Migration

Contents

Migration

This collection of topics details some issues for customers upgrading to WebSphere® MQ V7.0.

Introduction to WebSphere MQ Version 7.0 migration
An introduction to the documentation if you are considering migrating to WebSphere MQ Version 7.0.

➤Migrating WebSphere MQ applications◄
You do not need to migrate WebSphere MQ applications when a queue manager is upgraded. Applications built with earlier versions of WebSphere MQ continue to run when MQ is upgraded. When you choose to migrate an application, compile and link it with the new version of WebSphere MQ. Write your applications to be compatible with different versions of WebSphere MQ.

Coexistence
For the purposes of this section, coexistence is defined as the ability of two or more different versions of WebSphere MQ to function on the same computer. Two or more different versions of WebSphere MQ cannot coexist on the same computer, except for WebSphere MQ for z/OS® where multiple different versions can coexist in a limited number of scenarios.

Migrating WebSphere MQ components to Version 7.0
If you are migrating WebSphere MQ components to Version 7.0, this section contains specific advice.

Platform-specific information

This collection of topics describes migration information specific to each platform.

WebSphere MQ classes for JMS and classes for Java considerations
There are several changes to implementation of WebSphere MQ classes for JMS and classes for Java that you might need to consider when migrating to WebSphere MQ Version 7.0.

▶**Integration of WebSphere MQ classes for JMS with WebSphere Application Server**◀
You can configure WebSphere MQ as a JMS provider for WebSphere Application Server. The way the WebSphere MQ messaging provider is configured has changed between WebSphere Application Server V6.0/6.1 and V7.0. This topic describes the changes, and different configurations you can create to run different versions of WebSphere Application Server and WebSphere MQ.

WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions
You can migrate publish/subscribe configuration data from WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 to a WebSphere MQ Version 7.0.1 or later queue manager.

WebSphere MQ version 6 publish/subscribe migration
Publish/subscribe function in WebSphere MQ Version 7.0 is performed by the queue manager, rather than by a separate publish/subscribe broker. When you migrate your WebSphere MQ Version 6 systems to WebSphere MQ Version 7.0, publish/subscribe function is not automatically migrated. You must upgrade publish/subscribe information to WebSphere MQ Version 7.0 separately.

Upgrading and migrating WebSphere MQ clients from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0
This section contains topics that describe how to upgrade and migrate clients from WebSphere MQ Version 6.0 to Version 7.0.

Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:14

1. Introduction to WebSphere MQ Version 7.0 migration

An introduction to the documentation if you are considering migrating to WebSphere® MQ Version 7.0.

The migration process is described and instructions given for all platforms. There is additional information for z/OS®, in the *WebSphere MQ for z/OS Program Directory*.

▶This collection of topics highlights the main areas that you must consider and gives guidance on the type of action that you need to take to continue 'business as usual'. It is not the intention of these topics to cover the migration of every possible combination of a WebSphere MQ Version 7.0 installation and associated applications. ◀

Note:

▶Before upgrading any software or migrating WebSphere MQ components, make a full backup of your system to ensure that you can restore the system to its original working environment if a problem occurs. ◀

For distributed platforms, information about how to back up your system begins with Backing up and restoring WebSphere MQ.

For z/OS, information about backups begins with Planning for backup and recovery.

Some general considerations
The following lists some of the general issues to consider when making a migration or upgrade plan.

- Develop a backup plan in which you back up the relevant information on the queue manager and server.
- Read the latest README file for the product you are working with. You can find these files online for the relevant products starting from the IBM® WebSphere MQ Support Web page at http://www.ibm.com/support/docview.wss...
- If you need to have the queue manager active all the time, and you are unable to shut down the server running this queue manager, you might need to consider a different migration approach. This will mean performing the migration using the following general steps:
  - Copy all resources from the server concerned to another server.
  - Perform a migration on the duplicate server.
  - Switch over to the new server and queue manager at a convenient time.
  - Alternatively, in a queue-sharing environment on z/OS, you can migrate queue managers in a staged or sequential rolling manner to maintain 100% availability of shared queues.

- Be prepared to record a number of details about the existing system topology, including such things as the names of the queue managers and their queues, clients, channels and so on.
- Check whether there are any queues or queue managers that are no longer required.
- When you have upgraded from a previous version of WebSphere MQ to WebSphere MQ Version 7.0 on an individual computer or a z/OS image:
  - On platforms other than z/OS, any queue manager on that computer is migrated to WebSphere MQ Version 7.0 when you start the queue manager. You might decide to keep instances of WebSphere MQ, and therefore their queue managers, on earlier versions of WebSphere MQ, and administer the queue managers from a computer on which you have upgraded to WebSphere MQ Version 7.0.
  - On z/OS, you will need to migrate the queue managers individually. You might decide to keep instances of WebSphere MQ, and therefore their queue managers, on earlier versions of WebSphere MQ, and administer the queue managers from a computer on which you have upgraded to WebSphere MQ Version 7.0

Migrating from a beta version

If you have previously installed a WebSphere MQ beta driver, you must uninstall this driver and remove all remaining files **before** you install the general availability version of WebSphere MQ Version 7.0.

Format of error information

▶The format of error information, such as error messages in the error logs and First Failure Support Technology (FFST) records, might change when new functionality is introduced. Typically, such changes are infrequent but applications that use this error information might be affected.◀

Supported environments

The operating system on which you want to run a migrated WebSphere MQ Version 7.0 queue manager must be a supported WebSphere MQ Version 7.0 platform as documented on the Supported Environment Web page at: http://www.ibm.com/software/integration/wmq/requirements/. ❯Supported environments are also listed in the Quick Beginnings guide for your operating system, or the *WebSphere MQ for z/OS Concepts and Planning Guide.*❮

Migration requirements can vary according to the environment. Check each of the platform-specific sections for details.

Queue managers from previous versions of WebSphere MQ (for example, WebSphere MQ Version 6.0) are supported, provided that they are on a platform supported by WebSphere MQ Version 7.0.

Note: Where WebSphere MQ Version 5.3 is stated, the information also applies to WebSphere MQ Version 5.3.1 for z/OS.

Parent topic: Migration

This build: January 26, 2011 11:06:14

Notices | Trademarks | Downloads | Library | Support | Feedback

2. Migrating WebSphere MQ applications

You do not need to migrate WebSphere MQ applications when a queue manager is upgraded. Applications built with earlier versions of WebSphere MQ continue to run when MQ is upgraded. When you choose to migrate an application, compile and link it with the new version of WebSphere MQ. Write your applications to be compatible with different versions of WebSphere MQ.

Application migration is defined as recoding, recompiling or relinking an application to be compatible with, or to take advantage of, new versions of underlying software. In general recoding, recompiling and relinking are termed *rebuilding*. If an application does not need to be rebuilt to run on a new version of its underlying software, then no application migration is required, and the application said to be compatible with a later version of the underlying software. More rarely, if an application is built against a later version of its underlying software and runs against an earlier version, the application is said to be compatible with the earlier version of the underlying software.

Compatibility with later versions

Compatibility with later versions is a contract between an application and WebSphere MQ. The objective is for an application built on the present version of WebSphere MQ to continue to work, without migration, on future versions of WebSphere MQ. Typically functions that will not be supported in future versions are *deprecated* one or two versions before they are withdrawn. An application compatible with a later version requires no rebuilding when underlying software is upgraded.

You do not need to re-code, recompile, or relink a WebSphere MQ application to run it on a new version of a queue manager. WebSphere MQ applications are *compatible with later versions*. If you upgrade a queue manager, you can continue to deploy applications built against earlier versions of the queue manager to the server running the upgraded queue manager. Likewise, if you upgrade a client installation, you do not need to re-code, recompile, or relink the client application, and you can continue to deploy client applications built against earlier versions of WebSphere MQ.

When is an existing WebSphere MQ application compatible with a later level of queue manager?

1. Can you run an existing WebSphere MQ server application, built with an earlier WebSphere MQ version, on a server with a later queue manager installed?
2. Can you run an existing WebSphere MQ client application, built with an earlier WebSphere MQ version, on a client platform with an earlier client installation when connected to the later queue manager?
3. Can you run an existing WebSphere MQ client application, built with an earlier WebSphere MQ version, on a client platform with a later client installation when connected to an earlier queue manager?
4. Can you exchange messages between an existing WebSphere MQ client or server application, connected to an earlier queue manager, with applications connected to a later queue manager?

The answer to all these questions is, *yes*.

You might make changes in the operating environment as a result of migrating to the new level of queue manager. The operating environment changes, rather than changes in WebSphere MQ itself, might require application change, recompilation, or relinking. Even then, you can sometimes choose to build the application with the tools shipped with the earlier WebSphere MQ version rather than migrate the development environment to the new level of WebSphere MQ. Nonetheless, migrating WebSphere MQ applications as part of migrating to a new level of queue manager is something you will do eventually, and requires planning, control and testing.

Interoperability with later versions is a contract between WebSphere MQ clients and queue managers, and between queue managers. Earlier clients and queue managers can connect to, and exchange messages with, later versions. An application connected to an earlier version of the WebSphere MQ client and queue manager is not affected by upgrading the queue manager. WebSphere MQ client applications do not need to change to connect to new versions of a queue manager.

It also means that an application that exchanges messages with applications connected to other queue managers will continue to work if the other queue managers are upgraded to new versions, and the applications do not change. WebSphere MQ clients and queue managers are *interoperable with later versions*.

Compatibility with earlier versions

Compatibility with earlier versions is a contract between an application and the underlying software. The objective for an application to be compatible with earlier versions of the software, is to be able to run an application on an earlier version of the underlying software than the version it is built upon. The application must only use functions that are supported in both present and earlier versions of the underlying software, and the software must guarantee the constancy of the interfaces and behavior from version to version.

WebSphere MQ does *not* support applications running with earlier versions, though typically applications rebuilt against a later version, and redeployed to a queue manager running at an earlier version do work in practice, as long as they use no new function.

Interoperability with earlier versions is a contract between WebSphere MQ applications, WebSphere MQ clients and queue managers, and between queue managers. Applications, as part of the contract, need to restrict the functions they use to those provided in earlier versions of WebSphere MQ. An application built with a later version of WebSphere MQ can interoperate with an application built with and connected to an earlier version of WebSphere MQ.

A client application that is built to a later version of the WebSphere MQ client is not affected by being connected to an earlier version of the queue manager. It can only use the functions available in the earlier queue manager, of course.

Any WebSphere MQ application that uses only functions provided by an earlier version of a queue manager can continue to send messages to the earlier version when the application is rebuilt and connected to a later version of WebSphere MQ.

Is an application built or migrated on a new version of WebSphere MQ able to run on an earlier version?

1. Can you run a WebSphere MQ server application, built with a later WebSphere MQ version, on a server with an earlier queue manager installed?

2. Can you run a WebSphere MQ client application, built with a later WebSphere MQ version, on a client platform with an earlier client installation when connected to the later queue manager?

3. Can you run a WebSphere MQ client application, built with a later WebSphere MQ version, on a client platform with the later client installation when connected to an earlier queue manager?

4. Can you exchange messages between a WebSphere MQ client or server application, connected to a later queue manager, with applications connected to an earlier queue manager?

The answer to questions 1 and 2 is *no*, and to 3 and 4 is *yes*. WebSphere MQ programs are *interoperable with earlier versions*; they are **not** *compatible with earlier versions*. However the applications in scenario 1 and 2 usually do run without any errors being diagnosed if you do not use any new function. These are scenarios you need to avoid as they are not guaranteed to work all the time. If you find you have been running an incompatible configuration and you encounter a problem, you need to rebuild your applications with the earlier level of WebSphere MQ before continuing with problem diagnosis.

Suppose 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 strict answer is no, you need to upgrade all the client machines you deploy to, at least to the version of the client you have built; you do not need to upgrade the queue managers. In practice the client should work as long as you have used no new function.

Suppose you deploy some WebSphere MQ queue managers at a new version level. You have an existing WebSphere MQ application that you use to send messages between the servers. Should you rebuild the application to deploy it onto the new servers, or should 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. WebSphere MQ supports running the existing application on later servers (*compatible with later versions*) and supports sending messages from later application versions to earlier ones (*interoperable with earlier versions*). The one thing you cannot do is to rebuild the application and redeploy it onto both the earlier and newer servers, because WebSphere MQ does not support *compatibility with earlier versions*.

The next section describes a model to help you understand the WebSphere MQ operating environment and think about how changes in one part of the environment might affect a WebSphere MQ application.

Summary

Application migration is rarely required when queue managers are upgraded.

- WebSphere MQ applications are *compatible with later versions of WebSphere MQ*. They do not need to be rebuilt to work with later versions of queue managers.
- WebSphere MQ clients and queue managers are *interoperable with earlier and later versions of WebSphere MQ*.

When you do migrate an application to a later version of queue manager, use MQ data type versioning to make your applications interoperable with earlier versions of WebSphere MQ. Read What's new in WebSphere MQ V7.0 to see if there are any changes in a new version of WebSphere MQ that affect the way your application behaves when you rebuild it. Do not deploy an application built at a later level of WebSphere MQ to a client or server platform running at an earlier version level.

> ❯**Migration concepts**❮
> When you upgrade a system running WebSphere MQ there are four types of migration to consider: queue manager, client, application and operating environment migration.

Parent topic: Migration

This build: January 26, 2011 11:07:02

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2.1. Migration concepts

When you upgrade a system running WebSphere MQ there are four types of migration to consider: queue manager, client, application and operating environment migration.

Figure 1 shows two runtime operating system environments, with an WebSphere MQ server and server application installed in the environment called Server, and a WebSphere MQ client application in the environment called Client. The queue manager, *QM**, represents queue managers of various levels installed in other operating environments. The queue manager labeled *QM-n?* coexists on the same server as QM, but runs at a different release level. WebSphere MQ Migration information terms this a *coexistent* queue manager. Only z/OS supports multiple queue managers coexisting at different release levels in the same operating environment. The question-mark in the queue manager name indicates this capability might not be present in your environment.
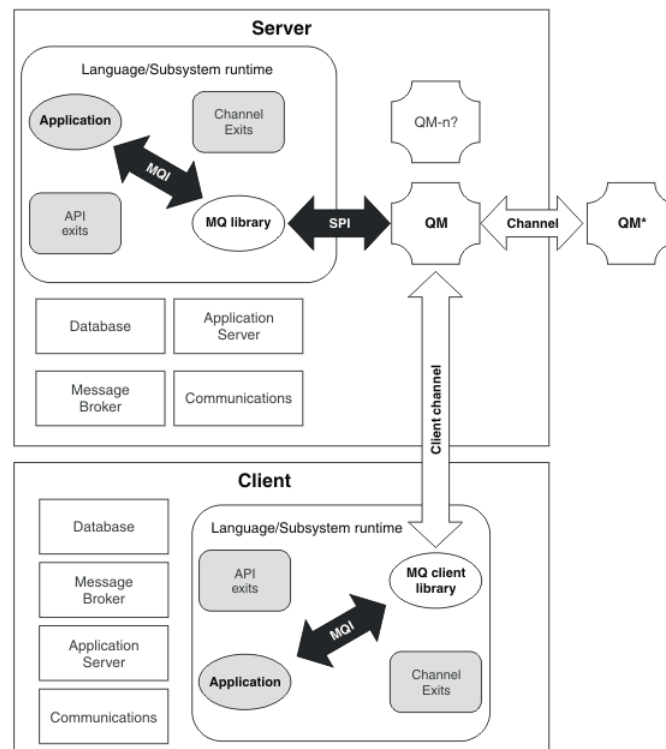
Figure 1. WebSphere MQ application migration model

WebSphere MQ has control over some, but not all, of interfaces shown in this model. It has complete control over an interface when it owns both sides of the interface, such as between an MQ channel and a queue manager. It shares control and use of the MQI interface and the exit interfaces with applications and it shares the control and use of operating environment interfaces with other software components. The diagram shows some major software components that share interfaces with WebSphere MQ, such the subsystem or language runtime environment, databases, application servers, communication subsystems and the message broker.

Using this model you can distinguish four types of migration that are discussed in the following sections:

Queue manager migration

Upgrading the Websphere MQ installation to a new version or release

WebSphere MQ client migration

Upgrading the Websphere MQ client installation to a new version or release. This is not the same as upgrading the client application itself.

Application migration

Any or all of relinking, recompiling or recoding a WebSphere MQ server or client application.

Environment migration

Upgrading the operating environment, or components in the environment such as installing a new level of JRE.

Queue manager migration

Queue manager migration takes place when you upgrade WebSphere MQ by installing a new release or version.

When you upgrade a queue manager, resources it owns such as the current log files are automatically migrated for you. The WebSphere MQ Migration information topic includes any additional migration tasks that you might need to do, particularly to exploit new functionality. Migration information also tells you about changes to default behavior, such as the introduction of channel sharing for WebSphere MQ client channels, which affects the way application client exit code operates.

Interfaces to WebSphere MQ resources that are shared between queue managers, such as channel interfaces, and the interfaces between WebSphere MQ libraries and the queue manager (labeled SPI in the diagram), are compatible with earlier and later releases; as long as you change nothing else in the environment they require no migration. If do you choose to change something in the environment; for example to exploit the interface to IPv6 that was introduced in Version 6.0, there are migration tasks to perform that are explained in WebSphere MQ Migration information.

WebSphere MQ upgrades shared MQ libraries when the WebSphere MQ server is upgraded. Application linkages to the shared libraries do not normally change, so there is no need to relink an application to pick up the new libraries. Applications will pick up the new version of a library as soon as a new version of the shared libraries are loaded. Both ends of the SPI interface, the shared library and the queue manager are then at the new version level.

If you have copied the libraries to a different location, into an IDE for example, or if you have included the installation location of the libraries in a version control system, there is the possibility that application will continue to load the old rather than the new version of the libraries. As the SPI interface is compatible with earlier and later releases the old libraries will probably continue to work and you might not notice a problem at first. Problems will become apparent either when you try to use new functions that are not supported in the earlier version, or when you apply fixes, and some fixes do not appear to work. Linking to libraries in anything other than their installed directory is an unsupported configuration, as is using server libraries at a different release level to the queue manager, though in practice, you might not notice any immediate problems.

WebSphere MQ client migration

WebSphere MQ client migration takes place when install a new release or version of the WebSphere MQ client. This is not the same as upgrading the client application itself.

WebSphere MQ clients are *interoperable with earlier and later versions* of WebSphere MQ, so there is little reason to upgrade a WebSphere MQ client, You might choose to do so when you are upgrading the client application, or when the WebSphere MQ client version goes out of service.

The WebSphere MQ client libraries (such as mqic.lib) are dynamic, and the application linkages to the libraries do not normally change. So there is no need to relink a client application to pick up new WebSphere client libraries. The client will pick up the library next time the library is loaded. Do not move libraries from their installed directory. Linking to libraries in anything other than their installed directory is an unsupported configuration.

Application migration

Application migration takes place when you rebuild your WebSphere MQ applications with a new version or release of the WebSphere MQ client or server tools. You might regard running an application against a new version of queue manager as application migration - but as long as the application has not

been rebuilt with the new version of WebSphere MQ tools, this is termed queue manager migration.

Application migration is a two step process. The first step is taken when an application is rebuilt using a new version of the WebSphere MQ development tools. The tools contain source files, such as headers, and linkages to the WebSphere MQ libraries. The second step takes place when you decide to change the set of WebSphere MQ capabilities the application uses. The choice of capabilities a WebSphere MQ application uses is influenced not only by the common set of capabilities of the queue managers it connects with, but also indirectly by the capabilities of the queue managers it exchanges messages with.

When you upgrade a queue manager you can continue to build an application using existing development tools rather than choosing to migrate the application to the new WebSphere MQ version or release. When you take the step to build your application with the new version of WebSphere MQ, in rare cases you may need to make code changes to preserve the behavior of the application. For example, in Version 7.0 of WebSphere MQ the JMS classes throw different exceptions to those thrown in Version 6.0.

Typically for licensing, support, functionality or environment compatibility reasons you would expect to upgrade the development environment, to keep it in step with the latest installed server environment. Remember, you must not deploy client or server applications to a earlier version of the client or server platform, though you can write the application to be interoperate with earlier versions if you want to communicate with earlier versions of the queue manager, or, in the case of client applications, to connect to an earlier version of the queue manager.

To help you write applications that can exchange messages with earlier versions of WebSphere MQ, WebSphere MQ provides data type versioning. Data type versioning *assists* you in exchanging messages that are compatible with target queue managers. Even with data type versioning you can still create messages that use new functions that are not compatible with all the queue managers an application interacts with.

You need to 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 WebSphere 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 functionality programs use.

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 even more so if it connects to queue managers on different platforms. The default values of some WebSphere constants, such as `MQPMO_SYNCPOINT`, `MQPMO_NO_SYNCPOINT` differ between platforms.

The following three tips are useful to consider when writing WebSphere MQ programs to run on multiple versions of the same platform.

- Use explicit MQSeries ❯data type❮ versioning. Rather than use `datatype_CURRENT_VERSION`, set the version to use explicitly. You can then decide to upgrade to the new version of a ❯data type❮ in line with the "lowest common denominator" queue manager.
- Review the default values provided by WebSphere MQ to initialize ❯data types❮, and provide your own where appropriate.
- Restrict programmers to the earlier function set and consider continuing to use the tools from the earliest version of WebSphere MQ in operation.

