance level updates on the latest release by stopping IBM MQ and using the IBM i standard maintenance procedure.

### Before you begin

To find out what version you have currently installed, use the following commands:

<i>Table 36. IBM MQ commands to display the installed versions</i>	
<b>IBM MQ Product</b>	<b>Version command</b>
IBM MQ Server	DSPMQMVER
IBM MQ Java	<p>IBM MQ classes for Java:</p> <pre>java com.ibm.mq.MQJavaLevel</pre> <p><b>Note:</b> For this command to work, you might need to set your environment classpath to include:</p> <ul style="list-style-type: none"> <li>• /QIBM/ProdData/mqm/java/lib/com.ibm.mq.jar</li> </ul> <p>IBM MQ classes for Java Message Service:</p> <pre>java com.ibm.mq.jms.MQJMSLevel</pre> <p><b>Note:</b> For this command to work, you might need to set your environment classpath to include:</p> <ul style="list-style-type: none"> <li>• /QIBM/ProdData/mqm/java/lib/com.ibm.mq.jakarta.client.jar (Jakarta Messaging 3.0) or /QIBM/ProdData/mqm/java/lib/com.ibm.mq.allclient.jar (JMS 2.0)</li> </ul> <p>See <a href="#">Environment variables relevant to IBM MQ classes for Java</a> and <a href="#">Environment variables relevant to IBM MQ classes for JMS</a>.</p>
IBM MQ Client	DSPMQMVER

### About this task

Maintenance updates for IBM i are supplied as PTFs (Program Temporary Fixes). They are available for download from the web as save files, which are normally stored in the QGPL library. IBM i PTF's can be found in [Fix Central](#).

### Procedure

**Prepare to quiesce queue managers:**

1. Read the cover letter carefully to see if you need to take any special actions.
2. Sign on to a new interactive IBM i session, ensuring that you are not accessing any IBM MQ objects.
3. Ensure that you have the following authorities:
  - \*ALLOBJ authority, or object management authority for the QMQM library.
  - Sufficient authority to use the ENDSBS command.
4. Warn all users that you are going to stop IBM MQ.
5. Stop the mqweb server by entering the following command:

```
ENDMQWEB
```

**Quiesce all queue managers:**

6. Run the ENDMQM command:

```
ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*YES)
TIMEOUT( 15 )
```

Where *15* is a timeout value in seconds.

If the ENDMQM command has not completed within a reasonable period (at least 10 minutes), use the WRKMQM command. This command identifies the queue managers that are still ending. Then force each one in turn to stop by running the following command:

```
ENDMQM MQMNAME( QMGRNAME ) OPTION(*IMMED)
```

Where *QMGRNAME* is the name of the queue manager.

Complete the tidying up of shared memory by running the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
TIMEOUT( 15 )
```

**If the commands in the previous step do not complete, end the subsystem immediately:**

7. Run the following command:

```
ENDSBS SBS(QMQM) OPTION(*IMMED)
```

**If the command in the previous step also does not complete, use the operating system command ENDJOB to end all jobs in the subsystem QMQM:**

**Note:** Do not use ENDJOBABN unless you intend to perform an IPL on the machine before starting IBM MQ. Ending IBM MQ jobs using ENDJOBABN can lead to damaged semaphores, which in turn can prevent your queue manager from starting.

8. If a QMGR must be shut down manually, end the jobs (ENDJOB) in the following order. Wait a few minutes for AMQA\* or AMQZ\* jobs to tidy up.
  - a. RUNMQLSR - TCP listener (multi-threaded)
  - b. AMQCLMAA - TCP listener (single-threaded)
  - c. AMQRMPPA - Channel process pooling job
  - d. RUNMQCHI - channel initiator
  - e. AMQCRSTA - receiving MCA jobs
  - f. RUNMQCHL - sending MCA jobs
  - g. AMQCRS6B - LU62 receiver channel
  - h. AMQPCSEA - command server
  - i. RUNMQTRM - Application trigger monitor

- j. RUNMQDLQ - Dead letter queue handler
  - k. AMQFCXBA - IBM Integration Bus Worker Job
  - l. AMQFQPUB - Queued Publish/Subscribe Daemon
  - m. RUNMQBRK - IBM Integration Bus Control Job
  - n. AMQZMUC0 ('0' is a zero) - Utility Manager
  - o. AMQZMUF0 ('0' is a zero) - Utility Manager
  - p. AMQZMUR0 ('0' is a zero) - Utility Manager
  - q. AMQZMGR0 ('0' is a zero) - Process Controller
  - r. AMQRRMFA - cluster repository manager
  - s. AMQZDMAA - deferred message manager
  - t. AMQZFUMA - object authority manager
  - u. AMQZLSA0 ('0' is a zero) - LQM agents
  - v. AMQZLAA0 ('0' is a zero) - LQM agents
  - w. AMQZXMA0 ('0' is a zero) - Execution Controller
9. Run the following command:

```
ENDMQM MQMNAME( QMGRNAME ) OPTION(*IMMED)
```

10. Run the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
TIMEOUT( 05 )
```

Where 05 is a timeout value in seconds.

11. Manually clean up shared memory.

Run the following command:

```
EDTF '/QIBM/UserData/mqm/qmgrs'
```

then:

- a. Take option 5 for **&SYSTEM** and check that the following directories are empty: isem, esem, msem, ssem, and shmem.
- b. Take option 5 for **QMGRNAME** and check that the following directories are empty:- isem, esem, msem, ssem, and shmem.
- c. Take option 5 for **&ipcc** in the QMGRNAME directory and check that the following directories are empty:- isem, esem, msem, ssem, and shmem.
- d. Take option 5 for **&qmpersist** in the QMGRNAME directory and check that the following directories are empty:- isem, esem, msem, ssem, and shmem.
- e. Take option 5 for **&app** and check that the following directories are empty: isem, esem, msem, ssem, and shmem.

#### Apply a PTF:

12. Load and apply a PTF.

### **Restoring a queue manager to a previous release on IBM i**

On IBM i, you can restore a queue manager to the previous version of the product from the latest version, if you have made a backup of the system or queue manager. If you have started the queue manager

and processed any messages, or changed the configuration, the task cannot give you any guidance on restoring the current state of the queue manager.

## Before you begin

1. You must have made a backup of the system or queue manager before you upgraded to the later version. For more information see [Backing up and restoring IBM MQ queue manager data](#)
2. If any messages were processed after starting the queue manager, you cannot easily undo the effects of processing the messages. You cannot revert the queue manager to the earlier version of the product in its current state. The task cannot give you any guidance how to deal with subsequent changes that have occurred. For example, messages that were indoubt in a channel, or in a transmission queue on another queue manager, might have been processed. If the queue manager is part of a cluster, then configuration messages and application messages might have been exchanged.

## About this task

When you revert to a earlier version of a queue manager, you revert the queue manager to its earlier code level. Queue manager data is reverted to the state it was in when the queue manager was backed up.

**Important:** If the queue manager is a member of one or more IBM MQ clusters, you should also review and follow the steps described in [Recovering a cluster queue manager](#).

## Procedure

1. Stop the queue manager.
2. If you performed a slip installation, you must reinstall IBM MQ.
  - a) Uninstall the earlier installation.
  - b) Reinstall the product from a manufacturing refresh.
  - c) Apply the fix pack and interim fixes that restore IBM MQ to its previous level.
  - d) Restore the queue manager data from the backup taken before installing the later version.
3. Restart the earlier version queue manager.

## Related tasks

[Backing up and restoring a queue manager](#)

## **Applying maintenance updates to multi-instance queue managers on IBM i**

On IBM i, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

## Before you begin

Before starting this task, see that the maintenance is applied to the IBM MQ installation on a server and not to individual queue managers. Before you apply maintenance, you must stop all the queue managers, and any IBM MQ service, on a server.

If you want a queue manager to keep running while maintenance is applied, you must configure it as a multi-instance queue manager, and have a standby instance running on another server. If the queue manager that you want to keep running is an existing single instance queue manager, you must convert it to a multi-instance queue manager. For prerequisites and guidance how to create a multi-instance queue manager, see [Multi-instance queue managers](#).

If you are running multi-instance queue managers, you then can apply a maintenance update to a running queue manager by switching the active instance to a different server.

Typically, active and standby installations are maintained at the same maintenance level. Consult the maintenance instructions for each update. Consult the instructions to see if it is possible to run the active and standby instances at different maintenance levels. Check whether fail over from higher to lower, or only lower to higher maintenance level is possible.

The instructions for applying a maintenance update might require you to stop a multi-instance queue manager completely.

If you have a primary server for running active queue manager instances, and a secondary server that runs standby instances, you have a choice of updating the primary or secondary server first. If you update the secondary server first, you must switch back to the primary server when both servers have been updated.

If you have active and standby instances on several servers, you must plan in what order you update the servers to minimize the disruption caused by ending the active instances on each server you update.

## About this task

Combine the steps in this task with the maintenance update procedure for applying maintenance to an IBM MQ server installation.

## Procedure

1. Where the maintenance update procedure instructs you to stop all running queue managers, or quiesce IBM MQ do the following instead:

See: [“Applying and removing maintenance on IBM i” on page 306.](#)

- a) If the queue manager is running as standby:

End the standby by adding the `INSTANCE(*STANDBY)` option to the **ENDMQM** command.

- b) If the queue manager is running as the active instance:

End the instance and transfer control to the standby instance by adding the `ALWSWITCH(*YES)` option to the **ENDMQM** command.

If there is no standby instance running, the command fails, and you must start a standby instance on a different server.

- c) If a queue manager is running as a single instance queue manager, you have no alternative but to stop the queue manager before applying the maintenance update.

When you complete this step, no queue manager instances are left running on the server you intend to update.

2. Continue with the maintenance update procedure, following the step to issue the **endmqm** command, or quiesce IBM MQ and apply maintenance to the IBM MQ server.
3. When you have completed the maintenance update, restart all the queue managers on the IBM MQ server, permitting standby instances:  
Add the `STANDBY(*YES)` option to the **STRMQM** command.
4. Repeat the procedure on the standby server, to update its maintenance level.
5. If necessary, switch the active instances back to the primary servers:  
Use the **ENDMQM** command with the `ALWSWITCH(*YES)` option, and then restart the instances using the **STRMQM** command with the `STANDBY(*YES)` option.

## Linux Applying and removing maintenance on Linux

Maintenance tasks associated with Linux are grouped in this section.

### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **V 9.4.0** *Applying maintenance on Linux*

From IBM MQ 9.4.0, you apply maintenance by upgrading IBM MQ.

### **About this task**

Maintenance updates are cumulative. You can apply your chosen update directly, without applying any previous updates first. The maintenance level updates might contain updates for one or more packages. Apply those parts of an update that correspond to the packages that are applied in your installation.

### **Procedure**

- To upgrade by using rpm, follow the steps in [“Upgrading an IBM MQ installation on Linux using the rpm command”](#) on page 339.
- To upgrade by using yum, follow the steps in [“Upgrading an IBM MQ installation on Linux Red Hat using yum”](#) on page 342.
- To upgrade by using dpkg, follow the steps in [“Upgrading an IBM MQ installation on Linux Ubuntu using dpkg”](#) on page 344.
- To upgrade by using apt, follow the steps in [“Upgrading an IBM MQ installation on Linux Ubuntu using apt”](#) on page 347.

### **Linux** *Staging maintenance level updates on Linux*

On Linux, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

### **Before you begin**

The steps in this task are based on an example scenario in which it is assumed that you have two copies of IBM MQ named Inst\_1 and Inst\_2, and a number of applications and two queue managers, QM1 and QM2, running on a server. To set up your configuration for this scenario, complete the following steps:

1. Install two copies of IBM MQ. In this example, they are named Inst\_1 and Inst\_2.
2. Make Inst\_1 primary by running **setmqinst**.
3. Associate all the queue managers on the server with Inst\_1 by running **setmqm**.
4. Start all the queue managers on the server.
5. Show and connect all direct connections with the queue managers associated with Inst\_1 in IBM MQ Explorer.
6. Set up remote connections to all the queue managers in each instance of IBM MQ Explorer.

**Note:** From 1Q 2023, for Multiplatforms, there are two types of maintenance:

- Fix packs, which contain roll-ups of all defects fixed since the previous fix pack delivery (or GA). Fix packs are produced exclusively for Long Term Support (LTS) releases during their normal support lifecycle.
- Cumulative security updates (CSUs), which are smaller updates and contain security patches released since the previous maintenance (GA). CSUs are produced for LTS releases (including releases in extended support), and also for the latest IBM MQ Continuous Delivery (CD) release, as required to deliver relevant security patches.

For maintenance releases in or after 1Q 2023, the fourth digit in the VRMF represents either a fix pack number or a CSU number. Both types of maintenance are mutually cumulative (that is, they contain everything included in older CSUs and fix packs), and both are installed using the same mechanisms for applying maintenance. Both types of maintenance update the F-digit of the VRMF to a higher number than any previous maintenance: fix packs use "F" values divisible by 5, CSUs use "F" values not divisible by 5.



For maintenance releases before 1Q 2023, the fourth digit in the VRMF always represents the fix pack level. For example, the first fix pack of the IBM MQ 9.3.0 LTS release is numbered 9.3.0.1.

For more information, see [Changes to IBM MQ's maintenance delivery model](#).

## About this task


You can install multiple copies of IBM MQ on a server to stage the release of IBM MQ maintenance level updates. For example, as in the scenario that is described in the task steps, by using two installations to roll out maintenance level updates, you maintain two maintenance levels on a server, with the aim of getting all queue managers and applications to the production maintenance level before replacing the previous level of maintenance with the next level.

Which installation an application uses is driven by the queue manager that an application connects to. The **setmqm** command associates a queue manager with an installation. You can associate a queue manager with a different installation as long as the installation is at the same or higher command level. In this scenario, all the installations are at the same command level. You can associate or reassociate a queue manager with either of the installations running any of the fix packs or cumulative security updates (CSUs).

In this scenario, an application links to the primary installation. When it connects to a queue manager, IBM MQ switches the linkage to the installation associated with the queue manager; see [“Multi-installation queue manager coexistence on AIX, Linux, and Windows”](#) on page 376.

For applications built with the link options described in the product documentation, the simplest way to configure the link library search path for IBM MQ applications is to make an installation primary. Only if it is important to pick up a fix in the IBM MQ link library itself, must you review the search path. Either you must make the installation with the IBM MQ link library fix primary, or make a local adjustment for the application, perhaps by running the **setmqenv** command.

Running commands is a different matter. Commands are always run from the primary installation, or the installation you have selected by running the **setmqenv** command. If you run a command from the wrong installation, the command fails. For example, if QM1 is associated with Inst\_1, running the command, Inst\_2\_Installation\_path/bin/stmqm QM1 fails.

 If you are using IBM MQ Explorer and you have two installations, you also have two IBM MQ Explorer instances. One linked to one installation, and one to the other. Each IBM MQ Explorer shows locally connected queue managers that are associated with the same installation as the instance of IBM MQ Explorer. To monitor all the queue managers on a server, set up remote connections to the queue managers associated with the other installations.

## Procedure

Apply the first maintenance level update to Inst\_2.

1. Download the first fix pack or cumulative security update (CSU) when it is released.  
For more information, see [“Where to find downloadable installation images”](#) on page 10.
2. Apply the fix pack or cumulative security update (CSU) you downloaded to Inst\_2.  
For more information, see [“Applying maintenance on Linux”](#) on page 312.
3. Verify Inst\_2.
4. Transfer the queue managers to Inst\_2 one at a time.
  - a) Stop QM1 and the applications connected to it.  
The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

**Note:** [“Applying maintenance level updates to multi-instance queue managers on Linux”](#) on page 315 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- b) Set up the local environment to the installation Inst\_2.

```
. Inst_2_INSTALLATION_PATH/bin/setmqenv -s
```

c) Associate the queue manager with Inst\_2.

```
setmqm -m QM1 -n Inst_2
```

d) Start QM1.

```
strmqm QM1
```

e) Repeat substeps [c](#) and [d](#) for QM2.

f)  Linux

Set up IBM MQ Explorer for Inst\_2.

i) Start the Inst\_2 instance of IBM MQ Explorer

ii) Click **IBM MQ > Queue Managers > Show/Hide Queue Managers... >**

iii) Click each directly connected queue manager listed in the **Hidden Queue Managers** list > **Show**.

iv) Click **Close**.

5. Set Inst\_2 primary.

```
Inst_2_INSTALLATION_PATH/bin/setmqinst -i -n Inst_2
```

Apply the second maintenance level update to Inst\_1.

6. Download the next fix pack or cumulative security update (CSU), for the version of your product when it is released.

For more information, see [“Where to find downloadable installation images” on page 10](#).

7. Apply the fix pack or cumulative security update (CSU), that you have just downloaded to Inst\_1.

For more information, see [“Applying maintenance on Linux” on page 312](#).

8. Verify Inst\_1.

9. Transfer queue managers to Inst\_1 one at a time.

a) Follow the procedure in step [“4” on page 313](#)

Replacing Inst\_2 by Inst\_1 in the instructions.

10. Set Inst\_1 primary.

```
Inst_1_INSTALLATION_PATH/bin/setmqinst -i -n Inst_1
```

For subsequent maintenance fixes, alternate between Inst\_2 and Inst\_1.

11. Alternate between repeating steps [“1” on page 313](#) to [“5” on page 314](#) for Inst\_2 and steps [“6” on page 314](#) to [“10” on page 314](#) for Inst\_1.

### Related concepts

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

[Associating a queue manager with an installation](#)

## Changing the primary installation

### **Related reference**

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

### *Applying maintenance level updates to multi-instance queue managers on Linux*

On Linux, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

## **Before you begin**

Before starting this task, see that the maintenance is applied to the IBM MQ installation on a server and not to individual queue managers. Before you apply maintenance, you must stop all the queue managers, and any IBM MQ service, on a server.

If you want a queue manager to keep running while maintenance is applied, you must configure it as a multi-instance queue manager, and have a standby instance running on another server. If the queue manager that you want to keep running is an existing single instance queue manager, you must convert it to a multi-instance queue manager. For prerequisites and guidance how to create a multi-instance queue manager, see [Multi-instance queue managers](#).

If you are running multi-instance queue managers, you then can apply a maintenance update to a running queue manager by switching the active instance to a different server.

Typically, active and standby installations are maintained at the same maintenance level. Consult the maintenance instructions for each update. Consult the instructions to see if it is possible to run the active and standby instances at different maintenance levels. Check whether fail over from higher to lower, or only lower to higher maintenance level is possible.

The instructions for applying a maintenance update might require you to stop a multi-instance queue manager completely.

If you have a primary server for running active queue manager instances, and a secondary server that runs standby instances, you have a choice of updating the primary or secondary server first. If you update the secondary server first, you must switch back to the primary server when both servers have been updated.

If you have active and standby instances on several servers, you must plan in what order you update the servers to minimize the disruption caused by ending the active instances on each server you update.

## **About this task**

Combine the steps in this task with the maintenance update procedure for applying maintenance to an IBM MQ server installation.

## **Procedure**

1. Ensure that no queue manager instances are running on the server that you intend to apply maintenance to:

- If the queue manager is running as standby, end the standby with the following command:

```
endmqm -x QMgrName
```

- If the queue manager is running as the active instance, end the instance and transfer control to the standby instance with the **endmqm** command. For example:

```
endmqm -shutdown_option -s QMgrName
```

where *-shutdown\_option* is an optional parameter specifying the type of shutdown. For more information, see [endmqm](#).

If there is no standby instance running, the command fails, and you must start a standby instance on a different server.

- If a queue manager is running as a single instance queue manager, you have no alternative but to stop the queue manager before applying the maintenance update.

When you complete this step, no queue manager instances are left running on the server you intend to update.

2. From IBM MQ 9.4.0, you install the maintenance updates by upgrading IBM MQ. Follow the appropriate steps outlined in one of the following topics to install the maintenance updates on the server:
  - To upgrade by using rpm, follow the steps in [“Upgrading an IBM MQ installation on Linux using the rpm command”](#) on page 339.
  - To upgrade by using yum, follow the steps in [“Upgrading an IBM MQ installation on Linux Red Hat using yum”](#) on page 342.
  - To upgrade by using dpkg, follow the steps in [“Upgrading an IBM MQ installation on Linux Ubuntu using dpkg”](#) on page 344.
  - To upgrade by using apt, follow the steps in [“Upgrading an IBM MQ installation on Linux Ubuntu using apt”](#) on page 347.
3. When you have completed the maintenance update, restart all the queue managers on the IBM MQ server, permitting standby instances:

Use the following command:

```
strmqm -x QmgrName
```

4. Repeat the procedure on the standby server to update its maintenance level.
5. If necessary, switch the active instances back to the primary servers:
  - a) End the instances by using the following command:

```
endmqm -shutdown_option -s QMgrName
```

where *-shutdown\_option* is an optional parameter specifying the type of shutdown. For more information, see [endmqm](#).

- b) Restart the instances by using the following command:

```
strmqm -x QMgrName
```

## Linux Applying maintenance level updates for RDQM

There are different procedures for applying maintenance level updates to a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

### About this task

For RDQM HA configurations, complete the steps on each node in the HA group in turn. Processing can then continue on the other nodes in the group while the update is in progress.

### Procedure

- To apply maintenance level updates for HA RDQM:
  - a) Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).
  - b) Change into the directory containing the maintenance packages.
  - c) Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

d) If DRBD has been updated in the Fix Pack, complete the following steps:

- a. Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqmkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.2 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- b. Update the appropriate DRBD kernel module that you identified. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-  
drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- c. Update the DRBD utilities. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

e) If Pacemaker has been updated in the Fix Pack, update it in RDQM. For example, for RHEL 8.2, run the following command:

```
yum install --allowrasing Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

- f) Apply the FixPack by using the procedure for upgrading on Linux using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum”](#) on page 342. For an RDQM install, the minimum commands are:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*  
yum install Advanced/RDQM/MQSeriesRDQM*
```

g) If DRBD or Pacemaker have been updated in the Fix Pack, reboot the node, for example:

```
reboot
```

h) Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

Proceed to the next node in the HA group and repeat the procedure.

- To apply maintenance level updates for DR RDQM on the DR secondary node:

a) Apply maintenance level updates to the DR secondary node:

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Change into the directory containing the maintenance packages.
- c. If DRBD has been updated in the Fix Pack, complete the following steps:

- i) Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqmkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.2 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- ii) Update the appropriate DRBD kernel module that you identified. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-  
drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

iii) Update the DRBD utilities. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

d. If Pacemaker has been updated in the Fix Pack, update it in RDQM. For example, for RHEL 8.2, run the following command:

```
yum install --allowerase Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

e. Apply the FixPack by using the procedure for upgrading on Linux using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum” on page 342](#). For an RDQM install, the minimum commands are:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*  
yum install Advanced/RDQM/MQSeriesRDQM*
```

f. If DRBD or Pacemaker have been updated in the Fix Pack, reboot the node, for example:

```
reboot
```

b) On the DR primary node, either end the DR queue managers or perform a managed failover of the DR queue managers to the DR secondary node.

c) Apply maintenance level updates to the DR primary node:

a. Log in as root, or with sufficient authority to run the following commands.

b. Change into the directory containing the maintenance packages.

c. If DRBD has been updated in the Fix Pack, complete the following steps:

i) Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.2 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

ii) Update the appropriate DRBD kernel module that you identified. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-  
drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

iii) Update the DRBD utilities. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

d. If Pacemaker has been updated in the Fix Pack, update it in RDQM. For example, for RHEL 8.2, run the following command:

```
yum install --allowerase Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

e. Apply the FixPack by using the procedure for upgrading on Linux using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum” on page 342](#). For an RDQM install, the minimum commands are:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*  
yum install Advanced/RDQM/MQSeriesRDQM*
```

f. If DRBD or Pacemaker have been updated in the Fix Pack, reboot the node, for example:

```
reboot
```

d) On the DR primary node, either start the DR queue managers or perform a managed failover of the DR queue managers to the DR primary node.

- To apply maintenance level updates for HA/DR RDQM:
  - a) Apply maintenance to the HA group on your recovery site. Complete the following steps on each node in the group in turn.
    - a. Log in as root, or with sufficient authority to run the following commands.
    - b. Change into the directory containing the maintenance packages.
    - c. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- d. If DRBD has been updated in the Fix Pack, complete the following steps:

- i) Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqmkernelmods> for up-to-date kernel module information. Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.2 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- ii) Update the appropriate DRBD kernel module that you identified. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- iii) Update the DRBD utilities. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

- e. If Pacemaker has been updated in the Fix Pack, update it in RDQM. For example, for RHEL 8.2, run the following command:

```
yum install --allowerase Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

- f. Apply the FixPack by using the procedure for upgrading on Linux using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum”](#) on page 342. For an RDQM install, the minimum commands are:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*
yum install Advanced/RDQM/MQSeriesRDQM*
```

- g. If DRBD or Pacemaker have been updated in the Fix Pack, reboot the node, for example:

```
reboot
```

- h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

- b) Apply maintenance to the HA group on your main site. Complete the following steps on each node in the group in turn.

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Change into the directory containing the maintenance packages.
- c. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- d. If DRBD has been updated in the Fix Pack, complete the following steps:

- i) Determine which DRBD kernel module is needed for the system on which RDQM is being installed. See <https://ibm.biz/mqrdqmkernelmods> for up-to-date kernel module information.

Helper scripts are provided in the `kmod-drbd-9` directories. For example, on a RHEL 8.2 system, running the helper script `Advanced/RDQM/PreReqs/e18/kmod-drbd-9/modver` returns the following information, identifying the kernel module that you need to install:

```
kmod-drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- ii) Update the appropriate DRBD kernel module that you identified. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/kmod-drbd-9/kmod-  
drbd-9.0.23_4.18.0_193-1.x86_64.rpm
```

- iii) Update the DRBD utilities. For example, for RHEL 8.2 you run the following command:

```
yum install Advanced/RDQM/PreReqs/e18/drbd-utils-9/*
```

- e. If Pacemaker has been updated in the Fix Pack, update it in RDQM. For example, for RHEL 8.2, run the following command:

```
yum install --allowrasing Advanced/RDQM/PreReqs/e18/pacemaker-2/*
```

- f. Apply the Fix Pack using the procedure for upgrading on Linux using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum” on page 342](#). For an RDQM install, the minimum commands are:

```
yum install MQSeriesGSKit* MQSeriesServer* MQSeriesRuntime*  
yum install Advanced/RDQM/MQSeriesRDQM*
```

- g. If DRBD or Pacemaker have been updated in the Fix Pack, reboot the node, for example:

```
reboot
```

- h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

## Related tasks

[“Installing RDQM \(replicated data queue managers\)” on page 256](#)

Installation tasks associated with RDQM are grouped in this section. RDQM is available on x86-64 for RHEL 8 (8.8 or later) and RHEL 9 (9.2 or later).

### *Removing maintenance level updates for RDQM*

There are different procedures for removing maintenance level updates to a high availability (HA) configuration, a disaster recovery (DR) configuration, or a combined DR/HA configuration.

## About this task

For RDQM HA configurations, complete the steps on each node in the HA group in turn. Processing can then continue on other the other nodes in the group while the update is in progress.

## Procedure

- To remove maintenance level updates for HA RDQM:
  - Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).
  - Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```



- c) Remove the Fix Pack using the procedure for removing maintenance level updates on Linux, see [“Removing maintenance on Linux using yum” on page 323](#). For example, to remove the 9.4.0.1 Fix Pack:

```
yum -y downgrade pathToInstallationFiles/MQSeries*
```

- d) Resume the node:

```
rdqmadm -r
```

Proceed to the next node in the HA group and repeat the procedure.

- To remove maintenance level updates for DR RDQM:

- a) Remove maintenance level updates to the DR secondary node:

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Remove the Fix Pack using the procedure for removing maintenance level updates on Linux, see [“Removing maintenance on Linux using yum” on page 323](#). For example, to remove the 9.4.0.1 Fix Pack:

```
yum -y downgrade pathToInstallationFiles/MQSeries*
```

- b) On the DR primary node, either end the DR queue managers or perform a managed failover of the DR queue managers to the DR secondary node.

- c) Remove maintenance level updates to the DR primary node:

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Remove the Fix Pack using the procedure for removing maintenance level updates on Linux, see [“Removing maintenance on Linux using yum” on page 323](#). For example, to remove the 9.4.0.1 Fix Pack:

```
yum -y downgrade pathToInstallationFiles
```

- d) On the DR primary node either start the DR queue managers or perform a managed failover of the DR queue managers to the DR primary node.

- To remove maintenance level updates for DR/HA RDQM

- a) Remove maintenance from the HA group on your recovery site. Complete the following steps on each node in the group in turn:

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- c. Log in as root, or with sufficient authority to run the following commands.
- d. Remove the Fix Pack using the procedure for removing maintenance level updates on Linux, see [“Removing maintenance on Linux using yum” on page 323](#). For example, to remove the 9.4.0.1 Fix Pack:

```
yum -y downgrade pathToInstallationFiles
```

- e. Resume the node:

```
rdqmadm -r
```

Proceed to the next node in the HA group and repeat the procedure.

- b) Remove maintenance from the HA group on your main site. Complete the following steps on each node in the group in turn.

- a. Log in as root, or with sufficient authority to run the following commands.
- b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- c. Log in as root, or with sufficient authority to run the following commands.
- d. Remove the Fix Pack using the procedure for removing maintenance level updates on Linux, see [“Removing maintenance on Linux using yum”](#) on page 323. For example, to remove the 9.4.0.1 Fix Pack:

```
yum -y downgrade pathToInstallationFiles
```

- e. Resume the node:

```
rdqmadm -r
```

Proceed to the next node in the HA group and repeat the procedure.

## **V 9.4.0** Removing maintenance on Linux using rpm

From IBM MQ 9.4.0, you can use the **xrpm** command to remove maintenance from an IBM MQ installation on Linux systems.

### Before you begin

When you use **xrpm** the IBM MQ installation that includes the maintenance level is replaced with an installation at an earlier level of IBM MQ. Therefore, you must decide which level of IBM MQ you want to revert to. Then you must ensure that the installation files for the earlier level of IBM MQ are available on the system.

### About this task

You can use **xrpm** only to roll back the fix pack level. You cannot use the command to roll back the version, release, or modification level of your IBM MQ installation. To roll back the version, release, or modification level of your installation, you must uninstall the higher level and then install the earlier level that you require. However, any queue managers that are running at a higher version or release of IBM MQ cannot then be started on the earlier version or release. For more information, see [“Queue manager migration”](#) on page 361.

### Procedure

1. Complete the following tasks:

- a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

- b) Stopped the mqweb server by using the **endmqweb** command.
- c) Stopped your listeners by using the **endmq1sr** command.
- d) Stopped all your queue managers by using the **endmqm** command.
- e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between sudo and su commands in Linux](#).

3. Set your current directory to the location of the earlier level installation files. The location might be a network location, or a local file system directory.
4. Optional: If there is more than one installation on the system, or if you want to remove maintenance from an IBM MQ installation in a nondefault location, create a unique set of packages:

- a) Run the **crtmqpkg** to create a unique set of packages:

```
./crtmqpkg suffix
```

where *suffix* specifies a name of your choosing that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is at `/var/tmp`. Ensure that the system has enough available space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the **crtmqpkg** command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix installationPath
```

- b) Set your current directory to the location that is specified when the **crtmqpkg** command operation completes successfully.

5. Remove the IBM MQ maintenance level:

- To remove the maintenance level from all available components in the default location, use the following command:

```
rpm --oldpackage -Uvh pathToInstallationFiles/MQSeries*
```

where *pathToInstallationFiles* specifies the path where the earlier level IBM MQ rpm installation files are located.

- To remove the maintenance level from all available components in a nondefault location, use the following command:

```
rpm --oldpackage --prefix installationPath -Uvh pathToInstallationFiles/MQSeries*
```

where *installationPath* specifies the path where IBM MQ is installed and *pathToInstallationFiles* specifies the path where the earlier level IBM MQ rpm installation files are located.

6. Use the **dspmqr** command to verify that the level is as expected:

```
dspmqr
```

## **V 9.4.0** Removing maintenance on Linux using yum

From IBM MQ 9.4.0, you can use the **yum** command to remove maintenance from an IBM MQ installation on Linux Red Hat systems.

### Before you begin

When you use **yum** the IBM MQ installation that includes the maintenance level is replaced with an installation at an earlier level of IBM MQ. Therefore, you must decide which level of IBM MQ you want to revert to. Then you must ensure that the installation files for the earlier level of IBM MQ are available on the system.

### About this task

You can use **yum** only to roll back the fix pack level of your installation. You cannot use the command to roll back the version, release, or modification level of your IBM MQ installation. To roll back the version, release, or modification level of your installation, you must uninstall the higher level and then install the earlier level that you require. However, any queue managers that are running at a higher version or release of IBM MQ cannot then be started on the earlier version or release. For more information, see [“Queue manager migration”](#) on page 361.

## Procedure

1. Complete the following tasks:

- a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

- b) Stopped the mqweb server by using the `endmqweb` command.
- c) Stopped your listeners by using the `endmq1sr` command.
- d) Stopped all your queue managers by using the `endmqm` command.
- e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding `sudo` before the commands, or by changing to the root user in the shell with the `su` command. For more information, see [Exploring the differences between `sudo` and `su` commands in Linux](#).

3. Set your current directory to the location of the earlier level installation files. The location might be a network location, or a local file system directory.
4. Optional: If there is more than one installation on the system, or if you want to remove maintenance from an IBM MQ installation in a nondefault location, create a unique set of packages:
  - a) Run the `crtmqpkg` to create a unique set of packages:

```
./crtmqpkg suffix
```

where *suffix* specifies a name of your choosing that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is at `/var/tmp`. Ensure that the system has enough available space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the `crtmqpkg` command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix installationPath
```

- b) Set your current directory to the location that is specified when the `crtmqpkg` command operation completes successfully.
5. Clear the repository cache by entering the following command:

```
yum clean all
```

6. Remove the IBM MQ maintenance level:

- To remove the maintenance level from all installed components in the default location, use the following command:

```
yum -y downgrade pathToInstallationFiles/MQSeries*
```

where *pathToInstallationFiles* specifies the path where the earlier level IBM MQ installation files are located.

- To remove the maintenance level from all installed components in a nondefault location, use the following command:

```
yum -y downgrade pathToInstallationFiles/MQSeries*suffix*
```

where *pathToInstallationFiles* specifies the path where the earlier level IBM MQ rpm installation files are located, and *suffix* specifies the suffix that was chosen when you ran the `crtmqpkg` command.

7. Use the **dspmqr** command to verify that the level is as expected:

```
dspmqr
```

## **V 9.4.0** Removing maintenance on Linux Ubuntu using dpkg

From IBM MQ 9.4.0, you can use the **dpkg** command to remove maintenance from an IBM MQ installation on Linux Ubuntu systems.

### Before you begin

When you use **dpkg** to remove fix pack maintenance, the IBM MQ installation that includes the maintenance level is replaced with an installation at an earlier level of IBM MQ. Therefore, you must decide which level of IBM MQ you want to revert to. Then you must ensure that the installation files for the earlier level of IBM MQ are available on the system.

### About this task

You can use **dpkg** only to roll back the fix pack level of your installation. You cannot use the command to roll back the version, release, or modification level of your IBM MQ installation. To roll back the version, release, or modification level of your installation, you must uninstall the higher level and then install the earlier level that you require. However, any queue managers that are running at a higher version or release of IBM MQ cannot then be started on the earlier version or release. For more information, see [“Queue manager migration”](#) on page 361.

### Procedure

1. Complete the following tasks:

a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

b) Stopped the mqweb server by using the **endmqweb** command.

c) Stopped your listeners by using the **endmqlsr** command.

d) Stopped all your queue managers by using the **endmqm** command.

e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between sudo and su commands in Linux](#).

3. Set your current directory to the location of the earlier level installation files. The location might be a network location, or a local file system directory.

4. Remove maintenance from each IBM MQ package by using the following command for each package:

```
dpkg -i pathToInstallationFiles/packageName
```

where *pathToInstallationFiles* specifies the path where the earlier level IBM MQ installation files are located, and *packageName* specifies the name of the package to remove maintenance from.

**Important:** You cannot specify multiple package files in the same command because of inter-package dependencies. Change the packages individually in the order shown. If you use apt to remove maintenance, the inter-package dependencies are handled for you. For more information, see [“Removing maintenance on Linux Ubuntu using apt”](#) on page 326.

- ibmmq-runtime
- ibmmq-jre

- ibmmq-java
- ibmmq-gskit
- ibmmq-server
- ibmmq-web
- ibmmq-ftbase
- ibmmq-ftagent
- ibmmq-ftservice
- ibmmq-ftlogger
- ibmmq-fttools
- ibmmq-amqp
- ibmmq-ams
- ibmmq-xrservice
- ibmmq-explorer
- ibmmq-client
- ibmmq-man
- ibmmq-msg\_ *language*
- ibmmq-samples
- ibmmq-sdk

5. Use the **dspmqrver** command to verify that the level is as expected:

```
dspmqrver
```

## **Removing maintenance on Linux Ubuntu using apt**

From IBM MQ 9.4.0, you can use the **apt** command to remove maintenance from an IBM MQ installation on Linux Ubuntu systems.

### **Before you begin**

When you use **apt** the IBM MQ installation that includes the maintenance level is replaced with an installation at an earlier level of IBM MQ. Therefore, you must decide which level of IBM MQ you want to revert to. Then you must ensure that the installation files for the earlier level of IBM MQ are available on the system.

### **About this task**

You can use **apt** only to roll back the fix pack level of your installation. You cannot use the command to roll back the version, release, or modification level of your IBM MQ installation. To roll back the version, release, or modification level of your installation, you must uninstall the higher level and then install the earlier level that you require. However, any queue managers that are running at a higher version or release of IBM MQ cannot then be started on the earlier version or release. For more information, see [“Queue manager migration” on page 361](#).

### **Procedure**

1. Complete the following tasks:

a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

b) Stopped the mqweb server by using the **endmqweb** command.

c) Stopped your listeners by using the **endmq1sr** command.

- d) Stopped all your queue managers by using the **endmqm** command.
- e) Backed up your data.  
For more information, see [Backing up and restoring queue manager data](#).
2. Log in as root, or with sufficient authority to run the following commands.  
You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).
3. Set your current directory to the location of the earlier level installation files. The location might be a network location, or a local file system directory.
4. Open the `IBM_MQ.list` file from the `/etc/apt/sources.list.d` directory.
5. Add the following line to the end of the `IBM_MQ.list` file:

```
deb [trusted=yes] file:installationFileLocation ./
```

where *installationFileLocation* is the directory where the earlier level IBM MQ installation files are located.

6. Refresh the repository index by using the following command:

```
apt-get update
```

7. Remove the IBM MQ maintenance level by using the following command:

```
apt-get -y --allow-downgrades install "ibmmq-*"=version
```

where *version* specifies the version of IBM MQ that matches the earlier level IBM MQ installation files that are in the current directory.

8. Use the **dspmqver** command to verify that the level is as expected:

```
dspmqver
```

## **Windows** Applying and removing maintenance on Windows

Maintenance tasks associated with IBM MQ on Windows are grouped in this section.

### Procedure

- To apply maintenance level updates, see [“Applying maintenance level updates on Windows” on page 328](#).
- To remove updates and revert to the previous maintenance level, see [“Removing maintenance level updates on Windows” on page 333](#).
- For information on how to use multiple installations of IBM MQ on the same server to control the release of maintenance fixes, see [“Staging maintenance level updates on Windows” on page 328](#).
- For information on how to use multi-instance queue managers to reduce the outage caused by applying maintenance updates, see [“Applying maintenance level updates to multi-instance queue managers on Windows” on page 331](#).

### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## **Applying maintenance level updates on Windows**

From IBM MQ 9.4.0, you apply maintenance for server and client installations by upgrading IBM MQ.

### About this task

**Note:** From 1Q 2023, for Multiplatforms, there are two types of maintenance:

- Fix packs, which contain roll-ups of all defects fixed since the previous fix pack delivery (or GA). Fix packs are produced exclusively for Long Term Support (LTS) releases during their normal support lifecycle.
- Cumulative security updates (CSUs), which are smaller updates and contain security patches released since the previous maintenance (GA). CSUs are produced for LTS releases (including releases in extended support), and also for the latest IBM MQ Continuous Delivery (CD) release, as required to deliver relevant security patches.

For maintenance releases in or after 1Q 2023, the fourth digit in the VRMF represents either a fix pack number or a CSU number. Both types of maintenance are mutually cumulative (that is, they contain everything included in older CSUs and fix packs), and both are installed using the same mechanisms for applying maintenance. Both types of maintenance update the F-digit of the VRMF to a higher number than any previous maintenance: fix packs use "F" values divisible by 5, CSUs use "F" values not divisible by 5.

For maintenance releases before 1Q 2023, the fourth digit in the VRMF always represents the fix pack level. For example, the first fix pack of the IBM MQ 9.3.0 LTS release is numbered 9.3.0.1.

For more information, see [Changes to IBM MQ's maintenance delivery model](#).

### Procedure

- To upgrade a server installation by using the launchpad, follow the steps in [“Upgrading an IBM MQ server installation using the Launchpad”](#) on page 349.
- To upgrade a server installation by using `msiexec`, follow the steps in [“Upgrading an IBM MQ server installation using `msiexec`”](#) on page 350.
- To upgrade a client installation by using the GUI installer, follow the steps in [“Upgrading an IBM MQ client installation using the GUI installer”](#) on page 351.
- To upgrade a client installation by using `msiexec`, follow the steps in [“Upgrading an IBM MQ client installation using `msiexec`”](#) on page 352.

## **Staging maintenance level updates on Windows**

On Windows systems, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

### Before you begin

The steps in this task are based on an example scenario in which it is assumed that you have two copies of IBM MQ named `Inst_1` and `Inst_2`, and a number of applications and two queue managers, `QM1` and `QM2`, running on a server. To set up your configuration for this scenario, complete the following steps:

1. Install two copies of IBM MQ. In this example, they are named `Inst_1` and `Inst_2`.
2. Make `Inst_1` primary by running `setmqinst`.
3. Associate all the queue managers on the server with `Inst_1` by running `setmqm`.
4. Start all the queue managers on the server.
5. Show and connect all direct connections with the queue managers associated with `Inst_1` in IBM MQ Explorer.
6. Set up remote connections to all the queue managers in each instance of IBM MQ Explorer.



**Note:** From 1Q 2023, for Multiplatforms, there are two types of maintenance:

- Fix packs, which contain roll-ups of all defects fixed since the previous fix pack delivery (or GA). Fix packs are produced exclusively for Long Term Support (LTS) releases during their normal support lifecycle.
- Cumulative security updates (CSUs), which are smaller updates and contain security patches released since the previous maintenance (GA). CSUs are produced for LTS releases (including releases in extended support), and also for the latest IBM MQ Continuous Delivery (CD) release, as required to deliver relevant security patches.

For maintenance releases in or after 1Q 2023, the fourth digit in the VRMF represents either a fix pack number or a CSU number. Both types of maintenance are mutually cumulative (that is, they contain everything included in older CSUs and fix packs), and both are installed using the same mechanisms for applying maintenance. Both types of maintenance update the F-digit of the VRMF to a higher number than any previous maintenance: fix packs use "F" values divisible by 5, CSUs use "F" values not divisible by 5.

For maintenance releases before 1Q 2023, the fourth digit in the VRMF always represents the fix pack level. For example, the first fix pack of the IBM MQ 9.3.0 LTS release is numbered 9.3.0.1.

For more information, see [Changes to IBM MQ's maintenance delivery model](#).

## About this task

You can install multiple copies of IBM MQ on a server to stage the release of IBM MQ maintenance level updates. For example, as in the scenario that is described in the task steps, by using two installations to roll out maintenance level updates, you maintain two maintenance levels on a server, with the aim of getting all queue managers and applications to the production maintenance level before replacing the previous level of maintenance with the next level.

Which installation an application uses is driven by the queue manager that an application connects to. The **setmqm** command associates a queue manager with an installation. You can associate a queue manager with a different installation as long as the installation is at the same or higher command level. In this scenario, all the installations are at the same command level. You can associate or reassociate a queue manager with either of the installations running any of the fix packs or cumulative security updates (CSUs).

In this scenario, an application links to the primary installation. When it connects to a queue manager, IBM MQ switches the linkage to the installation associated with the queue manager; see [“Multi-installation queue manager coexistence on AIX, Linux, and Windows”](#) on page 376.

For applications built with the link options described in the product documentation, the simplest way to configure the link library search path for IBM MQ applications is to make an installation primary. Only if it is important to pick up a fix in the IBM MQ link library itself, must you review the search path. Either you must make the installation with the IBM MQ link library fix primary, or make a local adjustment for the application, perhaps by running the **setmqenv** command. See [“Migrating IBM MQ library loading to a later version on Windows”](#) on page 416.

Running commands is a different matter. Commands are always run from the primary installation, or the installation you have selected by running the **setmqenv** command. If you run a command from the wrong installation, the command fails. For example, if QM1 is associated with Inst\_1, running the command `Inst_2_Installation_path/bin/strmqm QM1` fails.

If you are using IBM MQ Explorer and you have two installations, you also have two IBM MQ Explorer instances. One linked to one installation, and one to the other. Each IBM MQ Explorer shows locally connected queue managers that are associated with the same installation as the instance of IBM MQ Explorer. To monitor all the queue managers on a server, set up remote connections to the queue managers associated with the other installations.

## Procedure

Apply the first maintenance level update to Inst\_2.

1. Download the first fix pack or cumulative security update (CSU) when it is released.

For more information, see [“Where to find downloadable installation images”](#) on page 10.

2. Upgrade IBM MQ to apply the fix pack or cumulative security update (CSU) that you downloaded to Inst\_2.

For more information, see [“Upgrading an IBM MQ installation on Windows”](#) on page 349.

3. Verify Inst\_2.
4. Transfer the queue managers to Inst\_2 one at a time.

- a) Stop QM1 and the applications connected to it.

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

**Note:** “Applying maintenance level updates to multi-instance queue managers on Windows” on page 331 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- b) Set up the local environment to the installation Inst\_2 by using the **setmqenv** command

```
"Inst_2_INSTALLATION_PATH\bin\setmqenv" -s
```

The -s option sets up the environment for the installation that runs the **setmqenv** command.

- c) Associate the queue manager with Inst\_2 by using the **setmqm** command:

```
setmqm -m QM1 -n Inst_2
```

- d) Start QM1 by using the **strmqm** command:

```
strmqm QM1
```

- e) Repeat substeps [c](#) and [d](#) for QM2.

- f) Set up IBM MQ Explorer for Inst\_2.

- i) Start the Inst\_2 instance of IBM MQ Explorer

**Tip:** On Windows, hover over the IBM MQ icon in the system tray. The hover help shows the installation name associated with the IBM MQ Explorer instance.

- ii) Click **IBM MQ > Queue Managers > Show/Hide Queue Managers... >**

- iii) Click each directly connected queue manager listed in the **Hidden Queue Managers** list > **Show**.

- iv) Click **Close**.

5. Set Inst\_2 primary by using the **setmqinst** command:

```
"Inst_2_INSTALLATION_PATH\bin\setmqinst" -i -n Inst_2
```

Apply the second maintenance level update to Inst\_1.

6. Download the next fix pack or cumulative security update (CSU), for the version of your product when it is released.

For more information, see [“Where to find downloadable installation images”](#) on page 10.

7. Upgrade IBM MQ to apply the fix pack or cumulative security update (CSU) that you downloaded to Inst\_1.

For more information, see [“Upgrading an IBM MQ installation on Windows”](#) on page 349.

8. Verify Inst\_1.
9. Transfer queue managers to Inst\_1 one at a time.

- a) Follow the procedure in step [“4”](#) on page 330

Replacing Inst\_2 by Inst\_1 in the instructions.

10. Set Inst\_1 primary by using the **setmqinst** command:

```
"Inst_1_INSTALLATION_PATH\bin\setmqinst" -i -n Inst_1
```

For subsequent maintenance fixes, alternate between Inst\_2 and Inst\_1.

11. Alternate between repeating steps “1” on page 329 to “5” on page 330 for Inst\_2 and steps “6” on page 330 to “10” on page 330 for Inst\_1.

### Related concepts

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

[“Installing IBM MQ server on Windows” on page 177](#)

On Windows, IBM MQ is installed by using the Microsoft Installer (MSI). You can either use the Installation Launchpad to invoke MSI or alternatively, you can invoke MSI directly.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

**Windows** *Applying maintenance level updates to multi-instance queue managers on Windows*

On Windows platforms, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

## Before you begin

Before starting this task, see that the maintenance is applied to the IBM MQ installation on a server and not to individual queue managers. Before you apply maintenance, you must stop all the queue managers, and any IBM MQ service, on a server.

If you want a queue manager to keep running while maintenance is applied, you must configure it as a multi-instance queue manager, and have a standby instance running on another server. If the queue manager that you want to keep running is an existing single instance queue manager, you must convert it to a multi-instance queue manager. For prerequisites and guidance how to create a multi-instance queue manager, see [Multi-instance queue managers](#).

If you are running multi-instance queue managers, you then can apply a maintenance update to a running queue manager by switching the active instance to a different server.

Typically, active and standby installations are maintained at the same maintenance level. Consult the maintenance instructions for each update. Consult the instructions to see if it is possible to run the active and standby instances at different maintenance levels. Check whether fail over from higher to lower, or only lower to higher maintenance level is possible.

The instructions for applying a maintenance update might require you to stop a multi-instance queue manager completely.

If you have a primary server for running active queue manager instances, and a secondary server that runs standby instances, you have a choice of updating the primary or secondary server first. If you update the secondary server first, you must switch back to the primary server when both servers have been updated.

If you have active and standby instances on several servers, you must plan in what order you update the servers to minimize the disruption caused by ending the active instances on each server you update.

## About this task

Follow these steps to apply maintenance to a multi-instance queue manager on Windows.

## Procedure

1. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their SYSTEM.FTE.STATE queues should contain no messages.

2. Find out the current state of the queue managers and their associated listeners associated with the IBM MQ installation.