Operating environment migration

Operating environment migration takes place when some aspect of the operating system environment is upgraded. Many changes in the operating environment do not affect WebSphere MQ. In some cases operating environment changes might require queue manager or even application migration. More commonly, changes in the operating environment create the *possibility* of exploiting new functionality in your applications and in WebSphere MQ.

To keep queue managers in step with current software environments, supported environments change with every major new release of WebSphere MQ. It is these changes, rather than changes in WebSphere MQ itself which may necessitate changes, recompilation or relinkage of your applications. You do not normally need to migrate an application to the new version of the queue manager to accommodate the changes in the software environment, and often you can continue to build it with an older version of the WebSphere MQ development tools until you are ready to migrate the application to exploit new capabilities. In practice, you might well choose to migrate the application without making any immediate functional changes to keep your development environment current.

A (rare) example where environment migration forces you to migrate applications without having a functional requirement to do so might be as follows. You have chosen to upgrade a queue manager for some operational reason. The new version of the queue manager requires a new version of the operating environment. The operating environment does not support the linkage to the old language runtime, so applications have to be rebuilt with new linkages and use the new language runtime.

Parent topic: ❯Migrating WebSphere MQ applications❮

This build: January 26, 2011 11:07:02

3. Coexistence

For the purposes of this section, coexistence is defined as the ability of two or more different versions of WebSphere MQ to function on the same computer. Two or more different versions of WebSphere® MQ cannot coexist on the same computer, except for WebSphere MQ for z/OS® where multiple different versions can coexist in a limited number of scenarios.

Coexistence on WebSphere MQ for AIX

Coexistence on WebSphere MQ for HP-UX
WebSphere MQ for HP-UX Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for HP-UX, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Coexistence on WebSphere MQ for i5/OS
WebSphere MQ for i5/OS® Version 7.0 does not coexist with previous versions of WebSphere MQ.

Coexistence on WebSphere MQ for Linux
WebSphere MQ for Linux Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for Linux, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Coexistence on WebSphere MQ for Solaris
WebSphere MQ for Solaris Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for Solaris, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Coexistence on WebSphere MQ for Windows
WebSphere MQ for Windows Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. You do not have to uninstall your current version before installing WebSphere MQ Version 7.0 because the installation process does it for you.

Coexistence on WebSphere MQ for z/OS
You must take a number of factors into consideration when WebSphere MQ Version 7.0 for z/OS coexists with previous versions of WebSphere MQ for z/OS.

Coexistence of WebSphere MQ classes for JMS
The following are specific JMS coexistence considerations for WebSphere MQ Version 7.0.

Parent topic: Migration

This build: January 26, 2011 11:06:35

Notices | Trademarks | Downloads | Library | Support | Feedback

3.1. Coexistence on WebSphere MQ for AIX

❯WebSphere® MQ for AIX® Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0.❮

❯If you are migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0, you must uninstall WebSphere MQ Version 5.3.❮

❯To uninstall WebSphere MQ, see Uninstalling WebSphere MQ.❮

❯If you are migrating from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0, you do not have to uninstall WebSphere MQ because the installation process does it for you.❮

Parent topic: Coexistence

This build: January 26, 2011 11:06:41

Notices | Trademarks | Downloads | Library | Support | Feedback

3.2. Coexistence on WebSphere MQ for HP-UX

WebSphere® MQ for HP-UX Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for HP-UX, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Uninstalling WebSphere MQ

Parent topic: Coexistence

Related tasks
Uninstalling WebSphere MQ

This build: January 26, 2011 11:06:42

Notices | Trademarks | Downloads | Library | Support | Feedback

3.2.1. Uninstalling WebSphere MQ

About this task
To uninstall (server or client), use the HP-UX `swremove` program.

Procedure
1. Stop all WebSphere® MQ applications on the machine and the applications accessing remote machines.
2. Before starting to uninstall, end all WebSphere MQ activity.
    a. ❯Log in as a user in group `mqm`.❮
    b. Use the **dspmq** command to display the state of all the queue managers on the system (not applicable for a client installation).
    c. Use the **endmqm** command to stop all running queue managers.
    d. Stop any listeners associated with the queue managers, using the command:

       ```
       endmqlsr -m QMgrName
       ```

    e. To check that you have stopped all of them, enter the following:

       ```
       ps -ef | grep mq
       ```

    f. Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.
3. Log in as root.
4. Enter `swremove MQSERIES` to uninstall the MQSERIES package.
5. After uninstalling WebSphere MQ, you can delete the `/var/mqm` directory tree, (this will destroy all queue managers and their associated data).
6. If no other products require the Global Security Kit Version 7, you can uninstall packages `gsk7bas` and `gsk7bas64` by typing:

   ```
   swremove gsk7bas
   ```
   or
   ```
   swremove gsk7bas64
   ```

Parent topic: Coexistence on WebSphere MQ for HP-UX

Notices | Trademarks | Downloads | Library | Support | Feedback

3.3. Coexistence on WebSphere MQ for i5/OS

WebSphere® MQ for i5/OS® Version 7.0 does not coexist with previous versions of WebSphere MQ.

You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. You cannot install two versions of WebSphere MQ or MQSeries® on the same logical partition. If you try to do this, WebSphere MQ assumes that a slip install (an upgrade on the same machine) is being performed. For further guidance on performing a slip install, see Performing a slip install.

The WebSphere MQ Classes for Java do not coexist with any previous versions of the WebSphere MQ Classes for Java or the MA88 SupportPac: the same slip install process applies to this licensed program.

WebSphere MQ for i5/OS can coexist with any version of WebSphere MQ Classes for Java; you do not need to install a version of WebSphere MQ Classes for Java that matches the installed version of WebSphere MQ.

Parent topic: Coexistence

Notices | Trademarks | Downloads | Library | Support | Feedback

3.4. Coexistence on WebSphere MQ for Linux

WebSphere® MQ for Linux Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for Linux, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Uninstalling Websphere MQ
This topic explains how to remove WebSphere MQ for Linux from your system.

Parent topic: Coexistence

Related tasks
Uninstalling Websphere MQ

Notices | Trademarks | Downloads | Library | Support | Feedback

3.4.1. Uninstalling Websphere MQ

This topic explains how to remove WebSphere MQ for Linux from your system.

Procedure
1. Stop all WebSphere® MQ applications on the machine and the applications accessing remote machines.
2. End all WebSphere MQ activity:
   a. ▶Log in as a user from `group mqm`.◀
   b. Use the **dspmq** command to display the state of all the queue managers on the system (only applicable on a server installation).
   c. Use the **endmqm** command to stop all running queue managers.
   d. Stop any listeners associated with the queue managers, using the command:

          endmqlsr -m QMgrName

   e. To check that you have stopped all necessary WebSphere MQ activity, type:

          ps -ef | grep mq

      Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.

3. Log in as root.
4. Before you uninstall WebSphere MQ for Linux you must find out the names of the packages (components) currently installed on your system. To list all the packages with their version information, enter the following:

          rpm -qa | grep MQSeries
          rpm -qa | grep gsk

   Note: If you have applied maintenance to the install, remove these maintenance packages before removing the base install.

5. Some of the installed packages are dependent on others. The **rpm** command will not remove a package if others are dependent on it. For this reason you must uninstall the packages in such an order that each one you uninstall has no dependencies from other packages. To list all of the packages on which a named package (for example `MQSeriesServer`) depends, enter the following:

          rpm -q --requires MQSeriesServer

   Alternatively, remove all the components at the same time by appending all the package names to the rpm command arguments. For example, to remove the runtime, Server and SDK components, enter the following:

          rpm -ev MQSeriesRuntime MQSeriesServer MQSeriesSDK

6. After uninstalling , you might want to delete the contents of `/var/mqm`, which is not removed by the uninstallation. **Only do this if you do not need your queue manager data.** For example, do not delete the content if you plan to migrate to a later version of WebSphere MQ.

   Results

You have now uninstalled WebSphere MQ.

Parent topic: Coexistence on WebSphere MQ for Linux

This build: January 26, 2011 11:06:13

Notices | Trademarks | Downloads | Library | Support | Feedback

3.5. Coexistence on WebSphere MQ for Solaris

WebSphere® MQ for Solaris Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. If you are migrating from a previous version of WebSphere MQ for Solaris, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Uninstalling WebSphere MQ

Parent topic: Coexistence

Related tasks
Uninstalling WebSphere MQ

This build: January 26, 2011 11:06:42

Notices | Trademarks | Downloads | Library | Support | Feedback

3.5.1. Uninstalling WebSphere MQ

About this task
To uninstall WebSphere® MQ (server or client), use the Solaris **pkgrm** program.

Note: If any updates have been applied, remove them first.

Procedure

1. Stop all WebSphere MQ MQ applications on the machine and the applications accessing remote machines.
2. End all WebSphere MQ activity:
   a. ❯Log in as a user in `group mqm`.❮
   b. Use the **dspmq** command to display the state of all the queue managers on the system.
   c. Use the **endmqm** command to stop all running queue managers.
   d. Stop any listeners associated with the queue managers, using the command:

      `endmqlsr -m QMgrName`

   e. To check that you have stopped all of them, enter the following:

      `ps -ef | grep mq`

   f. Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.
3. Log in as root.
4. Enter `pkgrm mqm` to uninstall the `mqm` package.
   If a package has a dependency on `mqm`, **pkgrm** returns the name of the package. Uninstall the dependent packages first.
   Note: If the product was successfully uninstalled, you can delete the files and directories contained in `/opt/mqm`. If for any reason the product was not properly uninstalled, files might still exist in the package.
5. After uninstalling WebSphere MQ, you can delete the `/var/mqm` directory tree, (this will destroy all queue managers and their associated data).
6. If no other products require the Global Security Kit Version 7, you can uninstall packages `gsk7bas` and `gsk7bas64`.

Parent topic: Coexistence on WebSphere MQ for Solaris

This build: January 26, 2011 11:07:17

Notices | Trademarks | Downloads | Library | Support | Feedback

3.6. Coexistence on WebSphere MQ for Windows

WebSphere® MQ for Windows Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0. You do not have to uninstall your current version before installing WebSphere MQ Version 7.0 because the installation process does it for you.

Parent topic: Coexistence

This build: January 26, 2011 11:06:35

Notices | Trademarks | Downloads | Library | Support | Feedback

3.7. Coexistence on WebSphere MQ for z/OS

You must take a number of factors into consideration when WebSphere® MQ Version 7.0 for z/OS® coexists with previous versions of WebSphere MQ for z/OS.

Parent topic: Coexistence

This build: January 26, 2011 11:06:44

Notices | Trademarks | Downloads | Library | Support | Feedback

3.7.1. Multiple queue manager versions in z/OS

There can be several WebSphere® MQ subsystems in a z/OS image, and they can use different versions of WebSphere MQ, provided the WebSphere 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 WebSphere MQ subsystems in the z/OS image.)

There can be multiple queue managers in a z/OS image at different levels of WebSphere MQ. This means that you can run one queue manager with Version 7.0 and another in the same image with an earlier version, provided that the early code is that of Version 7.0.

Each WebSphere MQ system has its own security settings, and can use mixed case RACF® class support if it is at the appropriate level of WebSphere MQ. Follow the migration steps in Migration to mixed case security.

Use STEPLIBs to control which level of WebSphere MQ is used.

Parent topic: Coexistence on WebSphere MQ for z/OS

This build: January 26, 2011 11:06:45

Notices | Trademarks | Downloads | Library | Support | Feedback

3.7.2. Multiple queue manager versions in a queue-sharing group

A queue-sharing group can have Version 6.0 and Version 7.0 queue managers active and accessing shared queues and other shared objects.

The Version 6.0 queue managers must have a Version 7.0 coexistence PTF applied to enable them to run in a queue-sharing group with Version 7.0 queue managers.

►After the Version 7.0 coexistence PTF has been applied the Version 6.0 queue manager must be started at least one time to allow the migration of MQ internal objects.◄

A Version 7.0 queue manager cannot coexist in a queue-sharing group with other queue managers running code earlier than Version 6.0. If there is a Version 5.3.1 queue manager in the queue-sharing group, or the queue-sharing group migration actions have not been performed (see Migrating queue-sharing groups to Version 7.0), you cannot start a Version 7.0 queue manager as a member of that queue-sharing group. After you have performed queue-sharing group migration actions, or if there are Version 7.0 queue managers active in the queue-sharing group, you cannot start queue managers at Version 5.3.1 or lower in the queue-sharing group. Version 6.0 queue managers will not start in such a queue-sharing group unless they have had the Version 7.0 coexistence PTF applied.

You are recommended to only have a mixed version queue-sharing group for the time it takes to migrate all queue managers to Version 7.0. While the queue-sharing group contains mixed version queue managers, WebSphere® MQ for z/OS® Version 7.0 allows prototyping with new Version 7.0 facilities on a Version 7.0 queue manager, and tolerates operation at the Version 6.0 level or above.

Parent topic: Coexistence on WebSphere MQ for z/OS

This build: January 26, 2011 11:06:45

Notices | Trademarks | Downloads | Library | Support | Feedback

3.7.2.1. Function restrictions in a mixed queue-sharing group

You cannot alter a CF structure object from **CFLEVEL**(3) to **CFLEVEL**(4) until all queue managers in the queue-sharing group have been started at Version 6.0 or later level.

You cannot delete a CF structure object until all queue managers in the queue-sharing group have been started at Version 6.0 or later level.

Queue managers below Version 6.0 cannot connect to the Coupling Facility structure identified by the **CFLEVEL**(4) CF structure object, which means they can neither access the queues defined on it, nor messages stored on the queue.

You can define and alter objects with **QSGDISP**(GROUP) from a Version 7.0 queue manager. Those objects and their resulting copy objects are accessible on all the queue managers, but on older version queue managers the new Version 7.0 attributes and values are not available.

❯If you define a queue alias object with the properties **QSGDISP**(GROUP) and **TARGTYPE**(TOPIC) from a V7.0 queue manager, the **TARGTYPE** property is not recognized by the Version 6.0 queue manager. This will result in the Version 6.0 queue manager defining a copy object of the queue alias which is interpreted as referencing a queue instead of the intended topic.❮

On a Version 6.0 queue manager, MQSC commands using new Version 7.0 keywords and attribute values (but not new commands) can be entered for routing to a Version 7.0 queue manager using CMDSCOPE. Such commands, on whatever version queue manager, routed to Version 6.0 queue manager using CMDSCOPE will fail.

The operations and control panels work as detailed in Operations and control panels.

PCF commands can be entered only on a Version 6.0 or higher queue manager. If they use MQCACF_COMMAND_SCOPE they will fail on any queue manager they are routed to that is not at Version 6.0 or later.

Parent topic: Multiple queue manager versions in a queue-sharing group

This build: January 26, 2011 11:06:45

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3.7.2.2. Mixed case RACF support for multiple queue manager versions in a queue-sharing group

How you turn on mixed-case RACF support varies according to whether you have activated queue manager level checking or queue sharing group level checking, or both.

Mixed-case RACF security is supported in WebSphere® MQ Version 7.0. Ensure that you have installed a level of the security product that supports mixed case security, that you have applied any updates required by WebSphere MQ, and that the new WebSphere MQ RACF® classes are installed and active. Because a queue-sharing group can contain a mix of WebSphere MQ Version 7.0 queue managers and WebSphere MQ Version 6.0 queue managers, you need to consider the following situations:

- Mixed-case RACF support with queue manager level checking active
- Mixed-case RACF support with queue sharing group level checking active
- Mixed-case RACF support with queue manager and queue sharing group level checking active

Parent topic: Multiple queue manager versions in a queue-sharing group

Mixed-case RACF support with queue manager level checking active

There are multiple queue managers in a queue-sharing group running on different versions of WebSphere MQ, and they all have queue manager only security checking active.

The process for turning on mixed-case RACF® support for those queue managers that are running on WebSphere MQ Version 7.0 with mixed-case security is the same as when the queue managers are not in a queue-sharing group. Follow the migration steps in ❯Migration to mixed-case security❮.

Mixed-case RACF support with queue sharing group level checking active

Multiple queue managers in a queue-sharing group are running on different versions of WebSphere MQ, and they all have queue-sharing group only security checking active.

To turn on mixed-case RACF support for those queue managers that are running on WebSphere MQ Version 7.0 with mixed-case security, see ❯Migration to mixed-case security❮:

1. Carry out Steps 1-3.
2. Carry out Steps 4-6 for each queue manager that you are changing.
3. Carry out Step 7 for all queue managers in the queue-sharing group.
4. Carry out Step 8, but with the following additional consideration:
   If you are defining a shared mixed-case resource, you can protect it with a mixed-case profile in a mixed-case class on those queue managers that are using that support. On queue managers that are not using that support, the resource can only be protected using a generic uppercase profile in an uppercase class.
   In summary, queue managers using mixed-case support perform security checks against the mixed-case classes and queue managers using uppercase support (whatever the release of the product) perform security checks against the uppercase classes.

Carry out the above procedure if you have a shared mixed case resource, protected through a mixed case profile, but with some queue managers using SCYCASE(UPPER).

Mixed-case RACF support with queue manager and queue sharing group level checking active

There are multiple queue managers in a queue-sharing group running on different versions of WebSphere MQ, and they all have queue manager and queue-sharing group security checking active.

To turn on mixed-case RACF support for those queue managers that are running on WebSphere MQ Version 7.0 with mixed-case security, see Mixed-case RACF support with queue sharing group level checking active.

This build: January 26, 2011 11:06:46

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3.7.3. Operations and control panels

When using the operations and control panels, the WebSphere® MQ libraries you use in ISPF must be compatible with those of the queue manager you are working with.

Table 1. Compatibility of queue manager versions with operations and control panels versions

Panel level	Version 7 queue manager	Version 6 queue manager
Version 7	X	X with restrictions and warnings
Version 6	X with warning, if migration & coexistence PTF applied	X

The panels at Version 7.0 level work with Version 7.0 queue managers. They also work, with some restrictions, with Version 6.0 queue managers, or with a queue-sharing group containing a mixture of queue managers. If you are using the panels with a queue manager earlier than Version 7, messages warn you about the restrictions. The Version 7.0 panels do not work with other levels of queue manager. If you have applied the migration & coexistence PTF, panels at the Version 6 level work as for Version 7.0; if they are used with a Version 7.0 queue manager they will give a warning, which can be ignored. If you have not applied the PTF, they will not work with a Version 7.0 queue manager. This is summarized in Table 1.

Parent topic: Coexistence on WebSphere MQ for z/OS

This build: January 26, 2011 11:06:45

Notices | Trademarks | Downloads | Library | Support | Feedback

3.7.4. Application stubs

The stub modules that are link-edited with applications and exits (CSQASTUB, CSQBRSSI, CSQBRSTB, CSQBSTUB, CSQCSTUB, CSQQSTUB, and CSQXSTUB) might not work with earlier versions of the queue manager. For example, stubs supplied with Version 6 can be used by applications running on a Version 6 or Version 7 queue manager, ➤however an application linked with Version 7 stubs might not work with a Version 6 queue manager.◄

To take advantage of the new APIs introduced at WebSphere® MQ Version 7, for example MQSUB and MQCB, you must link-edit your application with the appropriate Version 7 stub or, for an LE program, the sidedeck, see Building z/OS batch applications using Language Environment. Such an application will not run on an earlier version of the queue manager.

Parent topic: Coexistence on WebSphere MQ for z/OS

This build: January 26, 2011 11:06:45

Notices | Trademarks | Downloads | Library | Support | Feedback

3.8. Coexistence of WebSphere MQ classes for JMS

The following are specific JMS coexistence considerations for WebSphere MQ Version 7.0.

Administered objects

WebSphere MQ Version 7.0 clients can read a WebSphere MQ Version 6.0 connection factory or destination object.

An object written under WebSphere MQ Version 7.0 can be used by a WebSphere MQ Version 6.0 client, but any of the new WebSphere MQ Version 7.0 properties that have been set are ignored.

For client migration information, see ➤WebSphere MQ classes for JMS and classes for Java considerations◄.

Parent topic: Coexistence

This build: January 26, 2011 11:06:40

Notices | Trademarks | Downloads | Library | Support | Feedback

4. Migrating WebSphere MQ components to Version 7.0

If you are migrating WebSphere® MQ components to Version 7.0, this section contains specific advice.

Migrating a queue manager cluster to WebSphere MQ Version 7.0.
This topic describes how to migrate a queue manager cluster.

Migrating client-connection and server-connection channels
This topic describes issues relating to migrating client-connection or server-connection channels to WebSphere MQ Version 7.0.

Migrating JMS Exception listeners
JMS exception listeners in WebSphere MQ Version 7.0 behave slightly differently than they did in previous releases.

Changes in WebSphere MQ Version 7.0 to consider
This topic provides information about changes in WebSphere MQ Version 7.0 to consider when migrating. It includes information about transport for SOAP, the behavior of **MQMessage.resizeBuffer**, **MQCONN** reason codes, and the use of OCSP to check for revoked TLS or SSL certificates.

Parent topic: Migration

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

4.1. Migrating a queue manager cluster to WebSphere MQ Version 7.0.

This topic describes how to migrate a queue manager cluster.

About this task

You must consider the following issues, which 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 WebSphere® MQ features
- Managing the migration of a cluster in the context of the wider WebSphere MQ network and your organization's systems architecture

Techniques for migrating a cluster with minimal planned and unplanned outages are detailed in the following topics:

Migrating a queue manager cluster: Creating a plan
Before carrying out a migration, plan what you will do.

Migrating a queue manager cluster: Creating a backout plan
Before performing a migration, decide on a backout plan in case of failure.

Migrating a queue manager cluster: Setting up a test environment
When planning to migrate a cluster, set up a test environment.

Migrating the test system
Migrate each queue manager in the test system.

Migrating a queue manager cluster: Migrating the production system
Migrate each queue manager in the production system.

Parent topic: Migrating WebSphere MQ components to Version 7.0

Related tasks
Migrating to WebSphere MQ for HP-UX Version 7.0

Related information
Migrating to WebSphere MQ Version 7.0 on AIX
Migrating from MQ V5.3 or later on i5/OS
Upgrading to WebSphere MQ for Linux Version 7.0
Migrating to WebSphere MQ Version 7.0 on Solaris
Migrating to WebSphere MQ for z/OS Version 7.0

🗔 This build: January 26, 2011 11:06:31

4.1.1. Migrating a queue manager cluster: Creating a plan

Before carrying out a migration, plan what you will do.

Procedure

1. Consider general queue manager migration issues, issues specific to clustering, your system architecture, and your installation's change control policies.
2. Decide whether you will carry out a staged migration, or migrate all queue managers at the same time.
3. Document and test the plan before migrating production queue managers.

   Migrating a queue manager cluster: Staged migration
   In a staged migration, queue managers are migrated one at a time over an extended period.

   Migrating one cluster queue manager
   This is an example of a basic migration plan for a cluster queue manager. Determine the order in which you need to migrate the queue managers, then use it as a basis for a procedure that fits your own requirements. Your procedure might have more or fewer steps:

Parent topic: Migrating a queue manager cluster to WebSphere MQ Version 7.0.

🗔 This build: January 26, 2011 11:06:30

4.1.1.1. Migrating a queue manager cluster: Staged migration

In a staged migration, queue managers are migrated one at a time over an extended period.

Cluster queue managers can participate in clusters with other queue managers running at different versions, which is why a staged migration is possible.

When you migrate a cluster, it is good practice to stage the migration. You can leave several days between migrating each queue manager in the cluster, to test applications before wholly committing all queue managers to run at the new version.

It is advisable to migrate full repositories first. If all full repositories are migrated before partial repositories, all queue managers running at the new version can exploit features of the new version. Queue managers at the back-level version cannot take advantage of new features, and will appear in the repositories of new-version queue managers with the default values for any new attributes.

If full repositories are not migrated before partial repositories, the cluster continues to work but not all new-version queue managers are able to take advantage of new features. This is because of the manner in which cluster objects are published to the cluster, via full repositories, as explained in the

following section.

- Repositories hold records that represent objects (for example, a queue record represents a cluster queue).
- Full repositories hold records for all objects defined in the cluster.
- Partial repositories hold records for all local objects and the remote objects which are being used locally.
- A WebSphere MQ version 6 record contains only version 6 attributes.
- A WebSphere MQ version 7 record contains all V6 attributes, plus additional V7 attributes.
- A repository stores information about parameters valid for the release of the queue manager it is running on. So a V6 repository stores information valid for V6 but does not store information about V7 parameters.
- When a partial repository connects to a full repository and requests information, the full repository sends records that it holds, so a V6 full repository sends only V6 records and a V7 full repository sends only V7 records.
- When a V7 partial repository sends V7 records, the full repositories store the records. A V6 full repository receives the V7 record and stores it as a V6 record. A V7 full repository receives the V7 record and stores it as a V7 record.
- When a partial repository sends records, the full repositories forward them on to all interested queue managers in the original source format and do no conversion of the record. For example, a record from a V6 partial repository being forwarded by a V7 full repository is not converted into a V7 record by the full repository, and a record from a V7 partial repository being forwarded by a V6 full repository is not converted into a V6 record by the full repository.
- When a queue manager receives data it does not recognize, it discards that information. So a V6 queue manager receiving information about a V7 queue manager discards any V7-specific information.
- If a queue manager is running at V7 and is backward migrated to V6 then any V7 specific information is discarded.
- A partial repository sends information about its objects to a full repository periodically, at least once every 27 days, or when an object is altered or defined.
- If a V7 partial queue manager receives a V6 record, it uses default values for any V7-specific attributes.
- If a V7 partial repository is connected to both a V7 and a V6 full repository, then the partial repository will hold information in the format of the last record sent to it. Thus it can hold V6 or V7 information. You might see a V7-specific attribute have a specifically set value, and a short while later have the V7 default value, and then the set value again - depending on where the last record received was received from. This does not happen if you migrate your full repositories first.
- When you have migrated all your repositories to V7, it is possible that some V7 record attributes will hold default values instead of the actual object attribute values. If this occurs, there are two alternative methods available to fix the V7 record containing default values.
    - Alter the object which the record containing default values represents (for example, using ALTER QL for a local queue). This 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. This forces the partial repository to discard the record containing default values and get a new record as required.

Parent topic: [Migrating a queue manager cluster: Creating a plan](#)

This build: January 26, 2011 11:06:30

[Notices](#) | [Trademarks](#) | [Downloads](#) | [Library](#) | [Support](#) | [Feedback](#)

4.1.1.2. Migrating one cluster queue manager

This is an example of a basic migration plan for a cluster queue manager. Determine the order in which you need to migrate the queue managers, then use it as a basis for a procedure that fits your own requirements. Your procedure might have more or fewer steps:

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. Monitor traffic to the suspended queue manager. The cluster workload algorithm can choose a suspended queue manager if there are no other valid destinations available or an application has affinity with a particular queue manager. You might have to close the application submitting messages to this queue manager.

2. Save a record of all cluster objects known by this queue manager. This data will be used after migration to check that objects have been migrated successfully.
    a. Issue the command `DISPLAY CLUSQMGR(*)` to view cluster queue managers.
    b. Issue the command `DISPLAY QC(*)` to view cluster queues.

3. Save a record of the full repositories' view of the cluster objects owned by this queue manager. This data will be used after migration to check that objects have been migrated successfully.
    a. Issue the command `DISPLAY CLUSQMGR(`*migrated queue manager name*`)` on the full repositories.
    b. Issue the command `DISPLAY QC(*) WHERE(CLUSQMGR EQ `*migrated queue manager name*`)` on the full repositories

4. Stop the queue manager.

5. Take a backup of the queue manager, as described in [Backing up queue manager data](#).

6. Install the new version of WebSphere® MQ.

7. Restart the queue manager.

8. Ensure that all cluster objects have been migrated successfully.
    a. Issue the command `DISPLAY CLUSQMGR(*)` to view cluster queue managers, and check the output against the data saved before migration.
    b. Issue the command `DISPLAY QC(*)` to view cluster queues and check the output against the data saved before migration.

9. Ensure that the queue manager is communicating with the full repositories correctly. Check that cluster channels to full repositories can start.

10. Ensure that the full repositories still know about the migrated cluster queue manager and its cluster queues.
    a. Issue the command `DISPLAY CLUSQMGR(`*migrated_queue_manager_name*`)` on the full repositories and check the output against the data saved before migration.
    b. Issue the command `DISPLAY QC(*) WHERE(CLUSQMGR EQ `*migrated_queue_manager_name*`)` on the full repositories and check the output against the data saved before migration.

11. Test that applications on other queue managers can put messages to the migrated cluster queue manager's queues.

12. Test that applications on the migrated queue manager can put messages to the other cluster queue managers' queues.

13. Resume the queue manager.
    a. Issue `RESUME QMGR CLUSTER(`*cluster name*`)`

14. Closely monitor the queue manager and applications in the cluster for a period of time.

Parent topic: Migrating a queue manager cluster: Creating a plan

Related information
Stopping a queue manager (z/OS)
Starting and stopping a queue manager (i5/OS)
Stopping a queue manager (other platforms)
Creating a point of recovery for non-shared resources (z/OS)
Backups of WebSphere MQ for i5/OS data
Backing up queue manager data (other platforms)
Starting a queue manager (z/OS)
Starting a queue manager (other platforms)

This build: January 26, 2011 11:06:31

Notices | Trademarks | Downloads | Library | Support | Feedback

4.1.2. Migrating a queue manager cluster: Creating a backout plan

Before performing a migration, decide on a backout plan in case of failure.

Procedure
The backout plan should detail what constitutes a successful migration, the conditions that trigger the backout procedure, and the backout procedure itself. The procedure could involve removing or suspending the queue manager from the cluster, backward migration, or keeping the queue manager offline until an external issue is resolved.

Parent topic: Migrating a queue manager cluster to WebSphere MQ Version 7.0.

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

4.1.3. Migrating a queue manager cluster: Setting up a test environment

When planning to migrate a cluster, set up a test environment.

When you make any system changes, it is good practice to test the changes in a test or quality-assurance environment before implementing the changes in a production system.

Ideally, execute an identical migration plan in test and production environments to maximize the chance of finding potential problems in test rather than in production. In practice, test and production environments are unlikely to be configured identically or to have the same workloads, so the migration steps carried out in test will not exactly match those carried out in production. Whether the plans and environments for test and production differ or not, it is always possible to find problems when migrating the production cluster queue managers. Do not assume that a problem-free test migration indicates a problem-free production migration.

Parent topic: Migrating a queue manager cluster to WebSphere MQ Version 7.0.

This build: January 26, 2011 11:06:27

Notices | Trademarks | Downloads | Library | Support | Feedback

4.1.4. Migrating the test system

Migrate each queue manager in the test system.

Before you begin
For each queue manager in the test system, in the order defined in the migration plan you developed in Migrating a queue manager cluster: Creating a plan, migrate and test the queue manager.

Parent topic: Migrating a queue manager cluster to WebSphere MQ Version 7.0.

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

4.1.5. Migrating a queue manager cluster: Migrating the production system

Migrate each queue manager in the production system.

Before you begin
For each queue manager in the production system, in the order defined in the migration plan you developed in Migrating a queue manager cluster: Creating a plan, migrate and test the queue manager.

Parent topic: Migrating a queue manager cluster to WebSphere MQ Version 7.0.

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

This topic's URL:
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4.2. Migrating client-connection and server-connection channels

This topic describes issues relating to migrating client-connection or server-connection channels to WebSphere® MQ Version 7.0.

The default for client channels is to use sharing conversations, described in Using sharing conversations. On client channels only that use sharing conversations, heartbeats can flow across the channel (from both ends) at any time, depending on channel activity and the heartbeat interval. On versions of WebSphere MQ earlier than Version 7.0, or on WebSphere MQ Version 7.0 channel instances which are configured to not allow sharing conversations, heartbeats can flow on client channels only when an MQGET call is outstanding. This can affect whether you set heartbeating on client channels and what value you set it to.

The default value on a migrated client-connection or server-connection channel for the SHARECNV channel attribute is 10, and the default WebSphere MQ V7.0 sharing MQCNO value for an existing client application is MQCNO_ALL_CONVS_SHARE. Conversations are, therefore, shared on TCP/IP channel instances by default when you migrate to WebSphere MQ Version 7.0. This is not apparent, unless you have send, receive, or security exits written to perform actions that are not generally expected in send, receive or security exits. In particular:

- If send or receive exits alter the MQCD structure on an MQXR_INIT call, the effect of these exits will differ, depending on whether they are on the first, or subsequent conversations on a channel instance with sharing conversations:
  - If the MQCXP SharingConversations field is set to FALSE, this exit instance applies to the first 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 is set to TRUE, this exit instance applies to a conversation that is sharing the channel instance with other conversations. Changes made to the MQCD in the exit instance are retained in the MQCD but cannot affect the way the channel runs.
- If send, receive, or security exit instances alter the MQCD, when the MQCXP SharingConversations field is set to TRUE, exit instances on other conversations can be changing the MQCD at the same time and updates can be overwritten; this does not affect the way the channel runs, but if you use the data in the MQCD for a different purpose that requires the integrity of the data to be preserved, then it might be necessary to serialize access to the MQCD across these different exit instances.
- For further information on the MQCXP SharingConversations field, see Using sharing conversations.
- If send or receive exits on the server-connection side of the channel instance need to perform MQI calls on the connection with which they are associated, they use the connection handle provided in the MQCXP Hconn field. You must be aware that client-connection send and receive exits cannot make MQI calls.

Performance implications of sharing conversations on client-connection channels
The SHARECNV channel attribute specifies the maximum number of conversations that share each TCP/IP channel instance. Sharing conversations has performance implications when migrating client-connection channels to WebSphere MQ Version 7.0.

Parent topic: Migrating WebSphere MQ components to Version 7.0

This build: January 26, 2011 11:06:32

Notices | Trademarks | Downloads | Library | Support | Feedback

This topic's URL:
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4.2.1. Performance implications of sharing conversations on client-connection channels

The SHARECNV channel attribute specifies the maximum number of conversations that share each TCP/IP channel instance. Sharing conversations has performance implications when migrating client-connection channels to WebSphere® MQ Version 7.0.

A SHARECNV channel attribute of 0 specifies no sharing of conversations over a TCP/IP channel instance. The channel instance runs in a mode similar to that of WebSphere MQ Version 6.0 and inhibits the following WebSphere MQ Version 7.0 features:

- Administrator stop-quiesce
- Heartbeating
- Read ahead
- Client asynchronous consume

Established client applications that do not need to use the WebSphere MQ Version 7.0 features can use SHARECNV(0). Using SHARECNV(0), processing of messages is, on average, 3 percent slower than under WebSphere MQ Version 6.0.

A SHARECNV channel attribute value of 1 specifies no sharing of conversations over a TCP/IP channel instance but makes the WebSphere MQ Version 7.0 features available.

A SHARECNV channel attribute value greater than 1 specifies sharing of conversations over a TCP/IP channel instance and makes the WebSphere MQ Version 7.0 features available.

The default value on a migrated client-connection channel for the SHARECNV channel attribute is 10, and the default WebSphere MQ V7.0 sharing MQCNO value for an existing client application is MQCNO_ALL_CONVS_SHARE. Conversations are, therefore, shared on TCP/IP channel instances by default when you migrate to WebSphere MQ Version 7.0.

All of the conversations on a socket are received by the same thread. High SHARECNV limits have the advantage of reducing queue manager thread usage. However, if a large number of conversations sharing a socket are all busy, there is a possibility of delays as the conversations contend with one another to use the receiving thread. In this situation a lower SHARECNV value is better.

On average, processing of messages from client applications is 15 percent slower when using SHARECNV(10), compared with SHARECNV(0); this is the cost of providing the client function that is new in WebSphere MQ Version 7.0. However, performance improvements introduced in WebSphere MQ Version 7.0 on distributed platforms and the availability of WebSphere MQ Version 7.0 performance features such as read ahead and client asynchronous consume, can mitigate this performance difference.

Parent topic: Migrating client-connection and server-connection channels

This build: January 26, 2011 11:07:01

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4.3. Migrating JMS Exception listeners

JMS exception listeners in WebSphere® MQ Version 7.0 behave slightly differently than they did in previous releases.

In versions of WebSphere MQ earlier than 7.0, an exception listener was called only to inform the application of any error condition that occurred asynchronously to the application's execution, for example, during the processing of a message for an asynchronous consumer where the application might have no other means to discover the exception. This could include connection broken events or if an attempt was made to process an unreadable message.

APAR IY81774 introduced a system property activateExceptionListener. If this property was set, all exceptions resulting from a broken connection were sent to the exception listener, regardless of the context in which they occurred. Therefore, in addition to being called for exceptions that occurred asynchronously to the application's execution, the exception listener was also passed any exceptions that indicated a connection broken event that were discovered during a normal synchronous JMS API call. For example, if a connection broken event occurred during a call to "receive", then the exception would not only be thrown from the receive method, but would also be passed back to the exception listener.

In WebSphere MQ Version 7.0, if the ASYNC_EXCEPTIONS property of the factory object is set to its default value of ASYNC_EXCEPTIONS_ALL, the exception listener is called for all broken connection exceptions and all exceptions that arise outside the scope of a synchronous JMS API call. Setting ASYNC_EXCEPTIONS property to ASYNC_EXCEPTIONS_ALL provides the same behavior as system property activateExceptionListener that was introduced in APAR IY81774. The property activateExceptionListener is therefore deprecated.

If the ASYNC_EXCEPTIONS property is set to ASYNC_EXCEPTIONS_CONNECTIONBROKEN, only exceptions indicating a broken connection are sent to the exception listener. These exceptions include connection broken exceptions occurring both synchronously and asynchronously, but do not include any other asynchronous errors such as for unreadable messages. In this mode, if the exception listener is triggered, the connection can be considered to have failed and it is no longer possible to send or receive messages.

Your applications might therefore receive more or fewer exceptions than previously. Ensure that the applications take appropriate action, for example, by attempting to remake the connection, when such exception listener calls are made.

For information about handling exceptions, see Exceptions in WebSphere MQ classes for JMS.

Parent topic: Migrating WebSphere MQ components to Version 7.0

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4.4. Changes in WebSphere MQ Version 7.0 to consider

This topic provides information about changes in WebSphere® MQ Version 7.0 to consider when migrating. It includes information about transport for SOAP, the behavior of **MQMessage.resizeBuffer**, **MQCONN** reason codes, and the use of OCSP to check for revoked TLS or SSL certificates.

Change in behavior of MQMessage.resizeBuffer in WebSphere MQ classes for Java

In earlier releases of WebSphere MQ, attempting to resize a buffer to a negative size using **MQMessage.resizeBuffer** in a Java program resulted in a NegativeArraySizeException. In WebSphere MQ Version 7.0, it results in an IllegalArgumentException.

WebSphere MQ Version 7.0 transport for SOAP

The level of Apache Axis has been updated from Version 1.1 to Version 1.4.

MQCONN reason codes

WebSphere MQ Version 7.0 provides some more specific reason codes for failed MQCONN calls.

Situations in which an MQCONN call failed to connect to a queue manager in WebSphere MQ Version 6.0, with reason code MQRC_Q_MGR_NOT_AVAILABLE, can still output reason code MQRC_Q_MGR_NOT_AVAILABLE in WebSphere MQ Version 7.0, or one of the following more specific reason codes:

- MQRC_CHANNEL_NOT_AVAILABLE
- MQRC_HOST_NOT_AVAILABLE
- MQRC_CHANNEL_CONFIG_ERROR
- MQRC_UNKNOWN_CHANNEL_NAME

If you have a WebSphere MQ Version 6.0 application that takes specific actions based on the reason code, you might need to change the application to take account of the additional reason codes.

Selectors

In version 7.0.1, changes were made in the implementation of message selector processing in Version 7.0.1 queued publish/subscribe from the implementation in version 7.0. If you are migrating from Version 7.0 to Version 7.0.1 the following information might be of interest to you.

As a result of changes to message selector processing, applications that check explicitly for reason code MQRC_SELECTION_NOT_AVAILABLE might need to check for, and handle, the reason code MQRC_SELECTION_NOT AVAILABLE. MQRC_SELECTION_NOT AVAILABLE can be returned by the MQSUB, MQPUT, and MQPUT1 API calls. See ➤Selecting on the content of a message◀ for details.

When a subscription is defined administratively using MQSC or PCF commands, the selector is not validated for invalid syntax. The **DEFINE SUB** command has no equivalent to the MQRC_SELECTION_NOT_AVAILABLE reason code.

➤

AuthorityInfoAccess extension in a TLS or SSL certificate

In WebSphere MQ version 7 the AuthorityInfoAccess (AIA) certificate extension in a TLS/SSL certificate is checked by default, and, if it contains a URL, an attempt is made to contact the OCSP responder at that URL. The URL contained in the extension often cannot be reached because of firewall restrictions, and the timeout on the attempt to contact it can be long, causing channels to take a long time to start, and perhaps to time out themselves if they are running with short heartbeat intervals. The typical solution to accessing an OCSP responder through a firewall is to set up an OCSP proxy server. WebSphere MQ supports proxy servers by providing the SSLHTTPProxyName configuration file variable (or, on a client, the MQSSLPROXY environment variable).

There might be situations in which you are not concerned about whether the TLS/SSL certificates you receive are revoked, for instance when running in a test environment. In that case, you can turn off AIA certificate extension checking using the OCSPCheckExtensions configuration file variable. In a production environment, if a certificate has an AIA extension it is important that the certificate is checked with the OCSP responder, as the certificate might be revoked. If you do not check the certificate, you might allow an unauthorized user, presenting a revoked certificate, access to your system.

◀

Change in behavior of MQPUT1 with MQPMO_SYNCPOINT
A client **MQPUT1** call within syncpoint in a default configuration of WebSphere MQ Version 7.0 can appear to succeed, with failures being returned to the application only when it later calls **MQCMIT**. For example, in one specific scenario in WebSphere MQ Version 7.0 an MQPUT1 call can complete successfully where a similar call in WebSphere MQ Version 6.0 fails with Completion code 2 and Reason code 2085. For more information see Change in behavior of MQPUT1.

Parent topic: Migrating WebSphere MQ components to Version 7.0

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5. Platform-specific information

This collection of topics describes migration information specific to each platform.

Migrating to WebSphere MQ for AIX Version 7.0
Instructions for migrating to WebSphere MQ Version 7.0.

Migrating to WebSphere MQ for HP-UX Version 7.0
Follow this information to migrate from previous versions of WebSphere MQ for HP-UX to WebSphere MQ for HP-UX Version 7.0.