- a) From the installation that you are updating, use the **dspmqr** command to list the state of the queue managers:

- To display the installation name and status of queue managers associated with all installations of IBM MQ, run the following command:

```
dspmqr -o installation -o status
```

- To display the status of active queue managers associated with the installation from which you are running the command, run the following command:

```
dspmqr -a
```

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QMgrName
```

3. Use the **endmqm** command to stop each running queue manager associated with this installation.

- If the queue manager is running as standby, run the **endmqm** command to end the standby as shown in the following example:

```
endmqm -x QMgrName
```

- If the queue manager is running as the active instance, run the **endmqm** command to end the active instance and transfer control to the standby instance as shown in the following example:

```
endmqm -shutdown_option -s QMgrName
```

where *-shutdown\_option* is an optional parameter specifying the type of shutdown. For more information about optional parameters for the **endmqm** command, see [endmqm](#).

If there is no standby instance running, and the command fails, start a standby instance on a different server.

- If a queue manager is running as a single instance queue manager, stop the queue manager. In the case of a single queue manager you have no alternative but to stop the queue manager before applying the maintenance update. For more information about how to stop a queue manager, see [Stopping a queue manager](#).

Stop any listeners associated with the queue managers by using the **endmq1sr** command as shown in the following example:

```
endmq1sr -m QMgrName
```

After you complete this step, no queue manager instances are left running on the server that you intend to update.

4. Upgrade IBM MQ to apply maintenance to the IBM MQ server.

Follow the instructions in [“Upgrading an IBM MQ installation on Windows”](#) on page 349.

5. When you have completed the maintenance update, use the **strmqm** command to restart all the queue managers on the IBM MQ server, permitting standby instances, as shown in the following example:

```
strmqm -x QmgrName
```

6. Repeat the procedure on the standby server, to update its maintenance level.

7. If necessary, switch the active instances back to the primary servers:

- a) Stop the instances by using the **endmqm** command as shown in the following example:

```
endmqm -shutdown_option -s QMgrName
```

- b) Restart the instances by using the **strmqm** command as shown in the following example:

```
strmqm -x QmgrName
```

### Related tasks

[Stopping a queue manager](#)

### Related reference

[dspmq \(display queue managers\)](#)

[DISPLAYSSTATUS](#)

[endmqm \(end queue manager\)](#)

[endmqlsr \(end listener\)](#)

[strmqm \(start queue manager\)](#)

## **Removing maintenance level updates on Windows**

From IBM MQ 9.4.0, you remove maintenance for server and client installations by uninstalling IBM MQ and then reinstalling an earlier level.

### About this task

Considerations for uninstalling and reinstalling IBM MQ at an earlier level:

- When you uninstall IBM MQ, your IBM MQ data is not removed. Therefore, when you reinstall the earlier level, your queue managers are preserved.
- Any queue managers that are running at a higher version or release of IBM MQ cannot be started on an earlier version or release. Therefore, when removing maintenance, ensure that you reinstall a version of IBM MQ at the same version and release, but a different maintenance level. For more information, see [“Queue manager migration”](#) on page 361.

### Procedure

- To uninstall IBM MQ on Windows, see [“Uninstalling IBM MQ on Windows”](#) on page 231.
- To install an IBM MQ server on Windows, see [“Installing IBM MQ server on Windows”](#) on page 177.
- To install an IBM MQ client on Windows, see [“Installing an IBM MQ client on Windows”](#) on page 204.

### Related tasks

[“Applying maintenance level updates on Windows”](#) on page 328

From IBM MQ 9.4.0, you apply maintenance for server and client installations by upgrading IBM MQ.

[“Applying maintenance level updates to multi-instance queue managers on Windows”](#) on page 331

On Windows platforms, you can use multi-instance queue managers to reduce the outage caused by applying maintenance updates.

## **Applying and removing maintenance on z/OS**

You can install maintenance to update IBM MQ for z/OS to a new maintenance level.


### **Before you begin**


This task assumes that you understand the difference between Long Term Support and Continuous Delivery releases, and the maintenance delivery model that applies in each case. For more information, see [IBM MQ Release Types and versioning](#).

The command level of a queue manager is the three-digit VRM level. An IBM MQ program can call MQINQ, passing the MQIA\_COMMAND\_LEVEL selector, to get the command level of the queue manager it is connected to.

### **About this task**

IBM MQ for z/OS uses PTFs for Maintenance.

 PTFs are specific to a particular set of libraries corresponding to specific release level. For UNIX System Services features (that is, JMS and WEB UI, Connector Pack, and Managed File Transfer) the z/OS PTFs are aligned directly with the Multiplatforms fix packs and cumulative security updates (CSUs). These fixes are cumulative, and are made available at the same time as the equivalent Multiplatforms fix pack or CSU.

 CD CSUs are not usually made available between CD releases, but are included in the next IBM MQ for z/OS CD release. You can also contact support to request a ++USERMOD.

Other fixes on IBM MQ for z/OS are distinct fixes on particular parts. These fixes resolve specific issues, are not cumulative, and are made available as and when they are produced.

PTFs are applied to and removed from the installed code using SMP/E. For more information about SMP/E, see [“Installing IBM MQ for z/OS” on page 269](#) and [“z/OS installation overview” on page 270](#) and the appropriate Program Directory. For download links for the Program Directories, see [IBM MQ for z/OS Program Directory PDF files](#).

Apart from any exceptions documented with the PTFs, PTFs do not change the correct operation of IBM MQ, and are reversible. Nonetheless, you must check that the fixes have not changed the operation of critical programs unexpectedly.

Applying PTFs does not change the version, release, or maintenance level of the code. No queue manager migration is required after applying maintenance. PTFs are grouped into Recommended Service Updates (RSUs) that have been tested together in a Consolidated Service Test (CST); see [Consolidated Service Test and the RSU](#).

PTFs that apply to a category of software fixes might be grouped together and identified using a fix category. For more information, see [IBM Fix category values and descriptions](#).

### **Procedure**

1. Open [Downloading IBM MQ 9.4](#).
2. To access the latest CD level, click the CD tab.
  - a) Find the section **Downloading the CD release for z/OS**.
  - b) To get the latest CD level, click **Download the IBM MQ 9.4.x base install image and PTFs from Shopz**.

Either order the features as a new product installation, or download and apply PTFs to a previously installed release.

Note that there is no CSU download for z/OS; it will be included in the next IBM MQ for z/OS 9.4 CD release.

3. To access the latest LTS downloads, click the LTS tab.

From this tab you can download the latest LTS base install level, and either an LTS fix pack or an LTS CSU, whichever is the latest.

- a) Find the section **Downloading the LTS release for z/OS**.
- b) To get the latest LTS base install level, click **Download the IBM MQ 9.4.0 LTS base install image and PTFs from Shopz**.

Either order the features as a new product installation, or download and apply PTFs to a previously installed release.

- c) To get the latest fix pack or LTS CSU, click **Download the IBM MQ 9.4.0.xx fix pack/CSU PTFs from Shopz**.

Fix packs and CSUs are cumulative. Therefore you are only offered the latest fix, which might be either a fix pack or a CSU.

### Related concepts

[IBM MQ release types and versioning](#)

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

## Applying WebSphere Liberty interim fixes to the mqweb server

You can apply WebSphere Liberty interim fixes to the WebSphere Liberty that runs the mqweb server.

### About this task

This task applies to both IBM MQ Long Term Support and IBM MQ Continuous Delivery.

**Important:** If an interim fix is not available for the WebSphere Liberty version that is installed in the IBM MQ installation, then you should contact IBM Support. You should NOT look to change the WebSphere Liberty version that is used by the IBM MQ Console and REST API and should only look to apply a WebSphere Liberty interim fix.

**Note:** This information does NOT apply to IBM MQ Appliance.

### Procedure

1. Check the Liberty version.

To do this, run the following command:

```
<MQ_INSTALLATION_PATH>/web/bin/productInfo version --ifixes
```

2. Use the security link or the information on the page for the Liberty APAR to locate the correct archive interim fix (iFix) for the version that is installed.

Liberty archive interim fixes come in a JAR format, and have an associated readme file that you can refer to for installation instructions. Download both files into a temporary directory.

3. After the interim fix has been downloaded, start a console and navigate to the directory that contains the interim fix JAR file.
4. Stop the mqweb server by using the command:

```
<MQ_INSTALLATION_PATH>/bin/endmqweb
```

5. 

As an administrative user, run the following command to set the umask for the user to 022:

```
umask 022
```

6. As an administrative user, run the following command to install the interim fix:

```
java -jar <iFix JAR> -installLocation <MQ_INSTALLATION_PATH>/web
```

7. Run the following command and check the output to confirm that the interim fix has been installed correctly:

```
<MQ_INSTALLATION_PATH>/web/bin/productInfo version --ifixes
```

8. Restart the mqweb server by using the command:

```
<MQ_INSTALLATION_PATH>/bin/stirmqweb
```

## Results

When the mqweb server restarts, the interim fix should be loaded.

## Example

The following example shows how to apply a WebSphere Liberty interim fix for APAR PH31442 to an IBM MQ 9.1.0.8 installation on Linux.

1. Run the following command to check the version of Liberty installed with IBM MQ 9.1.0.8:

```
/opt/mqm/web/bin/productInfo version --ifixes
```

This command generates the following output, which indicates that the Liberty version is 21.0.0.3:

```
Product name: WebSphere Application Server  
Product version: 21.0.0.3  
Product edition: BASE
```

2. Go to the web page for [APAR PH31442](#).
3. In the **Download Package** section of the web page, click the download link for the archive **21003-wlp-archive-IFPH34122**.
4. After you have been redirected to Fix Central, download the following files into a temporary directory:
  - 21003-wlp-archive-IFPH34122-ReadMe.txt
  - 21003-wlp-archive-ifph34122.jar
5. Start a console, and navigate to the temporary directory.
6. Stop the mqweb server by using the command:

```
/opt/mqm/bin/endmqweb
```

7. Run the following command as a root user to set the umask to 022:

```
umask 022
```

8. Next, as the same root user, run the following command to install the interim fix:

```
java -jar 21003-wlp-archive-ifph34122.jar --installLocation /opt/mqm/web
```

All being well, you should see the following output:

```
Applying fix to Liberty install directory at /opt/mqm/web now.  
lib/com.ibm.ws.ui.tool.javaBatch_1.0.50.cl210320210319-1444.jar  
lib/com.ibm.ws.ui.tool.explore_1.0.50.cl210320210319-1444.jar  
lib/com.ibm.ws.ui_1.0.50.cl210320210319-1444.jar  
Fix has been applied successfully.  
Successfully extracted all product files.
```

9. Run the following command to check that the interim fix has been installed correctly:

```
/opt/mqm/web/bin/productInfo version --ifixes
```



You should see the following output:

```
Product name: WebSphere Application Server
Product version: 21.0.0.3
Product edition: BASE
```

```
PH34122 in the iFix(es): [21003-wlp-archive-IFPH34122]
```

10. Restart the mqweb server by using the command:

```
/opt/mqm/bin/strmqweb
```

### Related tasks

[Contacting IBM Support](#)

### Related reference

[endmqweb \(end mqweb server\)](#)

[strmqweb \(start mqweb server\)](#)

## Upgrading IBM MQ

Upgrading is the process of taking an existing IBM MQ installation and upgrading to a new level of code.

### Before you begin

This task assumes that you understand the difference between Long Term Support and Continuous Delivery releases, and the maintenance delivery model that applies in each case. For more information, see [IBM MQ Release Types and versioning](#).

### About this task

When you upgrade from one release to another, or apply maintenance, including fix packs, cumulative security updates (CSUs), or interim fixes, the impact of the change depends on the extent of the change in the VRMF level:

- The term *upgrade* applies to increasing the version V, release R, or modification M level.
- The term *fix* applies to increasing the fix F level.

At each change of the V, R, or M level, the command level on the queue manager changes. On a change to the F level, the command level does not change.

**Multi** On Multiplatforms, after an upgrade has been applied, the only way to back out a VRM change is by taking one of the following actions:

- Uninstalling the product code and reinstalling the code.
- Installing the old level of code alongside the existing code and using the [setmqm](#) command to associate the queue manager with the other installation.

The general rule is that, if you have carried out an installation that causes the command level of the new installation to be updated, and started the queue manager, you cannot back out the changes.

**z/OS** On z/OS, you can install new releases of IBM MQ to upgrade IBM MQ to a new VRM level. For more information, see [“Upgrade and migration of IBM MQ on z/OS ” on page 471](#).

### Procedure

1. Open [Downloading IBM MQ 9.4](#).
2. To access the latest CD downloads, click the CD tab.

From this tab you can download the latest CD level and the latest CD CSU. If you are not running the latest CD level, you must download and install it before you can apply the latest CSU.

The format of the download is platform-specific. For Multiplatforms you download one or more parts from Passport Advantage or Fix Central. For z/OS you download PTFs from Shopz. For IBM MQ Appliance you download firmware images from Fix Central.

- a) Find the download section for your platform. For example **Downloading the CD release for Multiplatforms**.
- b) To get the latest CD level, click **Download the IBM MQ 9.4.x base install image**. For example, for Multiplatforms click **Download the IBM MQ 9.4.x base install image from Passport Advantage**.
- c) To get the latest CSU, click **Download the IBM MQ 9.4.x.x CSU from Fix Central**.

#### z/OS

Note that there is no CSU download for z/OS; it will be included in the next IBM MQ for z/OS 9.4 CD release.

3. To access the latest LTS downloads, click the LTS tab.

From this tab you can download the latest LTS base install level, and either an LTS fix pack or an LTS CSU, whichever is the latest.

The format of the download is platform-specific. For Multiplatforms you download one or more parts from Passport Advantage or Fix Central. For z/OS you download PTFs from Shopz. For the Appliance you download firmware images from Fix Central.

- a) Find the download section for your platform. For example **Downloading the LTS release for Multiplatforms**.
- b) To get the latest LTS base install level, click **Download the IBM MQ 9.4.0 LTS base install image**. For example, for Multiplatforms click **Download the latest IBM MQ 9.4.0 LTS base install image from Passport Advantage**.
- c) To get the latest fix pack or CSU, click **Download the IBM MQ 9.4.0.xx fix pack/CSU**.

Fix packs and CSUs are cumulative. Therefore you are only offered the latest fix, which might be either a fix pack or a CSU.

#### Related tasks

[“Applying maintenance to IBM MQ” on page 294](#)

Maintenance is the application of a reversible fix. Any changes to queue manager data are compatible with the previous code level.

## Linux Upgrading an IBM MQ installation on Linux

You can upgrade an IBM MQ installation on Linux systems without uninstalling the earlier version.

### Before you begin

The version that you are upgrading from must be IBM MQ 9.2.0, or later.

**V 9.4.0** If your current version is at IBM MQ 9.4.0 or higher, you can upgrade your installation with fix packs installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier does not need to be 0.

If your current version is earlier than IBM MQ 9.4.0, you can upgrade only if no fix packs are installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier must be 0.

### About this task

You can use rpm, a Debian installer on Linux Ubuntu, or the yum installer on Linux Red Hat.

Before you begin, ensure that you have backed up your data.

#### Note:

1. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
2. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

3. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.

**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

4. From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ install package. It remains available as a separate download. For more information, see [Installing and uninstalling IBM MQ Explorer as a stand-alone application on Linux and Windows](#).

On Linux for x86-64 only, if you are migrating on an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

## Procedure

- To upgrade a server installation using rpm, see [“Upgrading an IBM MQ installation on Linux using the rpm command”](#) on page 339
- To upgrade a server installation on Linux Red Hat using yum, see [“Upgrading an IBM MQ installation on Linux Red Hat using yum”](#) on page 342
- To upgrade a server installation on Linux Ubuntu using a Debian installer, see [“Upgrading an IBM MQ installation on Linux Ubuntu using apt”](#) on page 347

### ***Upgrading an IBM MQ installation on Linux using the rpm command***

You can use rpm to upgrade an IBM MQ installation on Linux systems.

## Before you begin

The version that you are upgrading from must be IBM MQ 9.2.0, or later.

**V 9.4.0** If your current version is at IBM MQ 9.4.0 or higher, you can upgrade your installation with fix packs installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier does not need to be 0.

If your current version is earlier than IBM MQ 9.4.0, you can upgrade only if no fix packs are installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier must be 0.

### **Important:**

- **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
- **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce

Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.

**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ install package. On Linux for x86-64 only, if you are migrating on an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

For more information about modifying an IBM MQ installation using rpm, see [“Uninstalling or modifying IBM MQ on Linux using rpm”](#) on page 151.

## Procedure

1. Complete the following tasks:

- a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

- b) Stopped the mqweb server by using the `endmqweb` command.
- c) Stopped your listeners by using the `endmqlsr` command.
- d) Stopped all your queue managers by using the `endmqm` command.
- e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding `sudo` before the commands, or by changing to the root user in the shell with the `su` command. For more information, see [Exploring the differences between `sudo` and `su` commands in Linux](#).

3. Optional: If your installation media is a [downloadable installation image](#), obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the file:
  - a) Decompress the file by using the following command:

```
gunzip partName.tar.gz
```

where `partName` is the name of the installation image file.

- b) Extract the installation files from the file by using the following command:

```
tar -xvf partName.tar
```

where `partName` is the name of the installation image file.

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

4. Set your current directory to the location of the installation files. The location might be a network location, or a local file system directory.

- Optional: If this is not the only installation on the system, or if you want to upgrade an IBM MQ installation in a non default location, run the **crtmqpkg** to create a unique set of packages to upgrade:

```
./crtmqpkg suffix
```

where *suffix* specifies a name of your choosing that uniquely identifies the installation packages on the system. *suffix* is not the same as an installation name, although the names can be identical. *suffix* is limited to 16 characters in the ranges A-Z, a-z, and 0-9.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is located at `/var/tmp`. You must ensure that the system has enough free space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the **crtmqpkg** command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix installationPath
```

- Set your current directory to the location of the installation packages. If you used the **crtmqpkg** command, this directory is the location that is specified when the **crtmqpkg** command operation completes successfully.
- From IBM MQ 9.2.0, you have the option of accepting the license before or after you install the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

- Upgrade IBM MQ:

- To upgrade all available components in the default location, use the following command:

```
rpm -Uvh MQSeries*
```

- To upgrade specific components in the default location, use the following command:

```
rpm -Uvh packageName.rpm
```

where *packageName.rpm* is a list of one of more components to upgrade. For a full list of components, see [“IBM MQ rpm components for Linux systems” on page 108](#).

- To upgrade all available components in a non default location, use the following command:

```
rpm --prefix installationPath -Uvh MQSeries*
```

where *installationPath* specifies the path where IBM MQ is installed.

- To upgrade specific components in a non default location, use the following command:

```
rpm --prefix installationPath -Uvh packageName.rpm
```

where *installationPath* specifies the path where IBM MQ is installed, and *packageName.rpm* is a list of one of more components to upgrade. For a full list of components, see [“IBM MQ rpm components for Linux systems” on page 108](#).

- Use the **dspmqr** command to verify that the version is as expected:

## Related tasks

[“Upgrading an IBM MQ installation on Linux Red Hat using yum” on page 342](#)

You can use yum to upgrade an IBM MQ installation on Linux Red Hat systems.

[“Upgrading an IBM MQ installation on Linux Ubuntu using apt” on page 347](#)

You can use apt to upgrade an IBM MQ installation on Linux Ubuntu systems.

## **Upgrading an IBM MQ installation on Linux Red Hat using yum**

You can use yum to upgrade an IBM MQ installation on Linux Red Hat systems.

## Before you begin

The version that you are upgrading from must be IBM MQ 9.2.0, or later.

**V 9.4.0** If your current version is at IBM MQ 9.4.0 or higher, you can upgrade your installation with fix packs installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier does not need to be 0.

If your current version is earlier than IBM MQ 9.4.0, you can upgrade only if no fix packs are installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier must be 0.

### Important:

- **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
- **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.
- **Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. On Linux for x86-64 only, if you are migrating on an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

For more information about modifying an IBM MQ installation by using yum, see [“Uninstalling or modifying IBM MQ on Linux Red Hat using yum” on page 153](#).

## Procedure

1. Complete the following tasks:
  - a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

- b) Stopped the mqweb server by using the `endmqweb` command.
- c) Stopped your listeners by using the `endmq1sr` command.
- d) Stopped all your queue managers by using the `endmqm` command.
- e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding `sudo` before the commands, or by changing to the root user in the shell with the `su` command. For more information, see [Exploring the differences between `sudo` and `su` commands in Linux](#).

3. Optional: If your installation media is a downloadable installation image, obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the file:

- a) Decompress the file by using the following command:

```
gunzip partName.tar.gz
```

where `partName` is the name of the installation image file.

- b) Extract the installation files from the file by using the following command:

```
tar -xvf partName.tar
```

where `partName` is the name of the installation image file.

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

4. Set your current directory to the location of the installation packages.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

5. Optional: If this installation is not the only installation on the system, or if you want to upgrade an IBM MQ installation in a non default location, run the `crtmqpkg` to create a unique set of packages to upgrade:

```
./crtmqpkg suffix installationPath
```

where:

- `suffix` specifies a name of your choosing that uniquely identifies the installation packages on the system. `suffix` is not the same as an installation name, although the names can be identical. `suffix` is limited to 16 characters in the ranges A-Z, a-z, and 0-9.
- `installationPath` specifies the path where the installation that you want to upgrade is installed.

**Note:** This command creates a full copy of the installation packages in a temporary directory. By default, the temporary directory is at `/var/tmp`. Ensure that the system has enough available space before you run this command. To use a different location, you can set the `TMPDIR` environment variable before you run the `crtmqpkg` command. For example:

```
$ TMPDIR=/test ./crtmqpkg suffix installationPath
```

6. Set your current directory to the location of the installation packages.

If you used the `crtmqpkg` command, this directory is the location that is specified when the `crtmqpkg` command operation completes successfully.

7. Update the yum repository file:

- a) Open the repository file. The file is in the `/etc/yum.repos.d` directory, and has a suffix of `.repo`. For example, `IBM_MQ.repo`.



- b) Add the following contents to the repository file. Replace *installationFilesLocation* with the location of the installation files for the version that you want to upgrade to. Replace *v.r.m* with the version, release, and modification number for the version of IBM MQ that you want to upgrade to:

```
[IBM-MQ-v.r.m-x86_64]
name=IBM MQ v.r.m x86_64
baseurl=file:///installationFilesLocation
enabled=1
gpgcheck=0
```

- c) Clear the repository cache by using the following command:

```
yum clean all
```

- d) Check that the IBM MQ repository is available by using the following command:

```
yum repolist
```

8. From IBM MQ 9.2.0, you have the option of accepting the license before or after you install the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

9. Upgrade IBM MQ:

- To upgrade all installed components, use the following command:

```
yum -y upgrade MQSeries*
```

- To upgrade all installed components in a non default location, use the following command:

```
yum -y upgrade MQSeries*suffix*
```

where *suffix* specifies the suffix that was chosen when you ran **crtmqpkg** in step [“5”](#) on page 343.

10. Use the **dspmquer** command to verify that the version is as expected:

```
dspmquer
```

### Related tasks

[“Upgrading an IBM MQ installation on Linux using the rpm command” on page 339](#)

You can use rpm to upgrade an IBM MQ installation on Linux systems.

[“Upgrading an IBM MQ installation on Linux Ubuntu using apt” on page 347](#)

You can use apt to upgrade an IBM MQ installation on Linux Ubuntu systems.

### **Upgrading an IBM MQ installation on Linux Ubuntu using dpkg**

You can use dpkg to upgrade an IBM MQ installation on Linux Ubuntu systems.

### Before you begin

The version that you are upgrading from must be IBM MQ 9.2.0, or later.



**V 9.4.0** If your current version is at IBM MQ 9.4.0 or higher, you can upgrade your installation with fix packs installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier does not need to be 0.

If your current version is earlier than IBM MQ 9.4.0, you can upgrade only if no fix packs are installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier must be 0.

### Important:

1. **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).

2. **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

3. **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.

**Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

4. From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ install package. On Linux for x86-64 only, if you are migrating on an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

For more information about modifying an IBM MQ installation on Ubuntu, see [“Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages”](#) on page 155.

### Procedure

1. Complete the following tasks:

a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

b) Stopped the mqweb server by using the **endmqweb** command.

c) Stopped your listeners by using the **endmq1sr** command.

d) Stopped all your queue managers by using the **endmqm** command.

e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding **sudo** before the commands, or by changing to the root user in the shell with the **su** command. For more information, see [Exploring the differences between \*\*sudo\*\* and \*\*su\*\* commands in Linux](#).

3. Optional: If your installation media is a downloadable installation image, obtained from Passport Advantage, you must decompress the **tar.gz** file and extract the installation files from the file:

a) Decompress the file by using the following command:

```
gunzip partName.tar.gz
```

where *partName* is the name of the installation image file.

b) Extract the installation files from the file by using the following command:

```
tar -xvf partName.tar
```

where *partName* is the name of the installation image file.

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

4. Set your current directory to the location of the installation files.

5. From IBM MQ 9.2.0, you have the option of accepting the license before or after you install the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

6. Upgrade each IBM MQ package by using the following command for each package:

```
dpkg -i packageName
```

where *packageName* specifies the name of the package to upgrade.

**Important:** Although `dpkg` permits multiple package files in the same command, this does not work for IBM MQ because of inter-package dependencies. You must upgrade the packages individually in the order shown. If you use `apt` to upgrade, the inter-package dependencies are handled for you. For more information, see [“Upgrading an IBM MQ installation on Linux Ubuntu using apt” on page 347](#).

- `ibmmq-runtime`
- `ibmmq-jre`
- `ibmmq-java`
- `ibmmq-gskit`
- `ibmmq-server`
- `ibmmq-web`
- `ibmmq-ftbase`
- `ibmmq-ftagent`
- `ibmmq-ftservice`
- `ibmmq-ftlogger`
- `ibmmq-fttools`
- `ibmmq-amqp`
- `ibmmq-ams`
- `ibmmq-xrservice`
- `ibmmq-explorer`
- `ibmmq-client`

- `ibmmq-man`
- `ibmmq-msg_language`
- `ibmmq-samples`
- `ibmmq-sdk`

7. Use the **`dspmqrver`** command to verify that the version is as expected:

```
dspmqrver
```

## Upgrading an IBM MQ installation on Linux Ubuntu using apt

You can use apt to upgrade an IBM MQ installation on Linux Ubuntu systems.

### Before you begin

The version that you are upgrading from must be IBM MQ 9.2.0, or later.

**V 9.4.0** If your current version is at IBM MQ 9.4.0 or higher, you can upgrade your installation with fix packs installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier does not need to be 0.

If your current version is earlier than IBM MQ 9.4.0, you can upgrade only if no fix packs are installed. That is, the fix pack number in the version.release.modification.fixpack (V . R . M . F) release identifier must be 0.

#### Important:

- **Deprecated** The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
- **Removed** **V 9.4.0** **V 9.4.0** The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- **Removed** For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.
- **Removed** For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ install package. On Linux for x86-64 only, if you are migrating on an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

For more information about modifying an IBM MQ installation on Ubuntu, see [“Uninstalling or modifying IBM MQ on Linux Ubuntu using Debian packages”](#) on page 155.

### Procedure

1. Complete the following tasks:
  - a) Stop all your IBM MQ applications.

If you use the Managed File Transfer (MFT) component, ensure that any file transfers that MFT agents are engaged in are completed. The SYSTEM.FTE.STATE queues must contain no messages.

- b) Stopped the mqweb server by using the `endmqweb` command.
- c) Stopped your listeners by using the `endmq1sr` command.
- d) Stopped all your queue managers by using the `endmqm` command.
- e) Backed up your data.

For more information, see [Backing up and restoring queue manager data](#).

2. Log in as root, or with sufficient authority to run the following commands.

You can do this by adding `sudo` before the commands, or by changing to the root user in the shell with the `su` command. For more information, see [Exploring the differences between `sudo` and `su` commands in Linux](#).

3. Optional: If your installation media is a downloadable installation image, obtained from Passport Advantage, you must decompress the `tar.gz` file and extract the installation files from the file:

- a) Decompress the file by using the following command:

```
gunzip partName.tar.gz
```

where `partName` is the name of the installation image file.

- b) Extract the installation files from the file by using the following command:

```
tar -xvf partName.tar
```

where `partName` is the name of the installation image file.

**Important:** You must use GNU tar (also known as `gtar`) to unpack any tar images.

4. Set your current directory to the location of the installation files.
5. From IBM MQ 9.2.0, you have the option of accepting the license before or after you install the product. To accept the license before installing, run the `mqlicense.sh` script. The license agreement is displayed in a language appropriate to your environment and you are prompted to accept or decline the terms of the license:

- To display the license agreement in the default manner, which uses an X-window where possible, use the following command:

```
./mqlicense.sh
```

- To display the license agreement as text in the current shell, which can be read by a screen reader, use the following command:

```
./mqlicense.sh -text_only
```

See [“Accepting the license on IBM MQ for Linux” on page 107](#) for more information about license acceptance.

6. Open the `IBM_MQ.list` file from the `/etc/apt/sources.list.d` directory.
7. Add the following line to the end of the `IBM_MQ.list` file:

```
deb [trusted=yes] file:installationFileLocation ./
```

where `installationFileLocation` is the directory where the unpacked files are located.

8. Refresh the repository index by using the following command:

```
apt-get update
```

9. Upgrade IBM MQ by using the following command:

```
apt-get upgrade "ibmmq-*"
```

10. Use the `dspmqver` command to verify that the version is as expected:

**Related tasks**

[“Upgrading an IBM MQ installation on Linux using the rpm command” on page 339](#)

You can use rpm to upgrade an IBM MQ installation on Linux systems.

[“Upgrading an IBM MQ installation on Linux Red Hat using yum” on page 342](#)

You can use yum to upgrade an IBM MQ installation on Linux Red Hat systems.

## **Windows** Upgrading an IBM MQ installation on Windows

To upgrade an IBM MQ server installation on Windows, from one version, release, and modification level to a later one, you can use either the Launchpad or msiexec. To upgrade a client installation, you can use either the GUI installer or msiexec.

**About this task**

Before you begin, ensure that you have backed up your data.

**Procedure**

- To upgrade a server installation, see [“Upgrading an IBM MQ server installation using the Launchpad” on page 349](#) or [“Upgrading an IBM MQ server installation using msiexec” on page 350](#).
- To upgrade a client installation, see [“Upgrading an IBM MQ client installation using the GUI installer” on page 351](#) or [“Upgrading an IBM MQ client installation using msiexec” on page 352](#).

## **Windows** Upgrading an IBM MQ server installation using the Launchpad

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using the Launchpad.

**Before you begin**

Ensure that you have:

1. Stopped all your IBM MQ applications
2. Shut down your listeners
3. Stopped all your queue managers
4. Backed up your data

**Procedure**

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate Setup.exe in the base directory of the IBM MQ installation image.
  - From a network location, this location might be `m:\instmq\Setup.exe`
  - From a local file system directory, this location might be `C:\instmq\Setup.exe`
3. Start the installation process.

Either run Setup.exe from a command prompt, or double-click Setup.exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

4. Follow the instructions on screen.
5. Select **Installing a new instance**, if you see a panel asking you to choose between installing a new instance, or maintaining or upgrading an existing instance, when you click the **Launch IBM MQ Installer** button.  
You use the other option when adding or removing features from an already installed IBM MQ.
6. On the next panel, choose between **Install leaving the existing installation(s) untouched** or **Upgrade an existing named installation already on the machine**, and click **Next**.



**Attention:** If you do not see this screen, it means that there was no IBM MQ server installation on the machine that could be upgraded by this installer.

7. Follow the installer prompts to upgrade your IBM MQ server installation.

### Related tasks

[“Upgrading an IBM MQ server installation using msiexec” on page 350](#)

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using msiexec.

[“Upgrading an IBM MQ client installation using the GUI installer” on page 351](#)

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using the GUI installer.

[“Upgrading an IBM MQ client installation using msiexec” on page 352](#)

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using msiexec.

### Windows

#### **Upgrading an IBM MQ server installation using msiexec**

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using msiexec.

### Before you begin

Ensure that you have:

1. Stopped all your IBM MQ applications
2. Shut down your listeners
3. Stopped all your queue managers
4. Backed up your data

### Procedure

1. Access the IBM MQ installation image.

The location might be a network location, or a local file system directory. See [Where to find downloadable installation images](#).

2. Locate IBM MQ.msi in the MSI directory of the IBM MQ installation image.

- From a network location, this location might be `m:\instmq\MSI\IBM MQ.msi`
- From a local file system directory, this location might be `C:\instmq\MSI\IBM MQ.msi`

3. Optional: If you are upgrading the only IBM MQ server installation, where the installation has the default value `Installation1` issue the following command:

```
msiexec /i "InstallationImage\MSI\IBM MQ.msi" /q AGREETOLICENSE=YES  
INSTALLATIONNAME="Installation1"
```

4. Optional: If you are upgrading an installation on a machine that already has one or more IBM MQ server installations of the level you are upgrading to, you must provide additional parameters to select a free MSI instance ID.

See [“Choosing MSI Instance IDs for multiple server installations”](#) on page 181 for more information.

In this case, the command might look something like this:

```
msiexec /i "InstallationImage\MSI\IBM MQ.msi" /q AGREETOLICENSE=YES  
INSTALLATIONNAME="Installation2" NEWINSTANCE=1  
TRANSFORMS=":InstanceId2.mst;1033.mst"
```

### Related tasks

[“Upgrading an IBM MQ server installation using the Launchpad”](#) on page 349

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using the Launchpad.

[“Upgrading an IBM MQ client installation using the GUI installer”](#) on page 351

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using the GUI installer.

[“Upgrading an IBM MQ client installation using msiexec”](#) on page 352

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using msiexec.

### **Upgrading an IBM MQ client installation using the GUI installer**

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using the GUI installer.

### Before you begin

Ensure that you have:

1. Stopped all your IBM MQ applications
2. Shut down your listeners
3. Stopped all your queue managers
4. Backed up your data

### Procedure

1. Access the IBM MQ installation image.  
See [Where to find downloadable installation images](#).
2. Locate Setup.exe in the Windows directory of the IBM MQ installation image.
3. Start the installation process.

Either run Setup.exe from a command prompt, or double-click Setup.exe from Windows Explorer.

**Note:** If you are installing on a Windows system with UAC enabled, accept the Windows prompt to allow the launchpad to run as elevated. During installation, you might also see **Open File - Security Warning** dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the installation to continue.

The IBM MQ Installation window is displayed.

4. Follow the instructions on screen. When you click the **Launch IBM MQ Installer** button, if you see a panel asking you to choose between installing a new instance, or maintaining or upgrading an existing instance, select **Installing a new instance**.
5. On the next panel, choose between **Install leaving the existing installation(s) untouched** or **Upgrade an existing named installation already on the machine**, and click **Next**.



**Attention:** If you do not see this screen, it means that there was no IBM MQ client installation on the machine that could be upgraded by this installer.

6. Follow the installer prompts to upgrade your IBM MQ client installation.

## Related tasks

[“Upgrading an IBM MQ client installation using msiexec” on page 352](#)

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using msiexec.

[“Upgrading an IBM MQ server installation using the Launchpad” on page 349](#)

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using the Launchpad.

[“Upgrading an IBM MQ server installation using msiexec” on page 350](#)

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using msiexec.

## **Upgrading an IBM MQ client installation using msiexec**

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using msiexec.

## Before you begin

Ensure that you have:

1. Stopped all your IBM MQ applications
2. Shut down your listeners
3. Stopped all your queue managers
4. Backed up your data

## Procedure

1. Access the IBM MQ installation image.

See [Where to find downloadable installation images](#).

2. Locate IBM MQ.msi in the Windows\MSI directory of the IBM MQ installation image.
3. Optional: If you are upgrading the only IBM MQ client installation, where the installation has the default value `Installation1` issue the following command:

```
msiexec /i "InstallationImage\Windows\MSI\IBM MQ.msi" /l*v install_log_path  
/q TRANSFORMS="1033.mst" REINSTALL=ALL REINSTALLMODE=vomus
```

4. Optional: If you are upgrading an installation on a machine that already has one or more IBM MQ client installations of the level you are upgrading to, you must provide additional parameters to select a free MSI instance ID.

See [“Choosing MSI Instance IDs for multiple client installations” on page 206](#) for more information.

In this case, the command might look something like this:

```
msiexec /i "InstallationImage\MSI\IBM MQ.msi" /q AGREETOLICENSE=YES  
INSTALLATIONNAME="Installation2" NEWINSTANCE=1  
TRANSFORMS=":InstanceId2.mst;1033.mst"
```

## Related tasks

[“Upgrading an IBM MQ client installation using the GUI installer” on page 351](#)

How you upgrade an IBM MQ client installation on Windows to a newer version, release, or modification, using the GUI installer.

[“Upgrading an IBM MQ server installation using the Launchpad” on page 349](#)

How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using the Launchpad.

[“Upgrading an IBM MQ server installation using msiexec” on page 350](#)



How you upgrade an IBM MQ server installation on Windows to a newer version, release, or modification, using `msiexec`.

## Migrating IBM MQ

Migration is the conversion of programs and data to work with a new code level of IBM MQ. Some types of migration are required, and some are optional. Queue manager migration is never required after applying a maintenance level update, that does not change the command level. Some types of migration are automatic, and some are manual. Queue manager migration is typically automatic and required after releases and manual and optional after a maintenance level upgrade that introduces a new function. Application migration is typically manual and optional.


### Before you begin


Before upgrading your IBM MQ installation or migrating your queue managers, you must read [“Changes that affect migration” on page 354](#) to identify what migration tasks you must plan for.


### About this task


Whenever you upgrade IBM MQ to a new release that changes its command level, migration is performed by the queue manager. Whenever you upgrade IBM MQ to a new maintenance or fix level, which introduces a new function using a new command level, you can migrate the queue manager to use the new command level and thereby the new function.

If you start a queue manager running on a later release level, then migration of the queue manager to that release level is required. .

 On IBM MQ for Multiplatforms, you cannot easily revert to a previous level of IBM MQ after installation. If you install a copy of IBM MQ obtained from Passport Advantage or from physical media, the installer uninstalls IBM MQ, if it is present. It then installs the new level of IBM MQ. To revert to the previous level of IBM MQ, you must keep the earlier installation image and any fixes you applied. Then you must uninstall the new level, reinstall the previous release level, and reapply the required fixes. If you have started any queue managers at the later level, they will not work with the restored level of IBM MQ. (Unless you installed a later maintenance level upgrade, not a new release or version: then you could revert to an earlier maintenance level by reinstalling the earlier maintenance level upgrade. Queue manager data is compatible between maintenance levels.) To restore IBM MQ to its previous level, after starting any queue managers, you must first back up the queue managers. You can then restore the backup queue managers after restoring the previous level of IBM MQ.

 On IBM MQ for z/OS you can backwards migrate from a Long Term Support (LTS) release. This also applies to CD releases that have the same VRM as an LTS release, for example IBM MQ 9.3.0 CD.

 Backwards migration is not supported to or from a Continuous Delivery (CD) release on z/OS, unless those releases have the same VRM as an LTS release, for example IBM MQ 9.3.0 CD.

**Important:**  From IBM MQ 9.4.0, AMQP channels no longer support CMS key repository files. If you are migrating a queue manager with an AMQP configuration to IBM MQ 9.4.0 or later, and your queue manager is currently configured with a CMS keystore, you must convert it to PKCS12 format before proceeding with the migration. For more information on how to perform this conversion, see [SSL/TLS support in Securing AMQP Clients](#).

### Related concepts

[IBM MQ release types and versioning](#)

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

### Related tasks





[Backing up and restoring a queue manager](#)

## Changes that affect migration

Changes to the product might affect the migration of a queue manager from an earlier release to the current release of IBM MQ, or affect existing applications or configurations. Review these changes before upgrading queue managers to the latest product version and decide whether you must plan to make changes to existing applications, scripts, and procedures before starting to migrate your systems.









## Changes in the current release

For details of changes in the current release, including those that affect migration, see the following information:

-   [What's new and changed in IBM MQ 9.4.0](#)
-   [IBM MQ, WebSphere MQ, and MQSeries product readmes](#)

## Changes in earlier versions

For information about what changed in an earlier release of the product, see the *What's new* and *What's changed* sections in the product documentation for that version of the product:

- IBM MQ 9.3
  - [What's new and changed in IBM MQ 9.3.0](#)
  - [What's new and changed in IBM MQ 9.3.x Continuous Delivery](#)
  - [What's changed in IBM MQ 9.3.0 Long Term Support](#)
  -   [IBM MQ, WebSphere MQ, and MQSeries product readmes](#)
- IBM MQ 9.2
  - [What's new and changed in IBM MQ 9.2](#)
  -  [What's new and changed in IBM MQ 9.2.x Continuous Delivery](#)
  -  [What's changed in IBM MQ 9.2.0 Long Term Support](#)
- IBM MQ 9.1
  - [What's new and changed in IBM MQ 9.1](#)
  -  [What's new and changed in IBM MQ 9.1.x Continuous Delivery](#)
  -  [What's changed in IBM MQ 9.1.0 Long Term Support](#)
- IBM MQ 9.0
  - [What's new and changed in IBM MQ 9.0.0](#)
  -  [What's new and changed in IBM MQ 9.0.x Continuous Delivery](#)
  -  [What's changed in IBM MQ 9.0.0.x Long Term Support](#)
- IBM MQ 8.0
  - [What's new in IBM MQ 8.0](#)
  - [What's changed in IBM MQ 8.00](#)


- [What's changed in IBM MQ 8.0 Fix Packs](#)
- IBM WebSphere MQ 7.5
  - [What's new in IBM WebSphere MQ 7.5](#)
  - [What's changed in IBM WebSphere MQ 7.5](#)
  - [What's changed in IBM WebSphere MQ 7.5 Fix Packs](#)


For older, out of support, versions of the product, the documentation is not available in the online IBM Documentation, but is available for you to download for offline use. For more information, see [Documentation for older versions of IBM MQ](#).


## Restrictions on reversing queue manager migration



### Attention:

 On IBM MQ for Multiplatforms, you cannot reverse queue manager migration to remove the effect of changes. This restriction applies whether your enterprise uses the Long Term Support (LTS) release or Continuous Delivery (CD) release model.

 On IBM MQ for z/OS, you can reverse queue manager migration as long as you have migrated from an earlier LTS release to a more recent LTS release. This statement also applies to those CD releases that have the same VRM as an LTS release, for example IBM MQ 9.3.0 CD.

 See [“Migration paths: IBM MQ for z/OS” on page 356](#) for a table of the migration paths available from IBM MQ 8.0 onwards.

For more information, see [IBM MQ release types: planning considerations](#).

### Related concepts

[“Migration concepts and methods” on page 357](#)

An overview of the various concepts and methods for migrating from one release of the product to another.

[“Migration considerations for IBM MQ 8.0 or later on Windows” on page 394](#)

[“Program and data directory locations on Windows” on page 396](#)

The installation location for IBM MQ program binary and data files on Windows depends on the IBM MQ version you are installing, and whether this is the first time IBM MQ is being installed.

## Considerations when migrating from Advanced Message Security 7.0.1

Advanced Message Security is a component of IBM MQ.

### Important:

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

Review the following list of changes carefully before upgrading queue managers to a later version of IBM MQ. Decide whether you must plan to make changes to existing applications, scripts, and procedures before starting to migrate systems:

- From IBM WebSphere MQ 7.5, AMS installation is a part of the IBM MQ installation process.
- The AMS security capabilities are enabled with its installation and controlled with security policies. You do not need to enable interceptors to allow AMS to start intercepting data.
- AMS in IBM MQ does not require the use of the **cfgmq** command as in the stand-alone version of Advanced Message Security.

## Migration paths

An overview of the migration paths between different IBM MQ versions. For some IBM MQ for z/OS migration paths, you can revert to the version you were using prior to migration. For IBM MQ for Multiplatforms, you cannot easily revert to a previous version.

**Note:** Before each new version of the product is released, it is tested for migration from earlier versions that are in support at that time. Direct migration from a version that is out of support might also work, but is neither tested nor supported. Therefore, to migrate to the latest version from a version that is out of support, you should first migrate to an interim version that was released before the earlier version went out of support.

- [“Migration paths: IBM MQ for Multiplatforms” on page 356](#)
- [“Migration paths: IBM MQ for z/OS” on page 356](#)
- [“Detailed migration information” on page 357](#)

### Migration paths: IBM MQ for Multiplatforms



You can migrate from IBM MQ 9.0 or later direct to IBM MQ 9.4 or later.

Direct migration from IBM MQ 8.0 to IBM MQ 9.4 is not supported. You must first migrate to IBM MQ 9.0, IBM MQ 9.1, IBM MQ 9.2 or IBM MQ 9.3.

*Table 37. Migration paths: IBM MQ for Multiplatforms*

Migration from	To IBM MQ 9.4 or later	To IBM MQ 9.3	To IBM MQ 9.2	To IBM MQ 9.1	To IBM MQ 9.0	To IBM MQ 8.0
IBM MQ 9.3 or later	Yes	-	-	-	-	-
IBM MQ 9.2	Yes	Yes	-	-	-	-
IBM MQ 9.1	Yes	Yes	Yes	-	-	-
IBM MQ 9.0	Yes	Yes	Yes	Yes	-	-
IBM MQ 8.0	No	Yes	Yes	Yes	Yes	-

**Note:** For IBM MQ 9.0 and later, the version covers both LTS and CD releases.

For IBM MQ for Multiplatforms, you cannot easily revert to a previous release of the product. However, if a queue manager has not been started, you can uninstall the current version and reinstall a different version of IBM MQ. It does not matter what versions of IBM MQ are installed between when a queue manager was last started and when it is next started.

After you have moved to a CD modification of the product, you must move to a higher version and release level to return to the LTS track. For example, you cannot go from IBM MQ 9.3.1 CD to IBM MQ 9.3.0.n LTS. Your next opportunity to return to the LTS track is at IBM MQ 9.4.0.

### Migration paths: IBM MQ for z/OS



You can migrate from IBM MQ 9.2 or later direct to IBM MQ for z/OS 9.4 or later.

If you are migrating to IBM MQ 9.4 or later from IBM MQ 9.1 or earlier, you must first migrate to IBM MQ 9.2 or IBM MQ 9.3. For more information, see [“Migrating from earlier unsupported releases of IBM MQ for z/OS” on page 472](#).

Table 38. Migration paths: IBM MQ for z/OS

Migration from	To IBM MQ 9.4 or later <sup>1</sup> on page 357	To IBM MQ 9.3 <sup>1</sup> on page 357	To IBM MQ 9.2 <sup>1</sup> on page 357	To IBM MQ 9.1 <sup>1</sup> on page 357
IBM MQ 9.3 or later	Yes	-	-	-
IBM MQ 9.2 or later	Yes	Yes	-	-
IBM MQ 9.1	No	Yes	Yes	-
IBM MQ 9.0	No	No	Yes	Yes






**Note:**

1. Means both LTS and CD releases.

To revert to a previous version, see [“Reverting a queue manager to a previous version on z/OS” on page 482.](#)

### Detailed migration information

For detailed information about migrating to the current version, see the following links:

-  [“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)
-   [“Planning to migrate IBM MQ to a later version on AIX and Linux” on page 425](#)
-  [“Planning to migrate IBM MQ to a later version on IBM i” on page 450](#)
-  [“Planning to migrate IBM MQ for z/OS to IBM MQ for z/OS 9.4” on page 472](#)

For migrating to an IBM MQ version other than the current version, see the documentation for the target version:

- [Migrating IBM MQ \(IBM MQ 9.3\)](#)
- [Migrating IBM MQ \(IBM MQ 9.2\)](#)
- [Migrating IBM MQ \(IBM MQ 9.1\)](#)
- [Migrating IBM MQ \(IBM MQ 9.0\)](#)
- [IBM MQ migration \(IBM MQ 8.0\)](#)

For out of service IBM MQ versions, where the documentation is no longer available in the online IBM Documentation, you can instead download the documentation for offline use. See [Documentation for older versions of IBM MQ.](#)

### Related concepts

[“Migration concepts and methods” on page 357](#)

An overview of the various concepts and methods for migrating from one release of the product to another.

### Migration concepts and methods

An overview of the various concepts and methods for migrating from one release of the product to another.

### Objects to consider during migration

It is important to consider four types of object during migration:

## Operating environment migration

Upgrading the operating environment, or components in the environment such as installing a new level of JRE; see [“IBM MQ operating environment migration”](#) on page 360.

## Queue manager migration

Migrating a queue manager following an upgrade of the IBM MQ installation to a new command level; see [“Queue manager migration”](#) on page 361.

When migrating queue managers that are members of a cluster, do full repositories before partial repositories. This is because an older repository cannot store newer attributes introduced in a newer release. It tolerates them, but does not store them.

## IBM MQ MQI client migration

Migrating a client configuration following installation of a new version or release of the IBM MQ MQI client; see [“IBM MQ MQI client migration”](#) on page 363.

It is better to migrate the clients after the queue managers that they communicate with have been migrated.

## Application migration

Relinking, recompiling, or recoding an IBM MQ server or client application; see [“Application migration and interoperation”](#) on page 364. Application migration also includes migrating any API or channel exits.

Use the new version of the libraries to build the applications, once the queue managers have been upgraded.

## Impact of migration on other queue managers or clients

In addition, you must consider the impact of migrating one queue manager, or IBM MQ MQI client, on other queue managers or clients:

### Compatibility, coexistence, and interoperability

See [“Coexistence, compatibility, and interoperability”](#) on page 372 for information about the compatibility of IBM MQ applications connected to queue managers and IBM MQ MQI client clients on different command levels. The section also explains the concept of queue manager coexistence, and the interoperability of IBM MQ JMS applications with WebSphere Application Server.

### Queue manager clusters

Can a queue manager cluster contain queue managers at different command levels? See [“Migrating a queue manager cluster”](#) on page 487 to answer this question, and how to migrate a cluster of queue managers.

### Queue sharing groups

Queue sharing groups involve multiple queue managers running on z/OS. How do you migrate queue managers that are part of a queue sharing group to a new command level? See [“Queue sharing group migration”](#) on page 474.

### High-availability clusters

How do you migrate queue managers that are part of a high-availability cluster to a new command level, and maintain continuous and reliable service? See [“Migrating a queue manager in a high-availability configuration”](#) on page 494, which covers both migration of multi-instance queue managers, and the migration of queue managers operating in high-availability clusters.

## IBM MQ application migration model

[Figure 1 on page 359](#) shows the various components of the application migration model.

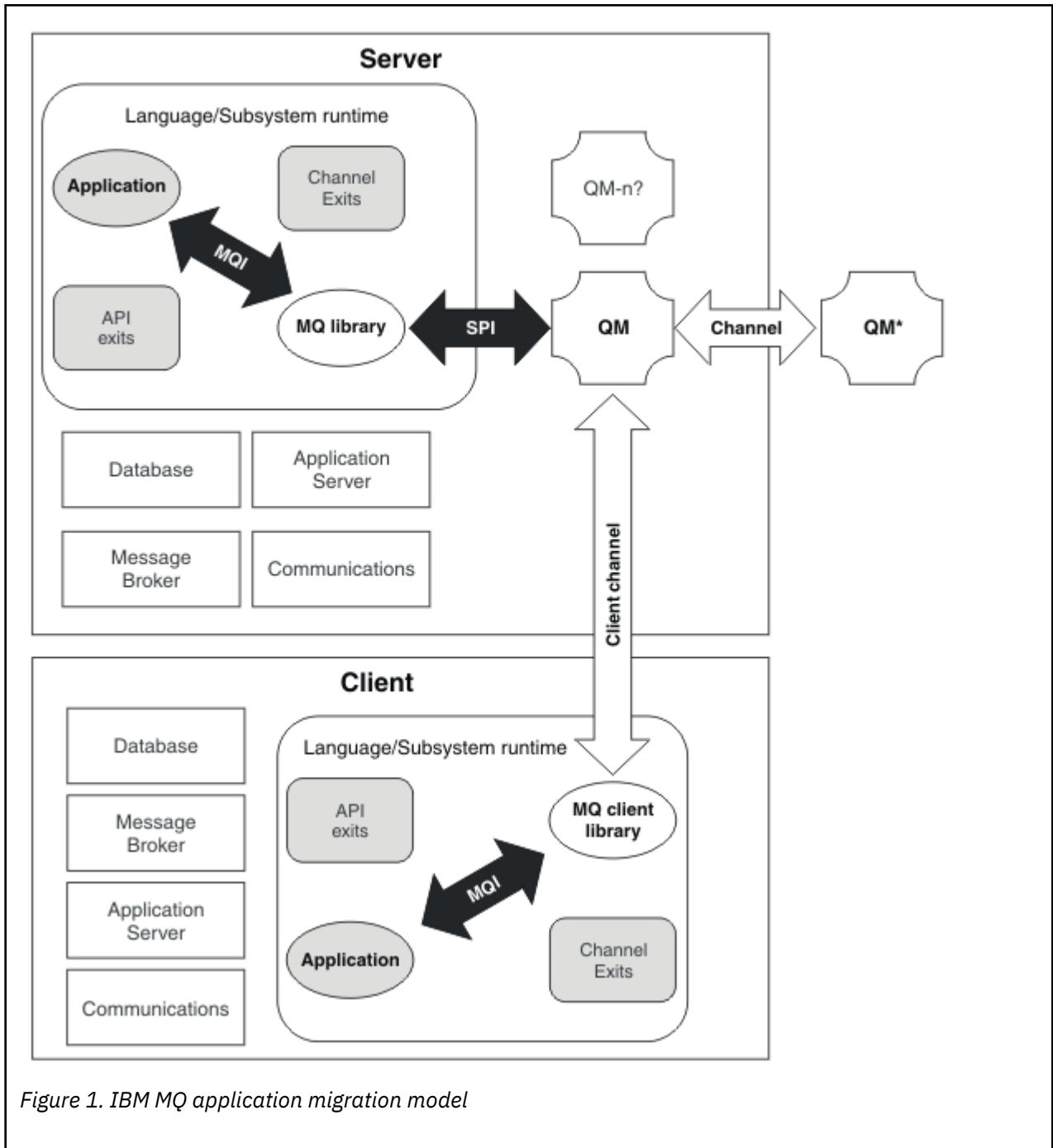


Figure 1. IBM MQ application migration model

This diagram shows two runtime operating system environments, each of which contains a number of software components, such as databases, application servers, and the language or subsystem run time environment. One environment is called **Server**, and contains an IBM MQ server and server application. The other environment is called **Client**, and contains an IBM MQ MQI client application.

The language or subsystem run time environment contains an IBM MQ application, the IBM MQ MQI client or server library, and IBM MQ channel and API exit programs.

The server environment has one or more queue managers, represented in the diagram by **QM**, that are using the installation of IBM MQ installed on the server. The components of the language or subsystem run time environment are connected to queue manager **QM**, either locally in the server, or remotely from the client.

The application is linked to the IBM MQ library by the MQI. The libraries are shown linked to the queue manager QM either by an SPI, which describes the connection between the process running the MQI and the queue manager processes, or by an IBM MQ MQI client connection.

The diagram also shows two more queue managers:

- The queue manager labeled QM\*, which represents queue managers of various levels installed on other servers.
- The queue manager labeled QM-n?, which represents a number of queue managers that coexist on the same server as queue manager QM, but are running at a different release level. The installations for these different release levels are not shown in the diagram. The question-mark in the queue manager name QM-n? indicates that this capability might not be present in your environment.

Multiple releases of IBM MQ installed in the same operating environment are called *coexistent*. It is not necessary, but it is usual, for coexistent installations to be at different release levels. Queue manager coexistence is important for migration in two respects:

1. It can be used to reduce the risk involved in migrating to a new command level, and reduce the downtime during the migration process.
2. You must consider any configuration implications of running some applications or clusters on the same server with queue managers at different command levels.

For more information, see [“Queue manager coexistence”](#) on page 373.

### ***IBM MQ operating environment migration***

You might need to perform some migration tasks for IBM MQ as a result of upgrading the operating environment.

To find out what operating environment upgrades you must make before upgrading IBM MQ, compare the requirements for different releases. For more information about system requirements, see [System Requirements for IBM MQ](#). By selecting the appropriate link on the web page, the SPCR tool enables you to go directly to the following information for the specific operating system, or systems, that your enterprise uses.


- Supported operating systems
- Prerequisites
- System requirements
- Optional supported software

For details about operating environment changes in the latest release that directly affect the migration to a new version of IBM MQ, see the following information:






- [What's new and changed in IBM MQ 9.4.0](#)
-   [IBM MQ, WebSphere MQ, and MQSeries product readmes](#)

Particular considerations apply when migrating an RDQM configuration, see [“Applying OS updates with RDQM”](#) on page 265 and [“Migrating replicated data queue managers”](#) on page 497.

For information about what changed in an earlier release of the product, see the *What's new* and *What's changed* sections in IBM Documentation for that version of the product:

- IBM MQ 9.3
  - [What's new and changed in IBM MQ 9.3.0](#)
  - [What's new and changed in IBM MQ 9.3.x Continuous Delivery](#)
  - [What's changed in IBM MQ 9.3.0 Long Term Support](#)
- IBM MQ 9.2
  - [What's new and changed in IBM MQ 9.2](#)
  -  [What's new and changed in IBM MQ 9.2.x Continuous Delivery](#)




-  [What's changed in IBM MQ 9.2.0 Long Term Support](#)
- IBM MQ 9.1
  - [What's new and changed in IBM MQ 9.1](#)
  -  [What's new and changed in IBM MQ 9.1.x Continuous Delivery](#)
  -  [What's changed in IBM MQ 9.1.0 Long Term Support](#)
- IBM MQ 9.0
  - [What's new and changed in IBM MQ 9.0.0](#)
  -  [What's new and changed in IBM MQ 9.0.x Continuous Delivery](#)
  -  [What's changed in IBM MQ 9.0.0.x Long Term Support](#)
- IBM MQ 8.0
  - [What's new in IBM MQ 8.0](#)
  - [What's changed in IBM MQ 8.0](#)
  - [What's changed in IBM MQ 8.0 Fix Packs](#)
- IBM WebSphere MQ 7.5
  - [What's new in IBM WebSphere MQ 7.5](#)
  - [What's changed in IBM WebSphere MQ 7.5](#)
  - [What's changed in IBM WebSphere MQ 7.5 Fix Packs](#)
- For IBM WebSphere MQ 7.1 and earlier, see [Documentation for older versions of IBM MQ](#).


Some changes might affect IBM MQ migration indirectly. For example, the runtime linkage conventions for applications, or the way memory is allocated, might change.

### ***Queue manager migration***

After upgrading an installation, queue manager migration might be required. Migration takes place when you start a queue manager. You can remove an upgrade before you have started a queue manager. However, if you remove the upgrade after a queue manager has been started, the queue manager will not work.

### **Migrating a queue manager to a later release**

 On IBM MQ for z/OS, queue manager migration is required after upgrading to a different version, release, or maintenance level of the product. The upgrade changes the command level. The current command, or VRM, level is shown in the z/OS console log.

 On IBM MQ for Multiplatforms, queue manager migration is always required for changes in the first two digits of the VRMF. Changes in the maintenance and fix level, M and F in the VRMF, never cause automatic queue manager migration. A change in the command level always requires queue manager migration, but if the change is shipped in a maintenance or fix pack, you have the choice of whether to increase the command level, and cause queue manager migration.

Command level always increases with a change in version or release. If you decide to use new function introduced in a maintenance level upgrade, you must change the command level. The converse is not the case. You do not have to change the command level when the fix level changes. You can decide to install the fix pack, but not use the new function. Whether or not you use the new function, the installation of the fix pack increases the maximum command level supported by the installation. Run the **dspmquer** command to display the current maximum supported command level.

Queue manager migration is the process of converting persistent queue manager data from one version to another. Persistent queue manager data includes log files and data in the queue manager directory.

The data records changes to objects such as messages, subscriptions, publications, queue managers, channels, queues, and topics.

Queue manager migration is required and largely automatic.

You can reduce the downtime and risk caused by queue manager migration, by verifying the new version first, using a different queue manager. Unless the platform supports queue manager coexistence, you need to perform the verification on a different server, or in a virtualized environment on the same server. If the platform you are upgrading supports queue manager coexistence, you can install the new version of IBM MQ on the same server, verify it, and minimize downtime to the time required to stop, backup, and restart the queue manager.

**Note:** If you are migrating a queue manager through multiple release levels, one level at a time, you must start the queue manager after each upgrade to migrate it. You must also start all the channels, to ensure they are migrated.

If you migrate from IBM MQ 8.0.0 Fix Pack 1, 2, or 3 directly to a version between IBM MQ 9.1.5 and IBM MQ 9.2.0 Fix Pack 1 inclusive, channel objects are not migrated correctly when the queue manager is started at the new code level. Channels continue to work normally, but channel names are not displayed by the **runmqsc** command or IBM MQ Explorer. From IBM MQ 9.2.0 Fix Pack 2, channel definitions are migrated correctly when the queue manager is started for the first time at the new code level.

When migrating queue managers that are members of a cluster, migrate full repositories before partial repositories. This is because an older repository cannot store newer attributes introduced in a newer release. It tolerates them, but does not store them.

## Restoring a queue manager to an earlier release

**Multi** For IBM MQ for Multiplatforms, you cannot restore a queue manager to an earlier release level after you have migrated it to a new release. You must back up your system before starting backwards migration. You can either back up queue manager data, or use a backup queue manager; see [Backing up and restoring IBM MQ](#). Before backing up, you must stop the queue manager.

**z/OS** For IBM MQ for z/OS, an IBM MQ 9.4.0 LTS or 9.4.0 CD queue manager can always be backwards migrated to the release it was previously running at, if the release was one of IBM MQ 9.2.0 LTS, IBM MQ 9.3.0 LTS, or IBM MQ 9.3.0 CD.

### Related concepts

[IBM MQ release types and versioning](#)

[“Upgrade and migration of IBM MQ on z/OS” on page 471](#)

You can install new releases of IBM MQ to upgrade IBM MQ to a new release, version or modification (VRM) level. Running a queue manager at a higher level to the one it previously ran on requires migration.

### Related tasks

[“Migrating a queue manager on AIX and Linux” on page 426](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating a queue manager on Windows” on page 398](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating a queue manager to the latest version on IBM i” on page 452](#)

Follow these instructions to migrate a queue manager on IBM i to the latest MQ version.

### Related information

[Moving a queue manager to a different operating system](#)

## **IBM MQ MQI client migration**

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.

It is better to migrate the clients after the queue managers that they communicate with have been migrated.

Client migration on the client workstation is optional and manual. Client migration on the server is required and automatic. You must upgrade an IBM MQ MQI client before migrating a client workstation to make use of new configuration options. You can make configuration changes to client and server connection channels on the server, but they have no effect on a client workstation, until the client is upgraded.

An example of client migration performed at the client workstation is to manually migrate configuration settings to the `mqclient.ini` configuration file.

An example of combined client and server migration is the deployment of a new client connection definition table (CCDT). To use a new version of the CCDT, generate the table on a queue manager that is at the new code level. Deploy the table to clients that are going to use it. To deploy the table to a client, you first must update the client to at least the same level as the queue manager that created the table.

An IBM MQ MQI client can interoperate with earlier and later versions of IBM MQ. Upgrading the IBM MQ MQI client makes new function available to client applications, and is important to maintain the service level. Migrating an IBM MQ MQI client gives it access to new configuration options.

The IBM MQ MQI client libraries, such as `mqic.dll`, are dynamic, and the application linkages to the libraries do not normally change. You do not relink a client application to pick up new IBM MQ client libraries. The client picks up the new library next time the library is loaded by the client application. Do not move libraries from their installed directory. Linking to libraries in anything other than their installed directory is an unsupported configuration.

### **Related concepts**

[“Application compatibility and interoperability with earlier versions of IBM MQ” on page 385](#)

[“Application compatibility and interoperability with later versions of IBM MQ” on page 386](#)

IBM MQ applications run against later versions of a queue manager without recoding, recompiling, or relinking. You can connect an application that is built against libraries shipped with an earlier version of IBM MQ to a queue manager running at a later version of IBM MQ.

### **Related tasks**

[“Migrating an IBM MQ MQI client to the latest version on IBM i” on page 466](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[“Migrating an IBM MQ MQI client on AIX and Linux” on page 441](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[“Migrating an IBM MQ MQI client on Windows” on page 415](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

### **Related reference**

[“MQ clients: Client Channel Definition Table \(CCDT\)” on page 388](#)

You can connect a supported IBM MQ client application to any supported level of queue manager. If a client uses CCDT to connect to a queue manager, the CCDT can be at a version greater than, less than, or equal to that of the client.

[“Supported IBM MQ client: Default behavior of client-connection and server-connection channels” on page 389](#)

## **Application migration and interoperation**

IBM MQ supports running applications compiled and linked against previous versions of IBM MQ, with later levels of IBM MQ. Use the new version of the libraries to build the applications, once the queue managers have been upgraded.

To migrate an application to run with a new level of IBM MQ, disconnect an application from the queue manager. Reconnect it when the queue manager is running again. However, it takes only one small difference in the interface between IBM MQ and the application to break an application, or make it behave wrongly. Sometimes a problem does not show up for a long time. For this reason, you must always test your applications against a new version of IBM MQ. The suggested extent of testing varies depending on the extent of the changes in IBM MQ; see [“Upgrade and migration of IBM MQ on z/OS”](#) on page 471 or [“Characteristics of different types of upgrade”](#) on page 293.

Application migration refers to four kinds of changes.

1. Application changes that are consequent to upgrading the operating environment along with the queue manager. Rarely, linkage conventions change. The most likely reason for a linkage change is switching from 32 bit to a 64 bit environment. If you are using SSL or TLS you might have to relink with a new secure library.
2. Changes that you must make to the application in order to run an application against a new level of queue manager. Changes of this sort are uncommon. However, you must check [“Changes that affect migration”](#) on page 354 to see if any changes might affect your applications.
3. Changes that are not required, but that you might want to make in future, perhaps because you have a business reason to modify an application.
4. Changes to applications that are supplied by IBM, or other vendors, that require you to run migration utilities. The utilities convert the applications to running on the new version of IBM MQ.

Do not load IBM MQ libraries from an earlier level. IBM MQ does not support connecting server applications loading libraries from the earlier level to connect to a later level of queue manager. On AIX, Linux, and Windows platforms, the application load path must be set up to the location of the IBM MQ server libraries. You do not have to recompile and relink an application. Applications compiled and linked against an earlier version of IBM MQ can load libraries from a later version.

**Multi** On [Multiplatforms](#), the product loads the library from the installation the application is connecting to. An application must initially load a library of at least the same level as the application linked to. IBM MQ then loads the correct version of the library from the installation that the queue manager is associated with. If you have two installations of the same version, but at different fix levels, IBM MQ chooses which library to load. The choice is based on the queue manager the application is connected to. If an application is connected to multiple queue managers, it is possible that multiple libraries are loaded.

To help you write applications that can exchange messages with earlier versions of the product, IBM MQ provides data type versioning. Data type versioning assists you in exchanging messages that are compatible with target queue managers. A good programming practice is to set the version number of a data structure explicitly. Do not assume that the default version is the one you require. By setting the version explicitly, you are forced to look up what version to use. The description of the data type version tells you what level of queue manager supports that version.

It is poor practice to set the data type version to the current version. If you recompile your program against a new version of IBM MQ, the data type version might change with unexpected consequences.

Client applications are more likely to connect to different queue managers than applications written for a specific server. Plan carefully when writing an application that is to connect to different versions of a queue manager, and to queue managers on different platforms. The default values of some IBM MQ constants, such as MQPMO\_SYNCPOINT, MQPMO\_NO\_SYNCPOINT differ between platforms. Some functions are not available on all platforms.

You must be aware of, and code to, the capabilities of all the queue managers the application interacts with. It requires planning and design to write an application that works with different versions of a queue manager. There is no API provided with IBM MQ to restrict an application to a function subset common

to the set of queue managers it interacts with. To improve interoperability, some developers choose to provide an MQI wrapper layer, or use MQI API exits, to control the functions programs use.

## Connection authentication

For a new IBM MQ 8.0, or later, installation, the **CONNAUTH CHCKLOCL** attribute will be set to **OPTIONAL**. This means that user IDs and passwords are not required, but if they are provided they must be a valid pair, or they will be rejected.

When you are migrating between a previous version of IBM MQ and the latest version, the **CONNAUTH CHCKLOCL** attribute on each queue manager is set to **NONE**, ensuring version to version continuity, but switching connection authentication off.

For more information see [Connection authentication: Configuration](#).

## Related concepts

[“Application compatibility and interoperability with earlier versions of IBM MQ” on page 385](#)

[“Application compatibility and interoperability with later versions of IBM MQ” on page 386](#)

IBM MQ applications run against later versions of a queue manager without recoding, recompiling, or relinking. You can connect an application that is built against libraries shipped with an earlier version of IBM MQ to a queue manager running at a later version of IBM MQ.

## Related tasks

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

## **Migration methods on IBM MQ for Multiplatforms**

There are three main methods of migrating from one release to another: Single-stage migration (called a slip installation on IBM i), side-by-side migration, and multi-stage migration. Multi-stage migration is not an option for IBM i.

### **Important:**

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

## Single-stage migration

Single-stage migration is the term that is used to describe replacing the only installation of IBM MQ on a server, with a later release.

The advantage of single-stage migration is that it changes the configuration of a queue manager on the earlier version as little as possible. Existing applications switch from loading the libraries from the earlier version, to loading the libraries of the later version, automatically. Queue managers are automatically associated with the installation on the later version. Administrative scripts and procedures are affected as little as possible by setting the installation to be the primary installation. If you set the installation of the later version to be the primary installation, commands such as **strmqm** work without providing an explicit path to the command.

Of the three approaches, single-stage migration preserves the greatest number of existing scripts and procedures for running IBM MQ. However, the other migration approaches support a gentler transition to the new version, which can reduce the overall impact on users.

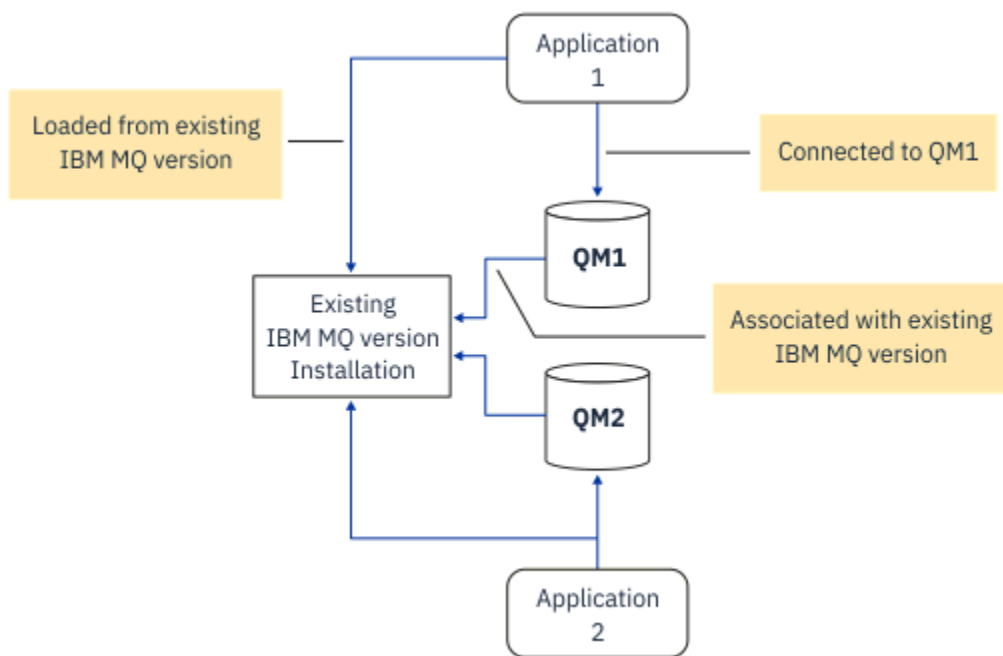


Figure 2. Single\_stage migration: earlier version installed with connected queue managers and associated applications

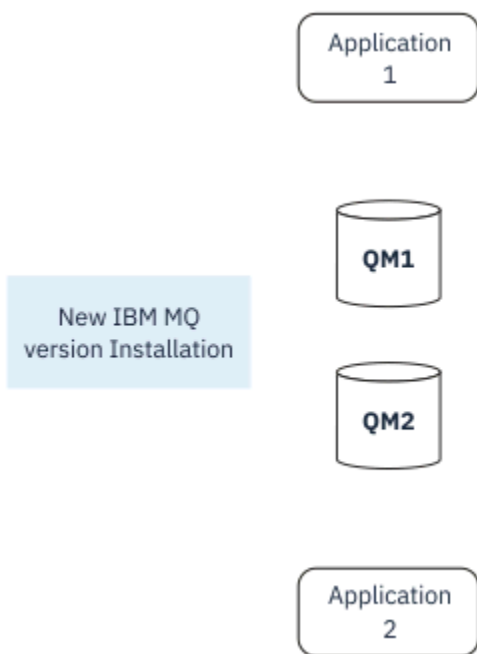


Figure 3. Single\_stage migration: later version installed but queue managers not yet connected and applications not yet associated

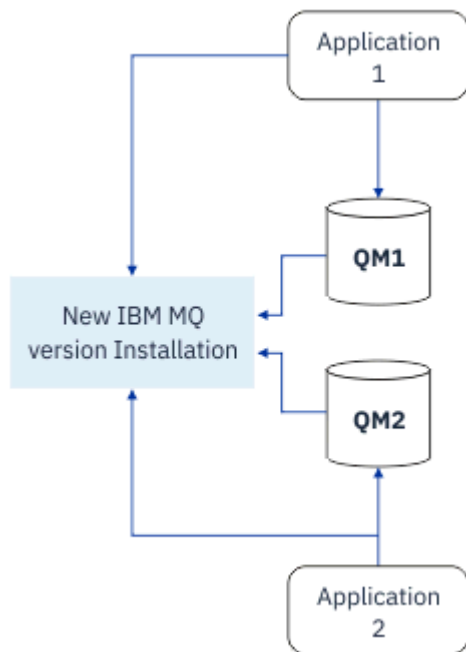


Figure 4. Single-stage migration: migrated queue managers connected to and applications associated with later version

For more information about single-stage migration, see:

- [Linux](#) [AIX](#) “Migrating on AIX and Linux: single-stage” on page 427
- [Windows](#) “Migrating on Windows: single stage” on page 401
- [IBM i](#) “Installation methods on IBM i” on page 452 (on IBM i, a single-stage migration is called a slip installation)

## Side-by-side migration

On AIX, Linux, and Windows, side-by-side migration is the term that is used to describe installing a later version of IBM MQ alongside an older version on the same server. The side-by-side migration scenario sits half-way between the single-stage and multi-stage migration scenarios and is based on the following premise:

- Install additional IBM MQ code alongside existing installation while queue managers are still running.
- Move queue managers one at a time to the new installation.
- Migrate and test applications one at a time.

During the installation and verification of the later version of IBM MQ, queue managers continue running, and remain associated with the older version of IBM MQ.

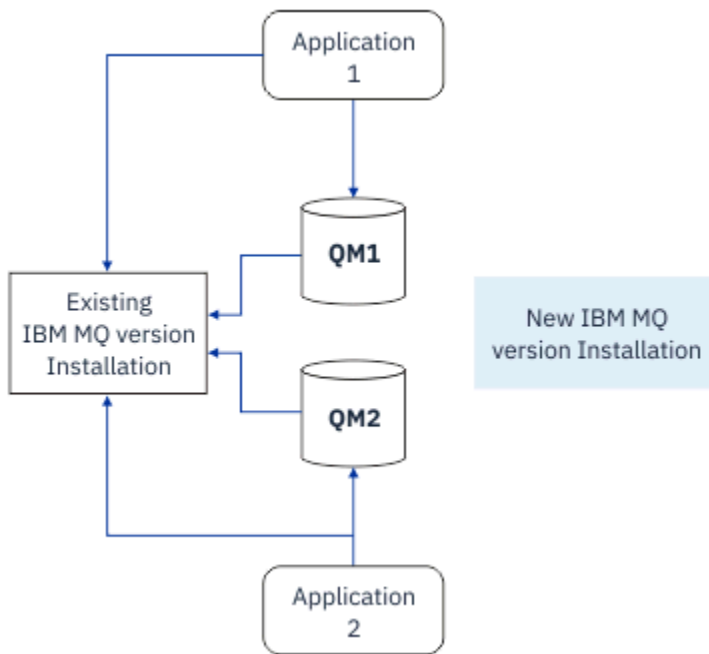


Figure 5. Side-by-side migration: later version installed but queue managers still connected to and applications still associated with earlier version

When you decide to migrate queue managers to the later version of IBM MQ, you stop all queue managers, migrate them all to the later version, and uninstall the earlier version of IBM MQ.

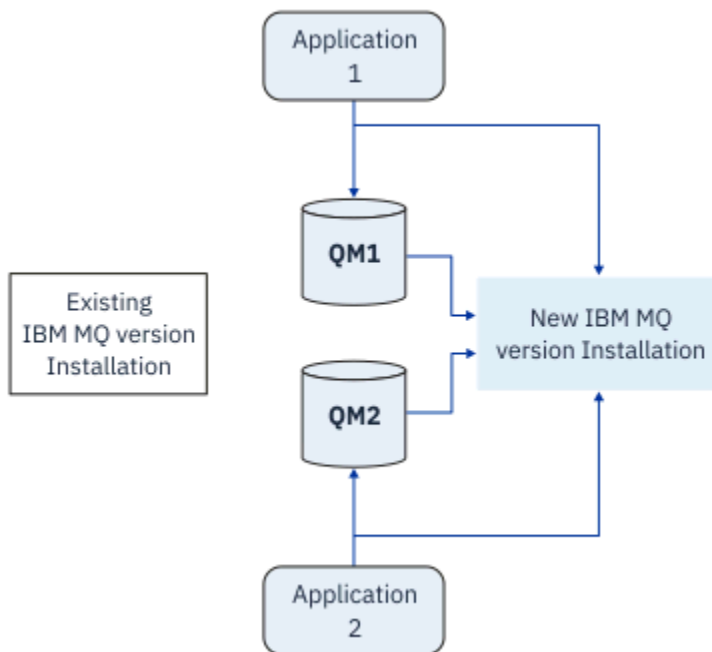


Figure 6. Side-by-side migration: migrated queue managers connected to and applications associated with later version

The advantage that the side-by-side migration has over the single-stage migration is that you can install and verify the later IBM MQ installation on the server before you switch over to it.

Although side-by-side migration is less flexible than multi-stage migration, it does have some advantages over the multi-stage approach. With the side-by-side approach, you can assign a later version of IBM MQ to be the primary installation. With the multistage approach, and one version of IBM MQ set as the



primary installation, many applications restart without having to reconfigure their environment, as IBM MQ commands work without providing a local search path.

For more information about side-by-side migration, see:

- ▶ **Linux** ▶ **AIX** [“Migrating on AIX and Linux: side-by-side” on page 431](#)
- ▶ **Windows** [“Migrating on Windows: side-by-side” on page 406](#)

**Note:** ▶ **IBM i** Side-by-side migration has a different meaning on IBM i. A side-by-side installation upgrades IBM MQ on a different computer. For more information, see [“Installation methods on IBM i” on page 452](#). Multiple installations are not applicable to IBM i.

## Multi-stage migration

▶ **ALW**

Multi-stage migration is the term that is used to describe running a later version of IBM MQ alongside an older version on the same server. Multi-stage migration is the most flexible approach.

After you install the later version alongside the earlier version, you can create new queue managers to verify the installation of the later version, and develop new applications. At the same time, you can migrate queue managers and their associated applications from the earlier version to the later version. By migrating queue managers and applications one by one, you can reduce the peak workload on your staff who are managing the migration.

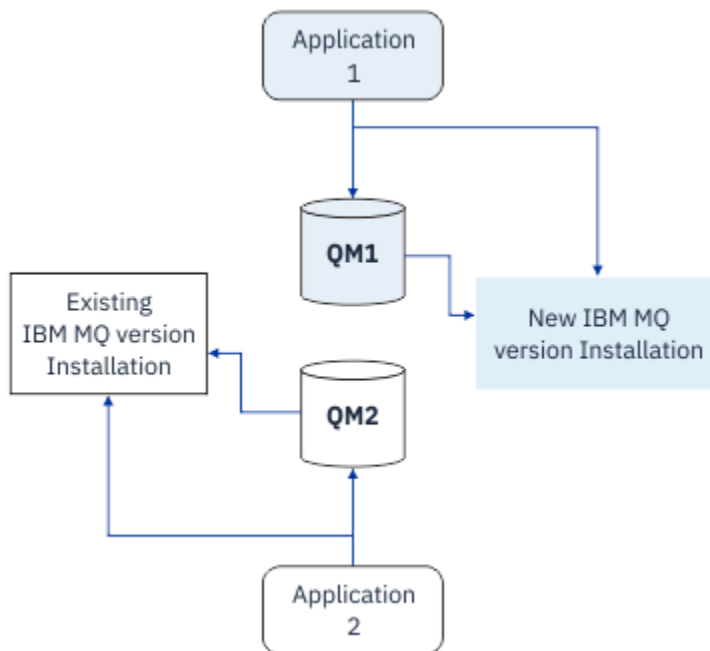


Figure 7. Multi-stage migration: one queue manager and application migrated to later version, and another queue manager and application still at earlier version

For more information about multi-stage migration, see:

- ▶ **Linux** ▶ **AIX** [“Migrating on AIX and Linux: multi-stage” on page 435](#)
- ▶ **Windows** [“Migrating on Windows: multi-stage” on page 409](#)

### Related concepts

[“Upgrade and migration of IBM MQ on z/OS” on page 471](#)

You can install new releases of IBM MQ to upgrade IBM MQ to a new release, version or modification (VRM) level. Running a queue manager at a higher level to the one it previously ran on requires migration.

## **Multiple IBM MQ installations**


Multiple IBM MQ installations are supported on AIX, Linux, and Windows. This gives you the option to install and select between one or more IBM MQ installations.

### Overview

You can select between:

- Simplicity of maintaining a single IBM MQ installation.
- Flexibility, by allowing up to a maximum of 128 IBM MQ installations on a system.


You can install multiple copies of the same code level; this is especially convenient for maintenance purposes.

 For example, if you want to upgrade IBM MQ 9.0.0.0 to IBM MQ 9.0.0 Fix Pack 1, you can install a second copy of IBM MQ 9.0.0.0, apply the maintenance to bring it to IBM MQ 9.0.0 Fix Pack 1, and then move the queue managers across to the new installation. You still have the original installation, so it is a simple matter to move the queue managers back if you encounter any problems.

Note that you can only move the queue manager to an installation at the same or a higher version. That is, you can move a queue manager in the following ways:

- From an earlier version to a later version, but not back. For example, from IBM MQ 9.0.0 to IBM MQ 9.1.0, but not from IBM MQ 9.1.0 to IBM MQ 9.0.0.
- From one fix pack level to another fix pack level at the same version, and back. For example, from IBM MQ 9.0.0.0 to IBM MQ 9.0.0 Fix Pack 1, and back to IBM MQ 9.0.0.0.



### Important considerations for multiple installations

1.  On Linux you must ensure that each package installed has a unique name. You can use the `crtmqpkg` command to create a unique set of packages. For more information, see [“Installing additional IBM MQ installations on Linux using the rpm command”](#) on page 116.
2. All installations share a data directory; this is where `mqs.ini` is located for example.
3. All installations share the same namespace for queue managers. This means that you cannot create several queue managers of the same name in different installations.
4. IBM MQ installations are fully relocatable. Each installation has a separate installation path. You can choose where to install IBM MQ.
5. IBM MQ resources have installation-scope resource isolation, so operations on one installation do not affect the others. This means that the resources created by one installation are isolated from those created by other installations. It enables actions, such as removing an installation of IBM MQ, while queue managers are running under another installation.
6. Queue managers are associated with an installation. You can move queue managers between installations at the same or higher version of IBM MQ, but you cannot migrate back to earlier releases.

### Locating installations on your system

To locate your installations, you can use the following methods:

- Use the platform installation tools to query what is installed and where on the system
- Use the `dspmqver` command to display IBM MQ version and build information.
- Use the `dspmqinst` command to display installation entries from `mqinst.ini`.

-   On AIX and Linux, use the following command to list the installations:

```
cat /etc/opt/mqm/mqinst.ini
```

-  On Windows, use the following command to query the registry:

```
reg.exe query "HKLM\Software\[Wow6432Node\]IBM\WebSphere MQ\Installation" /s
```

## Working with multiple installations

To work with a queue manager, you need to use the commands from its installation. If you select the wrong installation, you see:

```
AMQ5691: Queue manager 'MYQM' is associated with a different installation (Inst1)
```

To work with a queue manager, you have to use the control commands from its associated installation. You have a choice of:

- Using the full path to the control commands, for example:

```
$ MQ_INSTALLATION_PATH\bin\strmqm MYQM
```

or

- Setting the environment variables for an installation with one of:

```
$ MQ_INSTALLATION_PATH/bin/setmqenv 's
$ setmqenv -m MYQM
$ setmqenv -n InstallationName
$ setmqenv -p MQ_INSTALLATION_PATH
```

You might consider using a shell script or batch file to set up the environment for each IBM MQ installation. You can use the **setmqenv** or **crtmqenv** commands to help with this.

- **setmqenv** sets the values of the environment variables, such as PATH, CLASSPATH and LD\_LIBRARY\_PATH, for use with an IBM MQ installation.
- **crtmqenv** creates a list of the environment variables and their values for use with a particular IBM MQ installation. You can then use this list to incorporate into a shell script or batch file.

## Commands

To run a command, the operating system must find the command in an IBM MQ installation. In general, you must run a command from the installation that is associated with the correct queue manager. IBM MQ does not switch commands to the correct installation. However, there are some exceptions, such as the **setmqinst** command, where you can run the command from any installation that has the latest version of the product installed.

### Commands that work across installations

- [dspmq](#) (display queue managers)
- [dspmqinst](#) (display IBM MQ installation)
- [dspmqver](#) (display version information)
- [setmqinst](#) (set IBM MQ installation)

### Other control commands for multiple installations

- [crtmqenv](#) (create IBM MQ environment)
- [dspmqinst](#) (display IBM MQ installation)

- [setmqenv](#) (set IBM MQ environment)
- [setmqinst](#) (set IBM MQ installation)
- [setmqm](#) (set queue manager)

If an earlier version of the product is installed, the command that is run is the command for that version, unless the search path is overridden by a local setting. You can override the search path by running **setmqenv**. You must set the correct path to run a command. If you have set a primary installation, the command that is run is the copy in the primary installation, unless you override the selection with a local search path.

## Multiple releases on z/OS



Multiple releases can exist on z/OS. You use STEPLIBs to control which level of IBM MQ is used. For more information, see [“Coexistence” on page 372](#).

### Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

## Coexistence, compatibility, and interoperability

The definitions of the IBM MQ terms coexistence, compatibility, and interoperability.

### Coexistence

Is being able to install and run two or more versions of the same program on the same server. For IBM MQ, it normally means installing and running multiple versions of IBM MQ on a server.

### Compatibility

Is the ability to run applications from one level of queue manager with an earlier, or previous level, of the queue manager.

If you are using a message channel agent (MCA) channel, any version and release of an IBM MQ queue manager can connect, using an MCA channel, to any version and release of another IBM MQ queue manager.

The MCA channel is automatically configured to the latest version of protocol that is supported by both ends of the channel.

Compatibility is also the ability to run client applications with different versions of the IBM MQ MQI client, and different levels of the queue manager.

### Interoperability

Is mainly the ability to exchange messages between different versions of IBM MQ. It can also mean the interoperability between others things, such as publish/subscribe brokers, or between components such as the IBM MQ classes for JMS and WebSphere Application Server.

Maintaining the compatibility, coexistence, and interoperability of IBM MQ is important in order to preserve the investment you make in applications and administrative procedures.

Three areas to which this objective does not apply to as rigidly, are:

- GUI interfaces, such as IBM MQ Explorer.
- Information for service, such as FFST files and traces.
- Error messages. The text in an error message might change, to make the wording clearer or more accurate.

### Coexistence

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations. In addition to queue managers coexisting on a server,

objects, and commands must work correctly with different queue managers running at different command levels.

## Multiple queue manager versions in z/OS



There can be several IBM MQ subsystems in a z/OS image, and they can use different versions of IBM MQ, provided that the IBM MQ early code modules are of the latest version being used. These modules are loaded at z/OS IPL time and are shared among all the IBM MQ subsystems in the z/OS image.

This means that you can run one queue manager at the latest version and another in the same image with an earlier version, provided that the early code is that of the latest version.

The coexistence section lists restrictions in the use of objects and commands when they are used with queue managers at multiple command levels. The queue managers might be running on a single server, or in a cluster.

### Related concepts

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### *Queue manager coexistence*

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

## Single installation queue manager coexistence on all platforms

Single installation queue manager coexistence is useful in development and production environments. In development environments, you can set up different queue manager configurations to support different development activities. You can also work with multiple queue manager configurations on a single server, connected by channels, as if deployed on a network.

In production environments configuring multiple queue managers on a single server is less common. It has no performance or functional advantage over a single queue manager configuration. Sometimes, you must deploy multiple queue managers on server. It might be essential to meet the requirements

of a particular software stack, governance, administration, or as a consequence of the consolidation of servers.

## Queue manager coexistence in a multi-installation

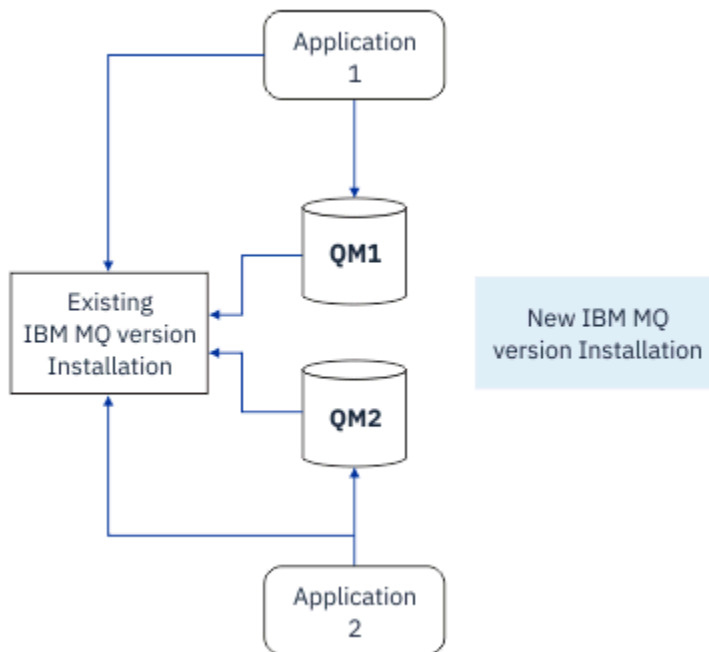
Multi-installation queue manager coexistence is supported on AIX, Linux, and Windows, and z/OS.<sup>1</sup>

With multi-installation queue manager coexistence on the same server, you can run queue managers at different command levels on the same server. You can also run multiple queue managers at the same command level, but associate them with different installations.

Multi-installation adds more flexibility to the coexistence of queue managers using a single installation. Any of the reasons behind running multiple queue managers, such as supporting different software stacks, might require different versions of IBM MQ.

The biggest benefit of multi-installation identified by early users, is in upgrading from one version of IBM MQ to another. Multi-installation makes upgrading less risky, less costly, and is more flexible in meeting the migration needs of applications running on a server.

The key to migration flexibility is being able to install a new version alongside an existing installation; see [Figure 8 on page 374](#), which is extracted from [“Migrating on AIX and Linux: side-by-side” on page 431](#) or [“Migrating on Windows: side-by-side” on page 406](#).



*Figure 8. Side-by-side installation - step 2*

When the installation is complete, and verified, migrate queue managers and applications to the new installation; see [Figure 9 on page 375](#). When migration is complete, uninstall the old installation.

<sup>1</sup> Do not confuse multi-installation queue manager coexistence with multi-instance queue managers. They are completely different, though they sound similar in English.

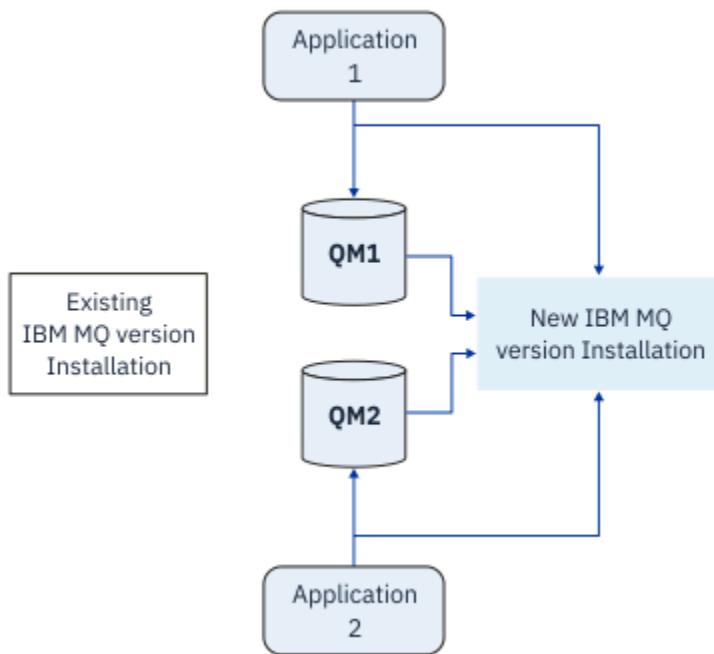


Figure 9. Side-by-side installation - step 4

Think of multi-installation as being the basis for a range of migration strategies. At one end is *single-stage*, in which you only have one installation on a server at a time. At the other end is *multi-stage* migration, in which you continue to run multiple installations at the same time. In the middle is side-by-side migration. Each of the three strategies is explained in the following tasks:

1. [“Migrating on AIX and Linux: single-stage” on page 427](#) or [“Migrating on Windows: single stage” on page 401](#)
2. [“Migrating on AIX and Linux: side-by-side” on page 431](#) or [“Migrating on Windows: side-by-side” on page 406](#)
3. [“Migrating on AIX and Linux: multi-stage” on page 435](#) or [“Migrating on Windows: multi-stage” on page 409](#)

## Updating queue managers to a new maintenance level

LTS

Another similar use of multi-installation is to support the updating of queue managers to a new maintenance level. You maintain two installations, one of which has the latest maintenance level update applied, and the other has the previous maintenance levels. When you have moved all queue managers to the latest maintenance level, you can replace the previous maintenance level update with the next maintenance level update to be released. The configuration allows you to stage the updating of applications and queue managers to the latest maintenance level. You can switch the primary installation designation to the latest maintenance level.

### Related concepts

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

[“Upgrade and migration of IBM MQ on z/OS” on page 471](#)

You can install new releases of IBM MQ to upgrade IBM MQ to a new release, version or modification (VRM) level. Running a queue manager at a higher level to the one it previously ran on requires migration.

### Related tasks

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Staging maintenance level updates on AIX” on page 303](#)

On AIX, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

[“Staging maintenance level updates on Linux” on page 312](#)

On Linux, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

[“Staging maintenance level updates on Windows” on page 328](#)

On Windows systems, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### *Multi-installation queue manager coexistence on AIX, Linux, and Windows*

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

**Note:** On Linux, a multi-installation can only be created when using the RPM installation media. Multi-installation is not supported on Ubuntu.

When you plan a multi-installation, you need only consider the major IBM MQ version number (for example, IBM MQ 9.4). CD releases and fix pack levels are not a significant additional factor.

The following figure shows two IBM MQ installations at different versions (for example, versions 9.4 and 9.1), two queue managers, and three applications. In this figure, note that application 3 is configured to load libraries from the Inst1 (IBM MQ 9.4) installation, even though it is connected to queue manager QM2 (IBM MQ 9.1).



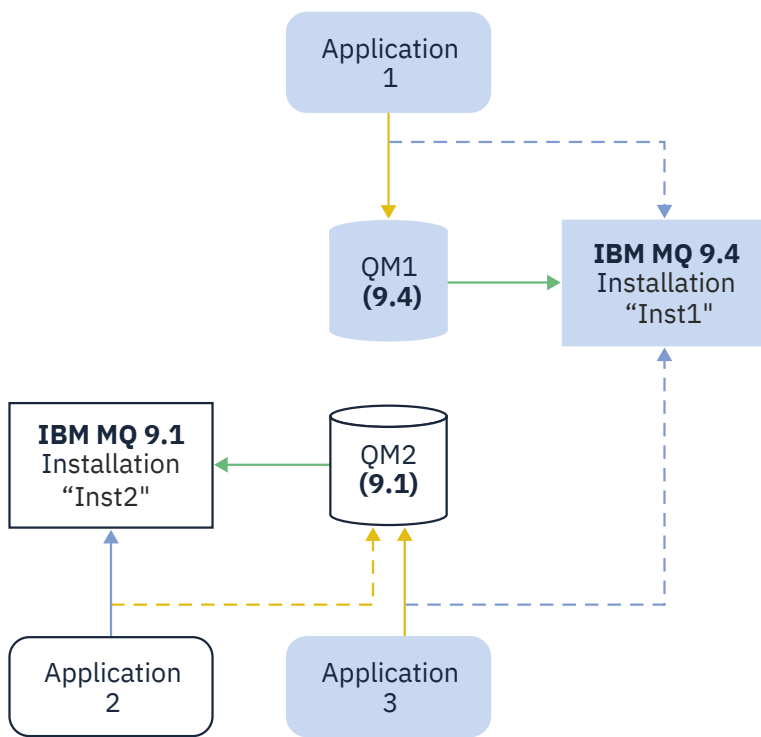


Figure 10. Coexistence of two queue managers running at different IBM MQ versions  
 Installing and migrating **377**

If you run multiple installations of IBM MQ on a server you must consider three questions:

1. Which installation is a queue manager associated with? See [“Queue manager association”](#) on page 378.
2. Which installation does an application load? See [“Loading IBM MQ libraries”](#) on page 378.
3. Which installation is an IBM MQ command run from? See [“Command association”](#) on page 380.

## Queue manager association

A queue manager is permanently associated with an installation, until you choose to change the association with the **setmqm** command. You cannot associate a queue manager with an installation at a lower command level than the current command level of the queue manager.

In [Figure 10 on page 377](#), QM1 is associated with Inst1. The association is made by running `setmqm -m QM1 -n Inst1`. When QM1 is first started, after running **setmqm**, if QM1 is running IBM MQ 9.1 it is migrated to the later version. QM2 is associated with IBM MQ 9.1 because the association has not been changed.

## Loading IBM MQ libraries

The application connections to the queue managers are established by calling MQCONN or MQCONNX in the normal way.

Which IBM MQ library an application loads depends on the configuration of the operating system loader, and on the IBM MQ installation the queue manager is associated with. In [Figure 10 on page 377](#), the operating system loads the IBM MQ library from the Inst1 installation for applications 1 and 3. It loads the IBM MQ 9.1 library for application 2. The operating system has loaded the wrong library for application 3. Application 3 requires the IBM MQ 9.1 libraries.

[Figure 11 on page 379](#) shows what happens to application 3. Application 3 is connecting to QM2, and QM2 is associated with the IBM MQ 9.1 installation. IBM MQ detects that the operating system has loaded the wrong library to process calls from application 3 to QM2. IBM MQ loads the correct library from the IBM MQ 9.1 installation. It transfers the MQCONN or MQCONNX call to the IBM MQ 9.1 library. Subsequent MQI calls that use the connection handle returned by MQCONN or MQCONNX, call entry points in the IBM MQ 9.1 library.

If you attempt a connection to QM1 with application 2, IBM MQ returns an error; see [2059 \(080B\) \(RC2059\): MQRC\\_Q\\_MGR\\_NOT\\_AVAILABLE](#).

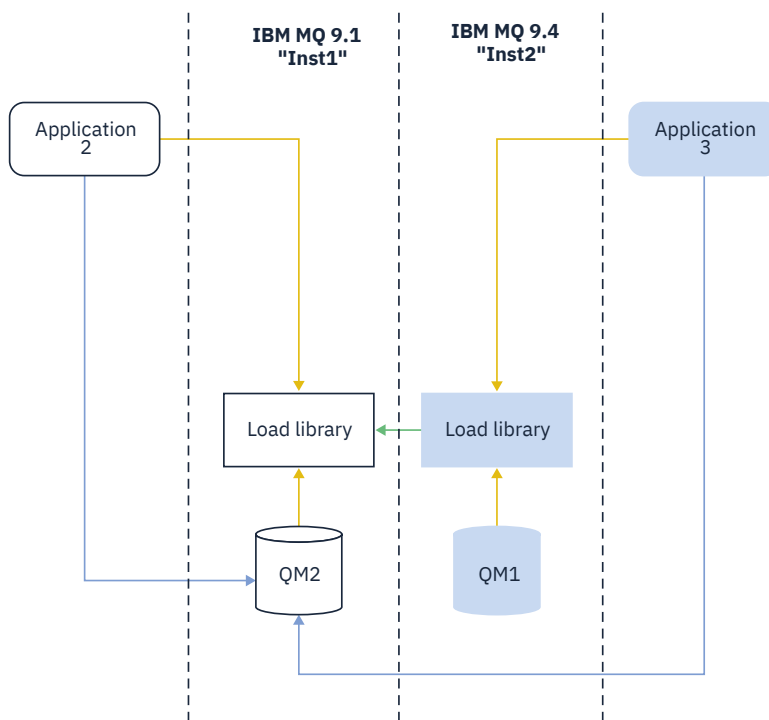


Figure 11. Loading calls in a different library

IBM MQ libraries include a routing capability that is based on the installation a queue manager is associated with. The operating system can load a library from any IBM MQ installation, and IBM MQ transfers MQI calls to the correct library.

The loading capability of IBM MQ libraries does not relax the restriction that an application compiled and linked at a later release level must not directly load an IBM MQ library at an earlier release level. In practice, as long as the operating system loads a library at the same or later level than the library the application was compiled and linked with, IBM MQ can call any other level of IBM MQ on the same server.

For example, suppose you recompile and link an application that is to connect to an IBM MQ 9.1 queue manager using the libraries shipped with IBM MQ 9.4. At run time the operating system must load the IBM MQ 9.4 libraries for the application, even though the application connects to an IBM MQ 9.1 queue manager. IBM MQ 9.4 detects the inconsistency and loads the IBM MQ 9.1 library for the application. The same applies to any future release. If the application is recompiled and linked against a later release, then the application must load an IBM MQ library that matches the later release, even if it continues to connect to an IBM MQ 9.4 queue manager.

Your application might not be linked to an IBM MQ library, but instead call the operating system directly to load an IBM MQ library. IBM MQ checks the library is from the installation that is associated with the queue manager. If it is not, IBM MQ loads the correct library.

## Special migration considerations involving loading IBM MQ libraries

You might have modified the installation of an early IBM MQ release to satisfy the requirements of a build environment, or the IT standards in your organization. If you copied IBM MQ libraries to other directories, or created symbolic links, you ended up with an unsupported configuration. A common IT standard or build environment requirement is to include IBM MQ libraries in the default load path on AIX and Linux systems. You can install IBM MQ into a directory of your own choosing, and IBM MQ can create symbolic links in `/usr` and its subdirectories. If you make an IBM MQ installation primary by using the **setmqinst** command, IBM MQ inserts symbolic links to the IBM MQ libraries into `/usr/lib`. As a result, the operating system finds the IBM MQ libraries in the default load path, if that includes `/usr/lib`.

For more information, see [Connecting applications in a multiple installation environment](#).

## Command association

Examples of commands are **dspmqver**, **setmqinst**, **runmqsc**, and **strmqm**. The operating system must find a command in an IBM MQ installation. Many commands also require a queue manager as an argument, and assume the default queue manager if a queue manager name is not provided as a parameter.

Unlike loading libraries, if a command includes a queue manager as a parameter, the command is not switched to the installation that is associated with the queue manager. You must use the **setmqenv** command to set up your environment correctly, so that any commands that you issue are run from the correct installation. You can provide a queue manager as a parameter to **setmqenv**, to set up the command environment for that queue manager. For more information, see [Running setmqenv](#).

On Windows, the **setmqinst** command sets global environment variables, and **setmqenv** local environment variables, including the PATH variable to find commands.

On AIX and Linux, the **setmqinst** command copies symbolic links for a subset of the commands into `/usr/bin`. For more information, see [“External library and control command links to primary installation on AIX and Linux”](#) on page 23. The **setmqenv** command sets up local environment variables, including the search path to the binary folder in the installation directory.

The following code shows two examples of running **setmqenv** to set up the command environment for the copy of IBM MQ that is associated with queue manager QM1.

---

IBM MQ for Windows.

```
"%MQ_INSTALLATION_PATH%\bin\setmqenv" -m QM1
```

IBM MQ for AIX or Linux.

```
. $MQ_INSTALLATION_PATH/bin/setmqenv -m QM1
```

Figure 12. Running **setmqenv**

---

## Related concepts

[Connecting applications in a multiple installation environment](#)

“External library and control command links to primary installation on AIX and Linux” on page 23

On AIX and Linux platforms the primary installation is the one to which links from the /usr file system are made. However, only a subset of those links created with previous releases are now made.

“Features that can be used only with the primary installation on Windows” on page 25

Some Windows operating-system features can be used only with the primary installation. This restriction is due to the central registration of interface libraries, which might conflict as a result of multiple versions of IBM MQ being installed.

[Installation configuration file, mqinst.ini](#)

## Related tasks

“Migrating on AIX and Linux: single-stage” on page 427

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later release. Single stage migration is also known as *upgrading in place* or *in place upgrade*.

Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

“Migrating on Windows: single stage” on page 401

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later version of the product. Single stage migration is also known as *upgrading in place* or *in place upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

[Changing the primary installation](#)

“Staging maintenance level updates on AIX” on page 303

On AIX, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

“Staging maintenance level updates on Linux” on page 312

On Linux, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

“Staging maintenance level updates on Windows” on page 328

On Windows systems, you can use multiple installations of IBM MQ on the same server to control the release of maintenance level updates.

“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

“Migrating IBM MQ library loading to a later version on Windows” on page 416

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[“Coexistence” on page 372](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations. In addition to queue managers coexisting on a server, objects, and commands must work correctly with different queue managers running at different command levels.

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

[strmqm -e CMDLEVEL](#)

### Related information

[Dynamic-Link Library Search Order](#)

## *Multiple installations and application programs*

When a local application connects to a queue manager, the application needs to load the libraries from the installation associated with the queue manager. Multiple installations introduce some complexity.

## Using the `setmqm` command

When you use `setmqm` to change the installation associated with a queue manager, the libraries that need to be loaded change.

When an application connects to multiple queue managers owned by different installations, multiple sets of libraries need to be loaded.

**Note:** If you link your applications to IBM MQ libraries, the applications automatically load the appropriate libraries when the application connects to a queue manager.

## Loading IBM MQ libraries in a multi-version environment

How libraries are located depends upon your environment.

If IBM MQ is installed in the default location, existing applications continue to work as before. Otherwise, you might need to rebuild the application or change your configuration.

The order in which libraries are searched, depends upon the platform you are using:

- Windows
  - The application's directory
  - The current directory
  - The global and your PATH variables
- Other platforms
  - LD\_LIBRARY\_PATH (or LIBPATH/SHLIB\_PATH)
  - An embedded search path (RPath)
  - The default library path

Table 39. Options for loading libraries

Platform	Option	Benefits	Drawbacks
AIX and Linux	Set/change the embedded runtime search path (RPath)	The path is explicit in the way the application is built	You need to recompile and link  If you move IBM MQ, you must change RPath
AIX and Linux	Set LD_LIBRARY_PATH or equivalent using setmqenv	Overrides RPath  No changes to existing applications  Easy to change if you move IBM MQ	Depends on environment variables  Possible impacts on other applications
Windows	Set PATH using setmqenv	No changes to existing applications  Easy to change if you move IBM MQ	Depends on environment variables  Possible impacts on other applications
All	Set the primary installation to IBM WebSphere MQ 7.1 or later	No changes to existing applications  Easy to change the primary installation  Similar behavior to previous versions of IBM MQ	AIX and Linux: Relies on /usr/lib in the default search path

### Related concepts

[“Multiple installations on AIX, Linux, and Windows” on page 17](#)

On AIX, Linux, and Windows, it is possible to have more than one copy of IBM MQ on a system.

### Mixed version cluster coexistence

A cluster can contain queue managers running at IBM MQ 9.4, and any currently supported earlier level of the product. However new features cannot be exploited from queue managers at an earlier level.

### Routing behavior in a mixed version publish/subscribe cluster

From IBM MQ 8.0, topic host routing is available for publish/subscribe clusters. The queue manager where the object is defined, and the full repository queue managers, must be at a level that supports the topic route hosting feature, that is IBM MQ 8.0 or later. Any queue manager in the cluster that is at an earlier level does not adhere to the topic route hosting behavior.

When a clustered topic is defined for topic host routing (by setting the topic **CLROUTE** parameter to TOPICHOST ), only queue managers at the new level are aware of the clustered topic. Older queue managers do not receive the clustered topic definition and therefore behave as if the topic is not clustered. This means that all queue managers that need to work in a routed publish/subscribe manner must be at a version that supports this feature, not just the queue managers that host the routed topics.

### Important notes:

- All full repositories must be at IBM MQ 8.0 or later to use this feature. If a full repository queue manager is at an earlier version, the **CLROUTE** of TOPICHOST is not recognized by the full repository, and the full repository propagates the topic definition to all queue managers in the cluster. Any pre-IBM MQ 8.0 queue managers then use the topic as if it is defined for DIRECT routing. This behavior is unsupported.

- If an older queue manager defines a direct routed clustered topic with the same name as an existing topic host routed clustered topic, the full repositories notice the conflicting definition and do not propagate the definition.

To find out the version of each queue manager in the cluster, specify the `VERSION` parameter with the `DISPLAY CLUSQMGR` command. If you issue this command from a queue manager with a full repository, the information returned applies to every queue manager in the cluster. Otherwise the information returned applies only to the queue managers in which it has an interest. That is, every queue manager to which it has tried to send a message and every queue manager that holds a full repository.

#### ISPF operations and control panels on z/OS

When using the operations and control panels, the IBM MQ libraries you use in ISPF must be compatible with the queue manager you are working with.

[Compatibility of queue manager versions with operations and control panel versions on z/OS](#) shows which versions of the operations and controls panels you use in ISPF are compatible with which levels of queue manager.

Version	Queue sharing group containing a mixture of IBM MQ for z/OS 9.2, IBM MQ for z/OS 9.3, and IBM MQ for z/OS 9.4 queue managers.	IBM MQ for z/OS 9.4 queue manager	IBM MQ for z/OS 9.3 queue manager	IBM MQ for z/OS 9.2 queue manager
IBM MQ for z/OS 9.4 panel	Compatible	Compatible	Compatible	Compatible
IBM MQ for z/OS 9.3 panel	Not compatible	Not compatible	Compatible	Compatible
IBM MQ for z/OS 9.2 panel	Not compatible	Not compatible	Compatible	Compatible

#### Queue sharing group coexistence on z/OS

Queue managers running on IBM MQ for z/OS 9.3, or any of the 9.3.x Continuous Delivery (CD) releases, can be part of a QSG with queue managers running on IBM MQ for z/OS 9.1.0 or later. This applies to any combination of CD and Long Term Support (LTS) releases from IBM MQ for z/OS 9.1.0.

From IBM MQ for z/OS 9.3, a queue manager checks to see if the QSG contains any incompatible queue managers. If there are incompatibilities in the QSG, the queue manager fails to start up, issuing message `CSQ5005E` followed by an `X'6C6'` abend with reason code `X'F50029'`.

Compatibility with a QSG can be determined in various ways:

- From IBM MQ for z/OS 9.3, the easier way is to use the `CSQ5PQSG VERIFY` function and check for message `CSQU599I`.

This indicates whether your IBM MQ for z/OS 9.3 queue manager can be added to an existing QSG. Note that it is always better to run this utility before attempting to add a queue manager to a QSG or migrating an existing queue manager in the QSG.

- Alternatively, you can query the Db2 tables to see all the queue manager levels in a QSG. For example, use the Db2 `SPUFI` command.

See [Executing SQL by using SPUFI](#) for more information. In addition, `CSQ45STB` in `SCSQPROC` has sample JCL that you can customize to do the Db2 `SELECT` commands.

Running this command shows in the following example that you have an IBM MQ for z/OS 9.0.0 queue manager in the QSG and that therefore you cannot run IBM MQ for z/OS 9.3 in the QSG.

```
SELECT QMGRNAME,ACTSTATE,CMDLEVEL FROM CSQ.ADMIN_B_QMGR WHERE QSGNAME = 'QSG1';
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
```



QMGRNAME CMDLEVEL	ACTSTATE	
MQ01	N	925
MQ02	N	900
MQ03	N	910

## Properties of objects in a queue sharing group with queue managers at different versions on z/OS

Attributes that did not exist in earlier versions can be created and altered on queue managers of a later version in a mixed queue sharing group. The attributes are not available to queue managers in the group that are at an earlier level.

## MQSC commands in a queue sharing group with queue managers at different versions on z/OS

Existing **MQSC** commands using new keywords and attribute values can be entered for routing to a migrated queue manager. You can enter the commands on any queue manager. Route the commands using **CMDSCOPE**. Commands with new keywords and attribute values, or new commands, routed to a previous version of queue manager, fail.

### ***Application compatibility and interoperability with earlier versions of IBM MQ***

Connecting an application that is built against libraries shipped with a later version of IBM MQ to an earlier version IBM MQ is not supported. Avoid building applications against a later version, and redeploying them to a queue manager running at an earlier version, although some applications do work in practice.

IBM MQ applications do interoperate with applications running on earlier versions of IBM MQ, as long as they use no new function. IBM MQ clients can connect to queue managers running at an earlier version than the client, as long as the client uses no new functions.

An IBM MQ application that uses only functions provided by an earlier version of a queue manager can continue to send messages to the earlier version. It does not matter what version of IBM MQ an application is built on and connected to. It can exchange messages with an application connected to an earlier version of IBM MQ, as long as it does not use new function.

Consider these four cases; the first two cases are not supported though they might work in practice, the last two cases are supported. The first two cases require compatibility with an earlier version of IBM MQ. The last two cases rely on the interoperability between all versions of IBM MQ

1. Running an IBM MQ server application, built with a later version of IBM MQ, connecting to a queue manager running on a server with an earlier version of IBM MQ installed.
2. Running an IBM MQ client application, built with a later version of IBM MQ, on a client platform with an earlier client installation, connecting to a queue manager running on a server with a later version of IBM MQ installed.
3. Running an IBM MQ client application, built with a later version of IBM MQ, on a client platform with the later client installation, connecting to a queue manager running on a server with an earlier version of IBM MQ installed.
4. Exchanging messages between an IBM MQ client or server application, connected to a queue manager running on a server with a later version of IBM MQ installed, with applications connected to a queue manager running on a server with an earlier version of IBM MQ installed.

Plan to avoid the first two cases, as they are not guaranteed to work all the time. If you are running an incompatible configuration and you encounter a problem, you must rebuild your applications with the correct level of IBM MQ. You can then continue with problem diagnosis.