❯Upgrading to WebSphere MQ for i5/OS Version 7.0❮
This section describes steps you must take when upgrading to WebSphere MQ for i5/OS®, V7.0.

Upgrading to WebSphere MQ for Linux Version 7.0
This section provides information about considerations for upgrading WebSphere MQ for Linux.

Migrating to WebSphere MQ for Solaris Version 7.0
Follow this information to migrate from previous versions of WebSphere MQ for Solaris to WebSphere MQ for Solaris Version 7.0.

Migrating to WebSphere MQ for Windows Version 7.0
Follow this information to migrate from previous versions of WebSphere MQ for Windows to WebSphere MQ for Windows Version 7.0.

Upgrading to WebSphere MQ for z/OS Version 7.0
This section describes the things that you must consider if you are migrating a single queue manager from a previous version of WebSphere MQ.

Parent topic: Migration

This build: January 26, 2011 11:06:35

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5.1. Migrating to WebSphere MQ for AIX Version 7.0

Instructions for migrating to WebSphere® MQ Version 7.0.

About this task
If you want to migrate to WebSphere MQ Version 7.0, complete this task.

If you migrate from a previous level of this product without first backing up your system, you **cannot** revert to your previous level, so back up your system **before** you install WebSphere MQ Version 7.0. You can then back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work, such as changes to messages and objects, performed by WebSphere MQ Version 7.0.

Procedure
1. Stop all MQ applications on the machine and the applications accessing remote machines.
2. End all WebSphere MQ activity.
   a. Log in as a user in `group mqm`.
   b. ❯Use the **dspmq** command to display the state of all the queue managers on the system.❮
   c. Use the **endmqm** command to stop all running queue managers.
   d. Stop any listeners associated with the queue managers, using the command:
      ```
      endmqlsr -m QMgrName
      ```
   e. To check that you have stopped all of them, enter the following:
      ```
      ps -ef | grep mq
      ```
      Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.
3. Log in as root.
4. Function supplied by the SupportPacs in Table 1 has been superseded by function in WebSphere MQ Version 7.0. Remove these SupportPacs before installing WebSphere MQ Version 7.0.

   Table 1. SupportPacs superseded by WebSphere MQ Version 7.0

SupportPac Number	Description
MA0Y	WebSphere MQ Bridge for HTTP

   Note: If you installed SupportPac MACS, remove the directory `/usr/mqm/inc64` and its contents.
   Review any other installed SupportPacs for their applicability to WebSphere MQ Version 7.0.
5. ❯ If you are migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0, you must uninstall WebSphere MQ Version 5.3. If you are migrating from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0, you do not have to uninstall WebSphere MQ because the installation process does it for you. However, when migrating from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0, before installing you must ensure that you manually remove the file sets which have been retired from WebSphere MQ Version 7.0.

       o Remove the following file sets before migrating from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0:

```
mqm.msg.De_DE

mqm.msg.Es_ES

mqm.msg.Fr_FR

mqm.msg.It_IT
```

     ◄

6. Install WebSphere MQ Version 7.0 by following the tasks set out in ►Installing a WebSphere MQ server◄.

7. Restart WebSphere MQ.

Migrating from an earlier version of WebSphere MQ for AIX client
If you want to migrate to a WebSphere MQ for AIX®, Version 7.0 client from an earlier version of the WebSphere MQ client, you must perform certain tasks.

Changes to the installation path
The current version of the WebSphere MQ for AIX client installs into a different directory to versions earlier than Version 5.3. If you are migrating from an early version, you need to take action.

Removal of obsolete code pages from WebSphere MQ for AIX
IBM-850 code pages are no longer supported.

Defining a transaction program

After you have migrated to WebSphere MQ Version 7.0
Perform these tasks immediately after you migrate to WebSphere MQ Version 7.0.

Parent topic: Platform-specific information

This build: January 26, 2011 11:05:51

Notices | Trademarks | Downloads | Library | Support | Feedback

5.1.1. Migrating from an earlier version of WebSphere MQ for AIX client

If you want to migrate to a WebSphere® MQ for AIX®, Version 7.0 client from an earlier version of the WebSphere MQ client, you must perform certain tasks.

You must first end all WebSphere MQ activity on the target machine.

This migration procedure applies only to migration from an earlier version of a WebSphere MQ for AIX client to IBM® WebSphere MQ for AIX Version 7.0 clients. If you are migrating from an earlier version of WebSphere MQ or MQSeries® for AIX, you are advised to uninstall your current version before installing the IBM WebSphere MQ for AIX Version 7.0 client.

Migration from an earlier version of WebSphere MQ for AIX involves updating any currently installed filesets, and installing any new filesets that might be required.

To update currently installed filesets:

1. Go into SMIT for root authority. From the shell, enter:

   ```
   smit
   ```

2. Select the device appropriate for your installation using the following sequence of windows:

   ```
   Software Installation and Maintenance
     Install and Update Software
       Update Installed Software to Latest Level (Update All)
   ```

   Alternatively, you can use the fastpath command to select the appropriate device:

   ```
   smitty update_latest
   ```

3. Click **List** to display the Single Select List window.
4. ►Click **/dev/cd0 (CD Drive)**.◄
5. Click **OK** to display the parameters for **Update All**.
6. Update all previously installed software for WebSphere MQ by selecting the **_update_all** option in the **Software to update** field.
7. Click **Enter**.
8. Click **OK** in the confirmation window to start updating the software.

When all previously installed filesets have been updated to the latest level, you can install any additional filesets. See "Installing a WebSphere MQ client" for more information.

Parent topic: Migrating to WebSphere MQ for AIX Version 7.0

This build: January 26, 2011 11:05:54

Notices | Trademarks | Downloads | Library | Support | Feedback

5.1.2. Changes to the installation path

The current version of the WebSphere® MQ for AIX® client installs into a different directory to versions earlier than Version 5.3. If you are migrating from an early version, you need to take action.

Changes in AIX LPP Version 4 packaging mean that the IBM® WebSphere MQ for AIX, Version 5.3 and later clients install into directory **/usr/mqm**. Versions previous to WebSphere MQ for AIX, V5.3 of the product installed into directory **/usr/lpp/mqm**.

Installation of the IBM WebSphere MQ for AIX client fails if a file system mounted as **/usr/lpp/mqm** is detected. If you are migrating from an earlier version

and a file system exists for this directory, you will need to do one of the following things before installing the IBM WebSphere MQ for AIX client. Either:

- Uninstall your existing WebSphere MQ or MQSeries® client, and either delete the file system or move it to the new install path of **/usr/mqm**

or

- Move the old file system of **/usr/lpp/mqm** to the new install path of **/usr/mqm** and create a symbolic link from the old path to the new by issuing the following command:

```
ln -s /usr/mqm /usr/lpp/mqm
```

If you uninstall your existing client and either delete or move your existing file system, you can then install the IBM WebSphere MQ for AIX client as described in the installation instructions.

However, if you move the old file system to the new installation path, you should then perform the migration installation described in Migrating from an earlier version of WebSphere MQ for AIX client.

Note: If you have already symbolically linked a file system to **/usr/lpp/mqm**, installation of the IBM WebSphere MQ for AIX client will destroy the contents of the file system and the symbolic link, leaving an empty file system. If this happens, you are advised to uninstall your existing WebSphere MQ client and either delete the file system or relink it to the new install path of **/usr/mqm**, before installing the IBM WebSphere MQ for AIX client.

The installation process for the IBM WebSphere MQ for AIX client creates a symbolic link from the old install path (**/usr/lpp/mqm**) to the new install path (**/usr/mqm**). Therefore any existing scripts or makefiles that reference the old path are still valid.

Parent topic: Migrating to WebSphere MQ for AIX Version 7.0

This build: January 26, 2011 11:05:55

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5.1.3. Removal of obsolete code pages from WebSphere MQ for AIX

IBM-850 code pages are no longer supported.

WebSphere® MQ Version 7.0 requires a base AIX® operating system at level 5.3 or higher and, from this level of operating system, the locales supporting IBM-850 code pages are no longer supported. Therefore, the following filesets containing message catalogs for IBM-850 code pages are not included in WebSphere MQ Version 7.0 for AIX:

```
mqm.msg.De_DE        (German)
mqm.msg.Es_ES        (Spanish)
mqm.msg.Fr_FR        (French)
mqm.msg.It_IT        (Italian)
```

If you have any of WebSphere MQ filesets installed that contain message catalogs encoded in the IBM-850 code page, you must delete them manually before you install WebSphere MQ Version 7.0. You can use the **lslpp** command to display them.

The `ifreqs` command is set up in the packages to ensure that you do not install the product with a mixture of WebSphere MQ Version 7.0, and earlier, message catalogs.

To find out which language is currently in use, use the **locale** command. If you are using any of the withdrawn locales, you need to change the setting of the LANG environment variable, or LC_MESSAGES environment variable, or both, to see messages in your required language; see WebSphere MQ for AIX Quick Beginnings for information about the LANG environment variable.

Parent topic: Migrating to WebSphere MQ for AIX Version 7.0

This build: January 26, 2011 11:06:33

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5.1.4. Defining a transaction program

WebSphere® MQ allows you to use the Communications Server for AIX® V5 graphical interface to configure transaction programs.

If you are migrating from a previous version of MQSeries®, you should delete any existing Communications Server definitions of transaction programs that can be invoked by WebSphere MQ using the following commands:

1. Type

```
snaadmin delete_tp_load_info.tp_name=xxxxx
```

2. Then type

```
snaadmin delete_tp.tp_name=xxxxx
```

An attempt to invoke a previously defined transaction program results in a SNA sense code of 084B6031. In addition, error message AMQ9213 is returned. See WebSphere MQ Messages for more information about this and other WebSphere MQ messages.

You can then re-create the transaction program definition using the following instructions

From the main window, click **Services**, **APPC**, and **Transaction programs ...** The following panel is displayed:
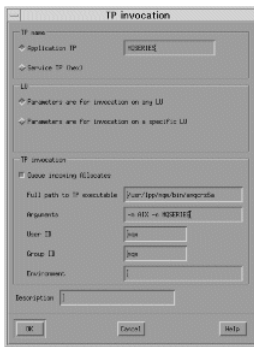
1. Type **TP name** (6) in the **Application TP** field.
2. Clear the **Queue incoming Allocates** check box.
3. Type the **Full path to executable** (7).
4. Type **-m Local queue manager** in the **Arguments** field.
5. Type **mqm** in the **User ID** and **Group ID** fields.
6. Enter environment variables **APPCLLU=local LU** (4) and **APPCTPN=Invokable TP** (6) separated by the pipe character in the **Environment** field.
7. Click **OK**.

Parent topic: Migrating to WebSphere MQ for AIX Version 7.0

This build: January 26, 2011 11:05:57

Notices | Trademarks | Downloads | Library | Support | Feedback

5.1.5. After you have migrated to WebSphere MQ Version 7.0

Perform these tasks immediately after you migrate to WebSphere® MQ Version 7.0.

About this task

Immediately after you migrate to WebSphere MQ Version 7.0, you must start your queue managers at least once to migrate your file system structure before you start any WebSphere MQ listeners. Otherwise, you will not be able to start WebSphere MQ listeners after migration.

If you cannot connect to a migrated queue manager using MQ Explorer and receive the error message "SYSTEM.MQEXPLORER.REPLY.MODEL not defined", run the following command on that queue manager:

    strmqm -c

❯This command refreshes existing system objects with default values (for example, setting the MCAUSER attribute of a channel definition to blanks), and creates the queue required by the WebSphere MQ Explorer.❮

     Extended Shared Memory (EXTSHM) environment variable
     You might need to use the extended shared memory environment variable to increase the number of shared storage segments.

Parent topic: Migrating to WebSphere MQ for AIX Version 7.0

This build: January 26, 2011 11:05:53

Notices | Trademarks | Downloads | Library | Support | Feedback

5.1.5.1. Extended Shared Memory (EXTSHM) environment variable

You might need to use the extended shared memory environment variable to increase the number of shared storage segments.

On AIX®, 32-bit applications can attach only 10 shared storage segments concurrently. When an application connects to WebSphere® MQ, typically two storage segments are attached. However, the number of shared storage segments needed might increase depending on the workload of the queue manager. If, when connecting to WebSphere MQ, your 32-bit application fails to connect because it cannot attach all of the shared storage segments, consider setting the environment variable EXTSHM=ON in the environment of the queue manager. Set EXTSHM=ON before running the **strmqm** command and in the environment of your 32-bit applications. Alternatively you can connect to the queue manager using isolated bindings, which use only a single shared storage segment when connecting to the queue manager. Do this by replacing MQCONN calls with MQCONNX calls and specifying MQCNO_ISOLATED_BINDING in the MQCNO parameter of the MQCONNX calls.

There is virtually no limit to the number of shared storage segments attached by 64-bit applications.

Parent topic: After you have migrated to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:44

Notices | Trademarks | Downloads | Library | Support | Feedback

5.2. Migrating to WebSphere MQ for HP-UX Version 7.0

Follow this information to migrate from previous versions of WebSphere® MQ for HP-UX to WebSphere MQ for HP-UX Version 7.0.

About this task

If you want to migrate to WebSphere MQ Version 7.0, complete this task.

If you migrate from a previous level of this product without first backing up your system, you **cannot** revert to your previous level, so back up your system **before** you install WebSphere MQ Version 7.0. This will enable you to back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work performed by WebSphere MQ Version 7.0.

Procedure

1. ❯Stop all Websphere MQ applications on the machine and any applications accessing remote machines. This includes any vendor products used to monitor or control WebSphere MQ.◀

2. End all WebSphere MQ activity.

   a. Log in as a WebSphere MQ administrator.

   b. Use the **endmqm** command to stop all running queue managers.

   c. Stop any listeners associated with the queue managers, using the command:

      ```
      endmqlsr –m QMgrName
      ```

   d. To check that you have stopped all of them, enter the following:

      ```
      ps –ef | grep mq
      ```

      Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.

3. Login as root.

4. Function supplied by the SupportPacs in the table below has been superseded by function in WebSphere MQ Version 7.0. Remove these SupportPacs before installing WebSphere MQ Version 7.0.

   Table 1. SupportPacs superseded by WebSphere MQ Version 7.0

SupportPac Number	Description
MA0Y	WebSphere MQ Bridge for HTTP
MA6P	WebSphere MQ - XA libraries for use with TX-series on HP-UX for IPF

   Note: If you installed SupportPac MACS, remove the directory `/usr/mqm/inc64` and its contents.
   Review any other installed SupportPacs for their applicability to WebSphere MQ for HP-UX Version 7.0.

5. Uninstall any WebSphere MQ service updates and then uninstall WebSphere MQ.

6. Install WebSphere MQ Version 7.0 by following the tasks set out in *Quick Beginnings for HP-UX*.

   After you have migrated to WebSphere MQ Version 7.0
   Perform these tasks immediately after you migrate to WebSphere MQ Version 7.0.

Parent topic: Platform-specific information

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hq10180_

5.2.1. After you have migrated to WebSphere MQ Version 7.0

Perform these tasks immediately after you migrate to WebSphere® MQ Version 7.0.

About this task

Immediately after you migrate to WebSphere MQ Version 7.0, you must start your queue managers at least once to migrate your file system structure before you start any WebSphere MQ listeners. Otherwise, you will not be able to start WebSphere MQ listeners after migration.

If you cannot connect to a migrated queue manager using MQ Explorer and receive the error message "SYSTEM.MQEXPLORER.REPLY.MODEL not defined", run the following command on that queue manager:

```
strmqm –c
```

❯This command refreshes existing system objects with default values (for example, setting the MCAUSER attribute of a channel definition to blanks), and creates the queue required by the WebSphere MQ Explorer.◀

Parent topic: Migrating to WebSphere MQ for HP-UX Version 7.0

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❯

5.3. Upgrading to WebSphere MQ for i5/OS Version 7.0

This section describes steps you must take when upgrading to WebSphere® MQ for i5/OS®, V7.0.

There are two major types of upgrade:

- The upgrade takes place on the same machine, optionally accompanied by a hardware upgrade. This is referred to as a *slip install*.
- The upgrade takes place on a different machine. This is referred to as a *side-by-side install*.

If you had followed the recommended procedure in previous releases for installing translated versions of WebSphere MQ, then there is an additional task, Migrate translated versions, to remove the old translated versions. If you follow the procedure for installing additional languages described in Installing translated versions, the additional task to remove old language versions is no longer required.

❯**Performing a slip install**◀
A slip installation upgrades WebSphere MQ for i5/OS on a computer with an earlier version is installed.

❯**Performing a side-by-side install**◀
Save the queue managers on your current installation. Upgrade WebSphere MQ for i5/OS on a different computer and configuring using the saved queue managers.

❯**Migrate translated versions**❮
Follow these instructions to migrate a translated version.

Parent topic: Platform-specific information
❮

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5.3.1. Performing a slip install

❯A slip installation upgrades WebSphere® MQ for i5/OS® on a computer with an earlier version is installed.❮

About this task
To perform a slip install, carry out the following tasks:

1. ❯End WebSphere MQ activity❮
   End WebSphere MQ applications and connections, and remove any unwanted or indoubt messages.

2. ❯Quiesce WebSphere MQ❮
   Stop all queue managers. If necessary force all queue managers to stop, tidy up shared memory and end all jobs in the QMQM subsystem.

3. ❯Save WebSphere MQ data❮
   Save WebSphere MQ data after removing unwanted FDC, trace and JOB files.

4. ❯Install base server❮
   Install the base WebSphere MQ server in its primary language and force object conversion.

5. ❯Install samples❮
   Install the WebSphere MQ samples

6. ❯Installing translated versions❮
   Install translated versions of WebSphere MQ from a choice of national-languages.

7. ❯Verify the installation❮
   How to check that your installation has been successful.

8. ❯Verify the upgrade❮
   After you have verified the installation, start the WebSphere MQ subsystem, check the queue managers, and take a fresh media recovery checkpoint.

9. ❯After upgrading❮
   This lists the tasks that you perform after upgrading WebSphere MQ for i5/OS.

10. ❯After installation❮
    Tasks to perform after you have installed WebSphere MQ for i5/OS, and before using it.

Parent topic: ❯Upgrading to WebSphere MQ for i5/OS Version 7.0❮

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5.3.1.1. End WebSphere MQ activity

❯End WebSphere MQ applications and connections, and remove any unwanted or indoubt messages.❮

About this task
Before performing a slip install or side-by-side install, 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 WebSphere® MQ. (On WebSphere MQ verion 5.3 and later, use the command WRKMQM, option 22 "Work with queue manager jobs", to help find them).
3. End all channels for all queue managers on the system. To do this, use the WRKMQMCHL command and select option 15.
4. On each queue manager, end the command server. To do this, enter the command:

       ENDMQMCSVR 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 this, use the WRKMQMCHST command and select option 17.
7. On each queue manager, save the latest media recovery checkpoint. To do this enter the following command:

       RCDMQMIMG OBJ(*ALL) OBJTYPE(*ALL) MQMNAME(QMGRNAME) DSPJRNDTA(*YES)

Parent topic: ❯Performing a slip install❮
Next topic: ❯Quiesce WebSphere MQ❮

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5.3.1.2. Quiesce WebSphere MQ

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 WebSphere® MQ is called *quiescing*. You need to quiesce WebSphere MQ to upgrade to a newer version.

To quiesce one or more queue managers:

Procedure

1. Sign on to a new interactive i5/OS® session, ensuring that you are not accessing any WebSphere MQ objects.
2. Ensure that you have:
    a. *ALLOBJ authority, or object management authority for the QMQM library.
    b. Sufficient authority to use the ENDSBS command.
3. Warn all users that you are going to stop WebSphere MQ.
4. Quiesce all queue managers:-
    a. On Version 5.3, use the ENDMQM command:

        ```
        ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*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 to identify the queue managers that are still ending, and force each one in turn to stop by issuing:

        ```
        ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
        ```

        Where *QMGRNAME* is the name of the queue manager.
        Complete the tidying up of shared memory by issuing the command:

        ```
        ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) TIMEOUT(15)
        ```

    b. On Version 6.0 or later, use 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 to identify the queue managers that are still ending, and force each one in turn to stop by issuing:

        ```
        ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
        ```

        Where *QMGRNAME* is the name of the queue manager.
        Complete the tidying up of shared memory by issuing the command:

        ```
        ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
           TIMEOUT(15)
        ```

5. If the command in the previous step does not complete, end the subsystem immediately by issuing:

    ```
    ENDSBS SBS(QMQM) OPTION(*IMMED)
    ```

6. If this also fails, use the operating system command ENDJOB to end all jobs in the subsystem QMQM, as described below.
    Note: Do not use ENDJOBABN unless you intend to IPL the machine before starting WebSphere MQ. Ending WebSphere MQ jobs using ENDJOBABN can lead to damaged semaphores, which in turn can prevent your queue manager from starting.
    a. If a QMGR(s) must be shut down manually, the recommended order of ending jobs (ENDJOB) is shown below (if the job exists) - wait a few minutes for AMQA* or AMQZ* jobs to tidy up.
        i. RUNMQLSR - TCP listener (multi-threaded)
        ii. AMQCLMAA - TCP listener (single-threaded)
        iii. AMQRMPPA - Channel process pooling job
        iv. RUNMQCHI - channel initiator
        v. AMQCRSTA - receiving MCA jobs
        vi. RUNMQCHL - sending MCA jobs
        vii. AMQCRS6B - LU62 receiver channel
        viii. AMQPCSEA - command server
        ix. RUNMQTRM - Application trigger monitor
        x. RUNMQDLQ - Dead letter queue handler
        xi. AMQFCXBA - Broker Worker Job
        xii. AMQFQPUB - Queued Publish/Subscribe Daemon
        xiii. AMQZMUC0 ('0' is a zero) - Utility Manager
        xiv. ➤AMQZMUF0 ('0' is a zero) - Utility Manager◀
        xv. AMQZMUR0 ('0' is a zero) - Utility Manager
        xvi. AMQZMGR0 ('0' is a zero) - Process Controller
        xvii. AMQRRMFA - cluster repository manager
        xviii. AMQZDMAA - deferred message manager
        xix. AMQALMPX - Log Manager
        xx. AMQZFUMA - Object Authority Manager
        xxi. AMQZLAS0 ('0' is a zero) - LQM agents
        xxii. AMQZLAA0 ('0' is a zero) - LQM agents
        xxiii. AMQZXMA0 ('0' is a zero) - Execution Controller
    b. Issue the following command:

        ```
        ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
        ```

    c. Issue the following command:

        ```
        ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
           TIMEOUT(05)
        ```

Where *05* is a timeout value in seconds.

d. Manually clean up shared memory. Issue the following command:

```
EDTF '/QIBM/UserData/mqm/qmgrs'
```

then:

    i. Take option 5 for &SYSTEM and check that the following sub-dirs are empty: isem, esem, msem, ssem, and shmem.

    ii. Take option 5 for QMGRNAME and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

    iii. Take option 5 for &ipcc in the QMGRNAME directory and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

    iv. Take option 5 for &qmpersist in the QMGRNAME directory and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

    v. Take option 5 for &app and check that the following sub-dirs are empty: isem, esem, msem, ssem, and shmem.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯End WebSphere MQ activity❮
Next topic: ❯Save WebSphere MQ data❮

This build: January 26, 2011 11:06:07

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.3. Save WebSphere MQ data

Save WebSphere 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 WebSphere MQ.

About this task

Procedure

1. Create a save file for every queue manager library on your system. To do this, 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 this, 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 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 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 MQ IFS data. To do this, issue the command:

```
CRTSAVF FILE(QGPL/QMUSERDATA)
```

9. Save your 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 WebSphere® MQ on a new machine, transfer the save files to the new machine.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Quiesce WebSphere MQ❮
Next topic: ❯Install base server❮

This build: January 26, 2011 11:06:06

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.4. Install base server

Install the base WebSphere MQ server in its primary language and force object conversion.

Before you begin
You have completed planning the installation, obtained the installation CDs and set the system values, see Setting system values.

About this task
Install the base WebSphere 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 entry. Otherwise the license agreement is displayed for you to accept. See License requirements.❮

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' 'V7R0M1' '0000' 0)

   Where the parameters of **PARM** are,

   5724H72

   The product identifier for WebSphere® MQ for i5/OS®.

   V7R0M1

   The version, release, and modification level.

   0000

   The option number for the base WebSphere MQ product.

   0

   Unused error structure.

   ❮

3. Install WebSphere MQ for i5/OS, V7.0 base product, and primary language. ❯

   RSTLICPGM LICPGM(5724H72) **DEV**(*install device*) **OPTION**(*BASE) **OUTPUT**(*PRINT)
          FRCOBJCVN(*YES *ALL)

   ❮ where the parameters of RSTLICPGM are,

   LICPGM(5724H72)

   The product identifier for WebSphere MQ for i5/OS.

   DEV(*install device*)

   The device from which the product is to be loaded, typically an optical drive, for example, `OPT01`.

   OPTION(*BASE)

   Install the base WebSphere MQ for i5/OS product.

   ❯**FRCOBJCVN(*YES *ALL)**❮

   ❯ An optional parameter. It forces object conversion. Otherwise object conversion takes place on first use and might take place at some inconvenient time. Or you can issue the `STROBJCVN` command after installation specifying the `QMQM` library as the object to convert.❮
   ❯The FRCOBJCVN parameter is only required when installing WebSphere MQ on the IBM i 6.1 operating system.❮

   Unspecified parameters

   Unspecified parameters such as **RSTOBJ**(*ALL), revert to defaults. The command installs both MQ and the language files for the primary language of your computer. For installing additional languages see Installing translated versions.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Save WebSphere MQ data❮
Next topic: ❯Install samples❮

This build: January 26, 2011 11:05:57

Notices | Trademarks | Downloads | Library | Support | Feedback

This topic's URL:
iq10392_

5.3.1.5. Install samples

Install the WebSphere® 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.❮

Procedure

1. Optionally pre-agree the license terms and conditions by running the command,

   CALL PGM(QSYS/QLPACAGR) **PARM**('5724H72' 'V7R0M1' '0001' 0)

   Where the parameters of **PARM** are,

   5724H72

   The product identifier for WebSphere MQ for i5/OS®.

   V7R0M1

   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**(*install device*) **OPTION**(1) **OUTPUT**(*PRINT)

   Where the parameters of RSTLICPGM are,

   LICPGM(5724H72)

   The product identifier for WebSphere MQ for i5/OS.

   DEV(*install device*)

The device from which the product is to be loaded, typically an optical drive, for example, `OPT01`.

`OPTION(1)`

Install the samples for WebSphere MQ for i5/OS.

`OUTPUT(*PRINT)`

The output is printed with the spooled output of the job.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Install base server❮
Next topic: ❯Installing translated versions❮

This build: January 26, 2011 11:05:59

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.6. Installing translated versions

Install translated versions of WebSphere MQ from a choice of national-languages.

About this task

The following language versions are available for WebSphere® MQ for i5/OS®:

Table 1. National-language versions of WebSphere MQ for i5/OS

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
2989	Simplified Chinese
2931	Spanish

WebSphere MQ for i5/OS 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 1. To do so:

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(install device) RSTOBJ(*LNG) LNG(language ID)`

   This will install 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 will be created by the RSTLICPGM command.

Results

Note:

1. To run the Japanese language version of WebSphere MQ for i5/OS, the CCSID of the job must be 939 (5035) rather than 930 (5026) because WebSphere MQ uses lowercase English characters.
2. If you are installing WebSphere MQ for i5/OS onto a machine for which the primary language is not on the CD, the install program will prompt you to load a CD containing the product in that language; if, however, you have only one product CD, this means that the WebSphere MQ product has not been translated into your language. To get around this, 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 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 MQ) or reorder the System Library list (because the product has been installed in more than one of the supplied languages).

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Install samples❮
Next topic: ❯Verify the installation❮

This build: January 26, 2011 11:06:00

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.7. Verify the installation

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 should see:

```
        Resource
        ID      Option  Feature  Description
        5724H72  *BASE   5050    WebSphere MQ for i5/OS
        5724H72  *BASE   2924    WebSphere MQ for i5/OS
        5724H72  1       5050    WebSphere MQ for i5/OS - Samples
```

2. Press F11, while viewing the Display Software Resources screen, and you will see the library and version number of the products installed:

```
        Resource                Feature
        ID      Option  Feature  Type   Library   Release
        5724H72  *BASE   5050    *CODE  QMQM      V7R0M1
        5724H72  *BASE   2924    *LNG   QMQM      V7R0M1
        5724H72  1       5050    *CODE  QMQMSAMP  V7R0M1
```

3. If you have installed additional language versions, you will also see entries for these. For example, if you have installed the French version, for which the language ID is 2928, you will see:

   a.
```
        Resource
        ID      Option  Feature  Description
        5724H72  *BASE   2928    WebSphere MQ for i5/OS
```

   b. and when you press F11:
```
        Resource                Feature
        ID      Option  Feature  Type   Library    Release
        5724H72  *BASE   2928    *LNG   QSYS2928   V7R0M1
```

4. Use the command DSPMQMVER to check exactly what version you have installed. For V7R0M1 it will report:
```
        Version: 7.0.1.0
```

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Installing translated versions❮
Next topic: ❯Verify the upgrade❮

This build: January 26, 2011 11:06:01

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.8. Verify the upgrade

❯After you have verified the installation, start the WebSphere MQ subsystem, check the queue managers, and take a fresh media recovery checkpoint.❮

Before you begin
Before you start, make sure you have performed the steps in Verifying the installation.

About this task
To verify that you have migrated to WebSphere® MQ for i5/OS®, V7.0 successfully:

Procedure

1. Make QMQMADM either the primary or a secondary group profile for your user profile. To do this, issue one of the following commands:
```
        CHGUSRPRF USRPRF(YOUR PROFILE) GRPPRF(QMQMADM)
        CHGUSRPRF USRPRF(YOUR PROFILE) SUPGRPPRF(QMQMADM)
```

2. Start the WebSphere MQ subsystem with the command:
```
        STRSBS SBSD(QMQM/QMQM)
```
   (If it is already running, you will 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.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯Verify the installation❮
Next topic: ❯After upgrading❮

This build: January 26, 2011 11:06:10

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.1.9. After upgrading

This lists the tasks that you perform after upgrading WebSphere® MQ for i5/OS®.

Before you begin
Satisfy yourself the upgrade has completed successfully.

Procedure
Delete the saved data in the save files in QGPL. This data was saved in Save WebSphere MQ data.
Parent topic: ❯Performing a slip install❮
Previous topic: ❯Verify the upgrade❮
Next topic: ❯After installation❮

This build: January 26, 2011 11:06:11

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This topic's URL:
iq10500_

5.3.1.10. After installation

Tasks to perform after you have installed WebSphere® MQ for i5/OS®, and before using it.

About this task
When you have correctly installed WebSphere MQ for i5/OS on your system:

Procedure
1. ❯Refer to the WebSphere MQ Web site at: WebSphere MQ for the latest product information.❮
2. ❯To install and apply all fix packs that are recommended, see WebSphere MQ Support❮
3.
   Some WebSphere MQ commands, for example CRTMQM (create queue manager) and DLTMQM (delete queue manager), rely on using i5/OS system commands for creating and managing objects, files, and libraries. Similarly some WebSphere MQ program code, for example a queue manager, relies on using i5/OS system programs.
   To enable this, the commands and programs listed must either have *PUBLIC *USE authority, or explicit *USE authority to the WebSphere MQ user profiles QMQM and QMQMADM.
   Such authority is applied automatically as part of the install process, and you do not need to apply it yourself.
   However, if you encounter problems, here is how to do it manually:
   a. **Commands**
      Set the authorities for commands using GRTOBJAUT with an OBJTYPE(*CMD) parameter, for example:

      ```
      GRTOBJAUT OBJ(QSYS/ADDLIBLE) OBJTYPE(*CMD) USER(QMQMADM) AUT(*USE)
      ```

      - QSYS/ADDLIBLE
      - QSYS/ADDPFM
      - QSYS/CALL
      - QSYS/CHGCURLIB
      - QSYS/CHGJOB
      - QSYS/CRTJRN
      - QSYS/CRTJRNRCV
      - QSYS/CRTJOBQ
      - QSYS/CRTJOBD
      - QSYS/CRTLIB
      - QSYS/CRTMSGQ
      - QSYS/CRTPF
      - QSYS/CRTPGM
      - QSYS/CRTSRCPF
      - QSYS/DLTJRN
      - QSYS/DLTJRNRCV
      - QSYS/DLTLIB
      - QSYS/DLTMSGQ
      - QSYS/OVRPRTF
      - QSYS/RCLACTGRP
      - QSYS/RTVJRNE
      - QSYS/RCVJRNE
      - QSYS/SBMJOB

   b. **Programs**
      Set the authorities for programs using GRTOBJAUT with an OBJTYPE(*PGM) parameter, for example:

      ```
      GRTOBJAUT OBJ(QSYS/QWTSETP) OBJTYPE(*PGM) USER(QMQMADM) AUT(*USE)
      ```

      - QSYS/QWTSETP(*PGM)
      - QSYS/QSYRLSPH(*PGM)
      - QSYS/QSYGETPH(*PGM)

4. Where you have more than one computer and a mixture of releases of OS/400® or i5/OS, and WebSphere MQ, you must compile CL programs either on the computer they are to run on, or on one with an identical combination of releases of OS/400 or i5/OS, and WebSphere MQ. When you install later versions of WebSphere MQ, delete all WebSphere MQ commands from previous releases in any QSYSVvRrMm libraries using the QSYS/DLTCMD command.
5. If you have never installed WebSphere MQ on your system before (that is, you are not doing a migration), perform the following tasks:
   a. Make all user profiles that are to be used for creating and administering queue managers members of the group profile QMQMADM, using the

command CHGUSRPRF.

   b. The default TCP channel listener in WebSphere MQ for i5/OS, V7.0 is a threaded listener, which starts threaded channels. If you want to run non-threaded TCP channel listeners in WebSphere MQ for i5/OS, V7.0, you must add an attribute to the CHANNELS stanza in the qm.ini file of each queue manager. The attribute is ThreadedListener=No. Information about qm.ini files is in the [WebSphere MQ System Administration Guide](#).

6.

   a. Start the WebSphere 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.

Results

You are now ready to start using WebSphere MQ for i5/OS.

Parent topic: ❯Performing a slip install❮
Previous topic: ❯After upgrading❮

This build: January 26, 2011 11:06:02

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2. Performing a side-by-side install

Save the queue managers on your current installation. Upgrade WebSphere® MQ for i5/OS® on a different computer and configuring using the saved queue managers.

About this task

To perform a side-by-side install, carry out the following tasks:

1. ❯End WebSphere MQ activity❮
   End WebSphere MQ applications and connections, and remove any unwanted or indoubt messages.

2. ❯Quiesce WebSphere MQ❮
   Stop all queue managers. If necessary force all queue managers to stop, tidy up shared memory and end all jobs in the QMQM subsystem.

3. ❯Save WebSphere MQ data❮
   Save WebSphere MQ data after removing unwanted FDC, trace and JOB files.

4. ❯Install base server❮
   Install the base WebSphere MQ server in its primary language and force object conversion.

5. ❯Install samples❮
   Install the WebSphere MQ samples

6. ❯Installing translated versions❮
   Install translated versions of WebSphere MQ from a choice of national-languages.

7. ❯Verify the installation❮
   How to check that your installation has been successful.

8. ❯Verify the upgrade❮
   After you have verified the installation, start the WebSphere MQ subsystem, check the queue managers, and take a fresh media recovery checkpoint.

9. ❯Restoring queue managers after upgrading❮
   Complete the side-by-side upgrade by restored the saved queue managers onto the server that you have upgraded.

10. ❯After upgrading❮
    This lists the tasks that you perform after upgrading WebSphere MQ for i5/OS.

11. ❯After installation❮
    Tasks to perform after you have installed WebSphere MQ for i5/OS, and before using it.

Parent topic: ❯Upgrading to WebSphere MQ for i5/OS Version 7.0❮

This build: January 26, 2011 11:06:09

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2.1. End WebSphere MQ activity

❯End WebSphere MQ applications and connections, and remove any unwanted or indoubt messages.❮

About this task

Before performing a slip install or side-by-side install, 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 WebSphere® MQ. (On WebSphere MQ verion 5.3 and later, use the command WRKMQM, option 22 "Work with queue manager jobs", to help find them).
3. End all channels for all queue managers on the system. To do this, use the WRKMQMCHL command and select option 15.
4. On each queue manager, end the command server. To do this, enter the command:
   ```
   ENDMQMCSVR 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 this, use the WRKMQMCHST command and select option 17.

7. On each queue manager, save the latest media recovery checkpoint. To do this enter the following command:

```
RCDMQMIMG OBJ(*ALL) OBJTYPE(*ALL) MQMNAME(QMGRNAME) DSPJRNDTA(*YES)
```

Parent topic: ❯Performing a side-by-side install❮
Next topic: ❯Quiesce WebSphere MQ❮

This build: January 26, 2011 11:06:06

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5.3.2.2. Quiesce WebSphere MQ

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 WebSphere® MQ is called *quiescing*. You need to quiesce WebSphere MQ to upgrade to a newer version.

To quiesce one or more queue managers:

Procedure

1. Sign on to a new interactive i5/OS® session, ensuring that you are not accessing any WebSphere MQ objects.

2. Ensure that you have:
   a. *ALLOBJ authority, or object management authority for the QMQM library.
   b. Sufficient authority to use the ENDSBS command.

3. Warn all users that you are going to stop WebSphere MQ.

4. Quiesce all queue managers:-
   a. On Version 5.3, use the ENDMQM command:

   ```
   ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*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 to identify the queue managers that are still ending, and force each one in turn to stop by issuing:

   ```
   ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
   ```

   Where *QMGRNAME* is the name of the queue manager.
   Complete the tidying up of shared memory by issuing the command:

   ```
   ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) TIMEOUT(15)
   ```

   b. On Version 6.0 or later, use 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 to identify the queue managers that are still ending, and force each one in turn to stop by issuing:

   ```
   ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
   ```

   Where *QMGRNAME* is the name of the queue manager.
   Complete the tidying up of shared memory by issuing the command:

   ```
   ENDMQM MQMNAME(*ALL) OPTION(*IMMED) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
     TIMEOUT(15)
   ```

5. If the command in the previous step does not complete, end the subsystem immediately by issuing:

   ```
   ENDSBS SBS(QMQM) OPTION(*IMMED)
   ```

6. If this also fails, use the operating system command ENDJOB to end all jobs in the subsystem QMQM, as described below.
   Note: Do not use ENDJOBABN unless you intend to IPL the machine before starting WebSphere MQ. Ending WebSphere MQ jobs using ENDJOBABN can lead to damaged semaphores, which in turn can prevent your queue manager from starting.
   a. If a QMGR(s) must be shut down manually, the recommended order of ending jobs (ENDJOB) is shown below (if the job exists) - wait a few minutes for AMQA* or AMQZ* jobs to tidy up.
      i. RUNMQLSR - TCP listener (multi-threaded)
      ii. AMQCLMAA - TCP listener (single-threaded)
      iii. AMQRMPPA - Channel process pooling job
      iv. RUNMQCHI - channel initiator
      v. AMQCRSTA - receiving MCA jobs
      vi. RUNMQCHL - sending MCA jobs
      vii. AMQCRS6B - LU62 receiver channel
      viii. AMQPCSEA - command server
      ix. RUNMQTRM - Application trigger monitor
      x. RUNMQDLQ - Dead letter queue handler
      xi. AMQFCXBA - Broker Worker Job
      xii. AMQFQPUB - Queued Publish/Subscribe Daemon
      xiii. AMQZMUC0 ('0' is a zero) - Utility Manager
      xiv. ❯AMQZMUF0 ('0' is a zero) - Utility Manager❮
      xv. AMQZMUR0 ('0' is a zero) - Utility Manager
      xvi. AMQZMGR0 ('0' is a zero) - Process Controller
      xvii. AMQRRMFA - cluster repository manager

        xviii. `AMQZDMAA` - deferred message manager

         xix. `AMQALMPX` - Log Manager

          xx. `AMQZFUMA` - Object Authority Manager

         xxi. `AMQZLAS0` ('0' is a zero) - LQM agents

       xxii. `AMQZLAA0` ('0' is a zero) - LQM agents

      xxiii. `AMQZXMA0` ('0' is a zero) - Execution Controller

b. Issue the following command:

```
ENDMQM MQMNAME(QMGRNAME) OPTION(*IMMED)
```

c. Issue the following command:

```
ENDMQM MQMNAME(*ALL) OPTION(*CNTRLD) ENDCCTJOB(*YES) RCDMQMIMG(*NO)
TIMEOUT(05)
```

Where *05* is a timeout value in seconds.

d. Manually clean up shared memory. Issue the following command:

```
EDTF '/QIBM/UserData/mqm/qmgrs'
```

then:

    i. Take option 5 for &SYSTEM and check that the following sub-dirs are empty: isem, esem, msem, ssem, and shmem.

    ii. Take option 5 for QMGRNAME and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

   iii. Take option 5 for &ipcc in the QMGRNAME directory and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

   iv. Take option 5 for &qmpersist in the QMGRNAME directory and check that the following sub-dirs are empty :- isem, esem, msem, ssem, and shmem.

    v. Take option 5 for &app and check that the following sub-dirs are empty: isem, esem, msem, ssem, and shmem.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯End WebSphere MQ activity❮
Next topic: ❯Save WebSphere MQ data❮

This build: January 26, 2011 11:06:08

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2.3. Save WebSphere MQ data

Save WebSphere 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 WebSphere MQ.

About this task

Procedure

1. Create a save file for every queue manager library on your system. To do this, 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 this, 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 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 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 MQ IFS data. To do this, issue the command:

```
CRTSAVF FILE(QGPL/QMUSERDATA)
```

9. Save your 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 WebSphere® MQ on a new machine, transfer the save files to the new machine.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Quiesce WebSphere MQ❮
Next topic: ❯Install base server❮

This build: January 26, 2011 11:06:06

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2.4. Install base server

Install the base WebSphere MQ server in its primary language and force object conversion.

Before you begin
You have completed planning the installation, obtained the installation CDs and set the system values, see Setting system values.

About this task
Install the base WebSphere 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 entry. Otherwise the license agreement is displayed for you to accept. See License requirements.◄

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' 'V7R0M1' '0000' 0)

   Where the parameters of **PARM** are,

   5724H72

   The product identifier for WebSphere® MQ for i5/OS®.

   V7R0M1

   The version, release, and modification level.

   0000

   The option number for the base WebSphere MQ product.