## Multi-installation and application loading

The loading capability of IBM MQ libraries does not relax the restriction that an application compiled and linked at a later release level must not directly load an IBM MQ library at an earlier release level. In practice, as long as the operating system loads a library at the same or later level than the library the application was compiled and linked with, IBM MQ can call any other level of IBM MQ on the same server.

For example, suppose you recompile and link an application that is to connect to an IBM MQ 9.1 queue manager using the libraries shipped with IBM MQ 9.4. At run time the operating system must load the IBM MQ 9.4 libraries for the application, even though the application connects to an IBM MQ 9.1 queue manager. IBM MQ 9.4 detects the inconsistency and loads the IBM MQ 9.1 library for the application. The same applies to any future release. If the application is recompiled and linked against a later release, then the application must load an IBM MQ library that matches the later release, even if it continues to connect to an IBM MQ 9.4 queue manager.

### Examples

1. You decide to rebuild a client application. Can you deploy it to your production environment that contains some earlier versions of client and server platforms?

The answer is no, you must upgrade all the client workstations you deploy to, at least to the version of the client you have built. The queue managers running on earlier versions of IBM MQ do not have to be upgraded. In practice all the clients are likely to work, but for maintainability you must avoid running incompatible levels of an application and the IBM MQ client.

2. You deploy some IBM MQ queue managers at a new version level. You have an existing IBM MQ application that you use to send messages between the servers. Do you rebuild the application to deploy it onto the new servers? Can you deploy the old version onto the new servers?

The answer is, either. You can continue to deploy the existing version of the application onto all your servers, or you can deploy the rebuilt application onto the new servers. Either configuration works. IBM MQ supports running the existing application on later servers and sending messages from later application versions to earlier ones. What you must not do is to rebuild the application on the later version and redeploy it onto both the earlier and newer servers. IBM MQ does not support compatibility with earlier versions.

## z/OS application stubs



The stub modules that are listed are link-edited with applications and exits.

- CSQASTUB
- CSQBRSSI
- CSQBRSTB
- CSQBSTUB
- CSQCSTUB
- CSQQSTUB
- CSQXSTUB

### ***Application compatibility and interoperability with later versions of IBM MQ***

IBM MQ applications run against later versions of a queue manager without recoding, recompiling, or relinking. You can connect an application that is built against libraries shipped with an earlier version of IBM MQ to a queue manager running at a later version of IBM MQ.

If you upgrade a queue manager to a later version, existing applications built against its earlier version work without change. Exceptions are noted in [“Changes that affect migration” on page 354](#). Likewise applications connected to the IBM MQ Client, run against later versions of the client without recoding, recompiling, or relinking. You can deploy client applications built against earlier versions of the IBM MQ Client libraries to connect using later versions of the libraries.

Consider these four cases; the first two cases are not supported though they might work in practice, the last two cases are supported. The first two cases rely on the compatibility of a later version of IBM MQ with applications built against earlier versions. The last two cases rely on the interoperability between all versions of IBM MQ.

1. Running an IBM MQ server application, built with a later version of IBM MQ, connecting to a queue manager running on a server with an earlier version of IBM MQ installed.
2. Running an IBM MQ client application, built with a later version of IBM MQ, on a client platform with an earlier client installation, connecting to a queue manager running on a server with a later version of IBM MQ installed.
3. Running an IBM MQ client application, built with a later version of IBM MQ, on a client platform with the later client installation, connecting to a queue manager running on a server with an earlier version of IBM MQ installed.
4. Exchanging messages between an IBM MQ client or server application, connected to a queue manager running on a server with a later version of IBM MQ installed, with applications connected to a queue manager running on a server with an earlier version of IBM MQ installed.

You might change the operating environment as a prerequisite of migrating to a new level of queue manager. The operating environment changes, rather than changes in IBM MQ itself, might require application change, recompilation, or relinking. Sometime the operating environment change affects only the development environment, and the operating environment supports applications built at an earlier level. In which case, you might be able to run existing applications built at the older level of the operating environment. You might not be able to build any new applications until the operating environment is upgraded.

In the future, after you have migrated queue managers and clients to the latest release level, consider changing your applications to take advantage of new capabilities.

## **z/OS application stubs**



The stub modules that are listed are link-edited with applications and exits.

- CSQASTUB
- CSQBRSSI
- CSQBRSTB
- CSQBSTUB
- CSQCSTUB
- CSQQSTUB
- CSQXSTUB

### ***Compatibility between different versions of an IBM MQ client and a queue manager***

Any supported version and release of an IBM MQ client can connect to any supported version and release of an IBM MQ queue manager. Supported IBM MQ clients are all clients included with the main MQ product. This includes IBM MQ Internet Pass-Thru (MQIPT). The MQI channel is automatically configured to the latest version that both the client and server support. If the client and server are different versions, the client application must use only the functions in the earlier version.

The compatibility between clients and queue managers applies only to the version and release (V . R) of the product. The statement of compatibility does not necessarily apply to the modification and fix pack level (M . F) of the product.

If there are known problems at a specific V . R . M . F of the product, upgrade to a more recent fix pack for the same Version . Release.

When you upgrade a queue manager to a different version, you automatically upgrade IBM MQ libraries. The libraries are used by IBM MQ client and server applications running on the same server as the

queue manager. To access new functions from remote clients, you must also upgrade the IBM MQ client installation on remote workstations. The IBM MQ client includes the IBM MQ client libraries.

Remote clients that have not been upgraded continue to work with an upgraded queue manager. In rare cases, the behavior of the client application might change. See [“Changes that affect migration” on page 354](#).

Remote clients that are connected to upgraded queue managers can use the new functions in the release. If an upgraded remote client is connected to a queue manager that has not been upgraded, it must not use new functions. In rare cases, the behavior of the client might change. See [“Changes that affect migration” on page 354](#).

You can generally assume that upgrading the IBM MQ client does not require you to recompile or relink the client application. You can also continue to use the same connection to the queue manager. If changes are required, they are identified in [“Migrating a queue manager on Windows” on page 398](#), for the particular migration path and platform you are concerned with.

The Client Channel Definition Table (CCDT) is an interface to customize the connection between an IBM MQ client and a queue manager. Entries in the tables are client connections, which are defined using a queue manager. The version of a CCDT is the version of the queue manager used to define the client connections. If an IBM MQ client uses CCDT to connect to a queue manager, the CCDT can be at a version greater than, less than, or equal to that of the client.

You can connect to a queue manager with an earlier IBM MQ client or an earlier CCDT. If you are using a CCDT, and you plan to use new client channel configuration options, such as shared conversations, you must upgrade the CCDT, and therefore the IBM MQ client installation, to the new version.

#### *MQ clients: Client Channel Definition Table (CCDT)*

You can connect a supported IBM MQ client application to any supported level of queue manager. If a client uses CCDT to connect to a queue manager, the CCDT can be at a version greater than, less than, or equal to that of the client.

When a client uses a CCDT file that was generated using a newer version of IBM MQ, only channel attributes within the CCDT that were available at the client's IBM MQ version are considered during negotiation with the queue manager. Channel attributes present in the CCDT that were added in newer versions of IBM MQ will be ignored by older clients.

## **Version of originating queue manager for a CCDT**

Before IBM MQ 9.0, clients can use a CCDT built by the same or earlier version queue manager, but there was previously a restriction on clients using a CCDT built by a later version queue manager. However, this restriction is removed in IBM MQ 9.0.

From IBM MQ 9.0, if a client uses a CCDT, it can use a CCDT built by a later version queue manager, as well as a CCDT built by the same, or earlier version of queue manager.

The same restriction on the use of CCDTs originating from later version queue managers is also removed in IBM MQ 8.0, and earlier versions, by APARs IT10863 and IT11547. for more information, see the technote [MQ 7.x, MQ 8.0, MQ 9.0, MQ 9.1, MQ9.2, and MQ9.3 compatibility with previous versions - including usage of CCDT files, JMS .bindings, SSL/TLS](#).

## **Common migration scenarios**

If, for example, you upgrade a queue manager from an earlier release to a later release, and you do not create new CCDTs for its clients, the clients connect to the later release queue manager without any changes being required. Client behavior might change as a result of changes to the queue manager.

Another common migration scenario is to update some queue managers and some clients to a later release, leaving other queue managers and clients at the earlier release. In this scenario, you want to update the CCDT for the IBM MQ clients to the same release as the queue managers to which they connect, so that those clients can fully use the function in the later release. The new clients can also connect to the earlier release queue managers. Existing clients connect to queue managers in both

releases. In order that the clients in the later release can use the new function in that release, you must deploy a CCDT that has been generated by a queue manager in that new release. Clients in the earlier release can continue to use the CCDT for that earlier release. Both sets of clients can connect to both sets of queue managers, regardless of the CCDT they are using.

### Related concepts

[Client channel definition table](#)

[Web addressable access to the client channel definition table](#)

### Related tasks

[Accessing client-connection channel definitions](#)

*MQ clients: Client configuration stanzas moved into a different configuration file*

Client configuration information is moved from existing configuration stanzas into a new configuration file, `mqclient.ini`.

Moving client configuration information affects existing settings. For example:

- Set the TCP KeepAlive attribute for client connections in `mqclient.ini`. For example:

```
TCP:
KeepAlive = Yes
```


An existing setting in `qm.ini` is ignored.

- Set ClientExitPath in `mqclient.ini`. For example:

```
ClientExitPath:
ExitsDefaultPath=/var/mqm/exits
ExitsDefaultPath64=/var/mqm/exits64
```

An existing setting in `mqs.ini` is moved to the client configuration file when you upgrade the client. If you add values to `mqs.ini`, they are ignored.

- Set JavaExitsClasspath in `mqclient.ini`.

 Do not continue to use the Java system property `com.ibm.mq.exitClasspath`. Existing settings continue to work, but they are deprecated. The setting in `mqclient.ini` has precedence over the Java system property.

See [Location of the client configuration file](#) for information on the possible locations of this file.

### Related tasks

[Assigning channel exits for IBM MQ classes for JMS](#)

[IBM MQ MQI client configuration file, mqclient.ini](#)

### Related reference

[The IBM MQ classes for JMS configuration file](#)

*Supported IBM MQ client: Default behavior of client-connection and server-connection channels*

The default for client and server connections is to share an MQI channel. You use the **SHARECNV** (share conversations) parameter to specify the maximum number of conversations that can be shared over a particular TCP/IP client channel instance.

The possible values are as follows:

#### **SHARECNV(2) to SHARECNV(99999999)**

Each of these values specifies the number of shared conversations. If the client-connection **SHARECNV** value does not match the server-connection **SHARECNV** value, then the lowest value is used. The default value is `SHARECNV(10)`, which specifies 10 threads to run up to 10 client conversations per channel instance. However, on distributed servers there are performance issues with `SHARECNV` channels that can be eased by using `SHARECNV(1)`. See [Tuning client and server connection channels](#).

## **SHARECNV(1)**

This value specifies no sharing of conversations over a TCP/IP socket. Performance on distributed servers is similar to that for a value of 0. Client heartbeating (whether in an MQGET call or not) and read ahead are available, and channel quiescing is more controllable.

## **SHARECNV(0)**

This value specifies no sharing of conversations over a TCP/IP socket. Only use a value of 0 if you have existing client applications that do not run correctly when you set **SHARECNV** to 1 or greater.

For all **SHARECNV** values of 1 or greater, the channel supports the following features:

- Bi-directional heartbeats
- Administrator stop-quiesce
- Read-ahead
- Asynchronous-consume by client applications

## **Heartbeats**

Heartbeats can flow across the channel at any time in either direction. If you use **SHARECNV(0)**, heartbeats flow only when an MQGET call is waiting.

## **Channel exits**

The behavior of a client or server connection channel exit changes when the channel is sharing conversations (that is, when you set **SHARECNV** to a value greater than 1). It is unlikely, but possible, that the change affects the behavior of existing exits. The change is as follows:

- Send or receive exits can alter the MQCD structure on an MQXR\_INIT call. The effect of these exits differs, depending on whether the conversation is shared with other conversations on the same channel:
  - If the MQCXP SharingConversations field passed to the exit instance is set to FALSE, this exit instance is the first, or only, conversation on the channel instance. No other exit can be changing the MQCD at the same time, and changes that are made to the MQCD can affect the way that the channel runs.
  - If the MQCXP SharingConversations field passed to the exit instance is set to TRUE, this exit instance is a subsequent conversation. It is sharing the channel instance with other conversations. Changes made to the MQCD in the exit instance are retained in the MQCD but do not affect the way the channel runs.
- Send, receive, and security exit instances can alter the MQCD, when the MQCXP SharingConversations field is set to TRUE. Exit instances on other conversations might be changing the MQCD at the same time. Updates written by one exit instance can be overwritten by another instance. It might be necessary to serialize access to the MQCD across these different exit instances to maintain the consistency of fields in MQCD.

Updating MQCD when the SharingConversations field is set to TRUE does not affect the way the channel runs. Only alterations made when the MQCXP SharingConversations field is set to FALSE, on an MQXR\_INIT call, change channel behavior.

### **Related concepts**

[Channel-exit programs for MQI channels](#)

### **Related tasks**

[Using sharing conversations](#)

[Using read ahead](#)

[Stopping MQI channels](#)

[Tuning client and server connection channels](#)

### **Related reference**

[HeartbeatInterval \(MQLONG\)](#)

[SharingConversations \(MQLONG\)](#)

[ALTER CHANNEL](#)

[The Asynchronous consume sample program](#)

### **GSKit version compatibility**

The stash files that you generate with IBM MQ 9.0.0 Fix Pack 1, or later must be compatible with any applications and other IBM MQ installations.

For the version of IBM Global Security Kit (GSKit) for IBM MQ 9.0.0 Fix Pack 1 or later, the stash file format that is used when you generate an `.sth` file to stash the key database password is different from earlier versions of GSKit. Stash files that are generated with this version of GSKit are not readable by earlier versions of GSKit. To ensure that stash files that are generated with IBM MQ 9.0.0 Fix Pack 1, or later, are compatible with your applications and other IBM MQ installations, you must update to a version of IBM MQ that contains a compatible version of GSKit. The following fix packs contain a compatible version of GSKit:

- 7.5.0.8
- 8.0.0.6
- 9.0.0.1

If you cannot update your applications or other IBM MQ installations, you can create a stash file that is compatible with an earlier version with the `runmqakm` command. Specify the `-v1stash` parameter when the `runmqakm` command is run with the `-stash` or `-stashpw` parameter to create a stash file that is compatible with earlier versions of IBM MQ.

## **Migrating from one Continuous Delivery release to another**


An overview of how you migrate from one Continuous Delivery (CD) release to another.

### **Before you begin**

If you want to migrate replicated data queue managers, follow the instructions in [“Migrating replicated data queue managers”](#) on page 497.

1. Back up your existing IBM MQ environment. This is required in case you need to revert to your current CD release of IBM MQ.

**Important:** Once the new installation is started, all of the existing IBM MQ objects will be migrated to the new modification level. If you do not back up your system, you cannot revert the objects to their previous level without completely uninstalling, and restoring a backup you made before you carried out the migration.


 Copy the `qm.ini` file and the registry entries.

For more information about backing up your system, see [Backing up and restoring IBM MQ queue manager data](#).

2. Use the `dmpmqcfg` command to save the current configuration details to a text file.

### **Procedure**

1. Stop all of the IBM MQ processes for the installation being migrated.
2. Upgrade the existing CD installation by using one of the following methods:

-   On Windows and AIX, upgrade IBM MQ by installing the new CD installation in the same location as the existing installation.

For more information about upgrading your CD installation on Windows, see [“Upgrading an IBM MQ installation on Windows”](#) on page 349.

For more information about upgrading your CD installation on AIX, see [“Installing IBM MQ server on AIX”](#) on page 43.

- ▶ **Linux** On Linux, if your existing CD installation is at IBM MQ 9.2.1 or later, you can upgrade IBM MQ by installing the new CD installation in the same location as the existing installation.

For more information about upgrading your CD installation on Linux, see [“Upgrading an IBM MQ installation on Linux”](#) on page 338.

- Uninstall the existing CD installation and then install the new CD modification level onto the same system.

Note that uninstalling the existing installation does not remove the object definitions from the system. The object definitions remain in place.

### 3. Start the queue manager.

```
stmqm QmgrName
```

When you first start a queue manager after migration to the new CD level:

- Any new attributes for existing objects are set to their default values.
- Any new default objects are created.
- Queue manager objects are migrated to the new modification level.

**Note:** If you have saved your current configuration details in a text file, that file can be used to duplicate these objects in the newly created queue manager after it has been created, if you installed the new version onto a different system.

See the [runmqsc](#) command for instructions on how you can do this.

#### Related concepts



[IBM MQ release types and versioning](#)

## Windows Migrating IBM MQ on Windows

IBM MQ migration tasks associated with Windows platforms are grouped in this section.

### Before you begin

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

**Important:**   From IBM MQ 9.4.0, AMQP channels no longer support CMS key repository files. If you are migrating a queue manager with an AMQP configuration to IBM MQ 9.4.0 or later, and your queue manager is currently configured with a CMS keystore, you must convert it to PKCS12 format before proceeding with the migration. For more information on how to perform this conversion, see [SSL/TLS support in Securing AMQP Clients](#).

### About this task

This topic lists the various steps you need to take to migrate to, or migrate from, the latest version of the IBM MQ product.

See also [“Migrating from one Continuous Delivery release to another”](#) on page 391, if you are migrating a Continuous Delivery release of the product.

### Procedure

- For information about creating a migration plan, see [“Planning to migrate IBM MQ to a later version on Windows”](#) on page 393.



- For information about migrating a queue manager from an earlier version to the latest version, see [“Migrating a queue manager to a later version on Windows”](#) on page 398.
- For information about reverting a queue manager to an earlier version, see [“Reverting a queue manager to an earlier version on Windows”](#) on page 413.
- For information about migrating an IBM MQ MQI client to the latest version, see [“Migrating an IBM MQ MQI client to a later version on Windows”](#) on page 415.
- For information about converting a single instance queue manager to a multi-instance queue manager, see [Converting a single instance to a multi-instance queue manager on Windows](#).
- For information about reverting a multi-instance queue manager to a single instance queue manager, see [Reverting to a single-instance queue manager on Windows](#).
- For information about migrating IBM MQ library loading to the latest version, see [“Migrating IBM MQ library loading to a later version on Windows”](#) on page 416.
- For information about migrating MQ Telemetry to the latest version, see [“Migrating MQ Telemetry on Windows”](#) on page 420.
- For information about migrating an MSCS configuration to the latest version, see [“Migrating an MSCS configuration on Windows”](#) on page 421.
- For information about Migrating logs to an Advanced Format disk, see [“Migrating logs to an Advanced Format disk on Windows”](#) on page 423.

### Related concepts

[“Migration concepts and methods”](#) on page 357

An overview of the various concepts and methods for migrating from one release of the product to another.

### Related tasks

[“Migrating IBM MQ on AIX and Linux”](#) on page 424

Migration tasks associated with AIX and Linux platforms are grouped in this section.

[“Migrating IBM MQ on IBM i”](#) on page 449

IBM MQ migration tasks associated with IBM i are grouped in this section.

[“Migrating IBM MQ on z/OS”](#) on page 471

Migration tasks associated with z/OS are grouped in this section.

### Related reference

[“Changes that affect migration”](#) on page 354

## **Windows** *Planning to migrate IBM MQ to a later version on Windows*

Before migrating IBM MQ to a later version on Windows, review the system requirements information, and the information about any changes that might affect migration, then create a migration plan.

### Before you begin

If there are concepts about migration you do not understand, see [“Migration concepts and methods”](#) on page 357.

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

### About this task

Use the following steps as a guide to creating a migration plan.

### Procedure

1. Review the IBM MQ system requirements for the later version of the product.

See [System Requirements for IBM MQ](#). See [“IBM MQ components and features”](#) on page 6 and [“Where to find downloadable installation images”](#) on page 10.

2. Decide whether to run the earlier version and the later version of the product on the same server, and also which migration method you want to use.

Choices are single-stage migration, side-by-side migration, or multi-stage migration. See [“Migration methods on IBM MQ for Multiplatforms”](#) on page 365.

3. Review all the changes in IBM MQ that affect you.

See [“Changes that affect migration”](#) on page 354.

4. Review performance changes.

See [MQ Performance documents](#).

5. Review the readme file for the later version of IBM MQ.

See [IBM MQ, WebSphere MQ, and MQSeries product readmes](#).

6. Plan the sequence and timing of queue manager migrations.

- If the queue manager is part of a queue manager cluster, you must migrate the queue managers that are full repositories first.
- If the queue manager is part of a high availability cluster, plan the migration to minimize downtime and maximize availability; see [“Migrating a queue manager in a high-availability configuration”](#) on page 494.

7. Plan to migrate your queue manager to the later version.

See [“Migrating a queue manager to a later version on Windows”](#) on page 398.

Backing up queue manager data is part of the queue manager migration task. An alternative approach is to install and configure a new server, then test the later version with a new queue manager on the new server. When you are ready to go into production on the later version, copy the queue manager configuration and data to the new server.

8. Plan to update any manual or automated procedures you have written with changes to messages and codes.

A suffix letter, indicating the severity of a message (I, W, E, S or T) is appended to IBM MQ diagnostic (AMQ) messages. Existing scripts looking for error codes without the severity will fail. For example, existing scripts looking for error matching to AMQ7468 will fail. You must update the scripts to look for error codes with the severity suffix added (for example, AMQ7468I). For more information, see [IBM MQ messages on Multiplatforms](#).

9. Decide on what regression tests to perform before putting the queue manager into production on the later version. Include in your regression tests the procedures and applications you identified in previous steps.

10. Plan to migrate your IBM MQ MQI client installations to the later version.

11. Plan to migrate your client and server applications to use new functions in the later version.

12. Decide which downloadable images you require for the migration.

For more information, see [“Where to find downloadable installation images”](#) on page 10.

#### **Windows** *Migration considerations for IBM MQ 8.0 or later on Windows*

From IBM MQ 8.0, a number of changes were made for IBM MQ for Windows. You must understand these changes before planning any migration tasks for IBM MQ 8.0 or later on Windows.

## **Installing a single copy of the product**

If you have an existing previous version of the product on your system, and want to upgrade to the latest version, you have various options. You can either:

- Uninstall the previous version and then install the latest version,

- Install the new copy alongside the currently installed one and uninstall the original at a later time. See [“Installing the product alongside an existing version”](#) on page 395, or
- Perform a migration installation, electing to replace the currently installed version when prompted.

After you have installed the product, start each queue manager and its data migration takes place. This includes the migration of queue managers from 32-bit to 64-bit.

## Installing the product alongside an existing version

If you want to install another version of the product alongside your existing product you can do so. See [“Multiple IBM MQ installations”](#) on page 370 and [“Migrating on Windows: side-by-side”](#) on page 406 for further information.

When you install the new version of the product, run the `setmqm` command to associate the queue managers with the new installation.

Start each queue manager in turn and its data migration takes place.

## Upgrading one of a pair of (or more) installations

If you already have, for example, an IBM MQ 8.0 installation and an IBM MQ 9.0 installation on a machine, upgrading the IBM MQ 8.0 installation to IBM MQ 9.0 requires the following additional step.

When you start the IBM MQ 9.0 installer, you are asked whether you want to **Install a new instance** or **Maintain or upgrade an existing instance**.

However, only the other IBM MQ 9.0 installation, or installations, are displayed; not the IBM MQ 8.0 installation in the selection box. At this point, select **Install a new instance**.

After the splash screen has been displayed, a second panel appears, which lists any older installations that you can upgrade to IBM MQ 9.0 using the IBM MQ 9.0 installer.

On this panel, select **Upgrade 8.0.0.n Installation 'Installation m'**, then click **Next**.

## Change of digital signature algorithm

The IBM MQ programs and installation image are digitally signed on Windows to confirm that they are genuine and unmodified.

In older releases before IBM MQ 8.0, the product was signed using the SHA-1 with RSA algorithm.

From IBM MQ 8.0, the SHA-256 with RSA algorithm is used. Some older versions of Windows do not support the new digital signature algorithm, but those versions are not supported by IBM MQ 8.0 or later.

See [“Hardware and software requirements on Windows systems”](#) on page 169, and ensure that you install IBM MQ 8.0 or later on a supported version of Windows.

## Existing applications

All applications that were built with previous versions of the product continue to work in IBM MQ 8.0 or later with a 64 bit queue manager.

All applications using the C++ object interface need to be rebuilt; applications using the C interface are not affected.

## Exits

Queue manager exits on Windows 64-bit operating systems must be compiled as 64-bit exits. Any 32-bit queue manager exits must be recompiled before they can be used with a 64-bit queue manager. If you try to use a 32-bit exit with a 64-bit queue manager on IBM MQ 8.0 or later, an AMQ9535 "invalid exit" error message is issued.

## Clients

32-bit client applications can connect transparently to queue managers from all supported versions of the product. This includes 64-bit IBM MQ 8.0 or later.

## Samples

From IBM MQ 8.0, the samples for the C and C++ languages are compiled as 64-bit.

### Related concepts

[“Hardware and software requirements on Windows systems” on page 169](#)

Check that the server environment meets the prerequisites for installing IBM MQ for Windows and install any prerequisite software that is missing from your system.

### Related reference

[Windows: changes from IBM MQ 8.0](#)

[Directory structure on Windows systems](#)

**Windows** *Program and data directory locations on Windows*

The installation location for IBM MQ program binary and data files on Windows depends on the IBM MQ version you are installing, and whether this is the first time IBM MQ is being installed.

## Windows program directory security permissions

**Windows**

From IBM MQ 9.1.0 Fix Pack 2 and IBM MQ 9.1.2, the IBM MQ installer on Windows sets additional permission restrictions as part of the security configuration of the MQ installation directories. The logic that does this is run at installation, upgrade, modification, and fix pack installation time.

You might find that, due to the increased security, you are unable to do certain things exactly the same way you used to do them. For example:

- An MQ Administrator (who is not also a member of the Administrators group) can no longer edit or recompile the sample programs in the Tools subdirectory. If you wish to do this, take a copy of the directory (or the portions you are interested in) and change your copies of the build scripts to reflect the new location.

In normal use, however, you should be unaware of the change, except for the little extra time required by the installer to make the changes. During this period the message `Initializing security...` will be displayed. A similar short pause will occur when installing the fix pack files or applying a patch.

The update of the security writes a log (`amqidsec-<Installationname>.txt`) to the TEMP directory on the machine. If you see the main install failing in custom action 'iwiLaunchAmqidsec', you should consult this file.

## First-time installations

When you install IBM MQ for the first time, you can accept default installation locations. You can also select the custom installation option by choosing the location for the IBM MQ binary files, and the location for the IBM MQ data and logs.

From IBM MQ 8.0, the default location for the program binary files is different from the default location for the data files.

IBM MQ version	IBM MQ program binary files installation location	IBM MQ data files location
IBM WebSphere MQ 7.5	Program and data files are in one location: C:\Program Files (x86)\IBM\WebSphere MQ	

Table 41. Default program and data directory locations on different versions of IBM MQ on Windows (continued)

IBM MQ version	IBM MQ program binary files installation location	IBM MQ data files location
IBM MQ 8.0	C:\Program Files\IBM\WebSphere MQ	C:\ProgramData\IBM\MQ
IBM MQ 9.0 and later	C:\Program Files\IBM\MQ	C:\ProgramData\IBM\MQ

## Subsequent installations and reinstallations

After the data directory is specified, during the installation process of any installation, it cannot be changed for subsequent installations. IBM MQ is only installed as a 64-bit version when it is installed on a 64-bit operating system.

For IBM MQ 9.0 and later, the default data directory is C:\ProgramData\IBM\MQ, unless a version of the product was previously installed, in which case the new installation continues to use the existing data directory.

## Existing IBM MQ 9.0 installation

The default program and data directory locations are the same for IBM MQ 9.0 and later versions. Therefore you do not need to change the specification of the program and data directories when upgrading from IBM MQ 9.0 to a later version.

## Existing IBM MQ 8.0 installation

Three upgrade paths are possible:

- Uninstall IBM MQ 8.0 first and then install IBM MQ 9.0 or later.
- Upgrade IBM MQ 8.0 at the beginning of the IBM MQ 9.0 or later installation process, without first uninstalling the earlier version.
- Install IBM MQ 9.0 or later alongside IBM MQ 8.0 and then uninstall IBM MQ 8.0.

When IBM MQ 8.0 is installed, the product binary files are put by default into C:\Program Files\IBM\WebSphere MQ and the product data and logs are put by default into C:\ProgramData\IBM\MQ.

When you uninstall IBM MQ 8.0, information about the location of the data directory is left in the registry. After uninstalling IBM MQ 8.0 and before installing IBM MQ 9.0 or later, you can run the `ResetMQ.cmd` script to tidy up files and data left behind by the uninstallation process.

**Important:** You should use this script with caution. `ResetMQ.cmd` can remove the existing queue manager configuration. For more information, see [Clearing IBM MQ installation settings](#).

### Installing IBM MQ 9.0 or later after uninstalling IBM MQ 8.0

After uninstalling IBM MQ 8.0, IBM MQ 9.0 or later is installed using the same installation name but using the IBM MQ 9.0 and later default program binary files location C:\Program Files\IBM\MQ. That is, the program files change location after the upgrade.

**Optional:** You can use the custom installation option to modify the installation path, including modifying it back to C:\Program Files (x86)\IBM\WebSphere MQ.

The default data path is C:\ProgramData\IBM\MQ.

### Upgrading IBM MQ 8.0 at the beginning of the IBM MQ 9.0 or later installation process

If you install IBM MQ 9.0 or later without uninstalling IBM MQ 8.0 and choose to upgrade the IBM MQ 8.0 installation, the new program binary files replace the IBM MQ 8.0 binary files so, by default, the new binary files are in C:\Program Files (x86)\IBM\WebSphere MQ. The existing data path is kept so, by default, the data path is C:\ProgramData\IBM\MQ.

## Installing IBM MQ 9.0 or later to coexist with IBM MQ 8.0

If you install IBM MQ 9.0 or later alongside IBM MQ 8.0, a unique path is chosen, which by default is C:\Program Files\IBM\MQ. The existing data path is kept so, by default, the data path is C:\ProgramData\IBM\MQ.

## Existing IBM WebSphere MQ 7.5 or IBM WebSphere MQ 7.1 installation

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

For IBM WebSphere MQ 7.5 or IBM WebSphere MQ 7.1, the interim version you use can be either IBM MQ 9.0 or IBM MQ 8.0. For information about specifying program and data directories when upgrading, see either of the following topics:

- [Program and data directory locations on Windows](#) in the IBM MQ 9.0 product documentation.
- [Windows: Program and data directory locations](#) in the IBM MQ 8.0 product documentation.

### Related concepts

[“Migration concepts and methods” on page 357](#)

An overview of the various concepts and methods for migrating from one release of the product to another.

[“Hardware and software requirements on Windows systems” on page 169](#)

Check that the server environment meets the prerequisites for installing IBM MQ for Windows and install any prerequisite software that is missing from your system.

### Related information

[Clearing IBM MQ installation settings](#)

## **Windows** *Migrating a queue manager on Windows*

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

### Related tasks

[“Migrating a queue manager on AIX and Linux” on page 426](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating a queue manager to the latest version on IBM i” on page 452](#)

Follow these instructions to migrate a queue manager on IBM i to the latest MQ version.

[“Migrating IBM MQ on z/OS” on page 471](#)

Migration tasks associated with z/OS are grouped in this section.

## **Windows** *Migrating a queue manager to a later version on Windows*

On Windows platforms, follow these instructions to migrate a queue manager from an earlier version to a later version of IBM MQ.

## Before you begin

If you have installed early support program code on the server, you must delete all the queue managers created with the installation. Uninstall the code before proceeding with installing the production level code.

1. Create a migration plan; see [“Planning to migrate IBM MQ to a later version on Windows” on page 393](#).
2. Review the IBM MQ system requirements for the latest version, including information about the versions of Windows that IBM MQ supports. See [System Requirements for IBM MQ](#).
3. Back up your system before you install a later version of IBM MQ over an earlier version. Once you have started a queue manager you cannot revert to the previous version. If you must restore the system, you cannot recover any work, such as changes to messages and objects, performed by the

later version of IBM MQ. For more information about backing up your system, see [Backing up and restoring IBM MQ queue manager data](#).

4. Review any other installed SupportPacs for their applicability to the later version.
5. If you are running on a server with multiple IBM MQ installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

## About this task

To run a command, the operating system must find the command in an IBM MQ installation. For some commands, you must run the command from the installation that is associated with the correct queue manager. IBM MQ does not switch commands to the correct installation. For other commands, such as **setmqinst**, you can run the command from any installation that has the later version of the product installed.

If an earlier version of the product is installed, the command that is run is the command for that version, unless the search path is overridden by a local setting. You can override the search path by running **setmqenv**. You must set the correct path to run a command. If you have set a primary installation, the command that is run is the copy in the primary installation, unless you override the selection with a local search path.

## Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

3. End all the activity of queue managers associated with the IBM MQ installation.
  - a) Run the **dspmqs** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmqs -o installation -o status
dspmqs -a
```

**dspmqs -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

**dspmqs -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.

→ **endmqm** { **-c**  
          **-w**  
          **-i**  
          **-p** } *QmgrName* →

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If



they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “Applying maintenance level updates to multi-instance queue managers on Windows” on page 331 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

d) Stop any listeners associated with the queue managers, using the command:

```
endmq1sr -m QMgrName
```

4. Back up the queue manager.

Take copies of all the queue manager's data and log file directories, including all subdirectories, and also the `qm.ini` file and the registry entries. For more information, see [Backing up and restoring IBM MQ queue manager data](#).

5. Stop the IBM MQ Service and exit the Service icon application.

6. Optional: If you are doing a single stage migration, optionally uninstall the current version of the product.

Note, that you carry out this step only if you are doing a single stage migration; see “[Migrating on Windows: single stage](#)” on page 401.

7. Install the later version of IBM MQ.

On Windows, you can do this either by using the Installation Launchpad or by using the **msiexec** command. For more information, see:

- “[Modifying a server installation using the Installation Launchpad](#)” on page 202
- “[Modifying a server installation silently using msiexec](#)” on page 203

8. Reenter domain, user ID, and password information

When the installation of the latest version completes, the Prepare IBM MQ Wizard starts automatically.

**Where UAC is enabled:** If you rerun the Prepare IBM MQ Wizard, ensure that the wizard is run with Administrator privilege, otherwise the wizard might fail.

9. Start the queue manager.

```
startmqm QmgrName
```

When you first start a queue manager after migration:

- Any new attributes for existing objects are set to their default values.
- Any new default objects are created.
- Queue manager data is migrated.

**Important:** Do not use the `-c` option to start the queue manager, unless you explicitly want to reset or re-create the default system objects.

You must start IBM MQ before you start any listeners.



## What to do next

Complete the tasks in your migration plan, such as verifying the new code level and deploying new functions such as automatically restarting client connections.

If you are using publish/subscribe, you must migrate the publish/subscribe broker.

If the queue manager is a member of a queue manager cluster, migrate the other members of the cluster.

**Important:** You must migrate the publish/subscribe broker state before you migrate your IBM MQ system to IBM MQ 8.0 or later, because broker publish/subscribe migration is not supported in IBM MQ 8.0, or later.

### Related concepts

[“Where to find downloadable installation images” on page 10](#)

You download installation images for IBM MQ from Passport Advantage, Fix Central, or (for z/OS systems) the ShopZ website. A number of IBM MQ components including fix packs, CSUs, clients, and the resource adapter are also available for downloading from Fix Central and elsewhere.

[“Queue manager migration” on page 361](#)

After upgrading an installation, queue manager migration might be required. Migration takes place when you start a queue manager. You can remove an upgrade before you have started a queue manager. However, if you remove the upgrade after a queue manager has been started, the queue manager will not work.

### Related tasks

[“Configuring IBM MQ with the Prepare IBM MQ Wizard” on page 195](#)

The Prepare IBM MQ Wizard helps you to configure IBM MQ with a user account for your network. You must run the wizard to configure the IBM MQ Service before you can start any queue managers.

[“Migrating a queue manager in a high-availability configuration” on page 494](#)

High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

[“Migrating a queue manager cluster” on page 487](#)

You can migrate queue managers in a cluster all at once, or one at a time, which is called a staged migration. Migrate full repository queue managers in a cluster before partial repository queue managers. You must consider what the effect is of migrating some queue managers in a cluster, before all the queue managers are migrated.

[“Maintaining and migrating IBM MQ” on page 290](#)

Maintenance, upgrade, and migration have three distinct meanings for IBM MQ. The definitions are described here. The following sections describe the various concepts associated with migration, followed by the various tasks needed; these tasks are platform-specific where needed.

[“Migrating IBM MQ” on page 353](#)


Migration is the conversion of programs and data to work with a new code level of IBM MQ. Some types of migration are required, and some are optional. Queue manager migration is never required after applying a maintenance level update, that does not change the command level. Some types of migration are automatic, and some are manual. Queue manager migration is typically automatic and required after releases and manual and optional after a maintenance level upgrade that introduces a new function. Application migration is typically manual and optional.

[“Upgrading IBM MQ” on page 337](#)

Upgrading is the process of taking an existing IBM MQ installation and upgrading to a new level of code.

### Related information

[IBM MQ - SupportPacs by Product](#)

 [Migrating on Windows: single stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later version of the product. Single stage migration is also known as *upgrading in place* or *in place*

*upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

## Before you begin

These topics guide you in deciding what other tasks you must perform to migrate queue managers and applications to the later version. For the precise sequence of commands to upgrade a queue manager to the later version, do the migration task for the platform you are interested in. All the tasks are listed by platform in the links at the end of this topic. As part of the queue manager migration task, back up your existing queue manager data. Even on a multi-installation server, queue managers cannot be restored to a previous command level after migration.



**Attention:** From IBM MQ 9.0, the `ccsid_part2.tbl` file replaces the existing `ccsid.tbl` file, used in previous versions of the product, to supply additional CCSID information.

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

-  Linux - all versions
-  Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

You should copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

## About this task

In the single-stage migration scenario, the installation of the later version of the product replaces an earlier version in the same installation location.

The advantage of single-stage migration is that it changes the configuration of a queue manager on the earlier version as little as possible. Existing applications switch from loading the libraries from the earlier version, to loading the libraries of the later version, automatically. Queue managers are automatically associated with the installation on the later version. Administrative scripts and procedures are affected as little as possible by setting the installation to be the primary installation. If you set the installation of the later version to be the primary installation, commands such as `strmqm` work without providing an explicit path to the command.

When you upgrade the earlier version to the later version, all the objects that you previously created are maintained. The components that were previously installed are preselected in the feature options when you install the new level. If you leave these components selected, you can keep them or reinstall them. If you clear any of these components, the installation process uninstalls them. By default, a typical migration installs only the same features that were installed in the previous version installation.

For example, if IBM MQ Explorer was not installed in an earlier installation, it is not stored in a later installation. If you want IBM MQ Explorer, select a custom installation, and select the IBM MQ Explorer feature on the **Features** panel. If you do not want IBM MQ Explorer, uninstall the IBM MQ Explorer feature by selecting a custom installation. Then clear the IBM MQ Explorer feature on the **Features** panel. For more information about how to uninstall features, see [“Modifying a server installation using the Installation Launchpad” on page 202](#).

You can also migrate a queue manager to a later version of the product on a system where an earlier version has been uninstalled. In this case, the queue manager data must have been retained, or restored from a backup.

## Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

3. End all the activity of queue managers associated with the IBM MQ installation.
  - a) Run the **dspmq** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmq -o installation -o status
dspmq -a
```

**dspmq -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

**dspmq -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.

```
endmqm { -c, -w, -i, -p } QmgrName →
```

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “Applying maintenance level updates to multi-instance queue managers on Windows” on page 331 describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- d) Stop any listeners associated with the queue managers, using the command:

```
endmq1sr -m QMgrName
```

4. Back up the queue manager.

Take copies of all the queue manager's data and log file directories, including all subdirectories, and also the `qm.ini` file and the registry entries. For more information, see [Backing up and restoring IBM MQ queue manager data](#).

5. Stop the IBM MQ Service and exit the Service icon application.

6. Optional: Optionally uninstall the current version of the product.

7. Upgrade the earlier version of the product to the later version in the same installation directory.

A reason for installing into the same location is to simplify application migration. If you change the installation location, you might remove IBM MQ libraries from an application search path. To migrate an application search path you must modify the application environment, or more rarely, the application itself.

- a) Decide on an installation naming convention. Give the installation a name of your choosing, or accept the default installation name.

For the first installation, the default name is *Installation1*. For the second installation, the name is *Installation2*, and so on.

- b) Upgrade the earlier version of the product to the later version in place, or uninstall the earlier version, without deleting any queue managers, and install the later version in the same default location.

On Windows, you can do this either by using the Installation Launchpad or by using the **msiexec** command. For more information, see:

- [“Upgrading an IBM MQ server installation using the Launchpad” on page 349](#)
- [“Upgrading an IBM MQ server installation using msiexec” on page 350](#)

On Windows, uninstalling the previous version of the product before you install the later version is optional.

8. Reenter domain, user ID, and password information

When the installation of the latest version completes, the Prepare IBM MQ Wizard starts automatically.

**Where UAC is enabled:** If you rerun the Prepare IBM MQ Wizard, ensure that the wizard is run with Administrator privilege, otherwise the wizard might fail.

9. Optional: Make the later version of the installation the primary installation.

- a) Run the **setmqinst** command

```
"Inst_1_INSTALLATION_PATH\bin\setmqinst" -i -n Inst_1
```

Make the installation primary to avoid specifying a search path to run IBM MQ commands

10. Start the queue managers and applications.

- a) Run the **setmqm** command to associate the queue managers with `Inst_1`.

```
setmqm -m QM1 -n Inst_1  
setmqm -m QM2 -n Inst_1
```

If you are migrating between any releases of the product, you must use **setmqm** to associate the queue managers with the new installation manually.

- b) Run the **strmqm** command to start the queue managers and migrate them to the later version of the product.

```
stimqm QM1
stimqm QM2
```

You must start IBM MQ before you start any listeners.

When you first start a queue manager after migration:

- Any new attributes for existing objects are set to their default values.
- Any new default objects are created.
- Queue manager data is migrated.

At this point, when the queue manager data is migrated, you cannot revert to a previous release.

**Important:** Do not use the `-c` option to start the queue manager, unless you explicitly want to reset or re-create the default system objects.

- When an application connects to a queue manager, the operating system searches its load path to load the IBM MQ library <sup>2</sup>An IBM MQ library contains code that checks that the queue manager is associated with an installation. If a queue manager is associated with a different installation, IBM MQ loads the correct IBM MQ library for the installation the queue manager is associated with.

## What to do next

You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

### Related concepts

[“Migrating a queue manager to a later version on AIX and Linux” on page 426](#)

On AIX and Linux, you can migrate a queue manager from an earlier version to a later version of IBM MQ in one of three ways: single-stage, side-by-side, or multi-stage.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

[Windows Migrating on Windows: side-by-side](#)

[Windows Migrating on Windows: multi-stage](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Migrating a queue manager to a later version on Windows” on page 398](#)

On Windows platforms, follow these instructions to migrate a queue manager from an earlier version to a later version of IBM MQ.

[“Configuring IBM MQ with the Prepare IBM MQ Wizard” on page 195](#)

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<sup>2</sup> On Windows, the IBM MQ library is a DLL. A DLL is sometimes called a load library or a shared library. The entry points to a DLL are defined in a link library, with the file extension `.lib32` or `.lib`. The `.lib` library is linked at build-time and the DLL loaded at runtime.

The Prepare IBM MQ Wizard helps you to configure IBM MQ with a user account for your network. You must run the wizard to configure the IBM MQ Service before you can start any queue managers.

[“Installing IBM MQ server on Windows” on page 177](#)

On Windows, IBM MQ is installed by using the Microsoft Installer (MSI). You can either use the Installation Launchpad to invoke MSI or alternatively, you can invoke MSI directly.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

### **Windows** *Migrating on Windows: side-by-side*

Side-by-side migration is the term used to describe installing a later version of IBM MQ alongside an earlier version on the same server. Queue managers remain running during the installation and verification of the later version of IBM MQ. They remain associated with the earlier version of IBM MQ. When you decide to migrate queue managers to the later version of IBM MQ, you stop all queue managers, uninstall the earlier version, and migrate them all to the new version of IBM MQ.

## Before you begin

From IBM MQ 9.0, the `ccsid_part2.tbl` file replaces the existing `ccsid.tbl` file, used in previous versions of the product, to supply additional CCSID information.



### Attention:

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

- **Linux** Linux - all versions
- **Windows** Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

Copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

## About this task

In the side-by-side migration scenario, you install the later version of IBM MQ alongside queue managers that continue to be associated with the installation of the earlier version of the product.

When you are ready to migrate the queue managers, and applications, to the later version:

1. Stop all the queue managers.
2. Uninstall the earlier version of the product.
3. Migrate all the queue managers and applications to the later version.

## Procedure

1. Install the later version in a different installation directory from the earlier version.

- a) Decide on an installation naming convention. Give the installation a name of your choosing, or accept the default installation name.

For the first installation, the default name is *Installation1*. For the second installation, the name is *Installation2*, and so on.

- b) Verify the installation.

Run the installation verification procedures and your own tests.

2. Uninstall the earlier version of the product.

When uninstalling the earlier product, you must stop all queue managers and applications that have loaded an IBM MQ library on the server. For this reason, you might choose to postpone uninstalling the earlier version of the product until a convenient maintenance window. When an earlier version of the product is not installed on a server, it is sufficient to stop the queue managers and applications that have loaded libraries from the installation that you are uninstalling or updating. It is not necessary to stop applications and queue managers associated with other installations.

- a) Stop all applications that have loaded IBM MQ libraries on the server.

- b) Stop the queue managers and listeners on the server.

- c) Uninstall the earlier version of the product.

- Stop all local IBM MQ applications
- You do not need to stop all the queue managers at this point.

3. Make the later version of the installation the primary installation.

- a) Run the **setmqinst** command

```
"Inst_1_INSTALLATION_PATH\bin\setmqinst" -i -n Inst_1
```

Make the installation primary to avoid specifying a search path to run IBM MQ commands

Use the `dspmqinst` command to discover the *Installation name*, or use the default value `Installation 1`.

Doing this means that you do not have to specify a search path on IBM MQ commands.

4. Start the queue managers and applications.

- When an application connects to a queue manager, the operating system searches its load path to load the IBM MQ library<sup>3</sup>. An IBM WebSphere MQ 7.1, or later, library contains code that checks that the queue manager is associated with an installation. If a queue manager is associated with

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<sup>3</sup> On Windows, the IBM MQ library is a DLL. A DLL is sometimes called a load library or a shared library. The entry points to a DLL are defined in a link library, with the file extension `.lib32` or `.lib`. The `.lib` library is linked at build-time and the DLL loaded at runtime.



a different installation, IBM MQ loads the correct IBM MQ library for the installation the queue manager is associated with.

During this process you continue to use queue manager QM2 while you upgrade queue manager QM1 and you use queue manager QM1 while you upgrade QM2.

Note that each queue manager needs to be stopped in order to be associated with the new installation.

## What to do next

You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

### Related tasks

**Windows** [Migrating on Windows: single stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later version of the product. Single stage migration is also known as *upgrading in place* or *in place upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

**Windows** [Migrating on Windows: multi-stage](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Uninstalling IBM MQ on Windows” on page 231](#)

You can uninstall the IBM MQ MQI clients and servers on Windows systems by using the control panel, the command line ( **msiexec** ), **MQParms**, or by using the installation media, in which case you can optionally remove queue managers as well.

[“Installing IBM MQ server on Windows” on page 177](#)

On Windows, IBM MQ is installed by using the Microsoft Installer (MSI). You can either use the Installation Launchpad to invoke MSI or alternatively, you can invoke MSI directly.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)



You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

### *Migrating on Windows: multi-stage*

Multi-stage migration is the term used to describe running a later version of IBM MQ alongside an earlier version on the same server. After installing the later version alongside the earlier version, you can create new queue managers to verify the later installation, and develop new applications. At the same time, you can migrate queue managers and their associated applications from the earlier version to the later version. By migrating queue managers and applications one-by-one, you can reduce the peak workload on staff managing the migration.

## Before you begin





### Attention:

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

-  Linux - all versions
-  Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

Copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

**Note:** If you are running the IBM MQ.NET monitor in transactional mode, the queue manager it connects to must be the primary installation.

## About this task

In the multi-stage migration scenario, you install the later version of the product alongside running queue managers that continue to be associated with the earlier version. You can create queue managers and run new applications using the later version installation. When you are ready to start migrating queue managers and applications from the earlier, you can do so, one-by-one. When migration to the later version is complete, you can uninstall the earlier version, and make the later version installation the primary installation.

With the multi-stage approach, until you uninstall the earlier version, you must configure an environment to run applications that connect to a queue manager to the later version. You must also provide a path to run IBM MQ commands. Both these tasks are accomplished with the **setmqenv** command.

**Note:** When you have uninstalled the earlier version, and set the later version as a primary installation, in most circumstances it is not necessary to run the **setmqenv** command to run applications. It is still necessary to run **setmqenv** to set the environment for commands that connect to a queue manager associated with an installation that is not primary.

## Procedure

1. Install the later version in a different installation directory from the earlier version and verify the installation.
  - a) Decide on an installation naming convention. Give the installation a name of your choosing, or accept the default installation name.

For the first installation, the default name is *Installation1*. For the second installation, the name is *Installation2*, and so on.
  - b) Verify the installation.

Run the installation verification procedures and your own tests.
2. Configure the operating system so that applications load the libraries for the later version of the product.

- a) Migrate queue managers one at a time.

The first set of applications to load the libraries for the later version of the product are the applications that connect to the first queue manager you are going to migrate.

It does not matter if those applications also connect to other queue managers on the server. If the applications load the later version libraries, IBM MQ automatically loads the libraries for the earlier version for those applications that connect to that version.

You can either migrate the operating system environment of all applications, or just the applications that connect to the first queue manager you are going to migrate.

- b) Migrate IBM MQ MQI client applications

Some of the applications might be running as IBM MQ MQI client applications on another workstation. When you migrate a queue manager, clients connected to it continue to run without loading a client library for the later version.

You can migrate these clients later, when you need to do so.

**Important:** If any IBM MQ MQI client applications are using the library for the earlier version on the server, you must eventually migrate the clients to use the later version of the product before you uninstall the earlier version.

3. Migrate an application to load the new library for the later version:

- Run **setmqenv** to modify the local path that is searched for IBM MQ libraries.
- Relink applications with an additional runtime load path.

Consult operating system documentation about how to modify the global search path, or include a fixed runtime load path in the application load module.

To run **setmqenv** using the `-s` option:

```
"Inst_1_INSTALLATION_PATH\bin\setmqenv" -s
```

The `-s` option sets up the environment for the installation that runs the **setmqenv** command.

4. Restart the queue manager and the applications that connect to it.

- a) Set up the local environment to the installation `Inst_1`.

```
"Inst_1_INSTALLATION_PATH\bin\setmqenv" -s
```

The `-s` option sets up the environment for the installation that runs the **setmqenv** command.

- b) Run the **setmqm** command to associate QM1 with `Inst_1`.

```
setmqm -m QM1 -n Inst_1
setmqm -m QM2 -n Inst_1
```

- c) Run the **strmqm** command to start QM1 and migrate it to the later version.

```
strmqm QM1
strmqm QM2
```

- d) Restart application 1

The application loads the later version library and connects to QM1, which is associated with the later version of the product.

5. Migrate all queue managers and applications to the later version.

Repeat steps “2” on page 410 and “4” on page 410, when required, until all the queue managers and applications are migrated to the later version of the product.

6. Uninstall the earlier version of the product.

When uninstalling the earlier product, you must stop all queue managers and applications that have loaded an IBM MQ library on the server. For this reason, you might choose to postpone uninstalling the earlier version of the product until a convenient maintenance window. When an earlier version of the product is not installed on a server, it is sufficient to stop the queue managers and applications that have loaded libraries from the installation that you are uninstalling or updating. It is not necessary to stop applications and queue managers associated with other installations.

- a) Log in as a user in group `mqm`.

- b) Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

- c) Stop the `mqweb` server that is associated with the IBM MQ installation by entering the following command:

```
endmqweb
```

- d) List the state of all the queue managers on the system by using the **dspmqs** command:

```
dspmqs -a
```

- e) List the status of listeners associated with a queue manager by using the **DISPLAY LSSTATUS** MQSC command:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- f) Stop any listeners associated with the queue managers, using the **endmqcls** command:

```
endmqcls -m QmgrName
```

- g) Stop each running queue manager that is associated with this installation by using the **endmqm** command:

```
endmqm QmgrName
```

- h) Uninstall the earlier version of the product. For more information, see “[Uninstalling or modifying IBM MQ on Linux](#)” on page 151

7. Make `Inst_1` the primary installation.

a) Run the **setmqinst** command

```
"Inst_1_INSTALLATION_PATH\bin\setmqinst" -i -n Inst_1
```

**Note:** Use the `dspmqinst` command to discover the *Installation name*, or use the default value `Installation 1`.

You do not have to set up a search path to run IBM MQ commands from the primary installation.

## What to do next

You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

Now that you have uninstalled the earlier version of the product, and made the later installation primary, you can review how the application runtime environment is set. It is no longer necessary to run **setmqenv** to set up the search path to load libraries for the later version. If you have only one installation of the later version of the product installed, it is not necessary to run **setmqenv** to run commands.

### Related concepts

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

**Windows** [Migrating on Windows: single stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later version of the product. Single stage migration is also known as *upgrading in place* or *in place upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

**Windows** [Migrating on Windows: side-by-side](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Installing IBM MQ server on Windows” on page 177](#)

On Windows, IBM MQ is installed by using the Microsoft Installer (MSI). You can either use the Installation Launchpad to invoke MSI or alternatively, you can invoke MSI directly.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

### *Reverting a queue manager to an earlier version on Windows*

On Windows platforms, you can revert a queue manager to an earlier version of the product from a later version, if you have made a backup of the system or queue manager. If you have started the queue manager and processed any messages, or changed the configuration, the task cannot give you any guidance on reverting the current state of the queue manager.

### Before you begin

1. You must have made a backup of the system or queue manager before you upgraded to the later version. For more information see [Backing up and restoring IBM MQ queue manager data](#)
2. If any messages were processed after starting the queue manager, you cannot easily undo the effects of processing the messages. You cannot revert the queue manager to the earlier version of the product in its current state. The task cannot give you any guidance how to deal with subsequent changes that have occurred. For example, messages that were indoubt in a channel, or in a transmission queue on another queue manager, might have been processed. If the queue manager is part of a cluster, then configuration messages and application messages might have been exchanged.
3. If you are running on a server with multiple IBM MQ installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

### About this task

When you revert to a earlier version of a queue manager, you revert the queue manager to its earlier code level. Queue manager data is reverted to the state it was in when the queue manager was backed up.

**Important:** If the queue manager is a member of one or more IBM MQ clusters, you should also review and follow the steps described in [Recovering a cluster queue manager](#).

### Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

3. End all the activity of queue managers associated with the IBM MQ installation.
  - a) Run the **dspmqs** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmqs -o installation -o status
dspmqs -a
```

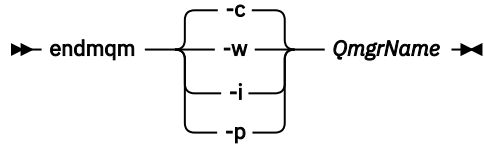
**dspmqs -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

**dspmq -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.



The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “[Applying maintenance level updates to multi-instance queue managers on Windows](#)” on [page 331](#) describes how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- d) Stop any listeners associated with the queue managers, using the command:

```
endmqm lsr -m QMgrName
```

4. Restore the system, or IBM MQ and the queue manager.

If your backup procedure was to save the queue manager data, you must reinstall IBM MQ:

- Uninstall the earlier installation.
- Reinstall the product from a manufacturing refresh.
- Apply the fix pack and interim fixes that restore IBM MQ to its previous level.
- Restore the queue manager data from the backup taken before installing the later version.

5. Restart the earlier version queue manager.

## What to do next

You might be reverting to an earlier version on a server with multiple IBM MQ installations. If one of the installations is primary, after reverting the earlier version that installation, by default, becomes the primary installation.

You must review how applications connect to an installation. After reverting to the earlier version, some applications might connect to the wrong installation.

### Related concepts

[Backing up and restoring a queue manager](#)

## Related reference

[Avoiding BFGSS0023E errors when removing fix packs](#)

### **Windows** *Migrating an IBM MQ MQI client on Windows*

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

#### Related concepts

[“IBM MQ MQI client migration” on page 363](#)

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.

#### Related tasks

[“Migrating an IBM MQ MQI client to the latest version on IBM i” on page 466](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[“Migrating an IBM MQ MQI client on AIX and Linux” on page 441](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

### **Windows** *Migrating an IBM MQ MQI client to a later version on Windows*

Before migrating an IBM MQ MQI client on Windows platforms, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

## Before you begin

Before starting to migrate a client, create a migration plan. For guidance on what to include in the plan, see [“Planning to migrate IBM MQ to a later version on Windows” on page 393](#).

## About this task

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration is reversible. It is optional and manual on a client workstation and is required and automatic on the IBM MQ server.

You must upgrade an IBM MQ MQI client before migrating a client workstation to make use of new configuration options. You can make configuration changes to client and server connection channels on the server, but they have no effect on a client workstation until the client is upgraded.

## Procedure

1. Review the IBM MQ system requirements for the later version of the product.

See [System Requirements for IBM MQ](#). See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).

2. Review all the changes in IBM MQ that affect you.

See [“Changes that affect migration” on page 354](#).

3. End all IBM MQ activity on the workstation.

4. Upgrade the client.

Select the appropriate option for your enterprise.

- For a client installation on a workstation, see [“Installing an IBM MQ client on Windows” on page 204](#).

- For a client installation on an IBM MQ server, see [Installing IBM MQ clients and servers on the same system](#).

## What to do next

After upgrading the IBM MQ MQI client, you must check the client channel configuration, and verify that your IBM MQ MQI client applications work correctly with the later version of the product.

### Related concepts

“IBM MQ MQI client migration” on page 363

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.

### Related tasks

“Planning to migrate IBM MQ to a later version on Windows” on page 393

**Windows** *Restoring an IBM MQ MQI client to an earlier version on Windows*

If you revert an IBM MQ MQI client from a later version of the product to an earlier version of the product, you must undo the configuration changes manually.

## About this task

It is unusual to revert earlier IBM MQ MQI client libraries to a workstation. The principal tasks are listed in the following steps.

## Procedure

1. End all IBM MQ activity on the workstation.
2. Uninstall the later version of the IBM MQ MQI client code.
3. Follow the client installation procedure for the platform to install the earlier version of the IBM MQ MQI client code.
4. If you configured a Client Connection Definition Table (CCDT) for a queue manager on a later version of the product, revert to using a table created by a queue manager on the earlier version.

The CCDT must always be created by a queue manager on the same, or earlier, release to the client.

**Windows** *Migrating IBM MQ library loading to a later version on Windows*

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

## Before you begin

To migrate applications from an earlier version of the product to the later version, you must know how the operating system loads an IBM MQ library for an application. Is the load path fixed by the application, and can you set the path in an environment variable? It is not essential to know the name of the IBM MQ library that the application loads. The library name does not change from an earlier version of the product to the later version, although the contents of the library do.

Read “Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376 before starting this task.

Plan and install the later version of IBM MQ, and remember the installation name and whether the installation was set to primary.



## About this task

To migrate an application from an earlier version of the product to the later version, you do not have to recompile or relink the application, because the IBM MQ libraries are compatible with later versions; see [“Application compatibility and interoperability with later versions of IBM MQ” on page 386](#).

Windows searches numerous directories for load libraries, called DLLs; see [Dynamic-Link Library Search Order](#). The build procedure for applications places the IBM MQ libraries to load before any other product libraries in the **cl** command. The IBM MQ `.lib` libraries must be in the PATH environment variable that you have specified at build time, and the DLL libraries at run time. The PATH variable is used by the application process to find the libraries it must load.

If you have followed this build procedure in the earlier release, then the effect of installing the later version of the product on the libraries that are loaded depends on which migration scenario that you are following:

### Single-stage scenario

If you are replacing an earlier version of the product with the later version, based on the single stage scenario described in [“Migrating on Windows: single stage” on page 401](#), you do not, in most cases, need to make any changes to the way IBM MQ libraries are loaded. The possible exception to this is if you changed the location of the libraries from the earlier version, or created symbolic links to the libraries.

### Side-by-side and Multi-stage scenarios

If you have chosen a multi-installation approach to installing the later version of the product, based either on the side-by-side scenario described in [“Migrating on Windows: side-by-side” on page 406](#), or the multi-stage migration scenario described in [“Migrating on Windows: multi-stage” on page 409](#), you must investigate whether applications connecting to the later version of the product are linked to, and load libraries from, the correct installation and then modify the environment for the operating system to resolve IBM MQ dependencies for an application as appropriate. Typically, you can modify the runtime environment, rather than relink the application. You can use the following two commands to assist you in configuring the runtime environment:

- **setmqinst** sets the primary installation; see [setmqinst](#).
- **setmqenv** initializes the command environment by setting environment variables; see [setmqenv](#).

Table 42 on page 417 summarizes the actions needed for each of these scenarios.

Action	Scenario	Latest version replaces earlier version in the same location <b>Single-stage</b>	Latest version replaces earlier version in a different location <b>Side-by-side</b>	Latest version alongside earlier version <b>Multi-stage</b>
<b>setmqinst</b>		<b>setmqinst</b> makes the later version installation primary. The global PATH is changed to point to the later version library and all Windows features work with the later version.		No. The later version installation can be primary, because an earlier version is installed.

Table 42. Windows configurations (continued)

Action	Scenario	Latest version replaces earlier version in the same location <b>Single-stage</b>	Latest version replaces earlier version in a different location <b>Side-by-side</b>	Latest version alongside earlier version <b>Multi-stage</b>
<b>No other configuration actions</b>	Library loading works correctly. The global PATH contains the location of the later version libraries. Even if the later version installation is not primary, library loading works correctly. The later version libraries are in the same location as the earlier version libraries were.	Library loading probably works correctly. The library loading might not work, if the application process locally modified the PATH to reference the location of the earlier version libraries. A local setting of PATH might override the global PATH that is set by <b>setmqinst</b> .	The library loading continues to work with the earlier version correctly, nothing works with the later version.	
<b>setmqenv</b>	Library loading works correctly. <b>setmqenv</b> sets the local PATH correctly.		Library loading works correctly, both for the earlier version and the later version.  <b>setmqenv</b> sets the local PATH correctly for the later version. But the Windows features that depend on the global path do not work correctly with the later version .  The correct earlier version is loaded, because the later version library loads the earlier version library for queue managers that have not been migrated from the earlier version.	

## Procedure

1. Consider which of the following questions apply to your configuration.

- Did you follow the build procedure documented in the product documentation for the earlier version of the product? You might be following a different build procedure tailored to your development environment, or adapted from a development tool such as Microsoft Visual Studio.
- How did you specify the load path for the earlier version?
- Is the application is loaded by another environment, such as Eclipse, or an application server? You must modify the parameters that govern how the parent environment loads applications, not the way the parent environment is loaded.
- Do the functions performed by an application require that the queue manager it connects to is associated with the primary installation?
- What constraints and requirements do you have on how the load path is specified in the later version? Security rules might restrict the use of LD\_LIBRARY\_PATH.
- Is the later version of the product installed alongside the earlier version?

2. Identify the installation of the later version of the product, from which the operating system is going to load IBM MQ libraries:
  - If you have a multiple installations of the later versions to load from a server, IBM MQ checks that the installation the library was loaded from is the installation that is associated with any queue manager the application calls. IBM MQ loads the correct library if the wrong library is loaded. It is necessary to configure only one runtime environment for all IBM MQ applications.
  - A typical choice is set the primary installation. Setting an installation to be primary places its library path in the global PATH variable.
  - If you upgraded an earlier version installation to the later version, a link path to the earlier version installation now points to an installation containing the later version. Applications that have a fixed linkage path to the earlier version installation now load the libraries for the later installation. They are then switched to the installation that is associated with any queue manager they connect to.
  - If you rebuild an application, it must link to an installation of the later version.
  - If you are running the IBM MQ.NET monitor in transactional mode, the queue manager it connects to must be the primary installation.

## What to do next

If you add further installations of the later version of the product, you must decide which installation to make primary, if you have chosen to make any primary. As long as applications load IBM MQ libraries from one of the later version installations, such as the primary installation, they can connect to queue managers associated with any other later version installation.

On Windows, you might build applications with different development tools. You must identify the property of the development tool that sets the PATH of the application that is being built, and not the properties of the tool itself. For example, if you are debugging with Microsoft Visual Studio, you can insert a call to **setmqenv** in the **Environment** property of the debugging section of the **Configuration** properties of a project.

A Windows application might call **LoadLibrary** and specify an explicit load path. You might build a side-by-side assembly and configure an explicit load path. If an application uses either of these mechanisms, and the later version IBM MQ library is not on the same path as the earlier release, you must recompile, or configure and relink your application to load the later version libraries.

### Related concepts

[“Features that can be used only with the primary installation on Windows” on page 25](#)

Some Windows operating-system features can be used only with the primary installation. This restriction is due to the central registration of interface libraries, which might conflict as a result of multiple versions of IBM MQ being installed.

### Related tasks

[Changing the primary installation](#)

[Connecting applications in a multiple installation environment](#)

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[“Coexistence” on page 372](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations. In addition to queue managers coexisting on a server, objects, and commands must work correctly with different queue managers running at different command levels.

[setmqenv](#)  
[setmqinst](#)  
[setmqm](#)

## **Windows** *Migrating MQ Telemetry on Windows*

Follow these instructions to migrate your existing installation of MQ Telemetry to a later version of the product on Windows.

### **Before you begin**

Before proceeding with this task, ensure that you back up your existing IBM MQ installation. You must stop the MQ Telemetry service `SYSTEM.MQXR.SERVICE` before migrating.

### **About this task**

The telemetry server is included in the product as an optional installation.

The Client Software Development Kit is no longer supplied as part of the product. Similar sample applications continue to be freely available from Eclipse Paho and MQTT.org. See [IBM MQ Telemetry Transport sample programs](#).

Because MQ Telemetry is a component of IBM MQ, MQ Telemetry can either be installed with the main product, or installed after the main product has been installed.

After the successful upgrade, Windows systems retain the telemetry data in the installation directory of the product, for example: `C:\Program Files (x86)\IBM\WebSphere MQ`. Telemetry data is migrated to the later version of the product when the queue manager is started again.

### **Procedure**

1. Create a migration plan.  
See [“Planning to migrate IBM MQ to a later version on Windows” on page 393](#).
2. [Migrate your queue managers to the later release](#).
3. [“Installation considerations for MQ Telemetry” on page 251](#).
4. Verify that the MQ Telemetry installation was successful. See [“Verifying the installation of MQ Telemetry” on page 252](#).
5. If the passphrases for your MQTT TLS channels are stored in plain text, you should encrypt the passphrases.  
Before IBM MQ 9.3.0, passphrases for MQTT TLS channels were stored in plain text. From IBM MQ 9.3.0, support for the encryption of passphrases for MQTT TLS channels is provided.  
Existing plain text passphrases are not changed to an encrypted form automatically. You must update your plain text passphrases to an encrypted form. For more information on how to encrypt your passphrases, see [Encryption of passphrases for MQTT TLS channels](#).

### **Results**

Message `AMQ4616` indicates completion of the task. The existing MQTT channels and previous subscriptions are still present.

### **Related concepts**

[“IBM MQ installation overview” on page 6](#)

An overview of concepts and considerations for installing IBM MQ, with links to instructions on how to install, verify, and uninstall IBM MQ on each of the supported platforms.

[“Installation considerations for MQ Telemetry” on page 251](#)

MQ Telemetry is a component of the main IBM MQ product. You can choose to install MQ Telemetry when you first install IBM MQ, or when you modify an existing IBM MQ installation.

### Related tasks

[“Verifying the installation of MQ Telemetry” on page 252](#)

There are three ways to verify the installation of MQ Telemetry. Any can be used, regardless of whether MQ Telemetry was installed as a custom installation of IBM MQ, or added to an existing installation of IBM MQ.

[“Verifying the installation of MQ Telemetry by using IBM MQ Explorer” on page 252](#)

Use the Define sample configuration wizard and the MQTT client utility in IBM MQ Explorer to verify that the MQ Telemetry components have installed. Also check that publish/subscribe works correctly.

### Windows

## **Migrating an MSCS configuration on Windows**

Migrate queue managers in a Microsoft Cluster Service (MSCS) configuration one node at a time, following these instructions.

### About this task

These steps are required for a rolling upgrade with a minimum amount of downtime. You must always upgrade an offline node with no online IBM MQ resources. In an Active/Passive configuration, if the node is Passive, you must ensure it cannot be switched to Active during the upgrade process.

The example, [“Migrating a four-node MSCS cluster from an earlier version of the product to the latest version” on page 421](#), shows this procedure applied to a four-node cluster.

### Procedure

1. Modify the possible owners of the IBM MQ resource to encompass only the Active node or nodes. With no owners assigned to Passive nodes, the IBM MQ resource that is being migrated cannot be activated.
2. Ensure that the group containing the IBM MQ resource is currently on one of the nodes defined as a possible owner. The group must include any applications connecting to the queue manager resource.
3. Stop the cluster service on the node being migrated. The MSCS cache is cleared of any IBM MQ DLLs that have been registered.
4. Migrate the selected node by following the standard instructions in [“Migrating a queue manager to a later version on Windows” on page 398](#). Apply the required maintenance level.
5. Start the cluster service on the selected node.
6. On the next node to be migrated, ensure that the IBM MQ resources are offline.
7. Remove this node from the list of possible owners. For clusters with more than two nodes, see the [Additional considerations](#) later in this topic.
8. Move the group containing the IBM MQ resource to one of the possible owners and bring it online.
9. Repeat steps 3-8 as necessary for any remaining nodes.

### **Migrating a four-node MSCS cluster from an earlier version of the product to the latest version**

The example in [Table 43 on page 422](#) illustrates the steps involved in migrating a four-node MSCS cluster.

In the example IBM MQ resources include queue managers, applications, and dependant MSCS resources, such as an IP address defined as an MSCS resource. In each step, the changes are italicized.

#### **Step 1**

Select the node to migrate and prepare it for upgrading from an earlier version of the product to the latest version.

1. Select node 1 to be migrated and convert it into a Passive node with no running IBM MQ resources.
2. Modify the possible owners of the group containing the IBM MQ resources, to encompass only the required online nodes. Failover does not attempt to switch IBM MQ resources to the node that is not a possible owner. It is safe to migrate that node.

3. Move the group containing the IBM MQ resource to one of the nodes that is a possible owner, and bring it online.
4. Stop the cluster service on the node being migrated. Stopping the service clears the MSCS cache of any IBM MQ libraries that have been registered for MSCS. The node goes offline.

**Step 2**

Migrate IBM MQ from an earlier version of the product to the latest version

**Step 3**

Start the cluster service on the selected node. The node becomes online, but it is not a possible owner, so no work is switched to it.

**Step 4**

Repeat steps 1 - 3 for node 2. Nodes 1 and 2 are now online, and you have migrated them to the latest version. They are still doing no work, as they are not possible owners of any of the IBM MQ resource groups.

**Step 5**

Migrate the cluster from running an earlier version of the product to the latest version. The number of migrated nodes is now greater or equal to the number of unmigrated nodes.

1. Change the set of possible owners from 3, 4 to 1, 2.
2. Move the IBM MQ resource groups from nodes 3 and 4 to nodes 1 and 2 and bring online.
3. From this point onward, the list of possible owners must include migrated nodes only. The IBM MQ resource must never failover to a node running a back level version of the product.

**Note:** If you must revert IBM MQ to an earlier version, the IBM MQ resources must be removed from MSCS control, before performing an uninstallation of IBM MQ

**Step 6**

Migrate node 3 to the latest version.

1. Follow steps 1 - 3 for node 3.
2. Add node 3 to the list of possible owners.
3. Move the QMC resource group back from node 1 to node 3 and bring online again.

**Step 7**

Repeat step 6 for node 4.

<i>Table 43. Migrating a four-node MSCS cluster</i>									
<b>Steps</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Node 1	State	Online	<i>Offline</i>	Offline	<i>Online</i>	Online	Online	Online	Online
	Version	Earlier version	Earlier version	<i>Latest version</i>	Latest version	Latest version	Latest version	Latest version	Latest version
	Groups	QMA					<i>QMC, QMA</i>	QMA	QMA
Node 2	State	Online	Online	Online	Online	Online	Online	Online	Online
	Version	Earlier version	Earlier version	Earlier version	Earlier version	<i>Latest version</i>	Latest version	Latest version	Latest version
	Groups	QMB	QMB	QMB	QMB		<i>QMD, QMB</i>	QMD, QMB	<i>QMB</i>

Table 43. Migrating a four-node MSCS cluster (continued)

Steps		0	1	2	3	4	5	6	7
Node 3	State	Online	Online	Online	Online	Online	Online	Online	Online
	Version	Earlier version	Earlier version	Earlier version	Earlier version	Earlier version	Earlier version	Latest version	Latest version
	Groups	QMC	QMC, QMA	QMC, QMA	QMC, QMA	QMC, QMA		QMC	QMC
Node 4	State	Online	Online	Online	Online	Online	Online	Online	Online
	Version	Earlier version	Earlier version	Earlier version	Earlier version	Earlier version	Earlier version	Earlier version	Latest version
	Groups	QMD	QMD	QMD	QMD	QMD, QMB			QMD
Possible Owners		1,2,3,4	2,3,4	2,3,4	2,3,4	3,4	1,2	1,2,3	1,2,3,4
Task			Update 1			Update 2	Transfer	Update 3	Update 4

## What to do next

**Additional considerations in an MSCS setup with more than 2 nodes:** A cluster might contain enough nodes for you to form a group of migrated queue managers and a group of unmigrated nodes. Switch to the migrated group when it contains half the number of queue managers. Before you have reached the half way point, the unmigrated group are possible owners. When you reach the half way point, switch the possible owners to the migrated group.

### Related concepts

Windows: MSCS restriction with multiple installations

### Related tasks

[“Migrating a queue manager in a high-availability configuration” on page 494](#)

High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

## **Windows** Migrating logs to an Advanced Format disk on Windows

An Advanced Format disk is one that has 4096 bytes per sector. The following is applicable only to the Windows platform as Advanced Format disks can be used on other platforms without carrying out a migration procedure.



**Attention:** On Windows, prior to IBM MQ 9.1.0, (or prior to IBM MQ 9.0.4 if you are a Continuous Delivery user), IBM MQ does not support Advanced Format disks

Note the following:

- A migrated log can be used on any disk whether or not it is Advanced Format.
- If you are not using an Advanced Format disk, you do not need to migrate the log of your queue manager.
- Queue managers that are created at IBM MQ 9.1.0 (or at IBM MQ 9.0.4 or later if you are a Continuous Delivery user) can be used on an Advanced Format disk without being migrated.
- If you use a queue manager that was created before IBM MQ 9.1.0 (or before IBM MQ 9.0.4 if you are a Continuous Delivery user) on a native Advanced Format disk, without migrating the queue manager first, the queue manager will not start
- It is possible to start a queue manager on an Advanced Format disk in emulation mode without migration. However IBM MQ log writes will not be on 4k boundaries and so the queue manager will not

have data integrity. Once the logs have been migrated, an Advanced Format disk in emulation mode is reliable.

- If you are not sure whether your disk is Advanced Format or not, use the Windows utility **fsutil** to find out.
- The Advanced Format disks that require you to migrate your log, include 4k native disks and 512-byte Emulation disks.
- Using **migmqlog** to change from linear logging to circular logging, or from circular logging to linear logging, also migrates the log so that the log can be used on an Advanced Format disk.

### Related information

[Changing your queue manager log from linear to circular](#)

[Changing your queue manager log from circular to linear](#)

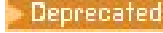
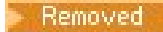


## **Migrating IBM MQ on AIX and Linux**

Migration tasks associated with AIX and Linux platforms are grouped in this section.


### Before you begin


If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

#### Important:

-  The IBM MQ Bridge to Salesforce is deprecated across all releases from November 22 2022 (see [US Announcement letter 222-341](#)).
-    The IBM MQ Bridge to Salesforce is removed from the product at IBM MQ 9.4.0. Salesforce connectivity can be achieved with IBM App Connect Enterprise. Salesforce Input and Salesforce Request nodes can be used to interact with Salesforce applications. For more information, see [Using Salesforce with IBM App Connect Enterprise](#).

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to Salesforce is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.



-  For Continuous Delivery, the IBM MQ Bridge to blockchain is removed from the product at IBM MQ 9.3.2.

 For Long Term Support, IBM MQ Bridge to blockchain is removed at IBM MQ 9.3.0 Fix Pack 15.

Blockchain connectivity can be achieved with IBM App Connect or through App Connect capabilities available with IBM Cloud Pak for Integration.

On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Bridge to blockchain is present, you must remove it before you upgrade to IBM MQ 9.4.0 or later.

- From IBM MQ 9.3.0, IBM MQ Explorer has been removed from the IBM MQ installation package. It remains available as a separate download, and can be installed from the stand-alone IBM MQ Explorer download available from Fix Central. On Linux for x86-64 only, if you are migrating from an installation where the IBM MQ Explorer is present as part of the IBM MQ installation, you must remove it before you upgrade to IBM MQ 9.3.0 or later.

**Important:**   From IBM MQ 9.4.0, AMQP channels no longer support CMS key repository files. If you are migrating a queue manager with an AMQP configuration to IBM MQ 9.4.0 or later, and your queue manager is currently configured with a CMS keystore, you must convert it to PKCS12 format before proceeding with the migration. For more information on how to perform this conversion, see [SSL/TLS support in Securing AMQP Clients](#).



## About this task

This topic lists the various steps you need to take to migrate to, or migrate from, the latest version of the IBM MQ product.

If you are migrating a Continuous Delivery release of the product, see also [“Migrating from one Continuous Delivery release to another”](#) on page 391.

If you want to migrate replicated data queue managers, follow the instructions in [“Migrating replicated data queue managers”](#) on page 497.

### Related concepts

[“Migration concepts and methods”](#) on page 357

An overview of the various concepts and methods for migrating from one release of the product to another.

### Related tasks

[“Migrating IBM MQ on IBM i”](#) on page 449

IBM MQ migration tasks associated with IBM i are grouped in this section.

[“Migrating IBM MQ on Windows”](#) on page 392

IBM MQ migration tasks associated with Windows platforms are grouped in this section.

[“Migrating IBM MQ on z/OS”](#) on page 471

Migration tasks associated with z/OS are grouped in this section.

### Related reference

[“Changes that affect migration”](#) on page 354

## **Planning to migrate IBM MQ to a later version on AIX and Linux**

Before migrating IBM MQ to a later version on AIX and Linux, review the system requirements information, and the information about any changes that might affect migration, then create a migration plan.

## Before you begin

If there are concepts about migration you do not understand, see [“Migration concepts and methods”](#) on page 357.

If you are migrating to IBM MQ 9.4 or later from IBM WebSphere MQ 7.5 or earlier, you must first migrate to an interim version. See [Migration paths](#).

## About this task

Use the following steps as a guide to creating a migration plan.

### Procedure

1. Review the IBM MQ system requirements for the later version of the product.  
See [System Requirements for IBM MQ](#).
2. Decide whether to run the earlier version and the later version of the product on the same server, and also which migration method you want to use.  
Choices are single-stage migration, side-by-side migration, or multi-stage migration. See [“Migration methods on IBM MQ for Multiplatforms”](#) on page 365.
3. Review all the changes in IBM MQ that affect you.  
See [“Changes that affect migration”](#) on page 354.
4. Review performance changes.  
See [MQ Performance documents](#).

5. Review the readme file for the later version of IBM MQ.

See [IBM MQ, WebSphere MQ, and MQSeries product readmes](#).

6. Plan the sequence and timing of queue manager migrations.

- If the queue manager is part of a queue manager cluster, you must migrate the queue managers that are full repositories first.
- If the queue manager is part of a high availability cluster, plan the migration to minimize downtime and maximize availability; see [“Migrating a queue manager in a high-availability configuration” on page 494](#).

7. Plan to migrate your queue manager to the later version.

See [“Migrating a queue manager to a later version on AIX and Linux” on page 426](#).

Backing up queue manager data is part of the queue manager migration task. An alternative approach is to install and configure a new server, then test the later version with a new queue manager on the new server. When you are ready to go into production on the later version, copy the queue manager configuration and data to the new server.

8. Plan to update any manual or automated procedures you have written with changes to messages and codes.

A suffix letter, indicating the severity of a message (I, W, E, S or T) is appended to IBM MQ diagnostic (AMQ) messages. Existing scripts looking for error codes without the severity will fail. For example, existing scripts looking for error matching to AMQ7468 will fail. You must update the scripts to look for error codes with the severity suffix added (for example, AMQ7468I). For more information, see [IBM MQ messages on Multiplatforms](#).

9. Decide on what regression tests to perform before putting the queue manager into production on the later version. Include in your regression tests the procedures and applications you identified in previous steps.

10. Plan to migrate your IBM MQ MQI client installations to the later version.

11. Plan to migrate your client and server applications to use new functions in the later version.

12. Decide which downloadable images you require for the migration.

For more information, see [“Where to find downloadable installation images” on page 10](#).

### **Migrating a queue manager on AIX and Linux**

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

#### **Related tasks**

[“Migrating a queue manager to the latest version on IBM i” on page 452](#)

Follow these instructions to migrate a queue manager on IBM i to the latest MQ version.

[“Migrating a queue manager on Windows” on page 398](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating IBM MQ on z/OS” on page 471](#)

Migration tasks associated with z/OS are grouped in this section.

### **Migrating a queue manager to a later version on AIX and Linux**

On AIX and Linux, you can migrate a queue manager from an earlier version to a later version of IBM MQ in one of three ways: single-stage, side-by-side, or multi-stage.

If you have installed early support program code on the server, you must delete all the queue managers created with the installation. Uninstall the code before proceeding with installing the production level code.

## Single-stage migration

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later release. Single stage migration is also known as *upgrading in place* or *in place upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

The advantage of single-stage migration is that it changes the configuration of a queue manager on the earlier version as little as possible. Existing applications automatically switch from loading the libraries from the earlier version to loading the libraries of the later version. Queue managers are automatically associated with the installation on the later version. Administrative scripts and procedures are affected as little as possible by setting the installation to be the primary installation. If you set the installation of the later version to be the primary installation, commands such as `strmqm` work without providing an explicit path to the command.

For more information about performing a single-stage migration, see [“Migrating on AIX and Linux: single-stage”](#) on page 427.

## Side-by-side migration

Side-by-side migration is the term used to describe installing a later version of IBM MQ alongside an earlier version on the same server. Queue managers remain running during the installation and verification of the later version of IBM MQ. They remain associated with the earlier version of IBM MQ. When you decide to migrate queue managers to the later version of IBM MQ, you stop all queue managers, uninstall the earlier version, and migrate them all to the later version of IBM MQ.

The advantage the side-by-side scenario has over the single-stage scenario is that you can install and verify the installation of the later version of the product on the server before switching over to it.

The side-by-side migration scenario is less flexible than multi-stage migration, and might not seem to have any advantages over it. However, side-by-side migration does have advantages over the multi-stage and single-stage approaches. With the side-by-side approach, because you uninstall the earlier version before starting any queue managers, you can assign an installation on the later version to be the primary installation. In the multi-stage approach, you cannot set an installation of the later version to be the primary installation while you continue to run the earlier version. With the later version having the primary installation, many applications restart without reconfiguring their environment, making the migration process simpler.


For more information about performing a side-by-side migration, see [“Migrating on AIX and Linux: side-by-side”](#) on page 431.

## Multi-stage migration

Multi-stage migration is the term used to describe running a later version of IBM MQ alongside an earlier version on the same server. After installing the later version alongside the earlier version, you can create new queue managers to verify the installation of the later version, and develop new applications. At the same time, you can migrate queue managers and their associated applications from the earlier version to the later version. By migrating queue managers and applications one-by-one, you can reduce the peak workload on staff managing the migration. When migration to the later version is complete, you can uninstall the earlier version, and make the later version installation the primary installation.

For more information about performing a multi-stage migration, see [“Migrating on AIX and Linux: multi-stage”](#) on page 435.

[Backing up and restoring a queue manager](#)  
[IBM MQ release types and versioning](#)

 [Migrating on AIX and Linux: single-stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later release. Single stage migration is also known as *upgrading in place* or *in place upgrade*.

Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

## Before you begin

1. The upgrade from the earlier version to the latest version of the product requires a full migration of queue managers. Create a migration plan. Use the planning task, [“Planning to migrate IBM MQ to a later version on AIX and Linux”](#) on page 425, as a guide.
2. Review the IBM MQ system requirements for the later version; see [System Requirements for IBM MQ](#).
3. Back up your system before you install a later version of IBM MQ over an earlier version. Once you have started a queue manager you cannot revert to the previous version. If you must restore the system, you cannot recover any work, such as changes to messages and objects, performed by the later version of IBM MQ. For more information about backing up your system, see [Backing up and restoring IBM MQ queue manager data](#).
4. Review any other installed SupportPacs for their applicability to the later version.
5. If you are running on a server with multiple installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).
6. From IBM MQ 9.0, the `ccsid_part2.tbl` file replaces the existing `ccsid.tbl` file, used in previous versions of the product, to supply additional CCSID information.



### Attention:

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

-  Linux - all versions
-  Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

Copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

## About this task

In the single-stage migration scenario, the installation of the later version of the product replaces an earlier version in the same installation location.

You can also migrate a queue manager to a later version of the product on a system where an earlier version has been uninstalled. In this case, the queue manager data must have been retained, or restored from a backup.

## Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

3. Stop the mqweb server that is associated with the IBM MQ installation by entering the following command:

```
endmqweb
```

4. End all the activity of queue managers associated with the IBM MQ installation.

- a) List the state of all the queue managers on the system by using the **dspmqr** command:

```
dspmqr -a
```

- b) List the status of listeners associated with a queue manager by using the **DISPLAY LSSTATUS MQSC** command:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Stop any listeners associated with the queue managers, using the **endmqclr** command:

```
endmqclr -m QmgrName
```

- d) Stop each running queue manager that is associated with this installation by using the **endmqm** command:

```
endmqm QmgrName
```

The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the migration to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.


You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you upgrading IBM MQ. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

5. Back up the queue manager.

Take copies of all the queue manager's data and log file directories, including all subdirectories, and also the `qm.ini` file. For more information, see [Backing up and restoring IBM MQ queue manager data](#).

6. Based on the version of IBM MQ that you want to migrate from, uninstall any fix packs:

- If you are migrating to IBM MQ 9.4, you must uninstall any fix packs that are installed on the earlier IBM MQ version before you upgrade your installation.
-  If you are migrating from IBM MQ 9.4 to a later version, you do not need to uninstall fix packs before upgrading your installation.

7. Upgrade the earlier version of the product to the later version in the same installation directory.

- On AIX, upgrade to the later version in place. For more information, see [“Installing IBM MQ server on AIX” on page 43](#).
- On Linux, if the version that you are upgrading from is later than IBM MQ 9.2.1, upgrade to the later version in place. For more information, see [“Upgrading an IBM MQ installation on Linux” on page 338](#).

- On Linux, if the version that you are upgrading from is earlier than IBM MQ 9.2.1, you must uninstall the previous version before you install the later version. For more information, see [“Installing and uninstalling IBM MQ on Linux” on page 94](#).
8. Optional: Set the primary installation to avoid specifying a search path to run IBM MQ commands by using the **setmqinst** command:

```
INSTALLATION_PATH/bin/setmqinst -i -n installationName
```

Use the [dspmqinst](#) command to discover the *InstallationName*.

If there is a primary installation, AIX and Linux applications that expect to find the IBM MQ library in `/usr/lib`, find a symbolic link to the library in `/usr/lib/32`<sup>4</sup>. `/usr/lib/32` is normally in the default search path. It is also specified as a load path in the IBM MQ build scripts for AIX and Linux.

It is sufficient to link applications only to `/usr/lib`. With a primary installation of the later version of the product defined on the server, an application can connect to any queue manager associated with any installation on the server. IBM MQ loads the correct library for the application.

9. Optional: Associate the queue managers with the installation by using the **setmqm** command:

```
setmqm -m qmgrName -n installationName
```

10. Start the queue managers and migrate them to the later version of the product by using the **strmqm** command:

```
strmqm qmgrName
```

When you first start a queue manager after migration:

- Any new attributes for existing objects are set to their default values.
- Any new default objects are created.
- Queue manager data is migrated.

At this point, queue manager data is migrated and you cannot revert to a previous release.

**Important:** Do not use the `-c` option to start the queue manager, unless you explicitly want to reset or re-create the default system objects.

You must start IBM MQ before you start any listeners.

11. Start your applications.

## What to do next

You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

### Related concepts

[“Migrating a queue manager to a later version on AIX and Linux” on page 426](#)

On AIX and Linux, you can migrate a queue manager from an earlier version to a later version of IBM MQ in one of three ways: single-stage, side-by-side, or multi-stage.

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Queue manager coexistence” on page 373](#)

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<sup>4</sup> `/usr/lib` for 64 bit applications.

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

 [Migrating on AIX and Linux: side-by-side](#)

 [Migrating on AIX and Linux: multi-stage](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Migrating a queue manager to a later version on Windows” on page 398](#)

On Windows platforms, follow these instructions to migrate a queue manager from an earlier version to a later version of IBM MQ.

[“Installing IBM MQ server on AIX” on page 43](#)

You can install an IBM MQ server on AIX either interactively or silently.

[“Installing the first IBM MQ installation on Linux using the rpm command” on page 112](#)

You can install an IBM MQ server on a 64-bit Linux system using rpm. The instructions in this topic are for the first installation of IBM MQ on a Linux system.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

 [Migrating on AIX and Linux: side-by-side](#)

Side-by-side migration is the term used to describe installing a later version of IBM MQ alongside an earlier version on the same server. Queue managers remain running during the installation and verification of the later version of IBM MQ. They remain associated with the earlier version of IBM MQ. When you decide to migrate queue managers to the later version of IBM MQ, you stop all queue managers, uninstall the earlier version, and migrate them all to the later version of IBM MQ.



## Before you begin

1. The upgrade from the earlier version to the latest version of the product requires a full migration of queue managers. Create a migration plan. Use the planning task, [“Planning to migrate IBM MQ to a later version on AIX and Linux”](#) on page 425, as a guide.
2. Review the IBM MQ system requirements for the later version; see [System Requirements for IBM MQ](#).
3. Back up your system before you install a later version of IBM MQ over an earlier version. Once you have started a queue manager you cannot revert to the previous version. If you must restore the system, you cannot recover any work, such as changes to messages and objects, performed by the later version of IBM MQ. For more information about backing up your system, see [Backing up and restoring IBM MQ queue manager data](#).
4. Review any other installed SupportPacs for their applicability to the later version.
5. If you are running on a server with multiple installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).
6. From IBM MQ 9.0, the `ccsid_part2.tbl` file replaces the existing `ccsid.tbl` file, used in previous versions of the product, to supply additional CCSID information.





### Attention:

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

-  Linux - all versions
-  Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

Copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

## About this task

In the side-by-side migration scenario, you install the later version of IBM MQ alongside queue managers that continue to be associated with the installation of the earlier version of the product. When you are ready to migrate the queue managers, and applications, to the later version:

1. Stop all the queue managers.
2. Uninstall the earlier version of the product.
3. Migrate all the queue managers and applications to the later version.

## Procedure

1. Install the later version in a different installation directory from the earlier version.

- a) Decide on an installation naming convention. Give the installation a name of your choosing, or accept the default installation name.

For the first installation, the default name is *Installation1*. For the second installation, the name is *Installation2*, and so on.



On AIX there is no option to set the installation name, *Installation1* is set by default.



b) Install the later version. For more information see, [“Installing IBM MQ server on AIX” on page 43](#) or [“Installing additional IBM MQ installations on Linux using the rpm command” on page 116](#).

c) Verify the installation.

Run the installation verification procedures and your own tests.

## 2. Uninstall the earlier version of the product.

When uninstalling the earlier product, you must stop all queue managers and applications that have loaded an IBM MQ library on the server. For this reason, you might choose to postpone uninstalling the earlier version of the product until a convenient maintenance window. When an earlier version of the product is not installed on a server, it is sufficient to stop the queue managers and applications that have loaded libraries from the installation that you are uninstalling or updating. It is not necessary to stop applications and queue managers associated with other installations.

a) Log in as a user in group `mqm`.

b) Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

c) Stop the `mqweb` server that is associated with the IBM MQ installation by entering the following command:

```
endmqweb
```

d) List the state of all the queue managers on the system by using the **`dspmqr`** command:

```
dspmqr -a
```

e) List the status of listeners associated with a queue manager by using the **`DISPLAY LSSTATUS MQSC`** command:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

f) Stop any listeners associated with the queue managers, using the **`endmqclr`** command:

```
endmqclr -m QMgrName
```

g) Stop each running queue manager that is associated with this installation by using the **`endmqm`** command:

```
endmqm QMgrName
```

h) Uninstall the earlier version of the product. For more information, see [“Uninstalling or modifying IBM MQ on Linux” on page 151](#)

## 3. Set the primary installation to avoid specifying a search path to run IBM MQ commands by using the **`setmqinst`** command:

```
INSTALLATION_PATH/bin/setmqinst -i -n installationName
```

Use the `dspmqrinst` command to discover the *InstallationName*.

If there is a primary installation, AIX and Linux applications that expect to find the IBM MQ library in `/usr/lib`, find a symbolic link to the library in `/usr/lib/32`<sup>5</sup>. `/usr/lib/32` is normally in the default search path. It is also specified as a load path in the IBM MQ build scripts for AIX and Linux.

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<sup>5</sup> `/usr/lib` for 64 bit applications.

It is sufficient to link applications only to `/usr/lib`. With a primary installation of the later version of the product defined on the server, an application can connect to any queue manager associated with any installation on the server. IBM MQ loads the correct library for the application.

4. Optional: Associate the queue managers with the installation by using the `setmqm` command:

```
setmqm -m qmgrName -n installationName
```

5. Start the queue managers and migrate them to the later version of the product by using the `strmqm` command:

```
strmqm qmgrName
```

When you first start a queue manager after migration:

- Any new attributes for existing objects are set to their default values.
- Any new default objects are created.
- Queue manager data is migrated.

At this point, queue manager data is migrated and you cannot revert to a previous release.

**Important:** Do not use the `-c` option to start the queue manager, unless you explicitly want to reset or re-create the default system objects.



You must start IBM MQ before you start any listeners.

6. Start your applications.

## What to do next


You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

### Related tasks

  [Migrating on AIX and Linux: single-stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later release. Single stage migration is also known as *upgrading in place* or *in place upgrade*.

Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

  [Migrating on AIX and Linux: multi-stage](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Installing IBM MQ server on AIX” on page 43](#)

You can install an IBM MQ server on AIX either interactively or silently.

[“Uninstalling or modifying IBM MQ on AIX” on page 60](#)

On AIX, you can uninstall the IBM MQ server or client using the System Management Interface Tool (SMIT) or the `installp` command. You can also modify an installation by uninstalling a subset of the file sets.

[“Installing the first IBM MQ installation on Linux using the rpm command” on page 112](#)

You can install an IBM MQ server on a 64-bit Linux system using rpm. The instructions in this topic are for the first installation of IBM MQ on a Linux system.

[“Uninstalling or modifying IBM MQ on Linux using rpm” on page 151](#)

On Linux, you can uninstall the IBM MQ server or client by using the `rpm` command. You can also modify an installation by removing selected packages (components) currently installed on your system.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.

[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

 [Linux](#) [AIX](#) *Migrating on AIX and Linux: multi-stage*

Multi-stage migration is the term used to describe running a later version of IBM MQ alongside an earlier version on the same server. After installing the later version alongside the earlier version, you can create new queue managers to verify the installation of the later version, and develop new applications. At the same time, you can migrate queue managers and their associated applications from the earlier version to the later version. By migrating queue managers and applications one-by-one, you can reduce the peak workload on staff managing the migration. When migration to the later version is complete, you can uninstall the earlier version, and make the later version installation the primary installation.

## Before you begin

1. The upgrade from the earlier version to the latest version of the product requires a full migration of queue managers. Create a migration plan. Use the planning task, [“Planning to migrate IBM MQ to a later version on AIX and Linux” on page 425](#), as a guide.
2. Review the IBM MQ system requirements for the later version; see [System Requirements for IBM MQ](#).
3. Back up your system before you install a later version of IBM MQ over an earlier version. Once you have started a queue manager you cannot revert to the previous version. If you must restore the system, you cannot recover any work, such as changes to messages and objects, performed by the later version of IBM MQ. For more information about backing up your system, see [Backing up and restoring IBM MQ queue manager data](#).
4. Review any other installed SupportPacs for their applicability to the later version.
5. If you are running on a server with multiple installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

6. From IBM MQ 9.0, the `ccsid_part2.tbl` file replaces the existing `ccsid.tbl` file, used in previous versions of the product, to supply additional CCSID information.

**Attention:**

The `ccsid_part2.tbl` file takes precedence over the `ccsid.tbl` file and:

- Allows you to add or modify CCSID entries
- Specify default data conversion
- Specify data for different command levels

The `ccsid_part2.tbl` is applicable to the following platforms only:

-  Linux - all versions
-  Windows

If you have added any of your own CCSID information into your existing `ccsid.tbl` file, you should copy this information into the new `ccsid_part2.tbl` file, if you want to take advantage of the new formats in your customizations

Copy the required information, rather than move the information, so that your existing version of IBM MQ continues to work.

**Note:** If you are running the IBM MQ.NET monitor in transactional mode, the queue manager it connects to must be the primary installation.

## About this task

With the multi-stage approach, until you uninstall the earlier version, you must configure an environment to run applications that connect to a queue manager to the later version. You must also provide a path to run IBM MQ commands. Both these tasks are accomplished with the **setmqenv** command.


**Note:** When you have uninstalled the earlier version, and set the later version as a primary installation, in most circumstances it is not necessary to run the **setmqenv** command to run applications. It is still necessary to run **setmqenv** to set the environment for commands that connect to a queue manager associated with an installation that is not primary.

## Procedure

1. Install the later version in a different installation directory from the earlier version and verify the installation.

- a) Decide on an installation naming convention. Give the installation a name of your choosing, or accept the default installation name.

For the first installation, the default name is *Installation1*. For the second installation, the name is *Installation2*, and so on.

 On AIX there is no option to set the installation name, *Installation1* is set by default.

- b) Install the later version. For more information see, [“Installing IBM MQ server on AIX” on page 43](#) or [“Installing additional IBM MQ installations on Linux using the rpm command” on page 116](#).

- c) Verify the installation.

Run the installation verification procedures and your own tests.

2. Configure the operating system so that applications load the libraries for the later version of the product.

- a) Migrate queue managers one at a time.

The first set of applications to load the libraries for the later version of the product are the applications that connect to the first queue manager you are going to migrate.

It does not matter if those applications also connect to other queue managers on the server. If the applications load the later version libraries, IBM MQ automatically loads the libraries for the earlier version for those applications that connect to that version.

You can either migrate the operating system environment of all applications, or just the applications that connect to the first queue manager you are going to migrate.

b) Migrate IBM MQ MQI client applications

Some of the applications might be running as IBM MQ MQI client applications on another workstation. When you migrate a queue manager, clients connected to it continue to run without loading a client library for the later version.

You can migrate these clients later, when you need to do so.

**Important:** If any IBM MQ MQI client applications are using the library for the earlier version on the server, you must eventually migrate the clients to use the later version of the product before you uninstall the earlier version.

3. Migrate an application to load the new library for the later version:

- Run **setmqenv** to modify the local path that is searched for IBM MQ libraries.
- Modify the global search path that is searched for IBM MQ libraries.
- Relink applications with an additional runtime load path.

Consult operating system documentation about how to modify the global search path, or include a fixed runtime load path in the application load module.

To run **setmqenv** using the -s option:

```
.Inst_1_INSTALLATION_PATH/bin/setmqenv -s -k
```

The -s option sets up the environment for the installation that runs the **setmqenv** command.

The -k option inserts the path to the IBM MQ load libraries at the start of the LD\_LIBRARY\_PATH environment variable, and adds the variable to the local environment; see [“Loading IBM MQ libraries” on page 378](#).

**Note:** On AIX the leading " ." is critical. The dot followed by a space instructs the command shell run **setmqenv** in the same command shell and inherit the environment set by **setmqenv**.

4. Restart the queue manager and the applications that connect to it.

a) Set up the local environment to the installation Inst\_1.

```
.Inst_1_INSTALLATION_PATH/bin/setmqenv -s
```

The -s option sets up the environment for the installation that runs the **setmqenv** command.

b) Run the **setmqm** command to associate QM1 with Inst\_1.

```
setmqm -m QM1 -n Inst_1  
setmqm -m QM2 -n Inst_1
```

c) Run the **strmqm** command to start QM1 and migrate it to the later version.

```
strmqm QM1  
strmqm QM2
```

d) Restart application 1

The application loads the later version library and connects to QM1, which is associated with the later version of the product.

5. Migrate all queue managers and applications to the later version.

Repeat steps “2” on page 436 and “4” on page 437, when required, until all the queue managers and applications are migrated to the later version of the product.

## 6. Uninstall the earlier version of the product.

When uninstalling the earlier product, you must stop all queue managers and applications that have loaded an IBM MQ library on the server. For this reason, you might choose to postpone uninstalling the earlier version of the product until a convenient maintenance window. When an earlier version of the product is not installed on a server, it is sufficient to stop the queue managers and applications that have loaded libraries from the installation that you are uninstalling or updating. It is not necessary to stop applications and queue managers associated with other installations.

a) Log in as a user in group `mqm`.

b) Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

c) Stop the `mqweb` server that is associated with the IBM MQ installation by entering the following command:

```
endmqweb
```

d) List the state of all the queue managers on the system by using the **`dspmqr`** command:

```
dspmqr -a
```

e) List the status of listeners associated with a queue manager by using the **`DISPLAY LSSTATUS`** MQSC command:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

f) Stop any listeners associated with the queue managers, using the **`endmqclr`** command:

```
endmqclr -m QMgrName
```

g) Stop each running queue manager that is associated with this installation by using the **`endmqm`** command:

```
endmqm QMgrName
```

h) Uninstall the earlier version of the product. For more information, see [“Uninstalling or modifying IBM MQ on Linux” on page 151](#)

## 7. Set the primary installation to avoid specifying a search path to run IBM MQ commands by using the **`setmqinst`** command:

```
INSTALLATION_PATH/bin/setmqinst -i -n installationName
```

If you set an installation of the later version of the product as primary on AIX and Linux, you do not have to set up `LD_LIBRARY_PATH` in most cases. You can remove calls to **`setmqenv`** to set `LD_LIBRARY_PATH`.

## What to do next

You cannot reinstall an earlier version of the product on a system that has the latest, or any other, version of IBM MQ installed.

Now that you have uninstalled the earlier version of the product, and made the later installation primary, you can review how the application runtime environment is set. It is no longer necessary to run **`setmqenv`**

to set up the search path to load libraries for the later version. If you have only one installation of the later version of the product installed, it is not necessary to run **setmqenv** to run commands.

### Related concepts

[“Installation name on AIX, Linux, and Windows” on page 14](#)

Each installation of IBM MQ on AIX, Linux, and Windows, has a unique identifier known as an installation name. The installation name is used to associate things such as queue managers and configuration files with an installation.



[“Queue manager coexistence” on page 373](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Multi-installation queue manager coexistence on AIX, Linux, and Windows” on page 376](#)

You can install multiple copies of IBM MQ for AIX, Linux, and Windows on the same server. These IBM MQ copies can be at the same or different version levels. This is called a multi-installation. Multi-installation is particularly useful when you upgrade from one IBM MQ version to a later version, because it allows you to run the earlier version alongside the later version.

### Related tasks

  [Migrating on AIX and Linux: single-stage](#)

Single-stage migration is the term used to describe replacing the only installation of IBM MQ on a server, with a later release. Single stage migration is also known as *upgrading in place* or *in place upgrade*. Single-stage migration preserves existing scripts and procedures for running IBM MQ the most. With other migration scenarios you might change some scripts and procedures, but you can reduce the effect queue manager migration has on users.

  [Migrating on AIX and Linux: side-by-side](#)

[“Planning to migrate IBM MQ to a later version on Windows” on page 393](#)

[“Installing IBM MQ server on AIX” on page 43](#)

You can install an IBM MQ server on AIX either interactively or silently.

[“Installing the first IBM MQ installation on Linux using the rpm command” on page 112](#)

You can install an IBM MQ server on a 64-bit Linux system using rpm. The instructions in this topic are for the first installation of IBM MQ on a Linux system.

[Associating a queue manager with an installation](#)

[Changing the primary installation](#)

[“Migrating IBM MQ library loading to a later version on AIX and Linux” on page 444](#)

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[setmqenv](#)

[setmqinst](#)

[setmqm](#)



On AIX and Linux, you can revert a queue manager to an earlier version of the product from a later version, if you have made a backup of the system or queue manager. If you have started the queue manager and processed any messages, or changed the configuration, the task cannot give you any guidance on reverting the current state of the queue manager.

## Before you begin

1. You must have made a backup of the system or queue manager before you upgraded to the later version. For more information see [Backing up and restoring IBM MQ queue manager data](#)
2. If any messages were processed after starting the queue manager, you cannot easily undo the effects of processing the messages. You cannot revert the queue manager to the earlier version of the product in its current state. The task cannot give you any guidance how to deal with subsequent changes that have occurred. For example, messages that were indoubt in a channel, or in a transmission queue on another queue manager, might have been processed. If the queue manager is part of a cluster, then configuration messages and application messages might have been exchanged.
3. If you are running on a server with multiple IBM MQ installations, you must identify the installation. Make sure that the commands you enter run against the correct installation; see [setmqenv](#).

## About this task

When you revert to an earlier version of a queue manager, you revert the queue manager to its earlier code level. Queue manager data is reverted to the state it was in when the queue manager was backed up.

**Important:** If the queue manager is a member of one or more IBM MQ clusters, you should also review and follow the steps described in [Recovering a cluster queue manager](#).

## Procedure

1. Log in as a user in group `mqm`.
2. Stop all applications using the IBM MQ installation.

If you use the Managed File Transfer (MFT) component, ensure that any MFT agents have finished all of the file transfers that they were engaged in. There should be no incomplete transfers associated with the agents, and their `SYSTEM.FTE.STATE` queues should contain no messages.

3. End all the activity of queue managers associated with the IBM MQ installation.
  - a) Run the **dspmqr** command to list the state of all the queue managers on the system.

Run either of the following commands from the installation that you are updating:

```
dspmqr -o installation -o status
dspmqr -a
```

**dspmqr -o installation -o status** displays the installation name and status of queue managers associated with all installations of IBM MQ.

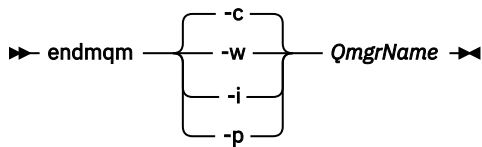
**dspmqr -a** displays the status of active queue managers associated with the installation from which the command is run.

- b) Use the MQSC command **DISPLAY LSSTATUS** to list the status of listeners associated with a queue manager, as shown in the following example:

```
echo "DISPLAY LSSTATUS(*) STATUS" | runmqsc QmgrName
```

- c) Run the **endmqm** command to stop each running queue manager associated with this installation.





The **endmqm** command informs an application that the queue manager it is connected to is stopping; see [Stopping a queue manager](#).

For the maintenance to proceed, applications must respond to an **endmqm** command by disconnecting from the queue manager and releasing any IBM MQ libraries they have loaded. If they do not, you must find another way to force applications to release IBM MQ resources, such as by stopping the applications.

You must also stop applications that are using the client libraries that are part of the installation. Client applications might be connected to a different queue manager, running a different installation of IBM MQ. The application is not informed about queue managers in the current installation being shut down.

Any applications that continue to have IBM MQ shared libraries from the installation loaded prevent you applying IBM MQ maintenance. An application might disconnect from a queue manager, or be forcibly disconnected, but keep an IBM MQ shared library loaded.

**Note:** “[Applying maintenance level updates to multi-instance queue managers on AIX](#)” on page 305 and “[Applying maintenance level updates to multi-instance queue managers on Linux](#)” on page 315 describe how to apply maintenance to a multi-instance queue manager. A multi-instance queue manager can continue to run on one server, while maintenance is applied to another server.

- d) Stop any listeners associated with the queue managers, using the command:

```
endmqm -m QMgrName
```

4. Restore the system, or IBM MQ and the queue manager.

If your backup procedure was to save the queue manager data, you must reinstall IBM MQ:

- a) Uninstall the earlier installation.
- b) Reinstall the product from a manufacturing refresh.
- c) Apply the fix pack and interim fixes that restore IBM MQ to its previous level.
- d) Restore the queue manager data from the backup taken before installing the later version.

5. Restart the earlier version queue manager.

## What to do next

You might be reverting to an earlier version on a server with multiple IBM MQ installations. If one of the installations is primary, after reverting the earlier version that installation, by default, becomes the primary installation.

You must review how applications connect to an installation. After reverting to the earlier version, some applications might connect to the wrong installation.

### Related concepts

[Backing up and restoring a queue manager](#)

### Related reference

[Avoiding BFGSS0023E errors when removing fix packs](#)

## Linux > AIX **Migrating an IBM MQ MQI client on AIX and Linux**

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

## Related concepts

[“IBM MQ MQI client migration” on page 363](#)

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.



## Related tasks

[“Migrating an IBM MQ MQI client to the latest version on IBM i” on page 466](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[“Migrating an IBM MQ MQI client on Windows” on page 415](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

  *Migrating an IBM MQ MQI client to a later version on AIX and Linux*

To upgrade a client to a later version of the product on AIX and Linux, you must first stop all IBM MQ activity on the workstation, then uninstall the earlier version and install the later version. After you have upgraded the client, you can then make any essential configuration and application changes.

## Before you begin

Before migrating an IBM MQ MQI client on AIX and Linux, first create a migration plan. For guidance on what to include in the plan, see [“Planning to migrate IBM MQ to a later version on AIX and Linux” on page 425](#), as a guide.

## About this task

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration is reversible. It is optional and manual on a client workstation and is required and automatic on the IBM MQ server.

You must upgrade an IBM MQ MQI client before migrating a client workstation to make use of new configuration options. You can make configuration changes to client and server connection channels on the server, but they have no effect on a client workstation until the client is upgraded.

## Procedure

1. Review the IBM MQ system requirements for the later version of the product.

See [System Requirements for IBM MQ](#). See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).

2. Review all the changes in IBM MQ that affect you.

See [“Changes that affect migration” on page 354](#).

3. End all IBM MQ activity on the workstation.

You are now ready to upgrade the client. Follow the instructions for the appropriate platform that your enterprise uses.

4. 

To upgrade the client on AIX:

- a) Uninstall your existing IBM MQ client installation.

For more information, see [“Uninstalling or modifying IBM MQ on AIX” on page 60](#).

- b) Follow the client installation procedure to install the upgraded version of the IBM MQ client:

- For a client installation on a workstation, see [“Installing an IBM MQ client on AIX” on page 48](#)

- For a client installation on an IBM MQ server, see [Installing IBM MQ clients and servers on the same system](#).

## 5. Linux

To upgrade the client on Linux:

- Uninstall your existing IBM MQ client installation.

For more information, see [“Uninstalling or modifying IBM MQ on Linux” on page 151](#).

- Follow the client installation procedure to install the upgraded version of the IBM MQ client:

- For a client installation on a workstation, see [“Installing an IBM MQ client on Linux using rpm” on page 119](#).
- For a client installation on an IBM MQ server, see [Installing IBM MQ clients and servers on the same system](#).

## What to do next

After upgrading the IBM MQ MQI client, you must check the client channel configuration, and verify that your IBM MQ MQI client applications work correctly with the later version of the product.

### Related concepts

[“IBM MQ MQI client migration” on page 363](#)

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.

### Related tasks

[“Planning to migrate IBM MQ to a later version on AIX and Linux” on page 425](#)

## Restoring an IBM MQ MQI client to an earlier version on AIX and Linux

To revert a client to an earlier version of the product on AIX and Linux, you must uninstall the later version, and then install the earlier version.

## About this task


If you revert an IBM MQ MQI client and client connection to an earlier code level, you must undo the configuration changes manually.

It is unusual to revert earlier IBM MQ MQI client libraries to a workstation.

## Procedure

- End all IBM MQ activity on the workstation.

You are now ready to restore the client to the earlier version. Follow the instructions for the appropriate platform that your enterprise uses.

-  AIX

To revert the client to the earlier version on AIX:

- Uninstall the IBM MQ MQI client code for the later version.

For more information, see [“Uninstalling or modifying IBM MQ on AIX” on page 60](#).

- Follow the client installation procedure to install the IBM MQ MQI client for the earlier version.

For more information, see the client installation procedure for the earlier version that you want to install.

-  Linux

To revert the client to the earlier version on Linux:

- Uninstall the IBM MQ MQI client code for the later version.

For more information, see [“Uninstalling or modifying IBM MQ on Linux” on page 151](#).

- b) Follow the client installation procedure to install the IBM MQ MQI client for the earlier version:  
For more information, see the client installation procedure for the earlier version that you want to install.
4. If you configured a Client Connection Definition Table (CCDT) for a queue manager using the later version, revert to using a table created by a queue manager for the earlier version.  
If a client uses CCDT to connect to a queue manager, the CCDT can be at a version greater than, less than, or equal to that of the client. For more information, see [MQI client: Client Channel Definition Table \(CCDT\)](#).

## **Migrating IBM MQ library loading to a later version on AIX and Linux**

On AIX and Linux, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to a later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### **Before you begin**

To migrate applications from an earlier version of the product to the later version, you must know how the operating system loads an IBM MQ library for an application. Is the load path fixed by the application, and can you set the path in an environment variable? It is not essential to know the name of the IBM MQ library that the application loads. The library name does not change from an earlier version of the product to the later version, although the contents of the library do.

Read [“Multi-installation queue manager coexistence on AIX, Linux, and Windows”](#) on page 376 before starting this task.

Plan and install the later version of IBM MQ, and remember the installation name and whether the installation was set to primary.

### **About this task**

To migrate an application from an earlier version of the product to the later version, you do not have to recompile or relink the application, because the IBM MQ libraries are compatible with later versions; see [“Application compatibility and interoperability with later versions of IBM MQ”](#) on page 386.

The build procedure for IBM MQ applications is to include an explicit library path to the location of the IBM MQ libraries, and to `/usr/lib`, in the link step of the compiler, as shown in [Figure 13](#) on page 444. The build procedure is the same for the later version of the product.