   0

   Unused error structure.
   ◄

3. Install WebSphere MQ for i5/OS, V7.0 base product, and primary language. ➤

   RSTLICPGM LICPGM(5724H72) **DEV**(*install device*) **OPTION**(*BASE) **OUTPUT**(*PRINT)
           FRCOBJCVN(*YES *ALL)

   ◄ where the parameters of RSTLICPGM are,

   LICPGM(5724H72)

   The product identifier for WebSphere MQ for i5/OS.

   DEV(*install device*)

   The device from which the product is to be loaded, typically an optical drive, for example, `OPT01`.

   OPTION(*BASE)

   Install the base WebSphere MQ for i5/OS product.

   ➤**FRCOBJCVN(*YES *ALL)**◄

   ➤An optional parameter. It forces object conversion. Otherwise object conversion takes place on first use and might take place at some inconvenient time. Or you can issue the `STROBJCVN` command after installation specifying the `QMQM` library as the object to convert.◄
   ➤The FRCOBJCVN parameter is only required when installing WebSphere MQ on the IBM i 6.1 operating system.◄

   Unspecified parameters

   Unspecified parameters such as **RSTOBJ**(*ALL), revert to defaults. The command installs both MQ and the language files for the primary language of your computer. For installing additional languages see Installing translated versions.

Parent topic: ➤Performing a side-by-side install◄
Previous topic: ➤Save WebSphere MQ data◄
Next topic: ➤Install samples◄

This build: January 26, 2011 11:05:58

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2.5. Install samples

Install the WebSphere® 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.◄

Procedure

1. Optionally pre-agree the license terms and conditions by running the command,

   CALL PGM(QSYS/QLPACAGR) **PARM**('5724H72' 'V7R0M1' '0001' 0)

   Where the parameters of **PARM** are,

   5724H72

   The product identifier for WebSphere MQ for i5/OS®.

   V7R0M1

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(install device) OPTION(1) OUTPUT(*PRINT)
    ```

    Where the parameters of RSTLICPGM are,

    LICPGM(5724H72)

    The product identifier for WebSphere MQ for i5/OS.

    DEV(install device)

    The device from which the product is to be loaded, typically an optical drive, for example, `OPT01`.

    OPTION(1)

    Install the samples for WebSphere MQ for i5/OS.

    OUTPUT(*PRINT)

    The output is printed with the spooled output of the job.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Install base server❮
Next topic: ❯Installing translated versions❮

This build: January 26, 2011 11:05:59

Notices | Trademarks | Downloads | Library | Support | Feedback

5.3.2.6. Installing translated versions

Install translated versions of WebSphere MQ from a choice of national-languages.

About this task

The following language versions are available for WebSphere® MQ for i5/OS®:

Table 1. National-language versions of WebSphere MQ for i5/OS

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
2989	Simplified Chinese
2931	Spanish

WebSphere MQ for i5/OS 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 1. To do so:

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(install device) RSTOBJ(*LNG) LNG(language ID)
    ```

    This will install 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 will be created by the RSTLICPGM command.

Results

Note:

1. To run the Japanese language version of WebSphere MQ for i5/OS, the CCSID of the job must be 939 (5035) rather than 930 (5026) because WebSphere MQ uses lowercase English characters.
2. If you are installing WebSphere MQ for i5/OS onto a machine for which the primary language is not on the CD, the install program will prompt you to load a CD containing the product in that language; if, however, you have only one product CD, this means that the WebSphere MQ product has not been translated into your language. To get around this, proceed as follows:
    o 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 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 MQ) or reorder the System Library list (because the product has been installed in more than one of the supplied languages).

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Install samples❮
Next topic: ❯Verify the installation❮

This build: January 26, 2011 11:06:01

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This topic's URL:
iq10400_

5.3.2.7. Verify the installation

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 should see:

```
        Resource
        ID      Option  Feature  Description
        5724H72  *BASE   5050    WebSphere MQ for i5/OS
        5724H72  *BASE   2924    WebSphere MQ for i5/OS
        5724H72  1       5050    WebSphere MQ for i5/OS - Samples
```

2. Press F11, while viewing the Display Software Resources screen, and you will see the library and version number of the products installed:

```
        Resource              Feature
        ID      Option  Feature  Type    Library   Release
        5724H72  *BASE   5050    *CODE   QMQM      V7R0M1
        5724H72  *BASE   2924    *LNG    QMQM      V7R0M1
        5724H72  1       5050    *CODE   QMQMSAMP  V7R0M1
```

3. If you have installed additional language versions, you will also see entries for these. For example, if you have installed the French version, for which the language ID is 2928, you will see:

   a.
```
        Resource
        ID      Option  Feature  Description
        5724H72  *BASE   2928    WebSphere MQ for i5/OS
```

   b. and when you press F11:
```
        Resource              Feature
        ID      Option  Feature  Type    Library   Release
        5724H72  *BASE   2928    *LNG    QSYS2928  V7R0M1
```

4. Use the command DSPMQMVER to check exactly what version you have installed. For V7R0M1 it will report:

```
        Version: 7.0.1.0
```

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Installing translated versions❮
Next topic: ❯Verify the upgrade❮

This build: January 26, 2011 11:06:01

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iq10410_

5.3.2.8. Verify the upgrade

❯After you have verified the installation, start the WebSphere MQ subsystem, check the queue managers, and take a fresh media recovery checkpoint.❮

Before you begin
Before you start, make sure you have performed the steps in Verifying the installation.

About this task
To verify that you have migrated to WebSphere® MQ for i5/OS®, V7.0 successfully:

Procedure

1. Make QMQMADM either the primary or a secondary group profile for your user profile. To do this, issue one of the following commands:

```
        CHGUSRPRF USRPRF(YOUR PROFILE) GRPPRF(QMQMADM)
        CHGUSRPRF USRPRF(YOUR PROFILE) SUPGRPPRF(QMQMADM)
```

2. Start the WebSphere MQ subsystem with the command:

```
        STRSBS SBSD(QMQM/QMQM)
```

   (If it is already running, you will 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.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Verify the installation❮
Next topic: ❯Restoring queue managers after upgrading❮

🏠 This build: January 26, 2011 11:06:11

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5.3.2.9. Restoring queue managers after upgrading

Complete the side-by-side upgrade by restored the saved queue managers onto the server that you have upgraded.

Before you begin
You have saved your queue manager data, see End WebSphere MQ activity, 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 WebSphere® 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 WebSphere MQ for i5/OS System Administration Guide for guidance. Otherwise, use the default setup.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Verify the upgrade❮
Next topic: ❯After upgrading❮

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5.3.2.10. After upgrading

This lists the tasks that you perform after upgrading WebSphere® MQ for i5/OS®.

Before you begin
Satisfy yourself the upgrade has completed successfully.

Procedure
Delete the saved data in the save files in QGPL. This data was saved in Save WebSphere MQ data.

Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯Restoring queue managers after upgrading❮
Next topic: ❯After installation❮

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5.3.2.11. After installation

Tasks to perform after you have installed WebSphere® MQ for i5/OS®, and before using it.

About this task
When you have correctly installed WebSphere MQ for i5/OS on your system:

Procedure
1. ❯Refer to the WebSphere MQ Web site at: WebSphere MQ for the latest product information.❮
2. ❯To install and apply all fix packs that are recommended, see WebSphere MQ Support❮
3.
   Some WebSphere MQ commands, for example CRTMQM (create queue manager) and DLTMQM (delete queue manager), rely on using i5/OS system commands for creating and managing objects, files, and libraries. Similarly some WebSphere MQ program code, for example a queue manager, relies on using i5/OS system programs.
   To enable this, the commands and programs listed must either have *PUBLIC *USE authority, or explicit *USE authority to the WebSphere MQ user profiles QMQM and QMQMADM.
   Such authority is applied automatically as part of the install process, and you do not need to apply it yourself.
   However, if you encounter problems, here is how to do it manually:
   a. **Commands**

Set the authorities for commands using GRTOBJAUT with an OBJTYPE(*CMD) parameter, for example:

```
GRTOBJAUT OBJ(QSYS/ADDLIBLE) OBJTYPE(*CMD) USER(QMQMADM) AUT(*USE)
```

- QSYS/ADDLIBLE
- QSYS/ADDPFM
- QSYS/CALL
- QSYS/CHGCURLIB
- QSYS/CHGJOB
- QSYS/CRTJRN
- QSYS/CRTJRNRCV
- QSYS/CRTJOBQ
- QSYS/CRTJOBD
- QSYS/CRTLIB
- QSYS/CRTMSGQ
- QSYS/CRTPF
- QSYS/CRTPGM
- QSYS/CRTSRCPF
- QSYS/DLTJRN
- QSYS/DLTJRNRCV
- QSYS/DLTLIB
- QSYS/DLTMSGQ
- QSYS/OVRPRTF
- QSYS/RCLACTGRP
- QSYS/RTVJRNE
- QSYS/RCVJRNE
- QSYS/SBMJOB

   b. **Programs**
     Set the authorities for programs using GRTOBJAUT with an OBJTYPE(*PGM) parameter, for example:

```
GRTOBJAUT OBJ(QSYS/QWTSETP) OBJTYPE(*PGM) USER(QMQMADM) AUT(*USE)
```

- QSYS/QWTSETP(*PGM)
- QSYS/QSYRLSPH(*PGM)
- QSYS/QSYGETPH(*PGM)

4. Where you have more than one computer and a mixture of releases of OS/400® or i5/OS, and WebSphere MQ, you must compile CL programs either on the computer they are to run on, or on one with an identical combination of releases of OS/400 or i5/OS, and WebSphere MQ. When you install later versions of WebSphere MQ, delete all WebSphere MQ commands from previous releases in any QSYSVvRrMm libraries using the QSYS/DLTCMD command.

5. If you have never installed WebSphere MQ on your system before (that is, you are not doing a migration), perform the following tasks:
   a. Make all user profiles that are to be used for creating and administering queue managers members of the group profile QMQMADM, using the command CHGUSRPRF.
   b. The default TCP channel listener in WebSphere MQ for i5/OS, V7.0 is a threaded listener, which starts threaded channels. If you want to run non-threaded TCP channel listeners in WebSphere MQ for i5/OS, V7.0, you must add an attribute to the CHANNELS stanza in the qm.ini file of each queue manager. The attribute is ThreadedListener=No. Information about qm.ini files is in the WebSphere MQ System Administration Guide.

6.
   a. Start the WebSphere 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.

Results
  You are now ready to start using WebSphere MQ for i5/OS.
Parent topic: ❯Performing a side-by-side install❮
Previous topic: ❯After upgrading❮

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5.3.3. Migrate translated versions

Follow these instructions to migrate a translated version.

About this task

Previous editions of this book recommended installing translated versions that are not on the CD by: installing a language that is on the CD, and then copying the QSYS29xx files into QSYS. This is no longer recommended because those objects will not be removed at a subsequent upgrade or reinstall. The new recommended procedure is described in Installing translated versions.

If you are upgrading now, and, when you installed your existing translated version, you followed the previous advice and copied objects into QSYS, then follow the steps below to ensure that all the old objects are removed at an upgrade or reinstall of MQ. This is a one-time resolution.

To remove old objects from QSYS:

Procedure

1. To uninstall the previous version of MQ, issue the command:

```
DLTLICPGM 5724B41
```

where `5724B41` is the component id of the previous version of MQ.

2. Create a temporary user profile:

   `CRTUSRPRF QMQMx`

   where QMQMx is any new temporary usrprf.

3. Delete the previous QMQM profile, and change the ownership of its objects to the temporary profile:

   `DLTUSRPRF USRPRF(QMQM) OWNOBJOPT(*CHGOWN QMQMx)`

4. Install the new version of WebSphere® MQ for i5/OS®, V7.0 base product and language:

   `RSTLICPGM LICPGM(5724H72) DEV(install device) RSTOBJ(*LNG) LNG(language ID)`

   See Installing translated versions for full details on this command, and what to do if your required language is not on the CD.

5. To preserve the required objects, change the ownership of the IFS `/QIBM/UserData/mqm` and its subdirs back to QMQM using the command:

   `CHGOWN OBJ('/QIBM/UserData/mqm') NEWOWN(QMQM)`

6. To preserve the required objects in the queue manager libraries, change their ownership back to QMQM using commands such as:

   `CHGOBJOWN OBJ(qmgr_lib/qmgr_object) OBJTYPE(*object_type) NEWOWN(QMQM)`

   where:

   o `qmgr_lib` is the queue manager library,

   o `qmgr_object` is one of the objects there,

   o `object_type` is the type of the object.

   Repeat the command for every object, and every queue manager.

7. Delete the temporary user profile QMQMx (and all its owned objects):

   `DLTUSRPRF USRPRF(QMQMx) OWNOBJ(*DLT)`

8. Follow the steps in Verifying the installation

Parent topic: ❯Upgrading to WebSphere MQ for i5/OS Version 7.0❮

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5.4. Upgrading to WebSphere MQ for Linux Version 7.0

This section provides information about considerations for upgrading WebSphere® MQ for Linux.

If you are upgrading from a previous version of WebSphere MQ for Linux, you must uninstall your current version before installing WebSphere MQ Version 7.0.

Because you cannot therefore revert to your previous level, back up your system before you install WebSphere MQ Version 7.0. This enables you to back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work, such as changes to messages and objects, that WebSphere MQ Version 7.0 has done.

❯

WebSphere MQ for Linux, (x86 and x86-64 platforms) and 32-bit and 64-bit queue managers

You can install WebSphere MQ for Linux (x86 platform) on 32-bit and 64-bit versions of the Linux operating system. If you currently have 32-bit WebSphere MQ for Linux (x86 platform) Version 5.3 or Version 6.0 installed on a 64-bit version of the Linux operating system, you can install WebSphere MQ for Linux (x86 platform) or WebSphere MQ for Linux (x86-64) when you upgrade to WebSphere MQ for Linux, Version 7.0.

If you install the 64-bit version of WebSphere MQ for Linux (x86-64 platform), existing queue managers are migrated to 64-bit when they are started. When a queue manager is 64-bit, you **cannot** start it by using a 32-bit version of WebSphere MQ.

Upgrading from WebSphere MQ for Linux (x86 platform), Version 7.0 to WebSphere MQ for Linux (x86-64 platform) Version 7.0 is not supported.

Upgrading from WebSphere MQ for Linux (x86-64 platform) to WebSphere MQ for Linux (x86 platform) is not supported for any version.

The supported upgrade paths for previous versions of WebSphere MQ for Linux (x86 and x86-64 platforms) to WebSphere MQ for Linux Version 7.0 are as follows:

From:	To:
WebSphere MQ for Linux, Version 5.3 (x86 platform)	WebSphere MQ for Linux, Version 7.0 (x86 platform)
	WebSphere MQ for Linux, Version 7.0 (x86-64 platform)
WebSphere MQ for Linux, Version 6.0 (x86 platform)	WebSphere MQ for Linux, Version 7.0 (x86 platform)
	WebSphere MQ for Linux, Version 7.0 (x86-64 platform)
WebSphere MQ for Linux, Version 6.0 (x86-64 platform)	WebSphere MQ for Linux, Version 7.0 (x86-64 platform)

❮

See the following topics for information about how to migrate to WebSphere MQ for Linux Version 7.0.

Upgrading to WebSphere MQ Version 7.0
Complete this task to migrate to WebSphere MQ Version 7.0, while retaining your WebSphere MQ data, and optionally upgrade your operating system to one supported by WebSphere MQ Version 7.0.

Upgrading to WebSphere MQ Version 7.0 using RPM upgrade tools
The use of RPM upgrade tools, using the -U or -F flags, to upgrade is not supported.

After you have upgraded to WebSphere MQ Version 7
You must perform certain tasks immediately after upgrading to V7.

Parent topic: Platform-specific information

This build: January 26, 2011 11:06:12

5.4.1. Upgrading to WebSphere MQ Version 7.0

Complete this task to migrate to WebSphere® MQ Version 7.0, while retaining your WebSphere MQ data, and optionally upgrade your operating system to one supported by WebSphere MQ Version 7.0.

❯

Before you begin

Review the upgrading limitations that are described in Upgrading to WebSphere MQ for Linux Version 7.0.

Review the WebSphere MQ Version 7.0 prerequisites that are described in *WebSphere MQ Quick Beginnings for Linux*. If your system version does not have the prerequisites, you must install a version that does. Operating system installation is an optional step in the procedure later in this topic.
❮

Procedure

1. Stop all WebSphere MQ applications on the computer.
2. End all WebSphere MQ activity:
    a. Log in as a user in group `mqm`.
    b. Display the state of all the queue managers on the system, by using the command `dspmq`.
    c. Stop all running queue managers, by using the command `endmqm`.
    d. Stop any listeners associated with the queue managers, by using the command:

           endmqlsr -m QMgrName

    e. To check that you have stopped all necessary WebSphere MQ activity, type:

           ps -ef | grep mq

       If any processes are listed that are running command lines beginning `amq` or `runmq`, stop them. Ignore any that start with `amqi`.

3. Log in as `root`.
4. Remove the SupportPacs listed in the table below. They have been superseded by function in WebSphere MQ Version 7.0.

SupportPac Number	Description
MA0Y	WebSphere MQ Bridge for HTTP

5. Uninstall all WebSphere MQ service updates, then uninstall WebSphere MQ.
6. Optional: If you need to upgrade your operating system, complete the following steps:
    a. Copy the `/var/mqm` directory and save it to a location that will not be erased by the operating system upgrade.
    b. Upgrade your operating system by following the manufacturer's instructions.
    c. Copy the `/var/mqm` directory that you saved in step 6.a back into your file system.
7. ❯Install WebSphere MQ Version 7.0 as described in *WebSphere MQ Quick Beginnings for Linux*.❮
8. Restart WebSphere MQ. Queue managers are migrated to WebSphere MQ Version 7.0 when you start them.

Parent topic: Upgrading to WebSphere MQ for Linux Version 7.0

🔧 This build: January 26, 2011 11:06:12

5.4.2. Upgrading to WebSphere MQ Version 7.0 using RPM upgrade tools

The use of RPM upgrade tools, using the -U or -F flags, to upgrade is not supported.

About this task

If you have already tried to upgrade WebSphere® MQ by using `rpm -U` or `rpm -F`, you might have deleted your old WebSphere MQ package entries from the RPM database without removing the product from your system. You might also have partially installed WebSphere MQ Version 7.0.

To continue upgrading to WebSphere MQ Version 7.0, follow these steps:

1. Find out which WebSphere MQ packages still have entries in your RPM database by using `rpm -qa | grep MQSeries`
2. Remove all remaining WebSphere MQ packages from your system by using `rpm -e <package-name>`
3. Remove the `/opt/mqm` directory by using `rm -rf /opt/mqm`
4. Install WebSphere MQ Version 7.0 using the instructions given in Installing a WebSphere MQ server, or Installing a WebSphere MQ client.

Parent topic: Upgrading to WebSphere MQ for Linux Version 7.0

🔧 This build: January 26, 2011 11:06:13

5.4.3. After you have upgraded to WebSphere MQ Version 7

You must perform certain tasks immediately after upgrading to V7.

About this task

Immediately after you upgrade to Websphere MQ Version 7.0, you must start your queue managers at least once to migrate your file system structure before you start any Websphere MQ listeners. Otherwise, you will not be able to start Websphere MQ listeners after upgrading.

If you cannot connect to a migrated queue manager by using MQ Explorer, and receive the error message `SYSTEM.MQEXPLORER.REPLY.MODEL not defined`, run the following command on that queue manager:

```
strmqm -c
```

❯This command refreshes existing system objects with default values (for example, setting the MCAUSER attribute of a channel definition to blanks), and creates the queue required by WebSphere® MQ Explorer. The queue manager is stopped when the command finishes.❮

Parent topic: Upgrading to WebSphere MQ for Linux Version 7.0

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5.5. Migrating to WebSphere MQ for Solaris Version 7.0

Follow this information to migrate from previous versions of WebSphere® MQ for Solaris to WebSphere MQ for Solaris Version 7.0.

About this task
If you want to migrate to WebSphere MQ Version 7.0 complete this task.

If you migrate from a previous level of this product without first backing up your system, you **cannot** revert to your previous level, so back up your system **before** you install WebSphere MQ Version 7.0. This will enable you to back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work performed by WebSphere MQ Version 7.0.

Procedure
1. Stop all MQ applications on the machine and the applications accessing remote machines.
2. End all WebSphere MQ activity.
   a. Log in as MQ administrator.
   b. Use the **endmqm** command to stop all running queue managers.
   c. Stop any listeners associated with the queue managers, using the command:
      ```
      endmqlsr -m QMgrName
      ```
   d. To check that you have stopped all of them, enter the following:
      ```
      ps -ef | grep mq
      ```
      Check that there are no processes listed that are running command lines beginning `amq` or `runmq`. Ignore any that start with `amqi`.
3. Log in as root.
4. Function supplied by the SupportPacs in the table below has been superseded by function in WebSphere MQ Version 7.0. Remove these SupportPacs before installing WebSphere MQ Version 7.0.

   Table 1. SupportPacs superseded by WebSphere MQ Version 7.0

SupportPac Number	Description
MA0C	MQSeries® Publish/subscribe
MA0R	WebSphere MQ transport for SOAP
MA88	MQSeries Classes for Java and WebSphere MQ classes for Java Message Service
MACR	MQSeries Client libraries for Sun Solaris (64-bit)

   Review any other installed SupportPacs for their applicability to WebSphere MQ Version 7.0.
5. Uninstall any WebSphere MQ service updates and then uninstall WebSphere MQ.
6. Install WebSphere MQ Version 7.0 by following the tasks set out in ❯*Quick Beginnings for Solaris*❮.

   After you have migrated to WebSphere MQ Version 7.0
   Perform these tasks immediately after you migrate to WebSphere MQ Version 7.0.

Parent topic: Platform-specific information

This build: January 26, 2011 11:07:16

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5.5.1. After you have migrated to WebSphere MQ Version 7.0

Perform these tasks immediately after you migrate to WebSphere® MQ Version 7.0.

About this task

Immediately after you migrate to WebSphere MQ Version 7.0, you must start your queue managers at least once to migrate your file system structure before you start any WebSphere MQ listeners. Otherwise, you will not be able to start WebSphere MQ listeners after migration.

If you cannot connect to a migrated queue manager using MQ Explorer and receive the error message "SYSTEM.MQEXPLORER.REPLY.MODEL not defined", run the following command on that queue manager:

```
strmqm -c
```

❯This command refreshes existing system objects with default values (for example, setting the MCAUSER attribute of a channel definition to blanks), and creates the queue required by the WebSphere MQ Explorer.❮

Parent topic: Migrating to WebSphere MQ for Solaris Version 7.0

This build: January 26, 2011 11:07:16

5.6. Migrating to WebSphere MQ for Windows Version 7.0

Follow this information to migrate from previous versions of WebSphere® MQ for Windows to WebSphere MQ for Windows Version 7.0.

Before you upgrade to WebSphere MQ Version 7.0, you must consider this information.

If you migrate from a previous level of this product without first backing up your system, you **cannot** revert to your previous level, so back up your system **before** you install WebSphere MQ Version 7.0. This enables you to back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work, such as changes to messages and objects, for example, performed by WebSphere MQ Version 7.0. For distributed platforms, information about how to back up your system begins with Backing up and restoring WebSphere MQ in the WebSphere MQ *System Administration Guide*.

The installation process for WebSphere MQ for Windows detects whether this is a new installation or an update from a previous level of this product. If you migrate from a previous level, all the objects that you previously created (for example, your queue managers) can be 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. However, if you deselect any of these components, the installation process uninstalls them.

You can also migrate to WebSphere MQ V7.0 on a system where a previous version has been uninstalled but where the queue manager data has been retained.

If an earlier version of WebSphere MQ is installed on the computer:

- Ensure that no queue managers, listeners, MQ applications or remote applications that use queue managers are running and that the WebSphere MQ Service is stopped. To stop the WebSphere MQ Service, right-click on the WebSphere MQ icon in the system tray, then click **Stop WebSphere MQ**.
- When the installation of WebSphere MQ Version 7.0 completes, the Prepare Websphere MQ Wizard launches automatically. Use this wizard to reenter domain, user ID and password information.
  You can subsequently use the DCOMCNFG.EXE tool, shipped with Windows systems, to change the domain, user ID, and password information. This tool is described in Using DCOMCNFG.EXE to change access permissions
  For Windows Vista and Windows Server 2008 users with UAC enabled only: if you do not complete the Prepare WebSphere MQ Wizard directly after WebSphere MQ installs or if for any reason your machine is rebooted between completing WebSphere MQ installation and completing the Prepare WebSphere MQ Wizard, ensure the wizard is run with Administrator privilege, otherwise the wizard might fail.
- WebSphere MQ Version 7.0 supports migration from WebSphere MQ Version 5.3 and WebSphere MQ Version 6.0 only.
- WebSphere MQ Version 7.0 does not coexist with previous versions of WebSphere MQ. You must migrate from either WebSphere MQ Version 5.3 or WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0.
- By default, a typical WebSphere MQ Version 6.0 to Version 7.0 migration installs only the same features that were installed in the previous version installation. For example, if WebSphere MQ Explorer was not installed in the Version 6.0 installation, it is not installed in a Version 7.0 installation. If you want WebSphere MQ Explorer, select a custom installation of WebSphere MQ Version 7.0 and select the MQ Explorer feature on the Features panel. If you are migrating from WebSphere Version 5.3 to Version 7.0, WebSphere MQ Explorer is installed by default. If you do not want WebSphere MQ Explorer, uninstall the WebSphere MQ Explorer feature by selecting a custom installation of WebSphere MQ Version 7.0. Then deselect the MQ Explorer feature on the Features panel. For more information on how to deselect features, see Launchpad instructions in *Quick Beginnings for Windows*.

Choosing not to install WebSphere MQ Explorer and WebSphere Eclipse Platform
You can choose not to install the WebSphere MQ Explorer feature, during a custom installation.

Migrating to WebSphere MQ Version 7.0 on Windows Vista or Windows Server 2008
You can migrate to WebSphere MQ Version 7.0 on Windows Vista or Windows Server 2008 using either of the following supported migration paths:

User Account Control (UAC) on Windows Vista and Windows Server 2008
Windows Vista and Windows Server 2008 introduce a User Account Control (UAC) feature, which restricts the actions users can perform on certain operating system facilities, even if they are members of the Administrators group.

Launchpad migration instructions

SPX support on Windows Vista and Windows Server 2008

WebSphere MQ service objects
This section gives information about service objects in WebSphere MQ for Windows.

WebSphere MQ Explorer for Version 7.0 - error connecting to a migrated queue manager

Migrating an MSCS configuration
Migrate one node at a time, following these instructions.

Parent topic: Platform-specific information

This build: January 26, 2011 11:07:19

5.6.1. Choosing not to install WebSphere MQ Explorer and WebSphere Eclipse Platform

You can choose not to install the WebSphere® MQ Explorer feature, during a custom installation.

By default, a typical migration installation enables the WebSphere MQ Explorer feature. WebSphere MQ Explorer has a prerequisite of WebSphere Eclipse Platform V3.3.

If you do not want to install WebSphere Eclipse Platform V3.3, select a custom installation then deselect the WebSphere MQ Explorer feature from the Features panel.

If you installed WebSphere MQ Explorer on WebSphere MQ Version 6.0 but do not want to install it on WebSphere MQ Version 7.0, select a custom installation and then deselect the WebSphere MQ Explorer feature. The migration process removes the Version 6.0 WebSphere MQ Explorer feature.

For more information on how to deselect features, see Launchpad instructions in *Quick Beginnings for Windows*.

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:07:19

5.6.2. Migrating to WebSphere MQ Version 7.0 on Windows Vista or Windows Server 2008

You can migrate to WebSphere® MQ Version 7.0 on Windows Vista or Windows Server 2008 using either of the following supported migration paths:

Table 1. WebSphere MQ Version 7.0 on Windows Vista or Windows Server 2008: supported migration paths

From:	To:
WebSphere MQ Version 6.0 Client plus FixPack 6.0.2.1 on Windows Vista or Windows Server 2008	WebSphere MQ Version 7.0 Client on Windows Vista or Windows Server 2008
WebSphere MQ Version 7.0 on Windows XP SP2	WebSphere MQ Version 7.0 on Windows Vista or Windows Server 2008

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:07:20

5.6.3. User Account Control (UAC) on Windows Vista and Windows Server 2008

Windows Vista and Windows Server 2008 introduce a User Account Control (UAC) feature, which restricts the actions users can perform on certain operating system facilities, even if they are members of the Administrators group.

UAC is enabled by default on Windows Vista and Windows Server 2008. This means installing WebSphere® MQ on Windows Vista or Windows Server 2008 differs from installing WebSphere MQ on previous versions of Windows. At certain points during installation, migration, and uninstallation, you must manually accept the Windows UAC prompt to allow processes to run with elevated authority. During silent installation and uninstallation, you must invoke the process from an elevated command prompt. The points when you have to accept the Windows prompt for UAC or invoke processes from an elevated command prompt have been flagged in the specific topics affected.

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:07:20

5.6.4. Launchpad migration instructions

About this task

These instructions cover migrating WebSphere® MQ to Version 7.0 using the launchpad.

Procedure

1. Stop all existing WebSphere MQ processes.
    a. Stop execution of all WebSphere MQ applications on the local machine, and on any connected remote machines.
    b. Stop execution of all queue managers
    c. Stop execution of all channels
    d. Stop execution of all listeners
    e. Right click WebSphere MQ on the system tray and select **Stop WebSphere MQ**. Wait for all services to stop.
    f. Right click WebSphere MQ on the system tray and select **Exit**. Some previous versions of WebSphere MQ might not have an **Exit** option. If there is not, use the task manager to end process *amqmsrvn.exe*.
2. Insert the WebSphere MQ Version 7.0 Server CD into the CD-ROM drive.
3. If autorun is enabled, the launchpad starts automatically. If not, run **setup.exe** from the CD-ROM.
   If you are migrating on Windows Vista or Windows Server 2008 and UAC is enabled, accept the Windows prompt to allow the launchpad to run as elevated. During migration you might also see Open File - Security Warning dialog boxes that list International Business Machines Limited as the publisher. Click **Run** to allow the migration to continue.
4. Click the **Software Requirements** option to check if prerequisites are met. You might need to install or upgrade to WebSphere Eclipse Platform Version 3.3 if you want to use WebSphere MQ Explorer in WebSphere MQ Version 7.0.
5. Click the **Network Configuration** option and select from the three choices. Click **More Information** to launch the relevant WebSphere MQ documentation.
6. Click the **Migrating SSL Certificates** option and select from the choices. This option will only appear if you are migrating from WebSphere MQ Version 5.3, otherwise it will not be shown.
7. Click the **WebSphere MQ Installation** option, check the pre-installation status, select language, and click **Launch IBM WebSphere MQ Installer**.
    a. Read and accept the license agreement to proceed.
    b. Select **update** or **custom**. Update installs WebSphere MQ Version 7.0 with the same features as the previous version. Custom allows you to add or remove components for the new version.
    c. If **custom** was selected, choose components. Unselecting a component will remove the component from the machine if it is already installed. WebSphere MQ Explorer requires WebSphere Eclipse Platform 3.3 to have been installed.
    d. Confirm details and install. Follow any on-screen instructions.
    e. Restart computer on completion of installation if you are prompted to do so.
    f. WebSphere MQ will launch some final configuration steps, allowing you to review network configuration options, and select components to start up when finished.

8. WebSphere MQ Version 7.0 is now installed, and all persistent items have been migrated from the previous version of WebSphere MQ. You can use the launchpad to view the Quick Beginnings, Release Notes, or Product Tour before finishing.

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:07:18

Notices | Trademarks | Downloads | Library | Support | Feedback

5.6.5. SPX support on Windows Vista and Windows Server 2008

The Sequenced Package Exchange protocol (SPX) is not supported on Windows Vista or Windows Server 2008. SPX is supported on Windows XP and Windows 2003 only.

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:06:42

Notices | Trademarks | Downloads | Library | Support | Feedback

5.6.6. WebSphere MQ service objects

This section gives information about service objects in WebSphere® MQ for Windows.

In WebSphere MQ for Windows, services are now managed by service objects. The listener, command server, trigger monitor, and channel initiator services defined using the MMC plugin in earlier versions of WebSphere MQ will be migrated to queue manager objects as follows:

- The startup property of the command server (automatic or manual) is migrated to the SCMDSERV attribute of the queue manager.
- The startup property of the channel initiator (automatic or manual) is migrated to the SCHINIT attribute of the queue manager.
- For each listener defined in the WebSphere MQ Explorer, a queue manager LISTENER object is created.
- For each trigger monitor defined in the WebSphere MQ Explorer, a queue manager SERVICE object is created.

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0
Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

This build: January 26, 2011 11:06:29

Notices | Trademarks | Downloads | Library | Support | Feedback

5.6.7. WebSphere MQ Explorer for Version 7.0 - error connecting to a migrated queue manager

If you cannot connect to a migrated queue manager and see an error like "SYSTEM.MQEXPLORER.REPLY.MODEL not defined", run:

```
strmqm -c
```

on that queue manager.

❯This command refreshes existing system objects (for example, setting the MCAUSER attribute of a channel definition to blanks), and creates the queue required by WebSphere® MQ Explorer. ❮

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0
Parent topic: Considerations for migrating from WebSphere MQ for Linux Version 5.3

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

5.6.8. Migrating an MSCS configuration

Migrate 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 should always upgrade a Passive node with no Active WebSphere MQ resources. In an Active/Active setup, convert the node being migrated to a Passive node with no running MQ resources under MSCS control.

Procedure
1. Modify the possible owners of the WebSphere MQ resource to encompass only the Active node or nodes. This prevents the WebSphere MQ resource from experiencing an unexpected failover to the node currently being migrated.
2. Ensure that the group containing the WebSphere MQ resource is currently on one of the nodes defined as a possible owner. This should include any applications connecting to the queue manager resource.
3. Stop the cluster service on the node being migrated. This clears the MSCS cache of any WebSphere MQ DLLs that have been registered.
4. Migrate the Passive node by following the standard instructions in Migrating to WebSphere MQ for Windows Version 7.0. Apply the required maintenance level.
5. Start the cluster service on the Passive node.
6. On the next node to be migrated, ensure that the WebSphere MQ resources are offline.
7. Remove this node from the list of possible owners. For clusters with more than 2 nodes, see the additional considerations later in this topic.
8. Move the group containing the WebSphere MQ resource to one of the possible owners and bring it online.
9. Repeat steps 3-8 as necessary for any remaining nodes.

What to do next

Additional considerations in an MSCS setup with more than 2 nodes: When you modify the list of possible owners for the WebSphere MQ resources in a poly-node setup, ensure that the list of possible owners (at any given time) does not contain both migrated and non-migrated nodes. As each node is migrated, modify the list of possible owners to the remaining nodes that have not yet been migrated. When half of the nodes have been migrated, the list of possible owners should include only migrated nodes. Modify the list of possible owners at this point.

If you are migrating from WebSphere MQ Version 5.3, see MSCS migration issues

Parent topic: Migrating to WebSphere MQ for Windows Version 7.0

This build: January 26, 2011 11:07:01

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5.7. Upgrading to WebSphere MQ for z/OS Version 7.0

This section describes the things that you must consider if you are migrating a single queue manager from a previous version of WebSphere® MQ.

First class migration support is provided to WebSphere MQ for z/OS® Version 7.0 from WebSphere MQ for z/OS Version 6.0. This means you can restart a queue manager at WebSphere MQ Version 7.0 by replacing the executable code (for example, the STEPLIB data sets) with equivalent Version 7.0 libraries and then restarting the queue manager. When a backward migration PTF has been applied to Version 6.0 code, it is possible to fall back from Version 7.0 operation to Version 6.0.

▶The points below can be carried out before or after the initial stage (1) of migrating a single queue manager from a previous version of WebSphere MQ.
- Apply the Version 7.0 coexistence and backward migration PTFs to the Version 6.0 code.
- Restart production WebSphere MQ systems with this PTF-updated Version 6.0 code. Verify correct function before proceeding and review any special actions detailed in the PTFs. If you require fall back at this stage, use normal maintenance procedures to revert to the Version 6.0 code before PTF application.
◀

Follow these steps to migrate a production queue manager from WebSphere MQ Version for z/OS Version 6.0 to WebSphere MQ Version for z/OS Version 7.0:
1. Install Version 7.0 early code. Refresh the early code level of all queue managers in the LPAR.
2. Restart production WebSphere MQ systems with Version 7.0 code. Verify correct function of existing applications before using any new Version 7.0 functions. If problems become apparent at this stage, fall back to the Version 6.0 code with backward migration PTFs that have been previously validated for your environment.

For a queue-sharing group, apply the Version 6.0 coexistence and backward migration PTFs to all members before you migrate any member to Version 7.0.

For releases earlier than Version 6.0, no backward migration support from Version 7.0 is provided. You can migrate a queue manager from a release earlier than Version 6.0 directly to Version 7.0, but if problems arise there is no good fall back capability. This is not good practice for production systems, but it might be sufficient for a test queue manager. See section Migrating from an earlier unsupported release of WebSphere MQ or MQSeries for further information. Ensure that production systems are fully migrated to Version 6.0 and stability is achieved before migration to Version 7.0.

Migrating to WebSphere MQ for z/OS Version 7.0.1
This section describes some of the things that you must consider if you are migrating from a previous version of WebSphere MQ.

Migrating to WebSphere MQ for z/OS Version 7.0
You might need to perform some additional tasks when migrating from a previous version, depending on which of the new features you want to use, and which level of WebSphere MQ you are migrating from. Generally, the earlier the version of WebSphere MQ you are migrating from, the more tasks you need to perform.

Migrating from Version 6.0

Changing to full function WebSphere MQ

Reverting to previous versions

Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

Parent topic: Platform-specific information

This build: January 26, 2011 11:06:41

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.1. Migrating to WebSphere MQ for z/OS Version 7.0.1

This section describes some of the things that you must consider if you are migrating from a previous version of WebSphere MQ.

Migration support is provided to WebSphere MQ for z/OS Version 7.0.1 from either WebSphere MQ for z/OS Version 6.0, or from WebSphere MQ for z/OS Version 7.0. This support means you can restart a queue manager at WebSphere MQ Version 7.0.1 by replacing the executable code (for example, the STEPLIB data sets) with equivalent Version 7.0.1 libraries and then restarting the queue manager. After migrating to Version 7.0.1 from Version 6.0, when a backward migration PTF has been applied to Version 6.0 code, it is possible to fall back from Version 7.0.1 operation to Version 6.0. Likewise, after migrating to Version 7.0.1 from Version 7.0, when a backward migration PTF has been applied to Version 7.0 code, it is possible to fall back from Version 7.0.1 operation to Version 7.0. Backward migration is only possible from 7.0.1 if it has been operating in compatibility mode, OPMODE=COMPAT. See Controlling new functionality and backward migration using the OPMODE property for more details. Note, however, that after migrating to Version 7.0.1 from Version 7.0, it is NOT possible to backwards migrate to Version 6.0 directly - in this case backwards migration to Version 7.0 must occur first.

The following points can be carried out before or after the initial stage (1) of migrating a single queue manager from a previous version of WebSphere MQ.
- Apply the relevant Version 7.0.1 coexistence and backward migration PTF to the Version 6.0 or Version 7.0 code.
- Restart production WebSphere MQ systems with this PTF-updated Version 6.0 or Version 7.0 code. Verify correct function before proceeding and review any special actions detailed in the PTFs. If you require fall back at this stage, use normal maintenance procedures to revert to the Version 6.0 or Version 7.0 code before PTF application.

Follow these steps to migrate a production queue manager from WebSphere MQ Version for z/OS Version 6.0, or Version 7.0, to WebSphere MQ Version for z/OS Version 7.0.1:

1. Install Version 7.0.1 early code. Refresh the early code level of all queue managers in the LPAR.

2. Restart production WebSphere MQ systems with Version 7.0.1 code. Verify correct function of existing applications before using any new Version 7.0.1 functions. If problems become apparent at this stage, fall back to the Version 6.0, or Version 7.0, code with backward migration PTFs that have been previously validated for your environment.

3. Note, however, that if the new function switch is activated at Version 7.0.1 (by setting OPMODE=(NEWFUNC)), then it is NOT possible to backwards migrate to the earlier version of WebSphere MQ for z/OS.

For a queue-sharing group, apply the Version 6.0, or Version 7.0, coexistence and backward migration PTF to all members before you migrate any member to Version 7.0.1.

Starting in V7.0.1 certain system queues are provided with CFSTRUCT attributes which specify an application structure CSQSYSAPPL prefixed with the queue-sharing group name. The CSQSYSAPPL structure is an application structure for system queues. When an application connects with a GROUP unit of recovery disposition and either inquires what transactions are in doubt or attempts to resolve a transaction that was started elsewhere in the queue-sharing group (QSG), the queue manager to which it is now connected needs to be able to communicate with the other members of the QSG so that it can process the request. To do so it uses a shared queue called SYSTEM.QSG.UR.RESOLUTION.QUEUE, which must reside on the CSQSYSAPPL structure. For details of creating the Coupling facility structures see Set up the Coupling Facility. For information about setting up a GROUP unit of recovery disposition, see Enabling GROUP units of recovery.

For releases earlier than Version 6.0, no backward migration support from Version 7.0.1 is provided. You can migrate a queue manager from a release earlier than Version 6.0 directly to Version 7.0.1. However, if problems arise there is no good fall back capability. This migration is not good practice for production systems, but it might be sufficient for a test queue manager. Refer to Migrating from an earlier unsupported release of WebSphere MQ or MQSeries for further information. Ensure that production systems are fully migrated to Version 6.0, or Version 7.0 if that is your starting point, and stability is achieved before migration to Version 7.0.1.

When migrating to Version 7.0.1 directly from Version 6.0, it is necessary to perform additional steps as indicated by the CSQ45ATB sample. When migrating to Version 7.0.1 from Version 7.0, this additional step is not necessary.

Considerations when upgrading to WebSphere MQ for z/OS Version 7.0.1
Upgrading to WebSphere MQ z/OS V7.0.1 requires further considerations that are described in this topic.

Controlling new functionality and backward migration using the OPMODE property
The availability of new functions and backward migration for WebSphere MQ for z/OS can be controlled using the OPMODE property in the CSQ6SYSP macro.

Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:41

5.7.1.1. Considerations when upgrading to WebSphere MQ for z/OS Version 7.0.1

Upgrading to WebSphere MQ z/OS V7.0.1 requires further considerations that are described in this topic.