```
gcc -m32 -o amqsput_32_r amqsput0.c -I/opt/mqm/inc -L/opt/mqm/lib  
-Wl,-rpath=/opt/mqm/lib -Wl,-rpath=/usr/lib -lmqm_r -lpthread
```

*Figure 13. Linux C server application, 32 bit, threaded compile and link*

The example shown in [Figure 13](#) on page 444 is for Linux, but the build step for AIX is similar.

If you have followed this build procedure in the earlier release, then the effect of installing the later version of the product on the libraries that are loaded depends on which migration scenario that you are following:

#### **Single-stage scenario**

If you are replacing an earlier version of the product with the later version, based on the single stage scenario described in [“Migrating on AIX and Linux: single-stage”](#) on page 427, you do not, in most cases, need to make any changes to the way IBM MQ libraries are loaded. The possible exception to

this is if you changed the location of the libraries from the earlier version, or created symbolic links to the libraries.

### Side-by-side and Multi-stage scenarios

If you have chosen a multi-installation approach to installing the later version of the product, based either on the side-by-side scenario described in “[Migrating on AIX and Linux: side-by-side](#)” on page 431, or the multi-stage migration scenario described in “[Migrating on AIX and Linux: multi-stage](#)” on page 435, you must investigate whether applications connecting to the later version of the product are linked to, and load libraries from, the correct installation and then modify the environment for the operating system to resolve IBM MQ dependencies for an application as appropriate. Typically, you can modify the runtime environment, rather than relink the application. You can use the following two commands to assist you in configuring the runtime environment:

- **setmqinst** sets the primary installation; see [setmqinst](#).
- **setmqenv** initializes the command environment by setting environment variables; see [setmqenv](#).

Table 44 on page 445 summarizes the actions needed for each of these scenarios. The examples in [Table 44 on page 445](#) are all based on Linux, but the actions for AIX are similar.


Action	Scenario	Latest version replaces earlier version in the same location Single-stage	Latest version replaces earlier version in a different location Side-by-side	Latest version alongside earlier version Multi-stage
<b>setmqinst</b>		<b>setmqinst</b> makes the later version installation primary. Symbolic links to the IBM MQ link libraries are inserted into <code>/usr/lib</code> .		No. The later version installation can be primary, because an earlier version is installed.
<b>No other configuration actions</b>		Library loading works correctly.  Library loading works, even without the later version installation being made primary, because the libraries are installed in <code>/opt/mqm/lib</code> and the application was built with the link option, <code>-rpath=/opt/mqm/lib</code>	Library loading works correctly.  Library loading works, because the installation is primary, and the application was built with the link option, <code>-rpath=/usr/lib</code> .	The library loading continues to work with the earlier version correctly, nothing works with the later version.
<b>setmqenv, without setting the -k or -l options.</b>		Library loading works correctly.  <b>setmqenv</b> is unnecessary. Library loading works, because the libraries are installed in <code>/opt/mqm/lib</code> and the application was built with the link option, <code>-rpath=/opt/mqm/lib</code> .	Library loading works correctly.  <b>setmqenv</b> is unnecessary. Library loading works, because the installation is primary, and the application was built with the link option, <code>-rpath=/usr/lib</code> .	The library loading continues to work with the earlier version correctly, nothing works with the later version.

Table 44. AIX and Linux configurations (continued)

Action	Scenario	Latest version replaces earlier version in the same location Single-stage	Latest version replaces earlier version in a different location Side-by-side	Latest version alongside earlier version Multi-stage
<b>setmqenv, with the -k or -l options set.</b>	Library loading works correctly.		Library loading works correctly, both for the earlier version and the later version.  The correct earlier version is loaded, because the later version library loads the earlier version library for queue managers that have not been migrated from the earlier version.	
	The operating system finds the IBM MQ library location set by <b>setmqenv</b> . <b>setmqenv</b> adds the location to LD_LIBRARY_PATH.  <span style="background-color: #4F81BD; color: white; padding: 2px;">AIX</span> This is LIBPATH on AIX.  LD_LIBRARY_PATH is searched before paths set in the application or paths in the default search path. Not all applications can load a library using LD_LIBRARY_PATH. In which case the application works only if the library location is /opt/mqm/lib or /usr/lib			

## Procedure

1. Consider which of the following questions apply to your configuration.
  - Did you follow the build procedure documented in the product documentation for the earlier version of the product? You might be following a different build procedure tailored to your development environment, or adapted from a development tool.
  - How did you specify the load path for the earlier version?
  - Is the application is loaded by another environment, such as Eclipse, or an application server? You must modify the parameters that govern how the parent environment loads applications, not the way the parent environment is loaded.
  - What constraints and requirements do you have on how the load path is specified in the later version? Security rules might restrict the use of LD\_LIBRARY\_PATH.
  - Is the later version of the product installed alongside the earlier version?
2. Identify the installation of the later version of the product, from which the operating system is going to load IBM MQ libraries:
  - If you have a multiple installations of the later versions to load from a server, IBM MQ checks that the installation the library was loaded from is the installation that is associated with any queue manager the application calls. IBM MQ loads the correct library if the wrong library is loaded. It is necessary to configure only one runtime environment for all IBM MQ applications.
  - A typical choice is to set the primary installation. Setting an installation to be primary places symbolic links to the IBM MQ libraries in /usr/lib. Applications built have an explicit link to /usr/lib, and /usr/lib is also normally in the default library search path.
  - If you upgraded an earlier version installation to the later version, a link path to the earlier version installation now points to an installation containing the later version. Applications that have a fixed linkage path to the earlier version installation now load the libraries for the later installation. They are then switched to the installation that is associated with any queue manager they connect to.

- If you rebuild an application, it must link to an installation of the later version.
-  If you set LD\_LIBRARY\_PATH, or LIBPATH on AIX, you must check that the application is able to use LD\_LIBRARY\_PATH. setuid or setgid, applications, or applications built in other ways, might ignore LD\_LIBRARY\_PATH for security reasons.

## What to do next

If you add further installations of the later version of the product, you must decide which installation to make primary, if you have chosen to make any primary. As long as applications load IBM MQ libraries from one of the later version installations, such as the primary installation, they can connect to queue managers associated with any other later version installation.

### Related concepts

[“External library and control command links to primary installation on AIX and Linux” on page 23](#)

On AIX and Linux platforms the primary installation is the one to which links from the /usr file system are made. However, only a subset of those links created with previous releases are now made.

### Related tasks

[Connecting applications in a multiple installation environment](#)

[Changing the primary installation](#)

[Loading IBM MQ libraries](#)

[“Migrating IBM MQ library loading to a later version on Windows” on page 416](#)

On Windows, no change in the way IBM MQ libraries are loaded is normally required if you upgrade from an earlier version of the product to the later version by replacing an earlier version of the product with the later version, based on the single stage scenario. However, if you choose to take advantage of multi-installation in the later version of the product, based on the side-by-side or multi-stage migration scenarios, you might have to configure the runtime environment differently, for the operating system to load the later version of the IBM MQ library.

### Related reference

[“Coexistence” on page 372](#)

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations. In addition to queue managers coexisting on a server, objects, and commands must work correctly with different queue managers running at different command levels.

[setmqenv](#)

[setmqinst](#)

[setmqm](#)

## **Rebuilding a C++ application on Linux**

C++ IBM MQ MQI client and server applications on Linux must be recompiled using GNU Compiler Collection (GCC) 4.1.2, or later. Compilers older than GCC 4.1.2 are no longer supported. The C++ GCC 4.1.2 run time libraries, or later, must be installed in /usr/lib or /usr/lib64

If you are using one of the supported Linux distributions, the libraries are correctly installed; see [System Requirements for IBM MQ](#).

The GCC 4.1.2 libraries support SSL and TLS connections from an IBM MQ MQI client. SSL and TLS use IBM Global Security Kit (GSKit) version 8, which depends on libstdc++.so.6. libstdc++.so.6 is included in GCC 4.1.2.

## Before you begin

1. Check the required level of GCC for your distribution of Linux; see [System Requirements for IBM MQ](#).
2. If you are using SSL or TLS, also check the required level of libstdc++.so.

3. Check whether the application requires rebuilding. Run the following command to display what version of `libstdc++.so` the application depends upon. If the result is less than `libstdc++.so.6`, you must rebuild your application.

```
ldd ApplicationPath
```

## About this task

The task describes the steps required to rebuild a Linux C++ IBM MQ application. For more detailed instructions about building Linux applications for IBM MQ ; see [Building your procedural application on Linux](#)

## Procedure

1. Check that the required GCC library is installed correctly.

Run one of the following commands:

- Check the 32 bit library on an x86 Linux system:

```
ls -l /usr/lib/libstdc++.so.6
```

- Check the 64 bit library on any other Linux system.

```
ls -l /usr/lib64/libstdc++.so.6
```

2. Check that the GCC compiler is at least at version 4.1.2

Run the following command to display the version of GCC.

```
gcc -v
```

3. Rebuild the application

The commands to compile and link Linux C++ applications are described in [Building 32-bit applications](#) and [Building 64-bit applications](#)

## What to do next

When you deploy your Linux C++ application, ensure that the same GCC runtime library is correctly installed on the run time system.

### **Migrating MQ Telemetry on Linux**

Follow these instructions to migrate your existing installation of MQ Telemetry on Linux to the latest version of the product.

## Before you begin

Before proceeding with this task, ensure that you back up your existing IBM MQ installation. You must stop the MQ Telemetry service `SYSTEM.MQXR.SERVICE` before migrating.

## About this task

The telemetry server is included in the product as an optional installation.

For IBM WebSphere MQ 7.5, the Client Software Development Kit (the telemetry clients) is also included in the optional installation. From IBM MQ 8.0 onwards, the Client Software Development Kit is no longer supplied as part of the product. Similar sample applications continue to be freely available from Eclipse Paho and MQTT.org. See [IBM MQ Telemetry Transport sample programs](#).



Because MQ Telemetry is a component of IBM MQ, MQ Telemetry can either be installed with the main product, or installed after the main product has been installed. When you upgrade from a previous version of the product, you must download and use the latest version of the Client Software Development Kit.

After the successful upgrade, Linux systems retain all telemetry data kept in `/var/mqm`. Telemetry data is migrated to the later version of the product when the queue manager is started again.

## Procedure

1. Create a migration plan.  
See [“Planning to migrate IBM MQ to a later version on AIX and Linux” on page 425](#).
2. Migrate your queue managers to the latest release.
3. [“Installation considerations for MQ Telemetry” on page 251](#).
4. Verify that the MQ Telemetry installation was successful. See [“Verifying the installation of MQ Telemetry” on page 252](#).
5. If the passphrases for your MQTT TLS channels are stored in plain text, you should encrypt the passphrases.

Before IBM MQ 9.3.0, passphrases for MQTT TLS channels were stored in plain text. From IBM MQ 9.3.0, support for the encryption of passphrases for MQTT TLS channels is provided.

Existing plain text passphrases are not changed to an encrypted form automatically. You must update your plain text passphrases to an encrypted form. For more information on how to encrypt your passphrases, see [Encryption of passphrases for MQTT TLS channels](#).

## Results

Message AMQ4616 indicates completion of the task. The existing MQTT channels and previous subscriptions are still present.

### Related concepts

[“Installation considerations for MQ Telemetry” on page 251](#)

MQ Telemetry is a component of the main IBM MQ product. You can choose to install MQ Telemetry when you first install IBM MQ, or when you modify an existing IBM MQ installation.

### Related tasks

[“Verifying the installation of MQ Telemetry” on page 252](#)

There are three ways to verify the installation of MQ Telemetry. Any can be used, regardless of whether MQ Telemetry was installed as a custom installation of IBM MQ, or added to an existing installation of IBM MQ.

[“Verifying the installation of MQ Telemetry by using IBM MQ Explorer” on page 252](#)

Use the Define sample configuration wizard and the MQTT client utility in IBM MQ Explorer to verify that the MQ Telemetry components have installed. Also check that publish/subscribe works correctly.

IBM i

## Migrating IBM MQ on IBM i

IBM MQ migration tasks associated with IBM i are grouped in this section.

## Procedure

- For information about creating a migration plan, see [“Planning to migrate IBM MQ to a later version on IBM i” on page 450](#).
- For information about migrating an IBM MQ classes for JMS and IBM MQ classes for Java client, see [“Migrating an IBM MQ classes for JMS and Java client on IBM i” on page 451](#).
- For information about migrating a queue manager from a previous release, see [“Migrating a queue manager to the latest version on IBM i” on page 452](#) and [“Migrating a queue manager to a later version on IBM i - alternative method” on page 463](#).

- For information about upgrading an IBM MQ system, see [“Upgrading an entire IBM MQ system on IBM i”](#) on page 466.
- For information about upgrading an IBM MQ MQI client installation, see [“Migrating an IBM MQ MQI client to the latest version on IBM i”](#) on page 466.
- For information about converting a single instance queue manager to a multi-instance queue manager, see [“Migrating from a single instance to a multi-instance queue manager on IBM i”](#) on page 467.
- For information about reverting a multi-instance queue manager to a single instance queue manager, see [“Reverting to a single-instance queue manager on IBM i”](#) on page 470.

### Related concepts

[“Migration concepts and methods”](#) on page 357

An overview of the various concepts and methods for migrating from one release of the product to another.

### Related tasks

[“Migrating IBM MQ on AIX and Linux”](#) on page 424

Migration tasks associated with AIX and Linux platforms are grouped in this section.

[“Migrating IBM MQ on Windows”](#) on page 392

IBM MQ migration tasks associated with Windows platforms are grouped in this section.

[“Migrating IBM MQ on z/OS”](#) on page 471

Migration tasks associated with z/OS are grouped in this section.

### Related reference

[“Changes that affect migration”](#) on page 354

## **Planning to migrate IBM MQ to a later version on IBM i**

Before migrating IBM MQ to a later version on IBM i, review the system requirements information, and the information about any changes that might affect migration, then create a migration plan.

### Before you begin

If there are concepts about migration you do not understand, see [“Migration concepts and methods”](#) on page 357.

If you are migrating to IBM MQ 9.4 from IBM WebSphere MQ 7.1 or earlier, you must first migrate to an interim version. See [Migration paths](#).

### About this task

Use the following steps as a guide to creating a migration plan.

### Procedure

1. Review the IBM MQ system requirements for the later version of the product.  
See [System Requirements for IBM MQ](#).
2. Review all the changes in IBM MQ that affect you.  
See [“Changes that affect migration”](#) on page 354.
3. Review performance changes.  
See [MQ Performance documents](#).
4. Review the readme file for the later version of IBM MQ.  
See [IBM MQ, WebSphere MQ, and MQSeries product readmes](#).
5. Plan the sequence and timing of queue manager migrations.
  - If the queue manager is part of a queue manager cluster, you must migrate the queue managers that are full repositories first.

- If the queue manager is part of a high availability cluster, plan the migration to minimize downtime and maximize availability; see [“Migrating a queue manager in a high-availability configuration”](#) on page 494.
6. Plan to migrate your queue manager to the later version.

See [IBM i - Migrating a queue manager to the later release](#) or [Migrating a queue manager to the later release, alternative method](#)

Backing up queue manager data is part of the queue manager migration task. An alternative approach is to install and configure a new server, then test the later version with a new queue manager on the new server. When you are ready to go into production on the later version, copy the queue manager configuration and data to the new server.

7. Plan to update any manual or automated procedures you have written with changes to messages and codes.

A suffix letter, indicating the severity of a message (I, W, E, S or T) is appended to IBM MQ diagnostic (AMQ) messages. Existing scripts looking for error codes without the severity will fail. For example, existing scripts looking for error matching to AMQ7468 will fail. You must update the scripts to look for error codes with the severity suffix added (for example, AMQ7468I). For more information, see [IBM MQ messages on Multiplatforms](#).

8. Decide on what regression tests to perform before putting the queue manager into production on the later version. Include the procedures and applications you identified in previous steps in your regression tests.
9. Plan to migrate your IBM MQ MQI client installations to the later version.
10. Plan to migrate your client and server applications to use new functions in the later version.
11. Decide which downloadable images you require for the migration.

For more information, see [“Where to find downloadable installation images”](#) on page 10.

## **Migrating an IBM MQ classes for JMS and Java client on IBM i**

If you have IBM MQ Java SupportPac MA88 installed, you must uninstall it first.

### **Before you begin**

#### **SupportPac MQ88 is installed.**

If you try to install the latest version of IBM MQ classes for Java anyway, the installation fails with a warning requesting you to uninstall the old client. You must follow the steps in this task to uninstall IBM MQ classes for Java and IBM MQ classes for JMS.

#### **A previous version of IBM MQ classes for Java is installed.**

Installation of the latest version of IBM MQ classes for Java uninstalls the previous version automatically. Do not follow the steps in this task.

### **About this task**

The steps in this task uninstall the IBM MQ classes for JMS and Java.

### **Procedure**

To uninstall the previous IBM MQ Java client:

1. Delete the QMQMJAVA library and the /QIBM/ProdData/mqm/java directory, by issuing the command:

```
DLTLICPGM LICPGM(5648C60) OPTION(*ALL)
```

2. If the previous step failed to delete the IFS directory /QIBM/ProdData/mqm/java and its subdirectories, use the **EDTF** command, for example:

```
EDTF STMF('/QIBM/ProdData/mqm')
```

and select option 9 against the java directory.

## **Migrating a queue manager to the latest version on IBM i**

Follow these instructions to migrate a queue manager on IBM i to the latest MQ version.

### **Before you begin**

1. Create a migration plan. Use the planning task, [Planning migration to the latest version](#), as a guide.
2. Review the IBM MQ system requirements for the latest version of the product; see [System Requirements for IBM MQ](#)
3. Review any other installed SupportPacs for their applicability to the latest version of the product.

### **About this task**

There are two types of migration:

- The migration takes place on the same machine, optionally accompanied by a hardware upgrade. This migration is referred to as a *slip installation*. On IBM i, uninstalling the earlier version before you install the later version is optional.
- The migration takes place on a different machine. This migration is referred to as a *side-by-side installation*.

A side-by-side installation lets you prepare the new environment first, without interrupting the queue manager. It also gives you the limited option of reverting to use the earlier version installation, if the migration is unsuccessful. It is limited, because you cannot restore the queue manager data from the later version. You must restart processing with the queue manager data at the point you stopped the queue manager on the earlier release.

If you decide to do a side-by-side installation, you must prepare the new server first, installing the prerequisite software.

If you want to add Advanced Message Security to your system, you must select Option (2) when you install the product; see [“Installing Advanced Message Security on IBM i” on page 239](#) for further information.

### **Related tasks**

[“Migrating a queue manager on AIX and Linux” on page 426](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating a queue manager on Windows” on page 398](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

[“Migrating IBM MQ on z/OS” on page 471](#)

Migration tasks associated with z/OS are grouped in this section.

## **Installation methods on IBM i**

Select a slip installation or a side-by-side installation to upgrade IBM MQ for IBM i.

### **About this task**

A slip installation upgrades IBM MQ for IBM i on a computer with an earlier version is installed.

A side-by-side installation upgrades IBM MQ for IBM i on a different computer. You must save your queue managers before you start.

Follow the steps in the following tasks to carry out an upgrade.

The steps for both forms of upgrade are identical, except that you do not carry out the actions described in [“Restore queue managers after upgrading IBM MQ on IBM i”](#) on page 461 for a slip installation.

### **IBM i** End IBM MQ activity on IBM i

End IBM MQ applications and connections, and remove any unwanted or indoubt messages.

## About this task

Before performing a slip installation or side-by-side installation, carry out the following procedure:

## Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Stop all applications that are using the existing version of IBM MQ.  
To identify applications using the queue manager, use the command WRKMQM, option 22, Work with queue manager jobs, to help find them. Ignore jobs starting with AMQ\* or RUN\* and focus on your application job names.
3. End all channels for all queue managers on the system. To do so, use the WRKMQMCHL command and select option 15.
4. On each queue manager, end the command server. To do so, enter the command:

```
ENDMQMSVR MQMNAME( QMGRNAME ) OPTION(*IMMED)
```

where *QMGRNAME* is the name of the queue manager.

5. Remove any unwanted messages from your queues.
6. Resolve any in-doubt messages that are held by sender or server channels. To do so, use the WRKMQMCHST command and select option 17.
7. On each queue manager, save the latest media recovery checkpoint. To do so, enter the following command:

```
RCDMQMIMG OBJ(*ALL) OBJTYPE(*ALL) MQMNAME( QMGRNAME ) DSPJRNDTA(*YES)
```

### **IBM i** Quiesce IBM MQ on IBM i

Stop all queue managers. If necessary force all queue managers to stop, tidy up shared memory and end all jobs in the QMQM subsystem.

## About this task

The orderly shutdown of IBM MQ is called *quiescing*. You need to quiesce IBM MQ to upgrade to a newer version.

## Procedure

### Prepare to quiesce queue managers:

1. Sign on to a new interactive IBM i session, ensuring that you are not accessing any IBM MQ objects.
2. Ensure that you have the following authorities:
  - \*ALLOBJ authority, or object management authority for the QMQM library.
  - Sufficient authority to use the ENDSBS command.
3. Warn all users that you are going to stop IBM MQ.
4. Stop the mqweb server by entering the following command:

```
ENDMQWEB
```

### Quiesce all queue managers:

5. Run the ENDMQM command:

```
ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*YES)
TIMEOUT( 15 )
```

Where *15* is a timeout value in seconds.

If the ENDMQM command has not completed within a reasonable period (at least 10 minutes), use the WRKMQM command. This command identifies the queue managers that are still ending. Then force each one in turn to stop by running the following command:

```
ENDMQM MQMNAME( QMGRNAME ) OPTION(*IMMED)
```

Where *QMGRNAME* is the name of the queue manager.

Complete the tidying up of shared memory by running the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
TIMEOUT( 15 )
```

### If the commands in the previous step do not complete, end the subsystem immediately:

6. Run the following command:

```
ENDSBS SBS(QMQM) OPTION(*IMMED)
```

### If the command in the previous step also does not complete, use the operating system command **ENDJOB** to end all jobs in the subsystem QMQM:

**Note:** Do not use ENDJOBABN unless you intend to perform an IPL on the machine before starting IBM MQ. Ending IBM MQ jobs using ENDJOBABN can lead to damaged semaphores, which in turn can prevent your queue manager from starting.

7. If a QMGR must be shut down manually, end the jobs (ENDJOB) in the following order. Wait a few minutes for AMQA\* or AMQZ\* jobs to tidy up.

- a. RUNMQLSR - TCP listener (multi-threaded)
- b. AMQCLMAA - TCP listener (single-threaded)
- c. AMQRMPPA - Channel process pooling job
- d. RUNMQCHI - channel initiator
- e. AMQCRSTA - receiving MCA jobs
- f. RUNMQCHL - sending MCA jobs
- g. AMQCRS6B - LU62 receiver channel
- h. AMQPCSEA - command server
- i. RUNMQTRM - Application trigger monitor
- j. RUNMQDLQ - Dead letter queue handler
- k. AMQFCXBA - IBM Integration Bus Worker Job
- l. AMQFPUB - Queued Publish/Subscribe Daemon
- m. RUNMQBRK - IBM Integration Bus Control Job
- n. AMQZMUC0 ('0' is a zero) - Utility Manager
- o. AMQZMUF0 ('0' is a zero) - Utility Manager
- p. AMQZMUR0 ('0' is a zero) - Utility Manager
- q. AMQZMGR0 ('0' is a zero) - Process Controller
- r. AMQRRMFA - cluster repository manager

- s. AMQZDMAA - deferred message manager
  - t. AMQZFUMA - object authority manager
  - u. AMQZLSA0 ('0' is a zero) - LQM agents
  - v. AMQZLAA0 ('0' is a zero) - LQM agents
  - w. AMQZXMA0 ('0' is a zero) - Execution Controller
8. Run the following command:

```
ENDMQM MQMNAME( QMGRNAME ) OPTION(*IMMED)
```

9. Run the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
TIMEOUT( 05 )
```

Where 05 is a timeout value in seconds.

10. Manually clean up shared memory.

Run the following command:

```
EDTF '/QIBM/UserData/mqm/qmgrs'
```

then:

- a. Take option 5 for **&SYSTEM** and check that the following directories are empty: `isem`, `esem`, `msem`, `ssem`, and `shmem`.
- b. Take option 5 for **QMGRNAME** and check that the following directories are empty:- `isem`, `esem`, `msem`, `ssem`, and `shmem`.
- c. Take option 5 for **&ipcc** in the QMGRNAME directory and check that the following directories are empty:- `isem`, `esem`, `msem`, `ssem`, and `shmem`.
- d. Take option 5 for **&qmpersist** in the QMGRNAME directory and check that the following directories are empty:- `isem`, `esem`, `msem`, `ssem`, and `shmem`.
- e. Take option 5 for **&app** and check that the following directories are empty: `isem`, `esem`, `msem`, `ssem`, and `shmem`.

 Save IBM MQ data on IBM i

Save IBM MQ data after removing unwanted FDC, trace, and JOB files.

## Before you begin

You need to have completed the tasks to remove unwanted and indoubt messages and quiesced IBM MQ.

## About this task

### Procedure

1. Create a save file for every queue manager library on your system. To do so, issue the command:

```
CRTSAVF FILE(QGPL/ queue_manager_library )
```

where the `queue_manager_library` name consists of the name of the queue manager preceded by QM.

2. Save your queue manager libraries into the save files. To do so, issue the commands:

```
SAVLIB LIB( queue_manager_library ) DEV(*SAVF)
SAVF(QGPL/ queue_manager_library )
```

3. Remove all unwanted FDC data from directory:

```
QIBM/UserData/mqm/errors
```

4. Remove old FDC files with the command:

```
RMVLNK OBJLNK('/QIBM/UserData/mqm/errors/*.FDC')
```

This command cleans up all files with an extension of 'FDC' in the IFS.

5. Remove old JOB files with the command:

```
RMVLNK OBJLNK('/QIBM/UserData/mqm/errors/*.JOB')
```

This command cleans up all files with an extension of 'JOB' in the IFS.

6. Remove all unwanted trace data from directory, or remove the whole directory:

```
QIBM/UserData/mqm/trace
```

7. Remove all trace files with the command:

```
RMVLNK OBJLNK('/qibm/userdata/mqm/trace/*')
```

8. Create a save file for IBM MQ IFS data. To do so, issue the command:

```
CRTSAVF FILE(QGPL/QMUSERDATA)
```

9. Save your IBM MQ IFS data, using the command:

```
SAV DEV('/QSYS.LIB/QGPL.LIB/QMUSERDATA.FILE') OBJ('/QIBM/UserData/mqm')
```

10. If you are going to run IBM MQ on a new machine, transfer the save files to the new machine.

## Install IBM MQ server on IBM i

Install the IBM MQ server in its primary language.

### Before you begin

You have completed planning the installation, obtained the installation disks, and set the system values; see [“Configuring and tuning the operating system on IBM i”](#) on page 65.

### About this task

Install the IBM MQ server and force object conversion. Object conversion migrates objects from the older to the newer version. By performing it now, rather than when an object is first used, you avoid slowing down the first use of the upgraded product.

After following the optional step to pre-agree the license, the **RSTLICPGM** command runs without requiring any interactive input. Otherwise the license agreement is displayed for you to accept. See [“License requirements”](#) on page 8.

### Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.



2. Optionally pre-agree the license terms and conditions by running the command,

```
CALL PGM (QSYS/QLPACAGR) PARM ('5724H72' 'V8R0M0' '0000' 0)
```

Where the parameters of **PARM** are,

**5724H72**

The product identifier for IBM i.

**V9R4M0**

The version, release, and modification level.

**0000**

The option number for the \*BASE IBM MQ product option.

**0**

Unused error structure.

3. Install IBM MQ for IBM i, base product, and primary language.

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

where the parameters of RSTLICPGM are,

**LICPGM (5724H72)**

The product identifier for IBM i.

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

**OPTION (\*BASE)**


Install the base IBM MQ for IBM i product.

**Unspecified parameters**

Unspecified parameters such as **RSTOBJ (\*ALL)**, revert to defaults. The command installs both IBM MQ and the language files for the primary language of your system. For installing additional languages see [Installing translated versions](#).

## What to do next

Install any Program Temporary Fixes (PTF) that have been issued.

 *Install samples on IBM i*  
Install the IBM MQ samples

## Before you begin

If you have not already done so, sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.

## About this task

Install the samples.

After following the optional step to pre-agree the license, the **RSTLICPGM** command runs without requiring any interactive input. Otherwise the license agreement is displayed for you to accept. See [“License requirements” on page 8](#).

## Procedure

1. Optionally pre-agree the license terms and conditions by running the command,

```
CALL PGM (QSYS/QLPACAGR) PARM ('5724H72' 'V8R0M0' '0001' 0)
```

Where the parameters of **PARM** are,

**5724H72**

The product identifier for IBM i.

**V9R4M0**

The version, release, and modification level.

**0001**

The option number for the samples.

**0**

Unused error structure.

2. Install the samples using the command:

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (1) OUTPUT (*PRINT)
```

Where the parameters of RSTLICPGM are,

**LICPGM (5724H72)**

The product identifier for IBM i.

**DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

**OPTION (1)**

Install the samples for IBM i.

**OUTPUT (\*PRINT)**

The output is printed with the spooled output of the job.

**IBM i** *Install translated versions on IBM i*

Install translated versions of IBM MQ from a choice of national-languages.

### About this task

The following language versions are available for IBM i:

Language ID	Language
2909	Belgian English
2966	Belgian French MNCS (Multi-National Character Set)
2981	Canadian French MNCS
2975	Czech
2950	English uppercase
2924	English uppercase and lowercase
2984	English US DBCS
2938	English US uppercase DBCS
2928	French
2940	French MNCS
2929	German
2939	German MNCS
2976	Hungarian

Table 45. National-language versions of IBM MQ for IBM i (continued)

Language ID	Language
2932	Italian
2942	Italian MNCS
2962	Japanese
2986	Korean
2978	Polish
2979	Russian
2989	Simplified Chinese
2931	Spanish

IBM MQ for IBM i is installed in the language that is the primary language on your system.

You can install additional versions of the product in any of the languages shown in [Table 45 on page 458](#). To do so complete the following steps:

## Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority
2. Issue the following command specifying the appropriate language ID:

```
RSTLICPGM LICPGM(5724H72) DEV( installation device ) RSTOBJ(*LNG) LNG( language ID )
```

This installs the commands, message file, and panel groups into the relevant QSYS library for the language. For example, library QSYS2928 is used for French. If this QSYS29nn library does not exist, it is created by the **RSTLICPGM** command.

## Results

### Note:

1. To run the Japanese language version of IBM MQ for IBM i, the CCSID of the job must be 939 (5035) rather than 930 (5026) because IBM MQ uses lowercase English characters.
2. If you are installing IBM MQ for IBM i onto a machine for which the primary language is not on the CD, the installation program prompts you to load a CD containing the product in that language. If, however, you have only one product CD, this means that the IBM MQ product has not been translated into your language. To get around this issue, proceed as follows:
  - Install the product in one of the supplied languages, and then add the corresponding QSYS29nn library into the *system library* list (for example using command **CHGSYSLIBL**). At the same time, check that there are no IBM MQ \*CMD, \*MENU, or \*MSGF objects in libraries higher up the library list. If some exist, then either delete these objects (because they refer to an earlier version of IBM MQ) or reorder the System Library list (because the product has been installed in more than one of the supplied languages).

## IBM i *Verify the installation on IBM i*

How to check that your installation has been successful.

### Procedure

1. To ensure that the product has loaded correctly, issue the Display Software Resources (DSPSFWRSC) command and check that the licensed program 5724H72 is listed. If you have installed the base and the optional samples, you see:

```
Resource
ID   Option Feature Description
5724H72 *BASE 5050 IBM MQ for IBM i
5724H72 *BASE 2924 IBM MQ for IBM i
5724H72 1    5050 IBM MQ for IBM i - Samples
```

2. Press F11, while viewing the Display Software Resources screen, and you see the library and version number of the products installed:

```
Resource          Feature
ID   Option Feature Type Library Release
5724H72 *BASE 5050 *CODE QMQM V9R4M0 5724H72 *BASE 2924 *LNG QMQM V9R4M0
5724H72 1    5050 *CODE QMQMSAMP V9R4M0
```

3. If you have installed additional language versions, you also see entries for these versions. For example, if you have installed the French version, for which the language ID is 2928, you see:

a)

```
Resource
ID   Option Feature Description
5724H72 *BASE 2928 IBM MQ for IBM i
```

b) and when you press F11:

```
Resource          Feature
ID   Option Feature Type Library Release
5724H72 *BASE 2928 *LNG QSYS2928 V9R4M0
```

4. Use the command DSPMQMVER to check exactly what version you have installed. For example, for V9R4M0, it reports:

```
Version: 9.2.0.0
```

## IBM i *Verify the upgrade on IBM i*

After you have verified the installation, start the IBM MQ subsystem, check the queue managers, and take a fresh media recovery checkpoint.

### About this task

To verify that you have migrated to the latest version IBM MQ for IBM i, successfully:

### Procedure

1. Make QMQMADM either the primary or a secondary group profile for your user profile. To do so, issue one of the following commands:

```
CHGUSRPRF USRPRF( YOUR PROFILE ) GRPPRF(QMQMADM)
CHGUSRPRF USRPRF( YOUR PROFILE ) SUPGRPPRF(QMQMADM)
```

2. Start the IBM MQ subsystem with the command:

```
STRSBS SBS D(QMQM/QMQM)
```

(If it is already running, you get error message CPF1010 which you can safely ignore).

3. Check that your queue managers are accessible by issuing the command:

```
WRKMQM
```

Use option 14 against each queue manager to start it.

Use option 5 against each queue manager to check its attributes.

4. You can use the other options to check your queue manager objects. For example, check your queues using option 18, check your channels using option 20, and so on.
5. Take a fresh media recovery checkpoint, using the following command:

```
RCDMQMIMG OBJ(*ALL) OBJTYPE(*ALL) MQMNAME( QMGRNAME ) DSPJRNDTA(*YES)
```

Where *QMGRNAME* is the name of the queue manager.

**IBM i**

*Restore queue managers after upgrading IBM MQ on IBM i*

Complete the side-by-side upgrade by restoring the saved queue managers onto the server that you have upgraded.

## Before you begin

**Note:** Carry out this task only if you are performing a side-by-side upgrade.

Ensure that you have saved your queue manager data, see [“End IBM MQ activity on IBM i”](#) on page 453, and installed and verified the upgrade.

## About this task

Transfer the queue manager data, and journal receivers, onto the server that has been upgraded.

## Procedure

1. Restore the queue manager libraries for every queue manager, using the command:

```
RSTLIB SAVLIB( queue_manager_library ) DEV(*SAVF) (*PRINT)  
SAVF(QGPL/ queue_manager_library )
```

where the *queue\_manager\_library* name consists of the name of the queue manager preceded by QM.

2. Restore the IBM MQ IFS data, using the command:

```
RST DEV('/QSYS.LIB/QGPL.LIB/QMUSERDATA.FILE') OBJ('/QIBM/UserData/mqm') (*PRINT)
```

3. To associate the journal receivers, issue the command WRKJRN on the journal AMQAJRN in each queue manager library, by pressing *PF4* and selecting option 9.
4. If you want to set up your work management environment, job descriptions, and pools, see the [Administering IBMi](#) for guidance. Otherwise, use the default setup.

## IBM i *After Upgrading on IBM MQ for IBM i*

Tasks to perform after you have upgraded IBM MQ for IBM i.

### About this task

Satisfy yourself the upgrade has completed successfully.

### Procedure

Delete the saved data in the save files in QGPL. This data was saved in [“Save IBM MQ data on IBM i” on page 455](#).

## IBM i *Post installation tasks for IBM i*

Tasks to perform after you have installed IBM MQ for IBM i, and before using it.

### About this task

When you have correctly installed IBM MQ for IBM i on your system:

### Procedure

1. For the latest product information for IBM i, see [System requirements for IBM MQ](#).
2. To install and apply all fix packs, see [“Applying maintenance level updates on IBM i” on page 307](#).
3. Where you have more than one system and a mixture of releases of OS/400 or IBM i, and IBM MQ, you must take care when compiling CL programs. You must compile CL programs either on the system they are to run on, or on one with an identical combination of releases of OS/400 or IBM i, and IBM MQ. When you install later versions of IBM MQ, delete all IBM MQ commands from previous releases in any QSYSVvRrMm libraries using the QSYS/DLTCMD command.
4. If you have not installed IBM MQ on your system before, you must add user profiles to the QMQMADM group profile. Make all user profiles that are to be used for creating and administering queue managers members of the QMQMADM group profile, using the command CHGUSRPRF.
  - a) Start the IBM MQ subsystem, by issuing the command:

```
STRSBS SBSD(QMQM/QMQM)
```

**Note:** The subsystem must be started after each IPL of the system, so you might choose to start it as part of your system startup process.

5. Create the system-default objects. The system-default objects are created automatically when you issue the CRTMQM command to create a queue manager. For example: CRTMQM MQMNAME(QMGRNAME) ASP(\*SYSTEM). You can refresh them using the STRMQM command (Warning: this command will replace any existing default objects). For example: STRMQM MQMNAME(QMGRNAME) RDEFSYS(\*YES). Refer to the onscreen help for information about using this command.

**Note:** on the command STRMQM MQMNAME(QMGRNAME) RDEFSYS(\*YES):

- The command does not re-create the objects, it performs a CRTxxxx REPLACE(\*YES) for all of the SYSTEM.\* objects.
- This means that it refreshes the parameters on the objects back to their defaults. So if, for example, on the SYSTEM.DEFAULT.LOCAL.QUEUE object, TRGENBL had previously been changed to \*YES, then, when the command is run, it is changed back to TRGENBL(\*NO).
- If any messages exist on a queue, they are left intact, because the queues are not physically deleted.
- The contents of the SYSTEM.AUTH.DATA.QUEUE are untouched when this command is run.

- So, if the contents of this (or any other significant queue) become corrupt, it must be physically deleted and re-created either from scratch, or from a backup.

## Results

You are now ready to start using IBM MQ for IBM i.

**Note:** When you install IBM MQ for IBM i, two user profiles are created:

- QMQM
- QMQMADM

These two objects are central to the correct running of IBM MQ for IBM i. Do not alter or delete them. If you do, IBM cannot guarantee correct behavior of your product.

If you uninstall IBM MQ and data, these profiles are deleted. If you uninstall IBM MQ only, these profiles are retained.

## **Migrating a queue manager to a later version on IBM i - alternative method**

An alternative method of migrating a queue manager from an earlier version to a later version

### Before you begin

1. Review the IBM MQ system requirements for the later version of the product; see [System Requirements for IBM MQ](#)
2. Review any other installed SupportPacs for their applicability to the later version of IBM MQ.

### About this task

There are various parts to this form of migration:

1. As part of upgrading the IBM MQ product, carry out the following tasks:
  - a. [“Preparing to install IBM MQ on IBM i”](#) on page 463
  - b. [“Install IBM MQ server on IBM i”](#) on page 464
2. Following the IBM MQ product upgrade, carry out the following task:
  - a. [“Post installation tasks”](#) on page 465

## **Preparing to install IBM MQ on IBM i**

Carry out the following tasks to prepare your system for an upgrade.

### Procedure

1. Stop the IBM MQ queue managers by issuing the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) RCDMQMIMG(*YES)
TIMEOUT(30)
```

Ensure that the user profile issuing this command has \*ALLOBJ authority.

2. Create a save file for every queue manager library on your system. To do so, issue the command:

```
CRTSAVF FILE(QGPL/ queue_manager_library )
```

where the *queue\_manager\_library* name consists of the name of the queue manager preceded by QM.

3. Save your queue manager libraries into the save files. To do so, issue the commands:

```
SAVLIB LIB( queue_manager_library ) DEV(*SAVF)
SAVF(QGPL/ queue_manager_library )
```

4. Create a save file for IBM MQ IFS data. To do so, issue the command:

```
CRTSAVF FILE(QGPL/QMUSERDATA)
```

5. Save your IBM MQ IFS data, using the command:

```
SAV DEV('/QSYS.LIB/QGPL.LIB/QMUSERDATA.FILE') OBJ('/QIBM/UserData/mqm')
```

6. If you are going to run IBM MQ on a new machine, transfer the save files to the new machine.

7. Issue the following command before you upgrade your IBM MQ product, only if the upgrade is required on the same machine.

- a) DLTMQM QMgrName
- b) ENDSBS SBS(QMQM) OPTION(\*IMMED)
- c) WRKOBJLCK OBJ(QMQM) OBJTYPE(\*LIB)

Relinquish any locks on the system.

## **IBM i** Install IBM MQ server on IBM i

Install the IBM MQ server in its primary language and force object conversion.

### Before you begin

In either of the following cases, ensure that you have completed the planning and set the system values; see [“Configuring and tuning the operating system on IBM i”](#) on page 65

- If you have obtained the product through the [Passport Advantage and Passport Advantage Express website](#), follow the instructions in the `EGA.README.txt` file.
- If you have obtained the product on disk, follow the instructions within this topic.

### About this task

Install the IBM MQ server and force object conversion. Object conversion migrates objects from the older to the newer version. By performing it now, rather than when an object is first used, you avoid slowing down the first use of the upgraded product.

After following the optional step to pre-agree the license, the **RSTLICPGM** command runs without requiring any interactive input. Otherwise the license agreement is displayed for you to accept. See [“License requirements”](#) on page 8.

### Procedure

1. Sign on to the system with a user profile that has \*ALLOBJ special authority, for example QSECOFR.
2. Optionally pre-agree the license terms and conditions by running the command,

```
CALL PGM(QSYS/QLPACAGR) PARM('5724H72' 'V8R0M0' '0000' 0)
```

Where the parameters of **PARM** are,

#### **5724H72**

The product identifier for IBM i.

#### **V9R4M0**

The version, release, and modification level.

#### **0000**

The option number for the \*BASE IBM MQ product option.



## 0

Unused error structure.

3. Install IBM MQ for IBM i, base product, and primary language.

```
RSTLICPGM LICPGM (5724H72) DEV (installation device) OPTION (*BASE) OUTPUT (*PRINT)
```

where the parameters of RSTLICPGM are,

### **LICPGM (5724H72)**

The product identifier for IBM i.

### **DEV (installation device)**

The device from which the product is to be loaded, typically an optical drive, for example, OPT01.

### **OPTION (\*BASE)**

Install the base IBM MQ for IBM i product.

### **Unspecified parameters**

Unspecified parameters such as **RSTOBJ** (\*ALL), revert to defaults. The command installs both IBM MQ and the language files for the primary language of your system. For installing additional languages see [Installing translated versions](#).

## What to do next

Install any Program Temporary Fixes (PTF) that have been issued.

To install the IBM MQ samples, see: [“Install samples on IBM i”](#) on page 457.

### *Post installation tasks*

Actions required after upgrading IBM MQ.

## About this task

Install the samples.

Carry out these steps after installing the product.

## Procedure

1. Issue the following commands:

- a) STRSBS SBSD(QMQM/QMQM)

- b) CRTMQM MQMNAME(QMgrName) DFTQMGR(\*YES)

You receive the message " IBM MQ queue manager created."

- c) STRMQM MQMNAME(QMgrName)

You receive the message " IBM MQ queue manager ' QMgrName ' started."

2. Issue the following command:

```
STRMQMQSC SRCMBR(QMgrName) SRCFILE(*CURLIB/QMQSC) OPTION(*RUN)  
MQMNAME(QMgrName)
```

3. Reapply IBM MQ Authorities by issuing the command: CALL PGM(\*CURLIB/QMgrName)

- a) You must compile the CLP as follows:

```
CRTCLPGM PGM(*CURLIB/QMgrName) SRCFILE(*CURLIB/QMAUT) SRCMBR(*PGM)
```

How to upgrade an IBM MQ system on IBM i

## Before you begin

Ensure that you have backed up your entire system.

## About this task

To upgrade an IBM MQ system on IBM i you carry out a slip installation.

See [“Installation methods on IBM i” on page 452](#) for further information.

### Related tasks

[“Migrating a queue manager on Windows” on page 398](#)

The procedures for migrating a queue manager to a later version of the product, and for restoring a queue manager to an earlier version of the product are detailed in this section.

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

## Before you begin

1. Create a migration plan. Use the planning task, [“Planning to migrate IBM MQ to a later version on IBM i” on page 450](#), as a guide.

## Procedure

1. Review the IBM MQ system requirements for the later version of the product.  
See [System Requirements for IBM MQ](#). See [“IBM MQ components and features” on page 6](#) and [“Where to find downloadable installation images” on page 10](#).
2. Review all the changes in IBM MQ that affect you.  
See [“Changes that affect migration” on page 354](#).
3. End all IBM MQ activity on the workstation.
4. Upgrade the client.  
To upgrade an IBM MQ MQI client for IBM i installation on a workstation; see [“Installing an IBM MQ client on IBM i” on page 79](#).

## What to do next

Complete the tasks in your migration plan, such as verifying IBM MQ MQI client applications work correctly with the latest version.

### Related concepts

[“IBM MQ MQI client migration” on page 363](#)

IBM MQ MQI client migration is the process of converting IBM MQ MQI client configurations, and client and server channels from one version to another. Client migration can take place after upgrading the IBM MQ MQI client, and is reversible.

### Related tasks

[“Installing an IBM MQ client on IBM i” on page 79](#)

The IBM MQ client for IBM i is a part of the IBM MQ product.

[“Migrating an IBM MQ MQI client on AIX and Linux” on page 441](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[“Migrating an IBM MQ MQI client on Windows” on page 415](#)

Before migrating an IBM MQ MQI client, create a migration plan. Stop all IBM MQ activity on the client workstation. Upgrade the IBM MQ MQI client installation. Make any essential configuration and application changes.

[Installing IBM MQ MQI clients on the same machine as the server](#)

## **Migrating from a single instance to a multi-instance queue manager on IBM i**

To migrate a single instance queue manager to a multi-instance queue manager, on IBM i, you must move the queue manager data to a shared directory, and reconfigure the queue manager on two other servers.

### **Before you begin**

You must check the prerequisites for running a multi-instance queue manager as part of this task. Some environments have been tested with multi-instance queue managers, and are known to work. IBM i has been tested with multi-instance queue managers and is known to work. For a list of tested environments, see [Testing statement for IBM MQ multi-instance queue manager file systems](#). The support statement has detailed version and prerequisite information for each environment it lists. Other environments might work; a test tool is provided with IBM MQ to assist you in qualifying other environments.

You must have three servers to run a multi-instance queue manager. One server has a shared file system to store the queue manager data and logs. The other servers run the active and standby instances of the queue manager.

### **About this task**

You have a single-instance queue manager that you want to convert to a multi-instance queue manager. The queue manager conversion itself is straightforward, but you must do other tasks to create a fully automated production environment.

You must check the prerequisites for a multi-instance queue manager, set up the environment and check it. You must set up a monitoring and management system to detect if the multi-instance queue manager has failed and been automatically restarted. You can then find out what caused the restart, remedy it, and restart the standby. You must also modify applications, or the way applications are connected to the queue manager, so that they can resume processing after a queue manager restart.

### **Procedure**

1. Check the operating system that you are going to run the queue manager on, and the file system on which the queue manager data and logs are stored on. Check that they can run a multi-instance queue manager.
  - a) Consult [Testing statement for IBM MQ multi-instance queue manager file systems](#). See whether the combination of operating system and file system is tested and capable of running a multi-instance queue manager.

A shared file system must provide lease-based locking to be adequate to run multi-instance queue managers. Lease-based locking is a recent feature of some shared file systems, and in some case fixes are required. The support statement provides you with the essential information.

- b) Run **amqmfscck** to verify that the file system is configured correctly.

File systems are sometimes configured with performance at a premium over data integrity. It is important to check the file system configuration. A negative report from the **amqmfscck** tool tells you the settings are not adequate. A positive result is an indication that the file system is

adequate, but the result is not a definitive statement that the file system is adequate. It is a good indication.

- c) Run the integrity checking application provided in the technote, [Testing a shared file system for compatibility with IBM MQ Multi-instance Queue Managers](#).

The checking application tests that the queue manager is restarting correctly.

2. Configure a user and group to be able to access a share on the networked file system from each server that is running a queue manager instance.

On IBM i, QMQM, QMQMADM, and any other user profiles that are granted access to the share must have the same passwords on all the servers

3. Set up a directory for the share on the networked file system with the correct access permissions.

A typical configuration is to set up a single shared directory that contains all data and log directories for all queue managers that use the shared disk; see [Share named qmgrs and log directories](#).

For example, create a root directory on the share called MQHA that has subdirectories data and logs. Each queue manager creates its own data and log directories under data and logs. Create MQHA with the following properties:

On IBM i, follow the instructions to create a network share using NetServer.

4. Copy the queue manager data and the logs to the share.

You can choose to copy files manually, by following the procedure to back up the queue manager. elect one of these methods:

- Follow the instructions in [Backups of IBM MQ for IBM i data](#), copying the queue manager data to the share. You must use this method if the **DataPath** configuration attribute is specified for this queue manager.
- Stop the queue manager, and then type the command,

```
hamvmqm /m /dd share\data /dd share\logs
```

Where *share* is to be the location of the data and logs that you created in step “3” on page 468.

5. Update the queue manager configuration information stored on the current queue manager server.

If you moved the queue manager data and logs by running the **hamvmqm** command, the command has already modified the configuration information correctly for you.

If you moved the queue manager data and logs manually, you must complete the following steps.

- On IBM i,
  - a. Modify the Log: stanza in the queue manager *qm.ini* file, which is on the *share*:

```
LogPath= share/logs/QMgrName
```

- b. Modify the QueueManager: stanza in the IBM MQ *mqs.ini* file, which is typically in the /QIBM/UserData/mqm directory on IBM i:

```
DataPath= share/data/QMgrName
```

Where, *QMgrName* is the Directory name in the QueueManager: stanza in the *mqs.ini* file on IBM i. *share* is share where the data and logs are moved to.

6. Add the queue manager configuration information to the new queue manager server.

- a) Run the **dspmqinf** command to display the queue manager information on the server that ran the queue manager in the previous release.

```
dspmqinf -o command QMgrName
```

The command output is formatted ready to create a queue manager configuration.

```
addmqinf -s QueueManager -v Name= QMgrName -v Directory= QMgrName -v  
Prefix=d:\var\mqm Datapath= \share\data\QMgrName
```

b) Create a queue manager configuration on the other server.

Run the **addmqinf** command copied from the previous output

7. Add the network address of the new server to the connection name in client and channel definitions.

a) Find all the client, sender, and requester TCPIP settings that refer to the server.

Client settings might be in Client Definition Tables (CCDT), in environment variables, in Java properties files, or in client code.

Cluster channels automatically discover the connection name of a queue manager from its cluster receiver channel. As long as the cluster receiver channel name is blank or omitted, TCPIP discovers the IP address of the server hosting the queue manager.

b) Modify the connection name for each of these connections to include the TCPIP addresses of both servers that are hosting the multi-instance queue manager.

For example, change:

```
echo DISPLAY CHANNEL(ENGLAND) CONNAME | runmqsc QM1
```

```
5724-H72 (C) Copyright IBM Corp. 1994, 2024. ALL RIGHTS RESERVED.
```

```
Starting MQSC for queue manager QM1.
```

```
1: DISPLAY CHANNEL(ENGLAND) CONNAME
```

```
AMQ8414: Display Channel details.
```

```
CHANNEL(ENGLAND) CHLTYPE(SDR)
```

```
CONNAME(LONDON)
```

Into:

```
echo ALTER CHANNEL(ENGLAND) CHLTYPE(SDR) CONNAME('LONDON, BRISTOL') | runmqsc QM1
```

8. Update your monitoring and management procedures to detect the queue manager restarting.

9. Update client applications to be automatically reconnectable, if appropriate.

10. Update the start procedure for your IBM MQ applications to be started as queue manager services.

11. Start each instance of the queue manager, permitting them to be highly available.

The first instance of the queue manager that is started becomes the active instance.

Issue the command twice, once on each server.

```
strmqm -x QMgrName
```

## What to do next

To get the highest availability out of multi-instance queue managers, you must design client applications to be reconnectable and server applications to be restartable; see [Application recovery](#).

### Related concepts

[Application recovery](#)

[Automatic client reconnection](#)  
[Channel and client reconnection](#)  
[Multi-instance queue managers](#)

**IBM i** [Multi-instance queue managers on IBM i](#)

[Shared file system](#)

### Related tasks

[Backing up queue manager data](#)  
[Verifying shared file system locking](#)

### Related reference

[amqmfscck](#) (file system check)

**Multi** [Changing IBM MQ configuration information on Multiplatforms](#)

### Related information

[Testing a shared file system for compatibility with IBM MQ Multi-instance Queue Managers](#)  
[Testing statement for IBM MQ multi-instance queue manager file systems](#)

**IBM i** ***Reverting to a single-instance queue manager on IBM i***

Revert a multi-instance queue manager to a single instance queue manager, on IBM i, by stopping the standby instance. Then restart the active instance and do not set the flag that permits standby instances.

## Before you begin

You have at least three servers configured to run a queue manager as a multi-instance queue manager. The queue manager is currently running as a multi-instance queue manager, with one standby instance active.

## About this task

The task involves deactivating the active standby so that only the running multi-instance queue manager remains active. To prevent a standby instance being started in the future, you must stop the active instance and restart it. When you restart it, you start it as a single instance queue manager that prevents standby instances being started. The standby instance is stopped as a separate step, to give you the option of restarting the active instance at a later date. You can stop both instances by running the standard `endmqm QMgrName` command on the server running the active queue manager.

## Procedure

1. Stop the standby queue manager instance.

On the server running the standby instance:

```
ENDMQM MQMNAME (QMgrName) *WAIT
```

2. Stop the active queue manager instance.

On the server running the active instance:

```
ENDMQM MQMNAME (QMgrName) *WAIT
```

3. Restart the queue manager, preventing standbys.

On the server that is going to run the queue manager:

```
STRMQM MQMNAME (QMgrName)
```

## What to do next

You might want to run the queue manager as a single instance on the same server as the queue manager data.

When the queue manager is stopped move the queue manager data back to the server that is running the queue manager. Alternatively install IBM MQ, and then move the queue manager configuration definition onto the server with the queue manager data. Both tasks are variations of steps in [“Migrating from a single instance to a multi-instance queue manager on IBM i”](#) on page 467 to create a multi-instance queue manager.

## Migrating IBM MQ on z/OS

Migration tasks associated with z/OS are grouped in this section.

### Related concepts

[“Migration concepts and methods”](#) on page 357

An overview of the various concepts and methods for migrating from one release of the product to another.

[“Migration paths”](#) on page 356

An overview of the migration paths between different IBM MQ versions. For some IBM MQ for z/OS migration paths, you can revert to the version you were using prior to migration. For IBM MQ for Multiplatforms, you cannot easily revert to a previous version.

### Related tasks

[“Migrating IBM MQ on IBM i”](#) on page 449

IBM MQ migration tasks associated with IBM i are grouped in this section.

[“Migrating IBM MQ on AIX and Linux”](#) on page 424

Migration tasks associated with AIX and Linux platforms are grouped in this section.

[“Migrating IBM MQ on Windows”](#) on page 392

IBM MQ migration tasks associated with Windows platforms are grouped in this section.

### Related reference

[“Changes that affect migration”](#) on page 354

### Related information

[WebSphere MQ Support, Migration PTFs](#)

## Upgrade and migration of IBM MQ on z/OS

You can install new releases of IBM MQ to upgrade IBM MQ to a new release, version or modification (VRM) level. Running a queue manager at a higher level to the one it previously ran on requires migration.

From IBM MQ for z/OS 9.0.0, the way you upgrade the systems in your enterprise has changed. For more information, see [IBM MQ Release Types and versioning](#).

When you install a new level of IBM MQ on z/OS using SMP/E, it creates a set of IBM MQ libraries. The libraries for different levels of IBM MQ can coexist on the same instance of z/OS, allowing you to run different queue managers against different levels of IBM MQ on the same z/OS LPAR.

If you start a queue manager running on a later release level, then migration of the queue manager to that release level is required, even if the difference is only in the modification level, some migration might be required. The migration tasks that you must perform to migrate from one version to another are documented in [“Planning to migrate IBM MQ for z/OS to IBM MQ for z/OS 9.4”](#) on page 472; see also [“Changes that affect migration”](#) on page 354.

## Supported migration paths

Direct migration to IBM MQ for z/OS 9.4.0 is supported from IBM MQ for z/OS 9.2.0 and later, including all Continuous Delivery (CD) releases.

Migration from releases earlier than IBM MQ for z/OS 9.2.0, such as IBM MQ for z/OS 9.1.0, to IBM MQ for z/OS 9.4.0 is supported using the process described in [“Migrating from earlier unsupported releases of IBM MQ for z/OS ”](#) on page 472.

## Backwards migration

Migration from IBM MQ for z/OS 9.2.0 or 9.3.0 to IBM MQ for z/OS 9.4.0 Long Term Support (LTS) or IBM MQ for z/OS 9.4.0 Continuous Delivery (CD) releases are reversible; this reversal process is known as backwards migration.

Backwards migration is only supported if a queue manager was previously migrated.

### Notes:

1. There is no longer a need to install migration and coexistence PTFs to enable backwards migration. The backwards migration process for version 9.4.0 is described in [“Reverting a queue manager to a previous version on z/OS”](#) on page 482.
2. Migration from a CD release, such as IBM MQ for z/OS 9.3.5 to IBM MQ for z/OS 9.4.0 LTS or CD is not reversible, neither is migration to a CD release, unless that CD release is IBM MQ for z/OS 9.4.0 CD.
3. Migration from releases earlier than IBM MQ for z/OS 9.2.0 is not reversible; see [“Migrating from earlier unsupported releases of IBM MQ for z/OS ”](#) on page 472.

### Related concepts

[“Queue manager coexistence”](#) on page 373

Queue managers, with different names, can coexist on any server as long as they use the same IBM MQ installation. On z/OS, AIX, Linux, and Windows, different queue managers can coexist on the same server and be associated with different installations.

[“Migration methods on IBM MQ for Multiplatforms”](#) on page 365

There are three main methods of migrating from one release to another: Single-stage migration (called a slip installation on IBM i), side-by-side migration, and multi-stage migration. Multi-stage migration is not an option for IBM i.

## **Migrating from earlier unsupported releases of IBM MQ for z/OS**

IBM MQ for z/OS 9.4 supports migration of queue managers that previously ran at IBM MQ for z/OS 9.2 or later.

### Migrating from a release earlier than IBM MQ for z/OS 9.2

Migrating from a release earlier than IBM MQ for z/OS 9.2, for example, IBM MQ for z/OS 9.1 or IBM MQ for z/OS 9.0, requires a multi-stage migration.

Firstly, you must migrate the earlier release of IBM MQ to IBM MQ for z/OS 9.2 or IBM MQ for z/OS 9.3, following the instructions given in the documentation for that release. For more information about where to find the documentation for older versions of the product, see [Documentation for older versions of IBM MQ](#).

You can then migrate to IBM MQ for z/OS 9.4 following the instructions in [“Migrating IBM MQ for z/OS - order of tasks”](#) on page 474.

**Important:** Ensure that your system is stable at IBM MQ for z/OS 9.2 or IBM MQ for z/OS 9.3, before migrating to IBM MQ for z/OS 9.4, so that you have a system to revert to, if necessary.

## **Planning to migrate IBM MQ for z/OS to IBM MQ for z/OS 9.4**

Create a plan for migrating IBM MQ for z/OS to IBM MQ for z/OS 9.4.

### Before you begin

If there are concepts about migration you do not understand, see [“Migration concepts and methods”](#) on page 357.



## About this task

Use the following steps as a guide to creating your own plan to migrate your queue managers to IBM MQ for z/OS 9.4. Incorporate the task to migrate a queue manager, [“Migrating IBM MQ for z/OS - order of tasks”](#) on page 474, into your plan.

Migration plan overview for your enterprise	
Migration phase	Required tasks
Phase I, before migration.	Prepare each queue manager in your enterprise for migration.  See <a href="#">“Preparing to migrate a single IBM MQ for z/OS queue manager”</a> on page 476 for further information.
Phase II, migrate each single queue manager in the order listed.	Carry out this process for each queue manager.  For queue managers in a cluster, migrate full repository queue managers before migrating any partial repository queue managers.
Phase III, post migration.	See <a href="#">“Post migration tasks”</a> on page 484 for further information.

## Procedure

1. Review the IBM MQ system requirements for IBM MQ for z/OS 9.4.  
See [System requirements for IBM MQ](#).
2. Review all the changes in the product that affect you.  
For more information, see [What's new and changed in IBM MQ for z/OS 9.4.0](#).
3. Review performance changes.  
See [IBM MQ - Performance documents](#).
4. Plan the sequence and timing of queue manager migrations.
  - Check that any products using the queue managers support IBM MQ for z/OS 9.4.
  - If the queue manager is a member of a queue manager cluster, you must consider the order of migration of queue managers in the cluster; see [“Migrating a queue manager cluster”](#) on page 487.
  - Queue managers in a QSG, and queue managers in a cluster can be migrated in parallel, but at any time there should be enough queue managers working in the QSG, and cluster, to ensure that your business can operate satisfactorily while a staged migration takes place. See [“Queue sharing group migration”](#) on page 474.
5. Plan to update any manual or automated procedures you have written with changes to messages and codes.
6. Plan to update applications that might be affected by changes.  
Consider whether the application must be able to run on both the previous version and IBM MQ for z/OS 9.4. You might be able to change the application to be compatible with both code levels. If you cannot, you can query the queue manager command level, and make the code conditional on the command level. Call MQINQ setting the MQIA\_COMMAND\_LEVEL selector.
7. Decide on what regression tests to perform after migrating.  
Include the procedures and applications you identified in steps [“5”](#) on page 473 and [“6”](#) on page 473 in your regression tests.
8. Plan to migrate other vendor software, such as WebSphere Application Server, or CICS to use the later version.
9. Review any other installed SupportPacs for their applicability to IBM MQ for z/OS 9.4.

## What to do next

Perform the steps in your plan.

[About the CICS-MQ adapter](#)

[IBM MQ Support, Migration PTFs](#)

[IBM MQ - SupportPacs by Product](#)

### **Queue sharing group migration**

Although you can include queue managers from different IBM MQ for z/OS versions in a queue sharing group, you should migrate all queue managers in a queue sharing group to the newest version as quickly as you can.

Queue sharing groups can contain queue managers with a restricted set of different versions. This is supported so that you can migrate and test the upgrade of each queue manager.

When you migrate queue managers in a queue sharing group, migrate all the queue managers to the new version as quickly as you can. Queue sharing groups with queue managers at different versions are harder to administer than if all the queue managers are at the same version.

Before you migrate any member of a queue sharing group, you must upgrade the early code on each LPAR that runs a member of the queue sharing group. The early code on each LPAR must be upgraded to the highest level of IBM MQ that you are migrating to. For more information, see step “2” on page 476 of [“Preparing to migrate a single IBM MQ for z/OS queue manager”](#) on page 476.

Migrate each queue manager, one at a time, leaving the queue sharing group running. At no stage is an outage of the entire queue sharing group required.

Migrating each queue manager comprises the bulk of the work of migrating a queue sharing group. Approach migrating a queue sharing group as requiring some extra tasks that must be completed during the migration of each queue manager. These tasks are listed in [“Migrating IBM MQ for z/OS - order of tasks”](#) on page 474 as part of the procedure to migrate a single queue manager.

A good approach is to create a migration plan that incorporates queue sharing group migration. For more information, see [“Planning to migrate IBM MQ for z/OS to IBM MQ for z/OS 9.4”](#) on page 472.

Queue managers that run at IBM MQ for z/OS 9.2.n, 9.3.n, and 9.4.n LTS and CD releases (where n is greater than or equal to 0) can coexist in a queue sharing group.

When you plan a migration, refer to [Queue sharing group coexistence on z/OS](#) to determine whether your queue sharing group supports the migration of your queue manager.

### **Related reference**

[“Queue sharing group coexistence on z/OS”](#) on page 384

Queue managers running on IBM MQ for z/OS 9.3, or any of the 9.3.x Continuous Delivery (CD) releases, can be part of a QSG with queue managers running on IBM MQ for z/OS 9.1.0 or later. This applies to any combination of CD and Long Term Support (LTS) releases from IBM MQ for z/OS 9.1.0.

### **Migrating IBM MQ for z/OS - order of tasks**

Perform these instructions, in the order shown, to migrate a single IBM MQ for z/OS queue manager.

## Before you begin

Review [“Planning to migrate IBM MQ for z/OS to IBM MQ for z/OS 9.4”](#) on page 472.

## About this task

This topic lists the tasks required in each part of the process to migrate a single IBM MQ for z/OS queue manager, and the order in which these tasks must be done.

**Note:** You must perform the tasks in the following order:

1. [Before migration](#)

## 2. Migrating to the next release


### 3. Post migration tasks

## Procedure

### Before migration

- Before migration, complete the following tasks:
  - a) Make your existing queue manager ready for migration
  - b) Install IBM MQ for z/OS 9.4
  - c) Perform a backup operation
  - d) Run CSQ5PQSG, if using queue sharing groups
  - e) Update the STEPLIB concatenations for Batch, TSO, and RRS applications
  - f) Update the libraries you added to connect CICS to the queue manager
  - g) Update the libraries for the operations and control panels to the latest version IBM MQ libraries
  - h) Update system libraries to format IBM MQ dumps using the Interactive Problem Control System (IPCS)
  - i) Consider the migration of other server applications
  - j) Prepare the mqweb server for migration

### Migrating to the next release

- To migrate to the next release, complete the following tasks:
  - a) Update the initialization input data sets
  - b) Stop or disconnect all the applications using the queue manager
  - c) Stop the queue manager and its channel initiator
  - d) Update STEPLIB for the queue manager and the channel initiator
  - e) Update the queue manager startup JCL to add the CSQMINI DD card
  - f) If using a CipherSpec for a channel with SSLCIPH set to its direct hexadecimal value, for example 009D, update the channel initiator startup JCL to enable the relevant protocol .
  - g)  If migrating from IBM MQ 9.3.0 or earlier, increase the MEMLIMIT parameter in the channel initiator JCL to a minimum of 2G.
  - h) Start the queue manager and channel initiator
  - i) Test that everything is working correctly. If a problem occurs, revert the queue manager to a previous version
  - j) Optionally, migrate the mqweb server

### Post migration tasks

- After migration, complete the following tasks:
  - a) Check the changes in behavior
  - b) Modify the backup jobs to refer to the target version of IBM MQ libraries
  - c) Update the ZPARM module, if required
  - d) Perform a full regression test
  - e) Migrate client applications
  - f) Exploit the new functions provided by the migrated queue manager
  - g) Optionally, stop the mqweb server for previous versions

## *Preparing to migrate a single IBM MQ for z/OS queue manager*

Review the z/OS and IBM MQ customization steps, and change any customizations before starting any queue managers at IBM MQ for z/OS 9.4. Follow the steps to prepare a single IBM MQ queue manager on z/OS for migration.

### **Before you begin**

You can continue to run the queue manager on the previous version until it is ready to switch to IBM MQ for z/OS 9.4. Preparing for the switch can be a long process. Switching from the earlier version to IBM MQ for z/OS 9.4 is a quick process. The switch to IBM MQ for z/OS 9.4 occurs when you restart the queue manager using the IBM MQ for z/OS 9.4 libraries.

#### **Tips:**

1. To migrate applications, or the queue manager, when moving to a new release of IBM MQ, without changing STEPLIB, create data set aliases such as MQM.QMGR.SCSQLOAD, and reference them in JCL.  
Map the aliases to the real data sets, such as MQM.MQV940.SCSQLOAD.
2. You can use the z/OS command `D GRS,SYSTEM,RES=(*,MQM.V940.SCSQLOAD)` to display which jobs are using the specified data set, and so identify which jobs and JCL need to be changed.

### **About this task**

The steps are based on the setup procedure for new queue managers; see [Customizing your queue managers](#).

To prepare to migrate an IBM MQ queue manager on z/OS, you need to carry out the detailed steps in this topic, using the links within this overview.

1. Make your existing queue manager ready for migration; see [step 1](#).
2. Install IBM MQ for z/OS 9.4 and make target libraries available to all z/OS systems that are running queue managers, and grant access; see [step “2” on page 476](#).
3. Perform a back up operation of each queue manager in your enterprise; see [step “3” on page 477](#).
4. Bind, and grant execute authority for the Db2 plans; see [step 5](#).
5. Run CSQ5PQSG if using queue sharing groups, see [step “5” on page 478](#).
6. Update the STEPLIB concatenations for Batch, TSO, and RRS applications; see [step “6” on page 478](#).
7. If you are planning to define a QMINI data set, see [step “7” on page 478](#).
8. Update the libraries you added to connect CICS to the queue manager; see [step “8” on page 478](#).
9. Update the libraries for the operations and control panels to the IBM MQ for z/OS 9.4 libraries; see [step “9” on page 478](#).
10. Update system libraries to format IBM MQ dumps using the Interactive Problem Control System (IPCS); see [step “10” on page 479](#).
11. Consider the migration of other server applications; see [step “11” on page 479](#).
12. Prepare the mqweb server for migration; see [step “12” on page 479](#).

### **Procedure**

1. Make your IBM MQ configuration ready for migration, by applying the latest maintenance to the current version libraries.  
Refer to the Preventive Service Planning (PSP) bucket for your version of IBM MQ; see [PSP Buckets - How to find them on Web](#).
2. Install IBM MQ for z/OS 9.4, and make target libraries available to all z/OS systems that are running queue managers, and grant access.  
You must carry out the following procedure for each z/OS system.

If migrating a member of a queue sharing group, you need to upgrade the early code on all LPARs which host a member of the group, before any of the members of the group are migrated.

- a) Copy the IBM MQ target libraries to the system, and install the early code for IBM MQ for z/OS 9.4 (once for each z/OS system).
- b) APF authorize the load libraries and grant access to the data sets using your external security system.

See [APF authorize the IBM MQ load libraries](#) for more information.

Ensure that the APF lists in SYS1.PARMLIB are updated to ensure that any changes made dynamically remain in effect after an IPL.

- c) Make the IBM MQ for z/OS 9.4 early code and target libraries available on each z/OS system that is running queue managers.

This involves updating the LPA; see [Update the z/OS link list and LPA](#) for more information.

Once this is done, the following message is displayed in the job log of all queue managers when they start up, indicating they are using the most recent version of early code:

```
CSQ3111I <cpf> CSQYSCMD - EARLY PROCESSING PROGRAM IS V9.4 LEVEL 010-000
```

If you are using AMS, also add CSQ0DRTM to the LPA as described in the previous link.

- d) Copy the file system zFS and mount it read only.

You only need zFS if one of the following is installed:

- IBM MQ for z/OS UNIX System Services Components
- IBM MQ for z/OS Managed File Transfer
- IBM MQ for z/OS UNIX System Services Web Components
- IBM MQ for z/OS Connector Pack

See the Program Directory for further information. For download links for the Program Directories, see [IBM MQ for z/OS Program Directory PDF files](#).

3. Perform a back up operation for each queue manager in your enterprise, so that you have a copy of all objects and JCL before you make any changes.

This makes rolling back to the current system easier, if you require to do so.

- a) Back up your IBM MQ defined objects, for example using CSQUTIL COMMAND MAKEDEF(..)

See [Using the COMMAND function of CSQUTIL](#) for more information.

- b) Back up:

- Started task procedures for the queue manager, channel initiator and, if applicable, the AMS address space.
- The Initialization input data sets used in the CSQINP1 and CSQINP2 concatenations
- The system parameter module (ZPARM) libraries
- The JCL libraries containing the configuration definitions for your queue manager
- Other libraries containing queue manager configuration or procedures.

**Note:** You might also make a back up of page sets, BSDSs, and active logs as a fallback option. See [How to back up and recover page sets](#) for more information on backing up IBM MQ resources.

4. If you are using queue sharing groups, bind, and grant execute authority for the Db2 plans.

Customize and run the CSQ45BPL and CSQ45GEX samples in hlq.SCSQPROC. Tailor these members to your environment, using your Db2 subsystem names and data set names.

The header information in CSQ45BPL and CSQ45GEX describes how to customize the samples:

- CSQ45BPL of hlq.SCSQPROC contains the plan names required for the latest version of IBM MQ
- CSQ45GEX of hlq.SCSQPROC contains the authorities required

See steps 5 and 6 of [Set up the Db2 environment](#).

5. If you are using queue sharing groups, run `CSQ5PQSG`.

You must specify the **MIGRATE QSG** or **MIGRATE DSG** function, to verify that all queue managers in the QSG or DSG are at a version that is compatible with IBM MQ for z/OS 9.4.

6. Update the libraries you added to STEPLIB concatenations, to make Batch, TSO, and RRS adapters available to applications, so that they can always load the highest version IBM MQ library in the system.

Change the STEPLIB for the Batch, TSO, and RRS applications to reference the IBM MQ for z/OS 9.4 libraries, then restart the applications.

See [Set up Batch, TSO, and RRS adapters](#) for more information.

IBM MQ libraries include:

#### **thlqual.SCSQANLx**

This library contains error message information for your national language. The letter 'x' represents the letter for your national language.

#### **thlqual.SCSQAUTH**

This library contains the code that the applications use.

**Notes:** You can:

- a. Connect applications that reference IBM MQ for z/OS 9.4 libraries in STEPLIB to a queue manager that is running on IBM MQ for z/OS 9.4 or earlier. You must not connect applications that reference a STEPLIB from an earlier version to a queue manager running on a later version.
- b. Use the following command, replacing *thlqual* with the High Level Qualifier for your installation, to check which jobs are running with the specified library:

```
TSO ISRDDN ENQ 'thlqual.SCSQAUTH'
```

You can then modify the JCL for those jobs accordingly.

7. If you are planning to define a QMINI data set, define the data set and update the queue manager start up JCL to add CSQMINI DD to point to your QMINI data set.
8. Update the libraries you added to connect CICS to the queue manager.

You must update the IBM MQ libraries in the STEPLIB and DFHRPL concatenations of your CICS region JCL and restart CICS. You are then able to use the most recent IBM MQ features.

The connection between IBM MQ and CICS is provided by CICS libraries that you must update. Without this change, you are not able to use the most recent IBM MQ features. You must change the SCSQCICS library in the DFHRPL concatenation provided by IBM MQ, and also the STEPLIB concatenation.

For each CICS region that is connected to an IBM MQ queue manager, ensure that there is a separate CICS started procedure JCL.

This ensures that the modification of reference to a certain version of IBM MQ libraries in the CICS started procedure JCL only has impact for that single CICS region. In this way you can migrate one queue manager, and only the CICS region or regions connected to it, which makes staged migration possible.

CICS STEPLIB has thlqual.SCSQAUTH, and DFHRPL has thlqual.SCSQCICS, thlqual.SCSQLOAD, and thlqual.SCSQAUTH. For more information, see [Setting up the CICS - IBM MQ adapter](#).

**Note:** You can connect applications that reference IBM MQ for z/OS 9.4 libraries in STEPLIB to a queue manager that is running on IBM MQ for z/OS 9.4 or earlier. You must not connect applications that reference a STEPLIB from an earlier version to a queue manager running on a later version.

9. Update the libraries for the operations and control panels to the IBM MQ for z/OS 9.4 libraries.

For more information, see [Set up the operations and control panels](#).

**Note:** You can connect the operations and control panel that references IBM MQ for z/OS 9.4 libraries to the queue manager that is running on IBM MQ for z/OS 9.4, or earlier. You must not connect the

operations and control panel that references IBM MQ libraries from an earlier version to a queue manager running on a later version.

10. Update system libraries to format IBM MQ dumps using the Interactive Problem Control System (IPCS).

For more information, see [Include the IBM MQ dump formatting member](#).

11. Migrate other software, such as WebSphere Application Server for z/OS, Liberty, IBM Integration Bus, or IMS to use IBM MQ for z/OS 9.4 libraries.

- a) WebSphere Application Server for z/OS

If you are running in an application server environment where a bindings connection is being used, you need to update the WAS STEPLIB with IBM MQ libraries.

See [IBM MQ libraries and the WebSphere Application Server for z/OS STEPLIB](#) for further information.

You also need to configure the IBM MQ messaging provider with native libraries from IBM MQ for z/OS 9.4 of the IBM MQ installation; see [Configuring the IBM MQ messaging provider with native libraries](#) for further information.

Use the latest level of native libraries in z/OS UNIX System Services.

- b) WebSphere Application Server for z/OS Liberty

If you are running in an application server environment where a bindings connection is being used, you need to update the Liberty STEPLIB to use the updated IBM MQ for z/OS libraries.

You should also update the `wmqJmsClient.rar.location` variable, and the `wmqJmsClient nativeLibraryPath` attribute, in the Liberty `server.xml` to point to the new path to the z/OS UNIX System Services components feature.

**Note:** These steps also apply to IBM z/OS Connect EE.

- c) IMS

For more information, see [Setting up the IMS adapter](#).

**Note:** You can connect applications that reference IBM MQ for z/OS 9.4 libraries in STEPLIB to a queue manager that is running on IBM MQ for z/OS 9.4 or earlier. You must not connect applications that reference a STEPLIB from an earlier version to a queue manager running on a later version.

12. If you have configured the IBM MQ Console or REST API, you might need to prepare the mqweb server for migration.

The mqweb server that hosts the IBM MQ Console and REST API can only connect directly to queue managers at the same version of IBM MQ.

If you only have one queue manager on the z/OS system, you do not need to do anything now. You can migrate the existing mqweb server at the same time as the queue manager.

If you have more than one queue manager on the z/OS system, that will be running at different versions of IBM MQ during migration, create a new mqweb server at the latest level.

- a) Create a new mqweb server by following the procedure in [Create the mqweb server](#).
- b) Create a started task procedure for the new mqweb server by following the procedure in [Create a procedure for the mqweb server](#).
- c) Copy any relevant configuration settings from the `mqwebuser.xml` configuration file of the existing server to the `mqwebuser.xml` file of the new mqweb server.

The `mqwebuser.xml` file is in the `WLP_user_directory/servers/mqweb` directory, where `WLP_user_directory` is the directory that was specified when the `crtmqweb` script ran to create the mqweb server definition.

Configure the new server to use different HTTP and HTTPS ports to any existing servers.

- d) Start the new mqweb server by issuing the MVS™ **START procname** command, where `procname` is the name of the new mqweb server started task procedure.




## Results

You have prepared your IBM MQ queue manager on z/OS for migration.

## What to do next


Follow the instructions in [“Migrating a single IBM MQ z/OS queue manager to IBM MQ for z/OS 9.4” on page 480](#) to migrate the queue manager.

 *Migrating a single IBM MQ z/OS queue manager to IBM MQ for z/OS 9.4*

Carry out the instructions in this topic to migrate a single IBM MQ queue manager on z/OS.

## About this task

To migrate an IBM MQ queue manager on z/OS to a different version, you need to carry out the:

- Process described in [“Preparing to migrate a single IBM MQ for z/OS queue manager” on page 476](#)
- Detailed steps in this topic, using the links within this overview.
  1. Update the initialization input data sets; see step [“1” on page 480](#).
  2. Stop or disconnect all the applications using the queue manager; see step [“2” on page 480](#).
  3. Stop the queue manager and its channel initiator; see step [“3” on page 480](#).
  4. Update STEPLIB for the queue manager and the channel initiator; see step [“4” on page 480](#).
  5. If you have planned to define a QMINI data set, update the queue manager startup JCL to add the CSQMINI DD card; see step [“5” on page 481](#).
  6. If there are any channels that specify a hexadecimal value for the SSLCIPH channel attribute, for example 009D, check if you need to update the channel initiator JCL to enable the use of the CipherSpec; see step [“6” on page 481](#).
  7.  If migrating from IBM MQ 9.3.0 or earlier, increase the MEMLIMIT parameter in the channel initiator JCL; see step [“7” on page 481](#)
  8. Start the queue manager and its channel initiator; see step [“8” on page 481](#).
  9. Test that everything is working correctly. If there is a problem starting the queue manager, revert the queue manager to a previous version; see step [“9” on page 481](#).
  10. Optionally, migrate the mqweb server; see step [“10” on page 481](#).

## Procedure

1. Update the initialization input data sets.

Each IBM MQ queue manager gets its initial definitions from a series of commands contained in the IBM MQ initialization input data sets. These data sets are referenced by the Data Definition (DD) names CSQINP1, CSQINP2, and CSQINPT defined in the queue manager started task procedure. The channel initiator started task procedure has a similar data set referenced by the CSQINPX DD name.

See [Customize the initialization input data sets](#) for more information on the initialization input data sets.

The samples supplied for the initialization input data sets can change between versions of IBM MQ. You must review the customization you have made previously to CSQINP1, CSQINP2, CSQINPT, and CSQINPX, and merge them into the initial definitions provided with the latest version of the product. See [“Changes to initialization input data sets” on page 481](#) for more information.

2. Stop or disconnect all the applications using the queue manager (for example, CICS, IMS, or batch) and the IBM MQ channels that are connected to other queue managers.
3. Stop the queue manager and its channel initiator.
4. Update the STEPLIB for the queue manager, channel initiator and, if appropriate, AMS, started task procedures to use the IBM MQ for z/OS 9.4 libraries.



5. Update the queue manager startup JCL to add the CSQMINI DD card; see [The QMINI data set](#) for further information.
6. **Deprecated** If any channels running to or from the queue manager specify a hexadecimal value directly as their SSLCIPH value, you must update the channel initiator startup JCL to include DD cards to enable the relevant protocol for that CipherSpec.  
See [Deprecated CipherSpecs](#) for more information.
7. **V 9.4.0**  
If migrating from IBM MQ 9.3.0 or earlier, increase the MEMLIMIT parameter in the channel initiator JCL to a minimum of 2G.  
See [Storage configuration](#) for further information.
8. Start the queue manager and its channel initiator.
9. Test that everything is working correctly. If there is a problem starting the queue manager, consider reverting the queue manager to a previous version; see [Reverting a queue manager to a previous release](#).
10. If you have configured the IBM MQ Console or REST API, migrate the mqweb server.  
If you only have one queue manager on the z/OS system, migrate the mqweb server to IBM MQ for z/OS 9.4.
  - a) Stop the mqweb server started task.
  - b) Edit the mqweb server started task.
    - Change STEPLIB to reference the IBM MQ for z/OS 9.4 libraries.
    - Change INSTDIR, PATH and LIBPATH to reference IBM MQ for z/OS 9.4 files in z/OS UNIX System Services.
    - Review JAVA\_HOME, and change it to reference the latest 64 bit version of Java on your system, if necessary.

For more information on configuring the mqweb server started task procedure, see [Create a procedure for the mqweb server](#).
  - c) Ensure that the mqweb server is associated with the correct product ID.  
**Note:** From IBM MQ for z/OS 9.2, this is done in a different way compared to earlier versions. See [Associating the mqweb server with a PID](#) for more information.
  - d) Start the mqweb server started task.
  - e) Test that the queue manager can be accessed in the IBM MQ Console and REST API.  
If you have more than one queue manager on the z/OS system, running at different versions of IBM MQ, you should already have [created a new mqweb server at the latest level](#). Use the new mqweb server to access queue managers that have been migrated to IBM MQ for z/OS 9.4. You might need to change the HTTP host name or port used by applications that use the REST API.

## Results

You have migrated your IBM MQ for z/OS queue manager to the latest release.

## What to do next

Follow the instructions in [“Post migration tasks” on page 484](#) to complete the migration process.

### **z/OS** *Changes to initialization input data sets*

Sometimes the initialization input data sets samples change between versions of IBM MQ.

Important changes which are relevant to IBM MQ for z/OS 9.4, and when they were first available, are described below.

## CSQ4INSG

### IBM MQ for z/OS 9.0.4

The default value of **ADOPTCTX** for SYSTEM.DEFAULT.AUTHINFO.IDPWOS has changed to *YES*.

### IBM MQ for z/OS 9.0.1

Local queue SYSTEM.REST.REPLY.QUEUE added, to support the IBM MQ REST API.

Review the changes, and update the customized versions you are currently using as required.

#### Note:

The changes to the initialization data sets are required in [Create procedures for the IBM MQ queue manager](#) and [Customize the initialization input data sets](#).

#### *Reverting a queue manager to a previous version on z/OS*



After migrating to IBM MQ for z/OS 9.4.0 LTS or IBM MQ for z/OS 9.4.0 CD, from either IBM MQ for z/OS 9.3.0 or IBM MQ for z/OS 9.2.0, you can backward migrate, or fallback, to the version you were using prior to migration, using the **BACKMIG** option on the **START QMGR** command. Backwards migration is not supported for a CD release such as IBM MQ for z/OS 9.2.5.

## Before you begin

Certain function available in IBM MQ for z/OS 9.4 can affect the ability to backwards migrate. These functions are not enabled by default, but if you have enabled these functions, you need to disable them prior to performing backwards migration.

You should not exploit new IBM MQ for z/OS 9.4 functions, until you are sure that you will not need to perform backwards migration.

### Migrating back to IBM MQ for z/OS 9.3.0

  The first-class CAPEXPY attribute no longer applies to any object definitions, and will be deleted at the point of backwards migration. If you want to maintain these CAPEXPY values, identify any objects with the first-class CAPEXPY attribute set, and revert to using the CUSTOM attribute before migrating.

  For example, if MY .QUEUE has a CAPEXPY value of 5000:

```
ALTER QL(MY.QUEUE) CAPEXPY(NOLIMIT) CUSTOM(' CAPEXPY(5000)')
```



**Attention:** It is not a supported configuration to leave the first-class CAPEXPY attribute set on a shared object if any queue managers in the queue sharing group are being backwards migrated. This configuration might lead to both the first-class CAPEXPY and CUSTOM CAPEXPY attributes being set at the same time.

In this instance, the first-class attribute is always used by the queue managers that do support it, and the CUSTOM attribute applies to those that do not. Therefore, if any queue managers are being backwards migrated, only the CUSTOM CAPEXPY value should be set, to avoid confusion.

### Migrating back to IBM MQ for z/OS 9.2.0

Information described in the preceding *Migrating back to IBM MQ for z/OS 9.3.0 section* applies.

The **STATQ**, **STREAMQ**, and **STRMQOS** parameters introduced in IBM MQ 9.3.0 no longer apply, and for private, and copy object definitions, the new options are deleted at the point of backwards migration.

## About this task

A queue manager can only be backwards migrated if it outputs the [CSQY039I](#) message at start up. In this case you can use the information in this topic to perform the backwards migration.

Backwards migration is normally only performed immediately after a migration fails for some reason. However, it is possible to perform backwards migration at any time if the [CSQY039I](#) message is output at queue manager start up.

#### Notes:

- After performing a `START QMGR BACKMIG(vrm)`, the queue manager is ready to be started at the specified level.

If, instead, you start the queue manager at a higher version level than was specified for the **BACKMIG** operation, the queue manager forward-migrates the queue manager to the higher version, and it is no longer possible to backwards migrate unless you repeat the `START QMGR BACKMIG` operation.

- The **BACKMIG** operation makes direct changes to the page sets of IBM MQ and the objects stored on them. This means that you can restart the queue manager at the specified **BACKMIG** version, even if an IPL occurs before queue manager restart, or if the queue manager is started on a different LPAR.

If a queue manager issues the [CSQY040I](#) message at start up, backwards migration is not supported, and the procedure described in the following text is not applicable. If you have a back up of the queue manager data, prior to the migration, you could use that data to start the queue manager up at the earlier release.

#### Procedure

1. Ensure that the queue manager does not have any offline page sets.  
If it does, use the command **CSQUTIL FORMAT** to bring the page sets back online.
2. Shut the queue manager down cleanly.
3. Run the command `START QMGR BACKMIG(vrm)` where *vrm* is the version, release and modifier value of the release previously migrated from, for example 920.

This value is output in the [CSQY039I](#) message at queue manager start up.



**Attention:** You need to remove the period characters from the message output.

You should include the **PARM** parameter, if it is used usually with the **START QMGR** command.

The queue manager starts up, rewrites its data in a format suitable for backwards migration, and shuts down. If the command processes successfully, the [CSQY045I](#) message is output.

If the [CSQY043E](#) message is output, examine the messages displayed to resolve the problem and retry the command again.

4. Switch back to use the MSTR and CHINIT started procedure JCLs with the IBM MQ for z/OS 9.3.0 or IBM MQ for z/OS 9.2.0 libraries, as required.

If data set aliases are being used for load libraries, switch the aliases to refer to the IBM MQ for z/OS 9.3.0 or IBM MQ for z/OS 9.2.0 libraries.

For example, an alias named `MQM.MQP1.SCSQLOAD`, referring to `MQM.MQV940.SCSQLOAD`, needs to be changed to refer to `MQM.MQV930.SCSQLOAD`, or `MQM.MQV920.SCSQLOAD`, as required.

5. If you had planned to define a QMINI data set and you had added CSQMINI DD to your MSTR started procedure, remove the CSQMINI DD card.
6. Revert to using the system parameter module (CSQZPARM) used with IBM MQ for z/OS 9.3.0 or IBM MQ for z/OS 9.2.0, prior to migration, and linking to the IBM MQ for z/OS 9.3.0 or IBM MQ for z/OS 9.2.0 code, as required.
7. Verify the backwards migration by starting the queue manager, channel initiator and, listener or listeners separately.
8. Check for, and resolve, any errors that occur during start up.  
Once all three components start up cleanly, you can combine the start up of the three components, if required.
9. Verify correct functioning of existing applications.

## Results

Your queue manager will now be running at the version of code it was originally migrated from.

**Note:** It is not necessary to fall back the early code to the previous version, for this installation, when reverting your queue manager to an earlier version.

Early code refers to the IBM MQ load modules that must be loaded into the Link Pack Area (LPA) for IBM MQ to act as a z/OS subsystem. When a command is issued to a queue manager, or when an application connects to a queue manager, the first action taken by the IBM MQ system is to load the early code.

The LPA must contain the IBM MQ early code modules from the latest version of IBM MQ running on the system. For example, if an IBM MQ for z/OS 9.4.0 and IBM MQ for z/OS 9.3.0 queue manager run on the same system, the early code for IBM MQ for z/OS 9.4.0 must be loaded in the LPA.

For more information, see [Early code](#).

## Related information

[START QMGR \(start queue manager\) on z/OS](#)

### *Post migration tasks*

Follow the steps to perform the tasks you need to carry out after migrating a single IBM MQ queue manager on z/OS.

## About this task

After you have migrated an IBM MQ queue manager on z/OS you need to carry out the detailed steps in this topic, using the links within this overview.

1. Check the changes in behavior; see step [“1”](#) on page 484.
2. Modify the backup jobs to refer to the target version of IBM MQ libraries; see step [“2”](#) on page 484.
3. Update the ZPARM module if you have not already done so before starting the queue manager; see step [“3”](#) on page 484.
4. Perform a full regression test; see step [4](#).
5. Migrate client applications; see step [5](#).
6. Exploit the new functions provided by the migrated queue manager; see step [6](#).
7. Optionally, stop the mqweb server for previous versions; see step [7](#).

## Procedure

1. Check the changes in behavior made by default configuration changes.  
The default values of some properties might have been changed in the new version, which can lead to changes in behavior.
2. Modify backup and other administrative jobs, such as jobs to backup IBM MQ objects and channel authentication records, and MAKEDEF jobs.  
For example using CSQUTIL COMMAND MAKEDEF(..); see [Using the COMMAND function of CSQUTIL](#) to refer to the target version of IBM MQ libraries.
3. Update the system parameter (ZPARM) module if required.  
Note the following:
  - You should review changes to the ZPARM parameters between the version you have migrated from, and IBM MQ 9.4.0.
  - If you need to change the value of any parameters, you should generate a new ZPARM at this point. Do this by:
    - a. Tailoring the ZPARM sample to use the new IBM MQ libraries
    - b. Updating values for the parameters as necessary, and

- c. Recompiling, to generate the new ZPARM.
  - You do not have to recompile the ZPARM, if you do not change the values of any parameters.
- 4. Perform a full regression test.
- 5. Migrate client applications.
 

Client applications can be considered any time throughout the migration phase.

Clients are backwards and forwards compatible. It is advisable to migrate the client libraries to the same, or later, level as the queue manager, so that the latest function is available.
- 6. Exploit new functions provided by the migrated queue manager.
 


Your queue manager has been fully migrated to a new version level, so you can now take benefit of new capabilities.

However, note that additional configuration might be required to enable selected new features.

Review [What's new and changed in IBM MQ 9.4](#) and check which features best serve your business needs. Plan your action to develop new applications, or changing configurations, to enable those features.
- 7. If you created a new mqweb server for the latest version, you can stop the mqweb server for any previous versions when all queue managers on the z/OS system have been migrated to the latest version.

## Results

You have completed the migration of a single IBM MQ for z/OS queue manager.

 *Migrating a Managed File Transfer for z/OS installation to the next version of the product*  
 Follow these instructions to migrate an IBM MQ Managed File Transfer for z/OS installation to IBM MQ for z/OS 9.4.

## Overview

From IBM MQ 9.2, the install process for Managed File Transfer for z/OS (MFT) changed on z/OS.

MFT no longer has its own SMP/E install. Instead, MFT is installed at the same time as the queue manager code, using the IBM MQ for z/OS SMP/E install. For details on the install process see: [“Changes caused by making IBM MQ Managed File Transfer for z/OS part of the base product installation” on page 281.](#)

From IBM MQ for z/OS 9.2, the MFT libraries are placed into an mqft directory underneath the directory containing the z/OS UNIX System Services (z/OS UNIX) Components. For example: /mqm/V9R4M0/mqft.

Note that the mqft directory structure is the same as before, apart from the bin directory.

In earlier versions of MFT the bin directory was a peer of the mqft directory. That is, you might have installed MFT into a /mqmfte/V9R1Mn/ directory, and that directory would have contained both an mqft and a bin directory.

From IBM MQ for z/OS 9.2, the bin directory is located underneath the mqft directory; for example: /mqm/V9R4M0/mqft/bin.

**Important:** As part of migrating IBM MQ for z/OS 9.4, you should:

1. Adjust any scripts you had that are dependent on this directory structure.
2. Look at any JCL which you use to launch MFT processes, and adjust the BFG\_PROD and MQ\_PATH variables appropriately.

For example, if you have installed z/OS UNIX Components into /mqm/V9R4M0/ the value of MQ\_PATH will be /mqm/V9R4M0/ and the value of BFG\_PROD will be /mqm/V9R4M0/mqft.

Finally, the **fte\*** commands no longer require that the LIBPATH environment variable contains the path to the IBM MQ for z/OS Java libraries.

## Migration process

The process of migrating MFT to a new version is:

1. Install IBM MQ for z/OS 9.4, including the MFT component.
2. Perform a controlled shutdown of all of the agents in your topology:
  - a. For agents that are administered using JCL, you can do this by running the BFGAGSP member within the agent's data set
  - b. For agents that are being administered using z/OS UNIX, run the command **fteStopAgent** *agent\_name*.
3. Stop your loggers:
  - a. If your logger is being administered using JCL, run the BFGLGSP member within the logger's data set.
  - b. For loggers that are administered using z/OS UNIX, run the command **fteStopLogger** *logger\_name*
4. For each agent or logger that is being administered by JCL:
  - a. Copy the SCSQFCMD data set from the IBM MQ for z/OS 9.4 installation into a new data set specific to that agent or logger.
  - b. Edit the BFGCUSTM member inside the data set, and set the parameters enclosed within ++ characters to the appropriate values.
  - c. Run BFGCUSTM inside the copy of the data set. This generates a new set of JCL that can be used to administer the agent or logger.
  - d. Start the agent or logger again by running either the BFGAGST or BFGLGST member within the data set.
5. For each agent or logger that is being administered from z/OS UNIX:
  - a. The **fte\*** commands used to administer the agent or logger are located in a `mqft/bin` directory under the IBM MQ for z/OS UNIX System Services Components install; for example: `/mqm/V9R4M0/mqft/bin`.  
  
You need to adjust any scripts calling these commands, to take account of this change.
  - b. The commands no longer require that the IBM MQ for z/OS Java lib directory, for example, `/mqm/V9R4M0/java/lib` is in the LIBPATH environment variable.  
  
If you manually set the LIBPATH environment variable to contain the IBM MQ for z/OS Java lib directory, no longer do so.  
  
This variable might also be set in a `.wmqfterc` file, in which case you should remove it.
  - c. Additionally, you might need to update the STEPLIB environment variable if the queue manager has been migrated at the same time.  
  
This variable might be set in a `.wmqfterc` file as described in [Environment variables for MFT on z/OS](#).
  - d. Finally, you need to set the BFG\_DATA environment variable to the same value as it was before, to ensure the agent or logger has access to its existing configuration.  
  
This variable might be set in a `.wmqfterc` file as described in [Environment variables for MFT on z/OS](#).
  - e. Start the agent or logger again

### Related tasks

[Using Managed File Transfer for z/OS](#)

## **Adding a new queue sharing group to an existing Db2 data sharing group that is used by existing queue sharing groups**

Follow these steps to add a new queue sharing group, containing queue managers running at IBM MQ for z/OS 9.4, to a Db2 data sharing group used by existing queue sharing groups, running at earlier versions of IBM MQ for z/OS.

### **Before you begin**

Ensure all queue managers in the existing queue sharing groups have the latest versions of maintenance applied, including all migration and coexistence PTFs that are applicable.

For example, if the existing queue sharing groups contain a mixture of IBM MQ for z/OS 8.0, 9.0 and 9.1 queue managers, the IBM MQ for z/OS 8.0 queue managers should have the migration and coexistence PTFs that allow them to coexist with 9.0 and 9.1 queue managers, and the IBM MQ for z/OS 9.0 queue managers should have the migration and coexistence PTFs that allow them to coexist with 9.1 queue managers.

**Note:** There are no migration and coexistence PTFs specific to IBM MQ for z/OS 9.2 or higher.

### **About this task**

A Db2 data sharing group can be used by multiple different queue sharing groups, running a variety of different versions of IBM MQ for z/OS.

All the different queue sharing groups will share the same set of IBM MQ related tables, and these tables must use the definitions provided by the highest version of IBM MQ using the Db2 data sharing group, which in this case will be IBM MQ for z/OS 9.4.

### **Procedure**

1. Set up the coupling facility.

See [Set up the coupling facility](#).

2. Customize and include the initialization input sample `thlqual.SCSQPROC` (CSQ4INSS) in the CSQINP2 data set.

See [“Preparing to migrate a single IBM MQ for z/OS queue manager” on page 476](#) for more information.

3. Add the IBM MQ entries to the Db2 data-sharing group using the **CSQ5PQSG** program.

See [Add the IBM MQ entries to the Db2 data-sharing group](#).

4. Tailor the system parameter module to add Db2 data-sharing group and IBM MQ queue sharing group information.

See [“Preparing to migrate a single IBM MQ for z/OS queue manager” on page 476](#) for more information.

## **Migrating IBM MQ to a CP4I container**

The key steps to migrate an existing IBM MQ queue manager into a container environment using the IBM Cloud Pak for Integration container for IBM MQ.

### **About this task**

This scenario is documented here: [Migrating IBM MQ to a CP4I container scenario](#)

### **Migrating a queue manager cluster**

You can migrate queue managers in a cluster all at once, or one at a time, which is called a staged migration. Migrate full repository queue managers in a cluster before partial repository queue managers.



You must consider what the effect is of migrating some queue managers in a cluster, before all the queue managers are migrated.

## Before you begin

Before starting the migration, check that no cluster-specific migration issues are identified for the migration you are intending to perform.

Consider the following issues that relate to migrating a queue manager cluster:

- Minimizing application outages.
- Measuring and verifying migration success and planning for backward migration if there are any migration problems.
- Taking advantage of new IBM MQ features
- Managing the migration of a cluster in the context of the wider IBM MQ network and the systems architecture of your organization.

## About this task

Cluster queue managers can participate in clusters with other queue managers running at different versions, which is why a staged migration is possible. Being able to stage a migration is important, as migrating each queue manager in a cluster takes time. By staging the migration, which leaves other queue managers that are in the cluster running, you reduce the effect of queue manager downtime on applications.

Migrate queue managers with full repositories first. Then migrate the other queue managers, which have partial repositories, one at a time. Complete migration of the entire cluster before starting to use new functions.

If you do have to start using new functions before completing migration of the entire cluster, you might need to refresh the partial repositories. After each migration of a queue manager with a partial repository, issue the **REFRESH CLUSTER** command on the newly migrated queue manager. The command updates the cluster records in the newly migrated queue manager, potentially receiving updates for any new attributes. Do not do this step if you migrated the entire cluster before using new function. The **REFRESH CLUSTER** command takes a long time for all the changes to work through the cluster.

**Note:** For large clusters, use of the **REFRESH CLUSTER** command can be disruptive to the cluster while it is in progress, and again at 27 day intervals thereafter when the cluster objects automatically send status updates to all interested queue managers. See [Refreshing in a large cluster can affect performance and availability of the cluster](#).

If full repositories are not migrated before partial repositories, the cluster continues to work, but without all the new features in a version working as expected. To work predictably, the full repository queue managers must be running the latest IBM MQ major version (for LTS users) or CD version (for CD users). This ensures that the full repositories can store information from the rest of the cluster that arises from using new features.

A repository stores a record it receives in its own version. If the record it receives is at a later version, the later version attributes are discarded when the record is stored. An IBM MQ 9.3 queue manager receiving information about an IBM MQ 9.4 queue manager stores only IBM MQ 9.3 information. An IBM MQ 9.4 repository receiving an IBM MQ 9.3 record stores default values for attributes introduced in the later version. The defaults define the values for the attributes that are not included in the record it receives. For more information, see [“How mixed version cluster repositories are updated”](#) on page 489.

**Note:** In exceptional circumstances, it might be necessary to upgrade some of your partial repositories before your full repositories.

While the product supports this configuration, in this situation be very careful to avoid use of any new clustering function on the partial repositories, until your full repositories have been upgraded, to avoid unexpected results.



## Procedure

- For information about creating a migration plan for a queue manager cluster, see [“Creating a migration plan for a queue manager cluster”](#) on page 490.
- For information about creating a backout plan for the migration of a queue manager cluster, see [“Creating a backout plan for queue manager cluster migration”](#) on page 491.
- For information about how to migrate one queue manager in a queue manager cluster, see [“Migrating one cluster queue manager”](#) on page 491.

### ***How mixed version cluster repositories are updated***

Repositories store records for an object in a cluster in the version of the record format that matches the version of the queue manager hosting the repository. Repository queue managers forward object records, before they are stored, in the format that they are received in. The recipient ignores fields from a newer version, and uses default values for fields that are not present in the record.

Cluster repositories hold records that represent objects, for example, a queue record represents a cluster queue. A full repository holds records for all objects in the cluster. Partial repositories hold records for local objects and remote objects that are used locally. A repository record can hold information only about attributes at the same command level as the queue manager holding that repository. So for example, an IBM MQ 9.3 repository contains only IBM MQ 9.3 level attribute information. An IBM MQ 9.4 repository contains all IBM MQ 9.3 records, plus IBM MQ 9.4 records containing additional IBM MQ 9.4 attributes.

A repository stores a record it receives in its own version. If the record it receives is at a later version, the later version attributes are discarded when the record is stored. An IBM MQ 9.3 queue manager receiving information about an IBM MQ 9.4 queue manager stores only IBM MQ 9.3 information. An IBM MQ 9.4 repository receiving an IBM MQ 9.3 record stores default values for attributes introduced in the later version. The defaults define the values for the attributes that are not included in the record it receives.

A repository normally sends records in its own version format, which is the same as the format it has stored them in. There is one exception to this rule. When a full repository receives a record from a partial repository, it is immediately forwarded in the same format. So if an IBM MQ 9.3 full repository were to receive a record from an IBM MQ 9.4 partial repository, it would forward the IBM MQ 9.4 record. It sends the record to any other full repositories, and any other partial repositories that have subscriptions that match the record.

A partial repository reflects whichever full repository sent it the latest update to a record. As a consequence, you might see the information held by an IBM MQ 9.4 partial repository for new IBM MQ 9.4 attributes changing unexpectedly. The values might change from actual IBM MQ 9.4 information to default values. The changes occur if the full repositories in the cluster are at different levels. Migrate full repositories first to avoid instability.

A partial repository sends information about its objects to a full repository periodically at least once every 27 days. Information is sent about any object when it is altered or defined. See [How long do the queue manager repositories retain information?](#)

After migrating all full repositories to IBM MQ 9.4, some attributes might hold default values. The attributes might hold default values in place of actual values, if a repository has not received an update. You can refresh the repository in either of two ways:

- Alter the object which the record containing default values represents, for example, using `ALTER QL` for a local queue. The alteration forces the local repository to send the record again.
- Issue the **REFRESH CLUSTER** command on the partial repository which holds the record containing default values. **REFRESH CLUSTER** forces the partial repository to discard the record containing default values and get a new record as required.

**Note:** For large clusters, use of the **REFRESH CLUSTER** command can be disruptive to the cluster while it is in progress, and again at 27 day intervals thereafter when the cluster objects automatically send status updates to all interested queue managers. See [Refreshing in a large cluster can affect performance and availability of the cluster.](#)

In summary, for the most predictable, and fastest migration, when you stage cluster migration do these steps in the following order:

1. Migrate the queue managers with full repositories.
2. Migrate the queue managers with partial repositories.
3. Start using new function in the cluster.

**Note:** In exceptional circumstances, it might be necessary to upgrade some of your partial repositories before your full repositories.

While the product supports this configuration, in this situation be very careful to avoid use of any new clustering function on the partial repositories, until your full repositories have been upgraded, to avoid unexpected results.

### **Related concepts**

[How long do the queue manager repositories retain information?](#)

### ***Creating a migration plan for a queue manager cluster***

Before carrying out the migration of a queue manager cluster, plan what you are going to do. Identify the roles that different queue managers play in the cluster, and decide in what order to migrate the queue managers.

### **Procedure**

- What queue manager and application migration issues must be dealt with between the old and new versions?
- What system architecture and change control procedures must you consider?
- Consider migration questions specific to clusters, such as migrating full repositories first, and migrating overlapping clusters.
- Are any of the queue managers in a queue sharing group, or part of a high-availability solution?
- Is the cluster a publish/subscribe cluster? Which queue manager is a cluster topic host?
- Decide whether to carry out a staged migration, or migrate all queue managers at the same time.
- Do you have a test system to migrate , and a production system?
- Document and test the plan before migrating production queue managers.

### **Related concepts**

[“Application migration and interoperation” on page 364](#)

IBM MQ supports running applications compiled and linked against previous versions of IBM MQ, with later levels of IBM MQ. Use the new version of the libraries to build the applications, once the queue managers have been upgraded.

[Availability of cluster topic host queue managers](#)

[“How mixed version cluster repositories are updated” on page 489](#)

Repositories store records for an object in a cluster in the version of the record format that matches the version of the queue manager hosting the repository. Repository queue managers forward object records, before they are stored, in the format that they are received in. The recipient ignores fields from a newer version, and uses default values for fields that are not present in the record.

[“Queue manager migration” on page 361](#)

After upgrading an installation, queue manager migration might be required. Migration takes place when you start a queue manager. You can remove an upgrade before you have started a queue manager. However, if you remove the upgrade after a queue manager has been started, the queue manager will not work.

[“Queue sharing group migration” on page 474](#)

Although you can include queue managers from different IBM MQ for z/OS versions in a queue sharing group, you should migrate all queue managers in a queue sharing group to the newest version as quickly as you can.

### **Related tasks**

“[Migrating a queue manager in a high-availability configuration](#)” on page 494


High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

### ***Creating a backout plan for queue manager cluster migration***

Before performing a migration, decide on a backout plan in case of failure.

### **Before you begin**

What backout capabilities do the queue managers in the cluster support?

 If the libraries of the earlier level of IBM MQ include the appropriate PTFs to be able to backward migrate, queue managers running on z/OS can be reverted to an earlier level by changing the load libraries.

On other platforms, the only backout option is to restore a queue manager to a previous state. In restoring a queue manager, you lose any persistent changes since the queue manager started running at the new level.

### **About this task**

The backout plan must consider how to maintain the availability of the cluster. It must deal with any issues arising from migrating a queue manager in the cluster.

### **Procedure**

The backout plan must describe the following points:

- What constitutes a successful migration.
- The conditions that trigger the backout procedure.
- Alternative backout actions, such as:
  - a) Suspending a queue manager from the cluster.
  - b) Backward migration
  - c) Keeping a queue manager offline until an external issue is resolved.

### **Related concepts**

“[Queue manager migration](#)” on page 361

After upgrading an installation, queue manager migration might be required. Migration takes place when you start a queue manager. You can remove an upgrade before you have started a queue manager. However, if you remove the upgrade after a queue manager has been started, the queue manager will not work.

### ***Migrating one cluster queue manager***

Follow these steps to migrate a single queue manager in a cluster, starting with a queue manager in your test system. Base these steps on your cluster migration plan.

### **Procedure**

1. Suspend the queue manager that you want to migrate from the cluster:
  - a) Issue the **MQSC** command:

```
SUSPEND QMGR CLUSTER(cluster name)
```

- b) Check that no messages are sent to the queue manager.

You must close any application that continues to send messages to this queue manager. The cluster workload algorithm might choose the suspended queue manager. If there are no other valid destinations, or if an application has an affinity with the queue manager, it might select the queue manager.

2. Save a record of all cluster objects known by this queue manager. This data is used after migration to check that objects have been migrated successfully.

- a) Issue the command to view cluster queue managers.

```
DISPLAY CLUSQMGR(*)
```

- b) Issue the command to view cluster queues.

```
DISPLAY QC(*)
```

- c) Issue the command to view cluster topics.

```
DISPLAY TCLUSTER(*)
```

3. Save a record from the full repository of its view of the cluster objects owned by this queue manager. The record is used after migration to check that objects have been migrated successfully.

- a) Issue the command on the full repositories to display this queue manager.

```
DISPLAY CLUSQMGR(migrated queue manager name)
```

- b) Issue the command on the full repositories to display the cluster queues for this queue manager

```
DISPLAY QC(*) WHERE (CLUSQMGR EQ migrated queue manager name)
```

- c) Issue the command on the full repositories to display the cluster topics for this queue manager.

```
DISPLAY TCLUSTER(*) WHERE (CLUSQMGR EQ migrated queue manager name)
```

4. Migrate the queue manager.

Do one of the queue manager migration tasks, depending on the platform; see [“Migrating a queue manager on Windows”](#) on page 398.

The queue manager migration process is, in outline:

- a) Stop the queue manager.
- b) Take a backup of the queue manager.
- c) Install the new version of IBM MQ.
- d) Restart the queue manager.

5. Ensure that all cluster objects have been migrated successfully.

- a) Issue the command to view cluster queue managers and check the output against the data saved before migration.

```
DISPLAY CLUSQMGR(*)
```

- b) Issue the command to view cluster queues and check the output against the data saved before migration.

```
DISPLAY QC(*)
```

- c) Issue the command to view cluster topics and check the output against the data saved before migration.

```
DISPLAY TCLUSTER(*)
```

6. Check that the queue manager is communicating with the full repositories correctly.
7. Check that cluster channels to full repositories can start.
8. Check that the full repositories still have information about the migrated cluster queue manager, its cluster queues, and its cluster topics.
  - a) Issue the command on the full repositories and check the output against the data saved before migration.

```
DISPLAY CLUSQMGR(migrated_queue_manager_name)
```

- b) Issue the command on the full repositories and check the output against the data saved before migration.

```
DISPLAY QC(*) WHERE(CLUSQMGR EQ migrated_queue_manager_name)
```

- c) Issue the command on the full repositories and check the output against the data saved before migration.

```
DISPLAY TCLUSTER(*) WHERE(CLUSQMGR EQ migrated_queue_manager_name)
```

9. Test that applications on other queue managers can put messages to queues owned by the migrated cluster queue manager.
10. Test that applications on the migrated queue manager can put messages to the queues owned by other cluster queue managers.
11. Resume the queue manager by issuing the following command:

```
RESUME QMGR CLUSTER(cluster name)
```

12. Closely monitor the queue manager and applications in the cluster for a while.

## What to do next

When you have completed the migration of one queue manager in a cluster, on your test system, complete the migration of the other queue managers in each cluster on the test system.

When you have completed the migration of all of the queue managers on your test system, migrate each of the queue managers on your production system.

### Related concepts

[“Queue manager migration” on page 361](#)

After upgrading an installation, queue manager migration might be required. Migration takes place when you start a queue manager. You can remove an upgrade before you have started a queue manager. However, if you remove the upgrade after a queue manager has been started, the queue manager will not work.

### Related reference

[DISPLAYCLUSQMGR](#)

[DISPLAYQUEUE](#)

[RESUME QMGR](#)

[SUSPEND QMGR](#)

## Migrating a queue manager in a high-availability configuration

High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

### About this task

**Multi** For IBM MQ for Multiplatforms, high-availability configurations can be implemented by using a high-availability cluster solution or by using multi-instance queue managers. Red Hat Cluster Suite or Microsoft Cluster Service (MSCS) are examples of high-availability cluster solutions.

**Linux** For Linux platforms, you can implement high availability by using replicated data queue managers (RDQMs). For migrating RDQMs, see [“Migrating replicated data queue managers” on page 497](#).

**z/OS** For IBM MQ for z/OS there are several alternative techniques to increase queue manager availability; see [Availability on z/OS](#). Migration considerations on z/OS depend on the availability techniques that are employed, and are not described in this topic. The term high-availability configuration refers only to queue managers in configurations on platforms other than z/OS.

**MQ Appliance** Another solution is to configure a high availability group on a pair of IBM MQ Appliances. See the Appliance documentation for details of migrating HA queue managers.

The overall principles involved in queue manager migration in a high availability configuration based on multi-instance queue managers or on a high-availability cluster are the same. In either case, the principles are as follows:

1. You must not restart a queue manager at a lower command level than the one it was previously running.
2. You cannot upgrade the code if an active queue manager is running.
3. You cannot back up an active queue manager.

### Procedure

- To migrate a multi-instance queue manager, see [“Migrating a multi-instance queue manager” on page 494](#).
- To migrate a high availability cluster queue manager, see [“Migrating a high-availability cluster queue manager” on page 495](#).

### Related tasks

[“Migrating an MSCS configuration on Windows” on page 421](#)

Migrate queue managers in a Microsoft Cluster Service (MSCS) configuration one node at a time, following these instructions.

### *Migrating a multi-instance queue manager*

Follow the steps listed to migrate a queue manager in a multi-instance queue manager configuration.

### Before you begin

The following terms are relevant:

#### **active queue manager instance**

A queue manager instance that has been started permitting standby instances, and is running.

#### **standby queue manager instance**

A queue manager instance that has been started permitting standby instances, and is in standby. It is ready to take over from the active instance automatically.

## Procedure

Base your migration procedure on the following steps:

1. Before you start the migration process, create a different queue manager on a server, on which you have installed the upgrade.
2. Test the upgrade by performing whatever verification checks that your organization requires.
3. If you have a pool of servers that you pick from, when starting a queue manager instance, upgrade IBM MQ on the servers that are in the pool and are neither active or acting as a standby.
4. Stop the standby queue manager instance.  
Ensure that you have no system management procedure running that restarts the instance automatically.
5. If you do not have a pool of servers, upgrade IBM MQ on the server that was running the standby instance
6. Decide whether downtime or recoverability is more important in the migration.
7. Optional: Follow this procedure if recoverability is more important, and you must take a backup:
  - a) Stop the active queue manager instance, without switching to any standby.
  - b) Back up the queue manager
  - c) Start a queue manager instance, permitting standbys, on one of the upgraded servers.
  - d) If you have a pool of upgraded servers, start another one, permitting standbys.
8. Optional: Follow this procedure if availability is more important. You do not need to take a backup.
  - a) Start a queue manager instance as a standby on one of the upgraded servers.
  - b) Stop the active queue manager instance, switching to the standby.
  - c) If you have a pool of upgraded servers, start another one, permitting standbys.
9. Upgrade the IBM MQ code on the server that was the active queue manager instance.
10. Start the server as the standby instance if you have not already started a standby.

[“Migrating a queue manager in a high-availability configuration” on page 494](#)

High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

[“Migrating a high-availability cluster queue manager” on page 495](#)

Follow the steps listed to migrate a queue manager in a high-availability queue manager configuration.

### ***Migrating a high-availability cluster queue manager***

Follow the steps listed to migrate a queue manager in a high-availability queue manager configuration.

## Before you begin

The following terms are relevant:

### **active server**

The running server or active queue manager instance

### **passive server**

A server that is ready to take over from the active server automatically.

### **inactive server**

A server that is not prepared to take over automatically. The server might have been removed from the cluster, or taken offline in some way.

## Procedure

Base your migration procedure on the following steps. The details depend on the specific commands in the cluster concerned.

1. Before you start the migration process, create a different queue manager on a server on which you have installed the upgrade.
2. Test the upgrade by performing whatever verification checks that your enterprise requires.
3. Form two cluster pairs if you have four servers available.  
With two pairs, the queue manager can continue to run in a cluster-pair at the old command level. When you are ready, you can transfer the queue manager to the pair of servers at the new command level.
4. Remove a passive server from the cluster.  
Ensure that the cluster cannot automatically restart the server. The server is made inactive.
5. Create a second location for the upgraded code, if a high-availability cluster is using a common location for IBM MQ code.
6. Install, or upgrade, IBM MQ code using the server that is not now running the queue manager.
7. Verify the upgrade by creating a different queue manager on the server, and performing whatever verification checks that your organization requires.
8. If more than half the servers remain in the cluster, remove a server, upgrade IBM MQ, and verify the upgrade.  
Each server is made inactive as part of the process. Continue until half the servers are upgraded.
9. If your active server is part of a remaining cluster, deactivate the passive servers so that the cluster cannot reactivate them automatically.
10. Decide whether downtime or recoverability is more important in the migration.
11. Optional: Follow this procedure if recoverability is more important:
  - a) Stop the queue manager and remove the server from the cluster.
  - b) Back up the queue manager.
12. Optional: Follow this procedure if downtime is more important:
  - a) Add the migrated servers back into the cluster, as passive servers.
  - b) Switch the remaining server in the high-availability server cluster over to one of the passive servers.  
The switch causes the running queue manager to stop, and restarts it on one of the passive servers.
13. Upgrade any remaining high-availability servers, and add them back into the cluster.

[“Migrating a queue manager in a high-availability configuration” on page 494](#)

High-availability configurations of queue managers can increase the availability of IBM MQ applications. If a queue manager, or server fails, it is restarted automatically on another server. You can arrange for IBM MQ MQI client applications to automatically reconnect to the queue manager. Server applications can be configured to start when the queue manager starts.

[“Migrating a multi-instance queue manager” on page 494](#)

Follow the steps listed to migrate a queue manager in a multi-instance queue manager configuration.

### **9.4.0 Migrating an RDQM configuration from RHEL 8 to RHEL 9**

If you upgrade from RHEL 8 to RHEL 9, you must create a new Pacemaker cluster and migrate your replicated data queue managers (RDQMs) to the new cluster.

#### **About this task**

You must set up a separate RHEL 9 cluster and migrate each RDQM HA queue manager to it, using a backup and restore procedure. If you use a floating IP address to connect to an RDQM queue manager then you must recreate that floating IP address on the RHEL 9 cluster.

#### **Procedure**

1. Configure three RHEL 9 nodes.



2. Install IBM MQ Advanced on each of them, see [“Installing IBM MQ Advanced for Multiplatforms” on page 237](#).
3. Configure a new Pacemaker cluster to create a new HA group, see [Defining the Pacemaker cluster \(HA group\)](#).
4. Recreate each queue manager that you want to from the existing RHEL 8 HA Group, see [Creating an HA RDQM](#).
5. For each RDQM queue manager to be moved, complete the following actions:
  - a) End the RDQM queue manager on the RHEL 9 node.
  - b) End the RDQM queue manager on the RHEL 8 node.
  - c) Take a backup of the RDQM queue manager, its config and its data as required, on the RHEL 8 node, see [Backing up and restoring IBM MQ queue manager data](#).
  - d) Restore the backup on the RHEL 9 node.
6. Start the RDQM queue manager on the RHEL 9 node.
7. If required, configure the floating IP address on the RHEL 9 HA group, see [Creating and deleting a floating IP address](#).
8. After you confirm that the RDQM queue manager is working correctly on the RHEL 9 HA group, delete the queue manager from the RHEL 8 HA group, see [Deleting an HA RDQM](#).

## **Migrating replicated data queue managers**

When you need to migrate replicated data queue managers (RDQMs), you must upgrade all nodes in a sequence. Do not try to operate with the nodes at different levels.

This guidance is appropriate for moving between major releases, or CD releases, but not for applying (fix pack) maintenance. (See [“Applying maintenance level updates for RDQM” on page 316](#).)

**Note:** RHEL 7 is not supported on 9.4. If you were using RHEL 7 you must upgrade to RHEL 8 or RHEL 9 as part of this migration. You must set up a separate RHEL 9 or RHEL 8 cluster and migrate each RDQM HA queue manager to it, using a backup and restore procedure. If you use a floating IP address to connect to an RDQM queue manager then you must recreate that floating IP address on the new cluster.

The upgrade sequence for HA RDQM configurations consists of suspending a node, uninstalling IBM MQ and RDQM support, installing the newer version of IBM MQ and RDQM support, then resuming the node. You then move on and repeat this sequence on the next node. Following this sequence ensures that your queue managers continue to run on one of the nodes in the HA group while the migration is in progress.

The upgrade sequence for DR RDQM configurations consists of upgrading the recovery node, running the DR queue managers on the newly upgraded recovery node, upgrading the primary node, switching the DR queue managers back to running on the primary node.

The upgrade sequence for DR/HA RDQM configurations consists of upgrading the HA group on the recovery site, performing a managed failover from the main site to the recovery site, and then upgrading the HA group on the main site before failing the queue managers back to the main site.

You can back up a replicated data queue manager before migration.

### **Related tasks**

[“Installing RDQM \(replicated data queue managers\)” on page 256](#)

Installation tasks associated with RDQM are grouped in this section. RDQM is available on x86-64 for RHEL 8 (8.8 or later) and RHEL 9 (9.2 or later).

### *Migrating HA RDQMs*

Follow this sequence of steps to upgrade all the RDQM nodes in an HA group and so migrate the replicated data queue managers (RDQMs).

### **About this task**

You should upgrade all the nodes in an HA group in the same sequence to avoid operating with the nodes in the group at different levels.

**Note:** RHEL 7 is not supported on 9.4. If you were using RHEL 7 you must upgrade to RHEL 8 or RHEL 9 as part of this migration. You must set up a separate RHEL 9 or RHEL 8 cluster and migrate each RDQM HA queue manager to it, using a backup and restore procedure. If you use a floating IP address to connect to an RDQM queue manager then you must recreate that floating IP address on the new cluster.

If you have configured your HA group such that one node acts as a primary for all RDQMs, with the other two nodes as secondaries, you should upgrade the secondary nodes first and leave the primary node until last.

The sequence in which you upgrade, and the nodes that are marked as preferred and second preferred locations for RDQMs, affect where the RDQMs fail over to as you upgrade. During the migration sequence, while nodes are running different levels, the options for failing over are limited. An RDQM running on a lower level node can fail over to a higher level node but, once a queue manager has been started at the new level, it cannot fail over to a lower level node. You should choose an upgrade sequence and use preferred and second preferred locations settings to keep queue managers running on the lower level nodes for as long as possible. You should make changes to preferred and second preferred location settings before you suspend nodes, to ensure that the changes are effective immediately.

If you are also running DR RDQMs on any of the nodes, you should deal with these queue managers at the same time by following the instructions in [“Migrating DR RDQMs”](#) on page 499.

## Procedure

- Uninstall HA RDQM support and upgrade RDQM and IBM MQ.
  - a) Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

- b) Log in as root or switch to superuser using the **su** command.
- c) Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

- d) Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

- e) Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

- f) Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the drbd or drbd\_transport\_tcp kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp  
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

- g) Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).
- h) Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- Repeat the steps for the second node in the HA group. (Use the same path as you did on the first node.)

- Repeat the steps for the third node in the HA group. (Use the same path as you did on the first node.)

## Related reference

[rdqmadm \(administer replicated data queue manager cluster\)](#)

### Migrating DR RDQMs

Follow this sequence of steps to upgrade the primary and recovery nodes in a disaster recover replicated data queue manager (DR RDQM) configuration.

## About this task

The suggested sequence for upgrading your nodes is to upgrade your recovery node, then run your DR queue managers there while you then upgrade your primary node. When both nodes are upgraded you can restore the original primary and recovery roles.

**Note:** RHEL 7 is not supported on 9.4. If you were using RHEL 7 you must upgrade to RHEL 8 or RHEL 9 as part of this migration. You must set up a separate RHEL 9 or RHEL 8 cluster and migrate each RDQM queue manager to it, using a backup and restore procedure.

If you do not require to run your DR queue managers during the upgrade procedure, then you can omit the steps for failing over to the recovery node. You can just stop your DR queue managers and restart them after you have upgraded both nodes.

If you are also running HA RDQMs on either of the nodes, you should deal with these queue managers at the same time by following the instructions in [“Migrating HA RDQMs”](#) on page 497.

## Procedure

- Uninstall DR RDQM and IBM MQ and upgrade RDQM and IBM MQ.
  - a) Upgrade the DR secondary node:
    - a. Log in as root or switch to superuser using the **su** command.
    - b. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

- c. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

- d. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

- e. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

- f. Install the new levels of IBM MQ and RDQM, see [Installing RDQM \(replicated data queue managers\)](#).
- b) On the DR primary node, do one of the following steps:
    - End the DR queue managers, or
    - Perform a managed failover of the DR queue managers to the DR secondary node.

c) Upgrade the DR primary node:

- a. Log in as root or switch to superuser using the **su** command.
- b. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

c. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

d. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

e. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp  
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

f. Install the new levels of IBM MQ and RDQM, see [Installing RDQM \(replicated data queue managers\)](#).

d) On the DR primary node, do one of the following steps:

- Start the DR queue managers (if you previously ended them), or
- Perform a managed failover of the DR queue managers back to the DR primary node.

### *Migrating DR/HA RDQMs*

Follow these steps to upgrade all the RDQM nodes in both HA groups in a DR/HA configuration, and so migrate the replicated data queue managers (RDQMs).

## About this task

The suggested sequence for upgrading your nodes is to upgrade the HA group at your recovery site, then run your DR/HA queue managers there while you upgrade the HA group at your main site. When both HA groups are upgraded you can restore the original main and recovery roles.

**Note:** RHEL 7 is not supported on 9.4. If you were using RHEL 7 you must upgrade to RHEL 8 or RHEL 9 as part of this migration. You must set up a separate RHEL 9 or RHEL 8 cluster and migrate each RDQM HA queue manager to it, using a backup and restore procedure. If you use a floating IP address to connect to an RDQM queue manager then you must recreate that floating IP address on the new cluster.

## Procedure

- Uninstall DR/HA RDQM and IBM MQ and upgrade RDQM and IBM MQ.
  - a) Upgrade the HA group on your recovery site (presuming that the DR/HA RDQMs are running on the main site). Complete the following steps on each node in the group in turn.
    - a. Log in as root or switch to superuser using the **su** command.
    - b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

c. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

d. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

e. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

f. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp  
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

g. Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).

h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- b) On the HA group at the main site, either stop your queue managers, or perform a managed failover to the HA group that you have just upgraded on the recovery site.
- c) Upgrade the HA group on your main site. Complete the following steps on each node in the group in turn.

a. Log in as root or switch to superuser using the **su** command.

b. Suspend the HA group on the node, by entering the following command:

```
rdqmadm -s
```

c. Uninstall IBM MQ (this step also uninstalls RDQM):

```
rpm -qa | grep MQSeries | xargs yum -y remove
```

d. Uninstall Pacemaker:

```
rpm -qa | grep linbit | xargs yum -y remove
```

e. Uninstall DRBD:

```
rpm -qa | grep drbd | xargs yum -y remove
```

f. Verify that the DRBD kernel was successfully unloaded:

```
lsmod | grep drbd
```

If either the `drbd` or `drbd_transport_tcp` kernel modules are still loaded, they can be unloaded with the following commands:

```
modprobe -r drbd_transport_tcp  
modprobe -r drbd
```

If the unload fails for any reason, reboot the node.

- g. Install the new level of IBM MQ and dependent software, see [Installing RDQM \(replicated data queue managers\)](#).
- h. Resume the HA group on the node by entering the following command:

```
rdqmadm -r
```

You can now proceed to the next node in the group.

- d) You can now either start your queue managers (if you previously stopped them) or fail them back over to the main site from the recovery site.

### Related tasks

[“Migrating HA RDQMs” on page 497](#)

Follow this sequence of steps to upgrade all the RDQM nodes in an HA group and so migrate the replicated data queue managers (RDQMs).

[“Migrating DR RDQMs” on page 499](#)

Follow this sequence of steps to upgrade the primary and recovery nodes in a disaster recover replicated data queue manager (DR RDQM) configuration.

## Migrating to Internet Protocol version 6 (IPv6)

IBM MQ lets queue managers communicate using IPv6 in addition to IPv4. This simplifies migration from IPv4 to IPv6.

### Before you begin

When you are thinking of installing IBM MQ and using IPv6, bear in mind the following key points:

- IBM MQ recognizes IPv6 hexadecimal addresses (for example fe80:43e4:0204:acff:fe97:2c34:fde0:3485) as well as IPv4 dotted decimal addresses (for example 9.20.9.30).
- For a system running both IPv4 and IPv6 system, the connection name (CONNNAME) you specify for a given channel determines the IP protocol for the channel making a connection.
- To ensure consistency across the network, you should plan the introduction of IPv6 for the whole network, especially where clusters are involved. For example, although a queue manager is now IPv6 capable, this doesn't imply that the queue managers it can communicate with are also IPv6 capable.
- When setting the domain name server (DNS) or equivalent, consider whether the system on which the target queue manager is running can resolve to an IPv4 address, an IPv6 address or a dual IPv4 and IPv6 address.
- If the system that you are installing IBM MQ on does not support IPv6, IBM MQ will only be able to connect using IPv4.
- For a queue manager running on an IPv6 enabled system to be able to communicate with a queue manager running on an IPv4 enabled system, the IPv4 enabled system must have a host name that resolves to an IPv4 address only.
- If there are multiple domain name servers in an IBM MQ network, each host name used in a channel definition must resolve to the same address (or addresses), regardless of which DNS is used.

### About this task

Internet Protocol version 6 (IPv6) is designed by the Internet Engineering Task Force (IETF) to replace Internet Protocol version 4 (IPv4). IPv4 has been in use for over 20 years and is one of the primary methods for machines to communicate with each other over the internet. IPv4 is limited to 32-bit addressing for internet addresses. These addresses are needed by all new machines added to the internet and they are beginning to run out. The IETF is the controlling standards body for the Internet and to meet the growing demand for internet addresses the IETF has increased the number of digits used for Internet addresses from 32 to 128 bits. IPv6 offers a far larger number ( $2^{128}$ ) of internet addresses and should solve the address shortage for the foreseeable future. IPv6 is expected to gradually replace IPv4, with the two protocols coexisting for a number of years. IPv6 also simplifies header formats and improves

support for extensions and options, flow labeling capability, and consolidated authentication and privacy capabilities.

IPv6 is supported on the following IBM MQ platforms:

-  AIX
-  IBM i
-  Linux
-  Windows
-  z/OS

For more information about IPv6, see [IPv6](#).

### ***Migrating a queue manager to IPv6***

This section deals with migrating a queue manager when you are thinking of installing IBM MQ on an IPv6 network.

The IPv6 protocol can only be used by IBM WebSphere MQ 6.0 or later. In order to make use of the IPv6 protocol, IBM MQ must be installed on a system that is IPv6 capable.

The preferred IP version that two systems use for communicating (if both IPv4 and IPv6 are available) is determined by a new queue manager attribute IPADDRV. This parameter only has an effect if the host name resolves ambiguously to both an IPv4 address and an IPv6 address.

To migrate a queue manager to use the IPv6 protocol:

1. Configure dual IPv4 and IPv6 protocols on the system where the queue manager to be migrated resides.
2. Install IBM MQ.
3. Add an entry to the DNS to resolve the host name of the system that is to be migrated, to both an IPv4 address and an IPv6 address.
4. Set the IPADDRV parameter to IPv6 (or set the LOCLADDR parameter to resolve to an IPv6 address).



**CAUTION:** Not all IPv6 software can interpret an IPv4 mapped IPv6 address. If the combination of CONNAME and LOCLADDR results in an IPv4 mapped IPv6 address, ensure that the system hosting the target queue manager is capable of handling this.

Using mapped addresses can require protocol translators in the IP network.

### **Migration scenarios (non-cluster topology)**

It is possible to come up with a number of different interconnection possibilities, and the following sections aim to help you understand how IBM MQ will work in each case.

#### **Non-cluster migration scenario 1**

Three systems exist that are IPv4 only capable. Each system hosts a queue manager (QM1, QM2, and QM3) and each queue manager connects to the other two. All CONNAMEs in the cluster channel definitions are made using DNS names rather than IP addresses.

Enable QM1 to be able to use channels running over IPv6 as follows

1. Upgrade the host system to have dual IPv4 and IPv6 stacks.

**Important:** A listener is required for each IP stack.

2. Install the latest version of IBM MQ.

3. Update the DNS table so that it has two entries for the system running QM1; one entry for its IPv4 address and one for its IPv6 address. This enables a DNS name request to return both IPv4 and IPv6 addresses for this host.
4. Set the queue manager IPADDRV attribute to IPv6.

**Note:** Even with these changes made to support IPv6 addressing, QM1 will still be able to communicate with queue managers (both existing and new ones) that are only IPv4 capable.

Enable QM2 to be able to use channels running over IPv6 as for QM1 above.

- Communications between QM1 and QM2 will now be over IPv6.
- Communications between QM1 and QM3 will still be over IPv4.
- Communications between QM2 and QM3 will still be over IPv4.

With the queue manager IPADDRV attribute set to IPv6, the preference has been set for the queue manager to connect using the IPv6 protocol. If a channel from QM1 to QM3 has LOCLADDR set to a host name which resolves to an IPv6 address, or both IPv4 and IPv6 addresses (with the IPADDRV attribute set to IPv6, the IPv6 address will be returned as that is the preference), this channel will attempt to use the IPv6 protocol. If the IPv6 protocol installed on the QM1 host system is capable of using a mapped address then QM1 will communicate with QM3 over IPv6. Otherwise, the channel will fail to resolve CONNAME.

While QM3 remains a queue manager on an earlier version of the product, you will need to check that all CONNAMEs used to start a channel to QM3 do not resolve to an IPv6 address or dual IPv4 and IPv6 addresses where the IPv6 address could be returned. This would cause QM1 to attempt to start the channel over IPv6 which would fail, as it would be unable to resolve the CONNAME.

It is possible to upgrade a system to have dual IPv4 and IPv6 capability and still run a queue manager on an earlier version of the product, on the system. While it is not recommended to run this type of configuration, as long as the addresses that are returned to this level of queue manager are either IPv4 or an IPv4 mapped version of an IPv6 address, this should work.

## Non-cluster migration scenario 2

Three systems exist that are IPv4 only capable. Each system hosts a queue manager (QM1, QM2, and QM3) and each queue manager connects to the other two. All CONNAMEs in the cluster channel definitions are made using IP addresses.

Because addresses have been specified instead of DNS names, to allow a queue manager to connect to another using the IPv6 protocol you will need to duplicate the definitions that use IPv4 addresses between them and provide them with IPv6 addresses instead. The original definitions that use IPv4 addresses will continue to work, but if you intend to take advantage of the IPv6 protocol, you will need to connect using the new definitions.

Enable QM1 to be able to use channels running over IPv6 as follows

1. Upgrade the host system to have dual IPv4 and IPv6 stacks.  
**Important:** A listener is required for each IP stack.
2. Install IBM MQ.
3. Duplicate the channel, transmission queue and, where applicable, any process definitions using IPv6 addresses where required.

**Note:** Even with these changes made to support IPv6 addressing, QM1 will still be able to communicate with existing queue managers that are only IPv4 capable.

Enable QM2 to be able to use channels running over IPv6 as for QM1 above.

1. Upgrade the host system to have dual IPv4 and IPv6 stacks.  
**Important:** A listener is required for each IP stack.
2. Install IBM MQ.



3. Where necessary amend applications to write to the new remote queue (created above for QM1 with the IPv6 addresses).
4. Verify the channels can be started.

The queue managers can now connect as follows:

- QM1 can now connect with QM2 over either IPv4 or IPv6 depending on the channel the application writes its messages to.
- QM1 still connects with QM3 over IPv4 using the original definitions.

### ***Migrating a cluster to IPv6***

This section deals with migrating clusters when you are thinking of installing IBM MQ on an IPv6 capable network.

The following gives an overview of approaches that can be taken when migrating a cluster to the latest version of IBM MQ. Due to the variations that can occur within a cluster, the detail is deliberately general and should only be seen as a guide to the likely course of action you will need to take.

### **Migration scenarios (cluster topology)**

Where an IPv6 capable system is to be added to an IBM MQ cluster, all full repository systems in that cluster must be IPv6 capable.

The following scenarios are seen as the ones most likely to occur in customer installations. They describe the changes that are likely to be required.

#### **Scenario 1**

A cluster from an earlier version of the product is installed on IPv4 only capable, systems and you need to connect an IPv6 only capable system into the cluster. All CONNAMES in cluster channel definitions are made using DNS names rather than IP addresses.

When adding a new IPv6 only system to the cluster, identify those queue managers that your new system will communicate with. These include:

- The queue managers your new system will send messages to.
- The queue managers your new system will receive messages from.
- The full repository queue managers

The systems that you have identified must be upgraded before introducing the new system.

Recommended migration procedure:

- Upgrade each of the systems hosting a full repository queue manager as shown in "Migrating a queue manager to IPv6" non-cluster scenario 1.
- Upgrade the remaining cluster systems which need to be IPv6 capable as shown in "Migrating a queue manager to IPv6" non-cluster scenario 1.

With this configuration:

- The new IPv6 only capable system will communicate with the cluster using IPv6 addressing
- All other IPv4 systems that connect into the cluster will continue to communicate using IPv4 addressing
- The systems in the cluster will be able to connect to each other using either IPv4 or IPv6 addressing. The decision as to which address is used depends on whether you have set IPADDRV to specify IPv4 or IPv6 connections.

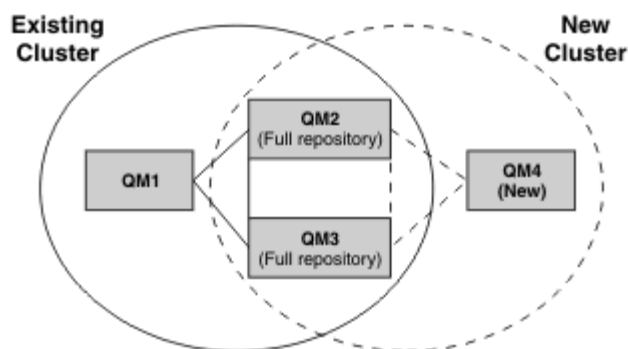
#### **Scenario 2**

A cluster from an earlier version of the product is installed on IPv4 only capable systems and you need to connect an IPv6 only capable system into the cluster. Your network does not support adding both IPv6 and IPv4 addresses using the same host name or you are using IP addresses rather than DNS names in the cluster channel CONNAMES.

The problem here is likely to be that all of the systems cannot be switched to IPv6 simultaneously and some at least must remain only IPv4 capable. The systems that your new IPv6 only system communicates with must be IPv4 and IPv6 capable. We do not recommend simply adding a new set of IPv6 channels into the cluster for the IPv6 system to use, as the IPv4 system would also try to use them, resulting in communication errors.

The recommended approach is:

- Define a new cluster which contains the IPv6 only capable system or systems with new IPv6 addresses and channel definitions. The existing cluster remains, and contains the IPv4 only system definitions. The image below gives a pictorial representation of this. QM1, QM2, and QM3 represent the original IPv4 cluster. QM2, QM3, and QM4 represent the new cluster created to allow the IPv6 only capable system (QM4) to connect into your configuration.
- If you are using DNS names, you can give each of the systems separate DNS names for IPv4 and IPv6 (for example system1\_ip4.ibm.com and system1\_ip6.ibm.com).
- Define a new CLUSRCVR channel and any corresponding CLUSSDR channels using the new IPv6 names or IP addresses on each system in the new cluster. In this way the systems with only IPv4 or IPv6 capability do not see channels which they are not able to use and no communications error will result.



**Note:** There are both IPv4 and IPv6 definitions connecting the full repositories so that definitions for both new and existing cluster definitions are replicated between them. Also be aware that the queue managers QM1 and QM4 cannot communicate directly because they do not share a common network. They could communicate indirectly, for example by using ALIAS queues defined in the queue managers QM2 and QM3. In the configuration shown above you would need to pay attention to the ordering of application messages flowing between QM2 and QM3 because multiple routes exist, if this is relevant you could use BIND\_OPEN to fix the route.

### Abbreviated migration scenarios

This section gives some abbreviated scenarios for when you are thinking of installing clusters on IBM MQ

### Abbreviated scenarios: Effects of CONNAME and LOCLADDR settings

The following table provides an overview of what will occur for the different TCP/IP stacks (IPv4 only, IPv6 only and dual IPv4 and IPv6 stacks) and given the settings for CONNAME and LOCLADDR the expected connection result.

**Note:** Using mapped addresses can require protocol translators in the IP network.

Table 46. Effects of CONNAME and LOCLADDR settings			
Stack Type	CONNAME setting	LOCLADDR setting	Connection result
IPv4 only stack	IPv4 address		Channel binds to IPv4 stack
	IPv6 address		Channel fails to resolve CONNAME

Table 46. Effects of CONNAME and LOCLADDR settings (continued)

Stack Type	CONNAME setting	LOCLADDR setting	Connection result
	Host name resolves to both IPv4 and IPv6 addresses		Channel binds to IPv4 stack
	IPv4 address	IPv4 address	Channel binds to IPv4 stack
	IPv6 address	IPv4 address	Channel fails to resolve CONNAME
	Host name resolves to both IPv4 and IPv6 addresses	IPv4 address	Channel binds to IPv4 stack
	Any address	IPv6 address	Channel fails to resolve LOCLADDR
	IPv4 address	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv4 stack
	IPv6 address	Host name resolves to both IPv4 and IPv6 addresses	Channel fails to resolve CONNAME
	Host name resolves to both IPv4 and IPv6 addresses	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv4 stack
Dual IPv4 and IPv6 stack	IPv4 address		Channel binds to IPv4 stack
	IPv6 address		Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses		Channel binds to stack determined by IPADDRV
	IPv4 address	IPv4 address	Channel binds to IPv4 stack
	IPv6 address	IPv4 address	Channel fails to resolve CONNAME
	Host name resolves to both IPv4 and IPv6 addresses	IPv4 address	Channel binds to IPv4 stack
	IPv4 address	IPv6 address	Maps an IPv4 CONNAME to an IPv4 mapped IPv6 address. IPv6 implementations that do not support IPv4 mapped IPv6 addressing fail to resolve CONNAME
	IPv6 address	IPv6 address	Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses	IPv6 address	Channel binds to IPv6 stack
	IPv4 address	Host name resolves to both IPv4 and IPv6 addresses	Maps an IPv4 CONNAME to an IPv4 mapped IPv6 address. IPv6 implementations that do not support IPv4 mapped IPv6 addressing fail to resolve CONNAME

Table 46. Effects of CONNAME and LOCLADDR settings (continued)

Stack Type	CONNAME setting	LOCLADDR setting	Connection result
	IPv6 address	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv6 stack
IPv6 only stack	IPv4 address		Maps an IPv4 CONNAME to an IPv4 mapped IPv6 address. IPv6 implementations that do not support IPv4 mapped IPv6 addressing fail to resolve CONNAME
	IPv6 address		Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses		Channel binds to IPv6 stack
	Any address	IPv4 address	Channel fails to resolve LOCLADDR
	IPv4 address	IPv6 address	Maps an IPv4 CONNAME to an IPv4 mapped IPv6 address. IPv6 implementations that do not support IPv4 mapped IPv6 addressing fail to resolve CONNAME
	IPv6 address	IPv6 address	Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses	IPv6 address	Channel binds to IPv6 stack
	IPv4 address	Host name resolves to both IPv4 and IPv6 addresses	Maps an IPv4 CONNAME to an IPv4 mapped IPv6 address. IPv6 implementations that do not support IPv4 mapped IPv6 addressing fail to resolve CONNAME
	IPv6 address	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv6 stack
	Host name resolves to both IPv4 and IPv6 addresses	Host name resolves to both IPv4 and IPv6 addresses	Channel binds to IPv6 stack

### Abbreviated scenarios: System configurations

Table 48 on page 509 gives a number of abbreviated scenarios based on the configuration of the installed queue managers and the IP configuration they are running on. The list is not intended to be exhaustive, but to give a number of examples of what to expect based on the configurations shown.

The abbreviations are combined in Table 48 on page 509 to give the configuration of the systems involved in trying to establish communication. For example:

- v71 + IPv6: Represents a queue manager from an earlier version of the product on a system with a TCP/IP 6 stack
- v8 + Dual: Represents a queue manager from the latest version of the product on system with a dual TCP/IP 4 and 6 stack

*Table 47. Abbreviations used in system configurations*

Abbreviation	Meaning
v71	queue manager from an earlier version of the product
v8	queue manager from the latest version of the product
IPv4	a system using an IPv4 only stack
IPv6	a system using an IPv6 only stack
Dual	a system using both an IPv4 and an IPv6 stack
IPv4DNS	DNS returns an IPv4 address only for host name of system holding the responding queue manager
IPv6DNS	DNS returns an IPv6 address only for host name of system holding the responding queue manager
DualDNS	DNS returns an IPv4 and IPv6 address for host name of system holding the responding queue manager
LOCLADDR4	The LOCLADDR parameter is set to IPv4 addressing
LOCLADDR6	The LOCLADDR parameter is set to IPv6 addressing
IPADDR4	IPADDRV is set to IPv4 addressing
IPADDR6	IPADDRV is set to IPv6 addressing

*Table 48. System configurations*

Originating queue manager		Responding queue manager			Result
Queue manager and Stack	LOCLADDR	IPADDRV	Queue Manager and Stack	DNS Return	
v71 + IPv6	Any	Not applicable			IP Error
v71 + IPv4 or v71 + Dual	Both LOCLADDR4 & LOCLADDR6	Not applicable	v71 + IPv4 or v71 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v71 + IPv4 or v71 + Dual	Blank or LOCLADDR4	Not applicable	v71 + IPv4 or v71 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v71 + IPv4 or v71 + Dual	Blank or LOCLADDR4	Not applicable	v71 + Dual	IPv6DNS	Unable to resolve CONNAME

Table 48. System configurations (continued)

Originating queue manager		Responding queue manager			Result
Queue manager and Stack	LOCLADDR	IPADDRV	Queue Manager and Stack	DNS Return	
v71 + IPv4 or v71 + Dual	Blank or LOCLADDR4	Not applicable	v71 + Dual or v8 + Dual v8 + IPv4	IPv4DNS or DualDNS	IPv4 connection can be established
v71 + IPv4 or v71 + Dual	LOCLADDR6	Not applicable			IP Error
v71 + IPv4 or v71 + Dual	Blank or LOCLADDR4 or both LOCLADDR4 & LOCLADDR6	Not applicable	v8 + IPv6	IPv6DNS	Unable to resolve CONNAME
v8 + IPv4	Blank or LOCLADDR4	Not specified	v71 + IPv4 or v71 + Dual or v8 + IPv4	IPv4DNS or DualDNS	IPv4 connection can be established
v8 + IPv4	LOCADD6	Not specified			Unable to resolve LOCLADDR
v8 + IPv4	Blank or LOCLADDR4	Not specified	v8 + IPv6	IPv6DNS	Unable to resolve CONNAME
v8 + IPv6	Blank or LOCLADDR6	Not specified	v71 + Dual	DualDNS	Attempts to start IPv6 channel and fails as there will be no IPv6 listener available
v8 + IPv6	Blank or LOCLADDR6	Not specified	v71 + IPv4	IPv4DNS	Attempts to start IPv6 channel and fails as there will be no IPv6 listener available
v8 + IPv6 or v8 + Dual	LOCLADDR6	Blank or IPADDR6	v8 + IPv6 or v8 + Dual	IPv6DNS or DualDNS	IPv6 connection can be established
v8 + Dual	LOCLADDR6	IPADDR4	v8 + Dual	IPv4DNS or DualDNS	IPv6 connection can be established where mapped addressing can be used
v8 + Dual	Blank or LOCLADDR4	IPADDR4	v71 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established

Table 48. System configurations (continued)

Originating queue manager		Responding queue manager			Result
Queue manager and Stack	LOCLADDR	IPADDRV	Queue Manager and Stack	DNS Return	
v8 + Dual	Both LOCLADDR4 & LOCLADDR6	Blank or IPADDR4	v71 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v8 + Dual	LOCLADDR4	IPADDR4			Unable to resolve LOCLADDR
v8 + Dual	LOCLADDR6 or both LOCLADDR4 & LOCLADDR6	Blank or IPADDR6	v8 + IPv6 or v8 + Dual	IPv6DNS or DualDNS	IPv6 connection can be established

## Migrating existing security configurations to use an alias CipherSpec

Migrating existing secure channel definitions to use an alias CipherSpec, for example, ANY\_TLS12\_OR\_HIGHER, ANY\_TLS13\_OR\_HIGHER, and so on, means that your enterprise can adapt to cipher additions and deprecations without needing to make further invasive configuration changes in the future.

In general terms, the migration step to use an alias CipherSpec is no different from the process you use to change any CipherSpec. That is, change the value of the CipherSpec for the channel definition at each end, and then restart the channels for the change to take effect.

The procedure described in the preceding text can be particularly challenging in clustering environments. Typically, you need to update manually defined channel definitions to a full repository one at a time.

To simplify migration, you make the change to specify an alias CipherSpec on a channel definition pairing on the responding message channel agent (that is SVRCONN, RCVR, and so on) first. For example, if the channel definition currently uses a specific TLS 1.2 CipherSpec, then modifying the responding message channel agent to use ANY\_TLS12\_OR\_HIGHER allows the sending message channel agent to continue using the specific TLS 1.2 cipher.

If you plan to change an existing cluster to use alias CipherSpecs, you first need to ensure that all members of the cluster are at IBM MQ 9.1.4, or higher, and if there are z/OS queue managers in the cluster, these need to be at IBM MQ 9.2.0 or later, in order to understand the new CipherSpec value. The procedure for migration is the same as migrating from plaintext to SSL or TLS. See [Upgrading clustered queue managers and channels to SSL/TLS](#) for more information.

Once both initiating and responding channel definitions use an alias CipherSpec, the negotiation of the TLS cipher varies, based on the availability of different algorithms on platform and maintenance levels.

Note, that although no assurance can be made on the exact CipherSpec that is chosen, the channel will only use the TLS protocol allowed by the alias CipherSpec considering FIPS, SUITEB, and weak CipherSpec deprecations and re-enablement on both peers.



**Attention:** Alias CipherSpecs do not guarantee that a specific CipherSpec will be used on a running channel, only that the negotiated CipherSpec is enabled and acceptable to IBM MQ on both ends of the channel. To request that a specific CipherSpec is used by a channel, you must specify that specific value on both ends of the channel.

If you add support for a new CipherSpec to the IBM MQ installations on the initiating and responding ends of the channel, the alias CipherSpec will allow this new CipherSpec to be used automatically without making any configuration changes.

#### Related tasks

[Enabling CipherSpecs](#)

#### Related reference

[ALTER CHANNEL](#)

## Migrating IBM MQ Managed File Transfer

Use the following topics to guide you through various migration scenarios for IBM MQ Managed File Transfer.

### Migrating Managed File Transfer agents from an earlier version

Agents migrated from versions of IBM MQ prior to IBM MQ 9.1.4 run as non highly available. You can make them run in high availability mode by carrying out the following procedure.

#### Procedure

1. Create the `SYSTEM.FTE.HA.<agent name>` queue in the agent queue manager using the following sample definition:

```
DEFINE QLOCAL(SYSTEM.FTE.HA.SRC) +
  DEFPRTY(0) +
  DEFSOPT(SHARED) +
  GET(ENABLED) +
  MAXDEPTH(0) +
  MAXMSGL(0) +
  MSGDLVSQ(PRIORITY) +
  PUT(ENABLED) +
  RETINTVL(99999999) +
  SHARE +
  NOTRIGGER +
  USAGE(NORMAL) +
  REPLACE
```

2. Provide the required authorities on the queue for the agent to open the queue for GET.
3. Create a replica of the agent configuration on another machine
4. Add the **highlyAvailable** property, and set the property to `true`, in the `agent.properties` file for both agent configurations.

#### Related concepts

[Maintenance in highly available agents](#)

### Migrating MFT to a new machine with a different operating system

The core steps required to successfully achieve a migration of MFT configurations to a new system or platform. The task is primarily focused on MFT configuration migration, but also discusses queue manager migration where appropriate.

#### Before you begin

Ensure that any agents you are going to migrate have completed any in-progress or pending transfers, and that you have taken a back up of:

- The coordination queue manager
- Agent queue managers
- Agents
- Resource Monitors



- Transfer Templates
- Scheduled Transfers

**Important:** IBM MQ installation names on one system are unlikely to match the installation names on the new system unless the old and new systems only have one installation, or you specify an installation name as part of the IBM MQ installation process.

## About this task

The following migration procedure is based on the scenario where QMA is both the coordination queue manager for topology, and the agent queue manager for an agent called Agent1.

Agent1 has a monitor, transfer template and scheduled transfer. QMA also connects to a queue manager called QMB running on another system using their sender and receiver channels for file transfers.

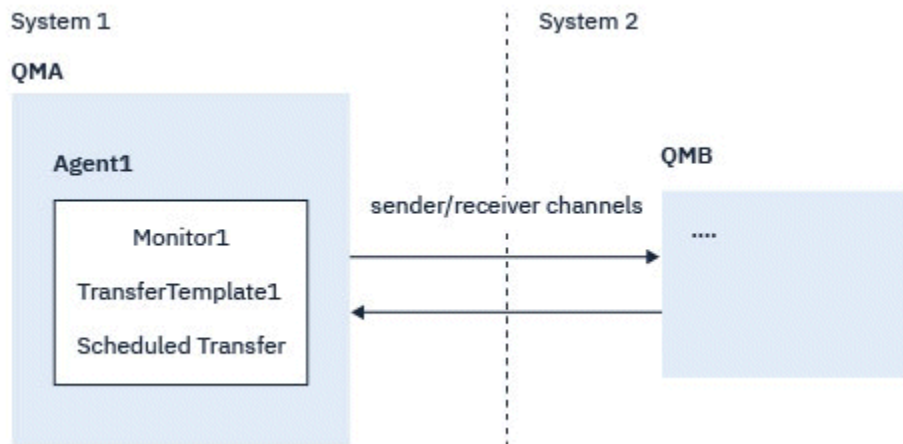


Figure 14. Migrating the MFT configuration on System 1



**Attention:** The following procedure explains only how to backup and restore MFT configurations. If you are migrating MFT to a new machine with the same operating system, queue manager data and log files can be backed up and restored by copying all the data files from the old system to the appropriate directories on the new system.

However, if the new machine has a different operating system, it is not possible to migrate the data files, because they are created platform specific.

## Procedure

### 1. Backup procedure

- Save the queue manager configuration using the **dmpmqcfig** command to rebuild it later from its definition.

For example:

```
dmpmqcfig -m QMA -a > /mq/backups/QMA.mqsc
```

- Back up the configuration files for the agent that are stored under the IBM MQ data directory /MQ\_DATA\_PATH/mqft

The mqft directory normally has three sub-directories, which are config, installation, and logs. These contain agent installation data, configuration, and database logger files respectively.

If the agent is Protocol Bridge Agent, the ProtocolBridgeCredentials.xml file in the agent configuration directory also needs to be backed up. This file defines the user names and credential information that the protocol bridge agent uses to authorize itself with the protocol server.

- Export the configuration of the resource monitor to an XML file using the MFT **ftelistMonitors** command with the **-ox** option.

For example:

```
fteListMonitors -ma Agent1 -mn Monitor -ox Monitor1Definition.xml
```

- d) Export transfer templates to XML files using the MFT **fteListTemplates** command with the **-x** and **-o** options.

For example, the following command creates TransferTemplate1.xml in the current directory:

```
fteListTemplates -x -o . TransferTemplate1
```

- e) Manually back up the scheduled transfer definitions.

It is not possible to export the definitions to XML files, but you can list scheduled transfers using the MFT **fteListScheduledTransfers** command and backing up the definitions manually.

## 2. Recreate procedure

- a) Recreate queue manager QMA after installing IBM MQ and MFT on the new system.

- b) Restore the QMA configuration by running the **runmqsc** command to parse in the queue manager configuration saved in Step “1.a” on page 513

For example:

```
runmqsc QMA < /mq/backups/QMA.mqsc
```

- c) Recreate the sender and receiver channels that connect to QMB on System two.

- d) On the QMB queue manager side, update the connections details, such as host name and port number of the sender channel that connects to QMA.

- e) Recreate Agent1 by copying all of the backed up agent configuration files to the new system, and start the agent.

- f) Import the XML file for Monitor1 using the MFT **fteCreateMonitor** command with the **-ix** and **-f** options.

For example:

```
fteCreateMonitor -ix Monitor1Definition.xml -f
```

- g) Publish a message containing the contents of TransferTemplate1.xml in the message body to the SYSTEM.FTE topic on the coordination queue manager.

Use a stand-alone application, and specify the topic string:

```
SYSTEM.FTE/Templates/<template_id>
```

where <template\_id> is the transfer template ID that can be found inside the TransferTemplate1.xml file.

For example, if the xml contains:

```
<?xml version="1.0" encoding="UTF-8"?><transferTemplateid="a7838085-0f2a-4980-b958-2dbbdfb22702" version="6.00">
```

, the topic string should be:

```
SYSTEM.FTE/Templates/a7838085-0f2a-4980-b958-2dbbdfb22702
```

- h) Recreate the scheduled transfers manually using the MFT **fteCreateTransfers** command.

## Migrating IBM MQ Internet Pass-Thru

Follow this procedure to upgrade to a new version of IBM MQ Internet Pass-Thru (MQIPT), or to apply fix pack maintenance to your MQIPT installation. You can also use this procedure to upgrade from MQIPT support pack 2.1 to MQIPT in IBM MQ 9.1.

### Procedure

1. Make backups of your data.

See [Making backups](#) for details.

2. Install the new version of MQIPT.

You can install the new version of MQIPT before uninstalling any versions of MQIPT that are currently installed. See [“Installing MQIPT” on page 288](#) for details.

3. Restore the backed-up data files to the MQIPT home directory to be used by the new installation.

If the MQIPT installation directory is used as the home directory, then overwrite any newly installed copies of data files with the backed-up files.

4. Ensure that any properties that contain file names in the new `mqipt.conf` configuration file, refer to files to be used by the new installation of MQIPT.

5. Review the list of changes and new features in the new version or fix pack of MQIPT.

If you need to make any changes to the MQIPT configuration for the new version, make the necessary changes to the new copies of the data files.

6. Stop the current version of MQIPT by issuing the following command:

```
mqiptAdmin -stop
```

7. Start MQIPT at the latest version by issuing the following command:

- On AIX and Linux systems:

```
MQIPT_INSTALLATION_PATH/bin/mqipt MQIPT_HOME_DIR
```

- On Windows systems:

```
MQIPT_INSTALLATION_PATH\bin\mqipt MQIPT_HOME_DIR
```

where

- `MQIPT_INSTALLATION_PATH` is the directory where that latest version of MQIPT is installed.
- `MQIPT_HOME_DIR` is the MQIPT home directory containing the data files to be used by the latest installation of MQIPT.

8. Test that MQIPT works correctly at the latest version.

After you confirm that the latest version of MQIPT is configured correctly, you can uninstall the previous version. See [“Uninstalling MQIPT” on page 289](#) for details.

9. If there are any passwords in your MQIPT configuration that have not been encrypted, or passwords that were encrypted prior to MQIPT in IBM MQ 9.1.5, encrypt these passwords using the latest protection method by following the procedure in [Encrypting stored passwords](#).



## Notices

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