- ❯Batch application programs that use z/OS Language Environment must be compiled and linked to use the WebSphere MQ DLL interface **if they were compiled and linked with WebSphere MQ 7.0.** See Building z/OS batch applications using Language Environment for more details.❮
- ❯Batch applications compiled and linked with earlier versions of WebSphere MQ are not affected.❮
- WebSphere MQ for z/OS no longer supports the form of subsystem definition parameter with only a single subsystem recognition character and no sysplex scope.
  Ensure that MQ subsystem definitions in **SYS1.PARMLIB(IEFSSNxx)** members have parameters of the form:
  - o CSQ3EPX,cpf,scope

  The old format:
  - o ❯CSQ3EPX,cpf❮

  should be modified to
  - o ❯CSQ3EPX,cpf,M❮

  for equivalent function.
  These changes must be performed before installing ERLY code for this release of WebSphere MQ, or message CSQ3112E will be issued at subsystem definition time.

Parent topic: Migrating to WebSphere MQ for z/OS Version 7.0.1

This build: January 26, 2011 11:07:02

5.7.1.2. Controlling new functionality and backward migration using the OPMODE property

The availability of new functions and backward migration for WebSphere MQ for z/OS can be controlled using the OPMODE property in the CSQ6SYSP macro.

When you move to a new version of WebSphere® MQ for z/OS® you can restrict the availability of certain new functions and control whether you want to permanently move forward to that new release. This can be controlled using the OPMODE property within the CSQ6SYSP macro. The OPMODE property uses two parameters, the **Mode** parameter and the **VerificationLevel** parameter.

The **Mode** parameter controls whether the certain new functions associated with a specific level of the queue manager are available.

Mode
Specifies the requested operation mode. The values can be as follows:

COMPAT

  The queue manager runs in compatibility mode. Certain new functions are not available. The queue manager can be migrated back to an earlier release.

NEWFUNC

  All new functions provided in this level of code are available. The queue manager cannot be migrated back to an earlier release.

The **VerificationLevel** parameter is used with COMPAT parameter.

VerificationLevel

  The VerificationLevel is used to confirm that the CSQ6SYSP parameters were coded for use with the level of CSQ6SYSP macro being compiled. The compatibility mode verification level is in **vrm** format.

  When OPMODE=(COMPAT,vrm), only those functions introduced at, or before release **vrm** are available, except when **vrm** matches the current code release, in which case new functions introduced at **vrm** at not available.

If you create a new queue manager and do not specify any parameter values, the default is OPMODE=(COMPAT,701). If the current version of the queue manager is version 7.0.1, this will prevent the new functions of version 7.0.1 from being used but it will allow you to migrate back to a previous level of queue manager.

If you set parameter values to OPMODE=(NEWFUNC,701) then all of the new features of version 7.0.1 are available. However by using the NEWFUNC parameter you cannot migrate back to a previous version. If you find an issue in the new functions, you can switch off the new functions by using OPMODE= (COMPAT,701). However, in this mode DIS SYSTEM shows OPMODE as (COMPAT,701); that is, you cannot revert the queue manager to run at a previous version. For further details, see Using CSQ6SYSP.

If you need assistance to revert to an earlier version of WebSphere MQ, contact your IBM® support center.

Parent topic: Migrating to WebSphere MQ for z/OS Version 7.0.1

This build: January 26, 2011 11:06:38

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.2. Migrating to WebSphere MQ for z/OS Version 7.0

You might need to perform some additional tasks when migrating from a previous version, depending on which of the new features you want to use, and which level of WebSphere® MQ you are migrating from. Generally, the earlier the version of WebSphere MQ you are migrating from, the more tasks you need to perform.

The new functions for this release are described in the WebSphere MQ for z/OS Concepts and Planning Guide. Consider which of these functions you want to use before customizing WebSphere MQ because you might not need to perform all the migration tasks.

When you migrate from a previous version of WebSphere MQ for z/OS® or MQSeries® for OS/390®, you can continue to use your existing queue managers with the new version, including their page sets, log data sets, object definitions, and initialization input data sets. You can continue to use your existing queues, including system queues such as the SYSTEM.CHANNEL.SYNCQ.

Do not cold start your queue managers when migrating from a previous version. A cold start deletes and redefines log files and page sets. This action destroys all messages and other information such as channel state.

If you use the Client Attachment feature, you must install and use the V7 feature. Previous versions of this feature will not work with WebSphere MQ Version 7.0.

If you are using IMS™ (other than the WebSphere MQ IMS bridge), restart the IMS control region after the migration to ensure that you use the new version of any changed files.

Additional considerations when you migrate to Version 7.0

Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:38

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.2.1. Additional considerations when you migrate to Version 7.0

Change in behavior of client connections to WebSphere MQ for z/OS
In WebSphere MQ Version 7.0, you can attach a maximum of five client connections to WebSphere MQ for z/OS® without having the Client Attachment feature installed.

Considerations when using the MQ Explorer to manage WebSphere MQ for z/OS queue managers
Using the WebSphere MQ Explorer to manage WebSphere MQ for z/OS queue managers has further implications that must be considered when migrating between different versions.

Migrating WebSphere MQ for z/OS RACF security profiles
This topic describes how to migrate RACF® security profiles to WebSphere MQ Version 7.0.

Migration to mixed case security

Exploiting 64-bit storage
WebSphere MQ Version 7 uses z/OS memory objects above the bar for some functions. You must therefore allow the queue manager to access storage above the bar.

Migrating from AMI

Parent topic: Migrating to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:39

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5.7.2.1.1. Change in behavior of client connections to WebSphere MQ for z/OS

In WebSphere® MQ Version 7.0, you can attach a maximum of five client connections to WebSphere MQ for z/OS® without having the Client Attachment feature installed.

In previous releases of WebSphere MQ, you needed to install the optional Client Attachment feature (CAF) on z/OS in order to attach clients.

If you do not have the CAF installed you can attach a maximum of five clients only by setting the MAXINST attribute on the server-connection channel to a value between 0 - 5. A value greater than five is interpreted as zero without the CAF installed.

If you decide to attach a limited number of clients without the CAF you must secure the server-connection channel; see WebSphere MQ Clients for information about server-connection security.

If you have the CAF installed you can attach a maximum of 999 999 999 clients.

If the default value remains at 999 999 999, and you then connect MQExplorer to a queue manager without the CAF, the following error messages can be generated:

CSQX263I: Client Attachment feature unavailable. A client attachment on connection conn-id by MQI channel channel-name was allowed without installation of the Client Attachment feature. Only a restricted number of these are allowed.

CSQX489E:Maximum instance limit exceeded. There are too many instances of the channel channel-name running to be able to start another. The CSQX489E error message is also generated if, for example, the attribute has a value of '3' and you try to attach a fourth instance of MQExplorer.

For more information about connection limits, see Server-connection channel limits.

Parent topic: Additional considerations when you migrate to Version 7.0

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5.7.2.1.2. Considerations when using the MQ Explorer to manage WebSphere MQ for z/OS queue managers

Using the WebSphere® MQ Explorer to manage WebSphere MQ for z/OS queue managers has further implications that must be considered when migrating between different versions.

If you use the WebSphere MQ Explorer to administer your z/OS queue manager, you must perform the following actions after migration between releases:

1. Start the WebSphere MQ Explorer.
2. Right click the Queue Managers folder icon in the Navigator pane.
3. Remove the migrated z/OS queue manager from the list of managed queue managers using the Hide option within the Hide/Show Queue Managers function.
4. Add the migrated z/OS queue manager back into the list by using the Show option within the Hide/Show Queue Managers function.

Do this when migrating from Version 6 to Version 7 or when migrating back from Version 7 to Version 6. These actions ensure that the WebSphere MQ Explorer's cached view of the queue manager attributes, including the command level, are correctly refreshed after the migration.

Parent topic: Additional considerations when you migrate to Version 7.0

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5.7.2.1.3. Migrating WebSphere MQ for z/OS RACF security profiles

This topic describes how to migrate RACF® security profiles to WebSphere® MQ Version 7.0.

You must ensure that you have addressed the following points when you migrate your RACF profiles to WebSphere MQ Version 7.0:

- External Security Manager software is at the correct version and level and that all of your prerequisite software is installed.
- WebSphere MQ RACF classes have been updated to include the new mixed case classes. For more information, see the RACF information in Security controls and options
- Enterprise has migrated to mixed case security - see ➤Migration to mixed case security◄.

Parent topic: Additional considerations when you migrate to Version 7.0

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5.7.2.1.4. Migration to mixed case security

If you want to use the mixed case security profile support follow these steps:

1. Ensure that you have installed a level of the security product that supports mixed case security, and that you have applied any updates required by WebSphere® MQ.

2. Ensure that the new WebSphere MQ RACF® classes are installed and active.

3. Copy all your existing profiles and access levels from the uppercase classes to the equivalent mixed case RACF class:

   a. MQADMIN to MXADMIN

   b. MQPROC to MXPROC

   c. MQNLIST to MXNLIST

   d. MQQUEUE to MXQUEUE

4. Start your queue manager with the queue manager SCYCASE attribute set to UPPER.

5. Change the value of the SCYCASE attribute to MIXED by issuing the following command:

   ```
   ALTER QMGR SCYCASE(MIXED)
   ```

6. Activate your existing security profiles by issuing the following command:

   ```
   REFRESH SECURITY(*) TYPE(CLASSES)
   ```

7. Test that your security profiles are working correctly.

8. Review your object definitions and create new mixed case profiles as appropriate, using REFRESH SECURITY as required to activate the profiles.

Parent topic: Additional considerations when you migrate to Version 7.0

This build: January 26, 2011 11:06:46

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.2.1.5. Exploiting 64-bit storage

WebSphere® MQ Version 7 uses z/OS® memory objects above the bar for some functions. You must therefore allow the queue manager to access storage above the bar.

Your installation might have customized the SMFPRMxx member of SYS1.PARMLIB or the IEFUSI exit to provide a default limit for jobs using virtual storage above the 2 GB bar.

If your installation does not have a default limit for storage above the bar, or if you want to use a different limit for your queue manager, you can provide a queue manager-specific restriction on the amount of virtual storage available above the bar for memory objects by coding a MEMLIMIT parameter on the JCL of the queue manager stored procedure, xxxxMSTR, for example:

```
//PROCSTEP EXEC PGM=CSQYASCP,REGION=0M,MEMLIMIT=2G
```

Parent topic: Additional considerations when you migrate to Version 7.0

This build: January 26, 2011 11:06:46

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.2.1.6. Migrating from AMI

AMI is not supplied as part of WebSphere® MQ Version 6.0 and later. If you have previously used AMI in WebSphere MQ Version 5.3.1, you can continue to use it by including the Version 5.3.1 SCSQLOAD file in your STEPLIB concatenation, as shown below:

```
//STEPLIB DD DISP=SHR,DSN=PP.MQM.V600.SCSQANLE V6 Messages
//        DD DISP=SHR,DSN=PP.MQM.V600.SCSQAUTH V6 API MODULES
//        DD DISP=SHR,DSN=PP.MQM.V531.SCSQLOAD AMI CODE
```

If you have removed WebSphere MQ Version 5.3.1 but need AMI functionality, you can install the AMI SupportPac MA0F. This is available from the WebSphere MQ Support site.

Parent topic: Additional considerations when you migrate to Version 7.0

This build: January 26, 2011 11:06:30

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.3. Migrating from Version 6.0

If you are migrating from Version 6.0 to Version 7.0, you must consider the following when you customize your new version.

Software levels
If you are migrating to WebSphere MQ Version 7.0, check that you have the correct levels of prerequisite and corequisite software.

Testing for distributed queuing

CICS users

WebSphere Event Broker and WebSphere Message Broker users
WebSphere MQ Version 7.0 provides a queued publish/subscribe interface to support the migration of publish/subscribe applications from a WebSphere MQ Version 6.0 environment (where publish/subscribe is performed by the broker) to an environment where publish/subscribe is supported by function in WebSphere MQ Version 7.0.

Migrating queue-sharing groups to Version 7.0

You can migrate one or more existing queue-sharing groups containing Version 6.0 queue managers to Version 7.0. The step sequence is designed so that at no stage is an outage of the entire queue-sharing group required.

Setting up a new queue-sharing group

CF structures

Channel initiators

Commands

Initialization input data sets CSQINP1 and CSQINP2

DB2 plan names

Clustering

CICS

JMS resources

Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:39

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5.7.3.1. Software levels

If you are migrating to WebSphere® MQ Version 7.0, check that you have the correct levels of prerequisite and corequisite software.

The minimum levels for some of the items of software required to use WebSphere MQ have changed. Check that you have the correct levels from the list in Software requirements.

Parent topic: Migrating from Version 6.0

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5.7.3.2. Testing for distributed queuing

You can use the supplied installation verification program, CSQ4IVPX, to confirm that distributed queuing is operational.

Parent topic: Migrating from Version 6.0

This build: January 26, 2011 11:07:20

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5.7.3.3. CICS users

If you are using CICS® Transaction Server for z/OS® Version 3.2 or later, the connection between WebSphere® MQ and CICS is provided by CICS libraries.

See the CICS Transaction Server for z/OS Version 3.2 Information Center at: http://publib.boulder.ibm.com/infocenter/cicsts/v3r2/index.jsp for further information.

You must also update the MQ libraries in the STEPLIB and DFHRPL concatenations of your CICS region JCL and restart CICS to be able to use the most recent WebSphere MQ features.

Parent topic: Migrating from Version 6.0

This build: January 26, 2011 11:06:39

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5.7.3.4. WebSphere Event Broker and WebSphere Message Broker users

WebSphere® MQ Version 7.0 provides a queued publish/subscribe interface to support the migration of publish/subscribe applications from a WebSphere MQ Version 6.0 environment (where publish/subscribe is performed by the broker) to an environment where publish/subscribe is supported by function in WebSphere MQ Version 7.0.

The queue manager attribute PSMODE controls the queued publish/subscribe interface. If you set PSMODE to COMPAT, the interface is not started. Therefore, if you want to use WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 with WebSphere MQ Version 7.0, ensure PSMODE is set to COMPAT.

If you set PSMODE to ENABLED, the queued publish/subscribe interface is started and processes any broker control messages on the SYSTEM.BROKER.CONTROL.QUEUE.

In WebSphere MQ Version 7.0 the endmqbrk command can no longer be used.

Parent topic: Migrating from Version 6.0

This build: January 26, 2011 11:06:43

5.7.3.5. Migrating queue-sharing groups to Version 7.0

You can migrate one or more existing queue-sharing groups containing Version 6.0 queue managers to Version 7.0. The step sequence is designed so that at no stage is an outage of the entire queue-sharing group required.

This migration might affect Tasks 9, 10 and 16 in Customizing your queue managers.

Version 6.0 and Version 7.0 queue managers can coexist within a queue-sharing group. However, some functions are not supported on the Version 6.0 queue managers. Additionally, some operations are unavailable until all queue managers in the queue-sharing group have been migrated to Version 7.0. See Multiple queue manager versions in a queue-sharing group. When all queue managers in the queue-sharing group have been migrated to Version 7.0, you can take full advantage of new Version 7.0 function.

Applying WebSphere MQ for z/OS Version 7.0 migration & coexistence PTFs

This step can be performed at any time in preparation for a migration to WebSphere® MQ for z/OS® Version 7.0, or as part of normal maintenance. It is not dependent on Version 7.0 being available.

You cannot add a Version 7.0 queue manager to a queue-sharing group, or start an existing queue manager in a queue-sharing group at Version 7.0 level, until all the queue managers in a queue-sharing group within the DB2® data-sharing group have had a migration & coexistence PTF applied. This restriction is because Version 7.0 requires new DB2 tables, and additional changes to existing DB2 tables. Similarly, after a Version 7.0 queue manager has been started in a queue-sharing group, you cannot start a Version 6.0 queue manager as a member of the group unless it has a migration & coexistence PTF applied.

The PTF changes some of the DB2 operations performed by the Version 6.0 queue manager so that it is compatible with WebSphere MQ for z/OS Version 7.0. Therefore, the PTF contains a new set of DBRMs. This means that you have two sets of plans: one set for queue managers without the PTF and the other set for queue managers with the PTF applied.

You must take the following steps to apply the PTF to queue managers in the queue sharing group:
1. Apply the PTF to the Version 6.0 libraries, and perform the additional holdaction tasks of binding new and changed DBRMs into plans.
2. Stop and restart each queue manager so that it picks up the new code level.
3. Perform testing of the new code level.

Migrating DB2 tables

After the PTF has been applied to all queue managers in the queue sharing group, the DB2 tables for the queue sharing group can be migrated. This step cannot be performed until all queue managers defined in a queue-sharing group within the DB2 data-sharing group have been started with the migration & coexistence PTF applied.

If the jobs described fail because of a DB2 locking problem, it might be due to contention for a DB2 resource, especially if the system is being heavily used. Resubmit the job later, preferably when the system is lightly used or quiesced.

You can either migrate the DB2 tables one queue-sharing groups at a time, or all queue-sharing groups at the same time. For more information, read the header information in the jobs

To migrate the tables and all queue-sharing groups

Upgrading from WebSphere MQ V6 requires additional steps to migrate DB2 tables.

1. Read the header information in the CSQ45ATB sample (in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0) and customize it. Run the job to perform the following steps: ❯
   a. Bind the new DB2 plan for the CSQ5PQSG utility.
   b. Grant execute authority to the DB2 plan.
   c. Check that the data-sharing group is in a state suitable for migration, using the MIGRATE DSG function.
   d. Modify the existing tables, and create the tables required for WebSphere MQ for z/OS Version 7.0.
   ❮
2. Read the header information in the CSQ45BPL and CSQ45GEX samples (in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0) and customize and run them, as described in Task 9: Set up the DB2 environment. This binds the Version 7.0 DBRMs into plans, and grants execute authority to them.

To migrate one queue-sharing group at a time

The following are the tasks that you perform to migrate a single queue-sharing group within the DB2 data-sharing group.

1. ❯Read the header information in the CSQ45ATB sample (in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0). Edit the step that executes the MIGRATE QSG function, specifying the name of the first queue-sharing group that is to be migrated. Run the job to perform the following steps:
   a. Bind the new DB2 plan for the CSQ5PQSG utility.
   b. Grant execute authority to the DB2 plan.
   c. Check that the queue-sharing group is in a state suitable for migration, using the MIGRATE QSG function.
   d. Modify the existing tables, and create the tables required for WebSphere MQ for z/OS Version 7.0.
   ❮
2. Read the header information in the CSQ45BPL and CSQ45GEX samples (in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0) and customize and run them, as described in Task 9: Set up the DB2 environment.
3. To migrate subsequent queue-sharing groups, use the MIGRATE QSG function of CSQ5PQSG for each queue-sharing group to be migrated. It is not necessary to run CSQ45ATB for any queue-sharing group, other than the first to be migrated.

Parent topic: Migrating from Version 6.0

5.7.3.6. Setting up a new queue-sharing group

This might affect Tasks 6, 9, 10, 13, 16, and 17 in Customizing your queue managers.

If you want to set up a new queue-sharing group or data-sharing group in WebSphere® MQ Version 7.0, follow these steps:

1. Review your DB2® data-sharing requirements.
   A single DB2 data-sharing group can be used to support multiple WebSphere MQ queue-sharing groups. If you intend to add this new queue-sharing group to a DB2 data-sharing group that already supports WebSphere MQ queue-sharing groups, you need to ensure that the migration & coexistence PTF has been applied, so that the DB2 tables used by WebSphere MQ can support Version 7.0 queue managers (see Applying WebSphere MQ for z/OS Version 7.0 migration & coexistence PTFs).
2. Customize the CSQ45ATB sample JCL in thlqual.SCSQPROC supplied with WebSphere MQ for z/OS® Version 7.0, deleting or bypassing the step that executes the MIGRATE QSG function. Run the job.
3. Set up the Coupling Facility. See Task 10: Set up the Coupling Facility.
4. Add the WebSphere MQ entries to the DB2 data-sharing group using the CSQ5PQSG program. See Task 16: Add the WebSphere MQ entries to the DB2 data-sharing group.
5. Tailor the system parameter module to add DB2 data-sharing group and WebSphere MQ queue-sharing group information. See Task 17: Tailor your system parameter module.
6. Customize and include the initialization input sample thlqual.SCSQPROC (CSQ4INSS) in the CSQINP2 data set.

See the WebSphere MQ for z/OS System Administration Guide for more information about managing queue-sharing groups.

Parent topic: Migrating from Version 6.0

5.7.3.7. CF structures

This might affect Task 10 in Customizing your queue managers.

WebSphere® MQ local queue objects defined with QSGDISP(SHARED) have their messages stored on a Coupling Facility (CF) list structure so that they can be accessed by any other queue managers within the queue-sharing group.

As with the CFSTRUCT attribute of queues, the name is specified without the initial four-character queue-sharing group name that forms the name used by z/OS®.

WebSphere MQ Version 6.0 and later support large messages on shared queues (up to 100 MB) and use DB2® to store data from those messages. CF structures supporting large shared queue messages must have the new CFLEVEL(4).

CFLEVEL(4) function

CFLEVEL(3) functions

Recommendations
When all queue managers in the queue-sharing group have been migrated to Version 7.0, alter all CF structure objects to have at least CFLEVEL(3). This gives greater resilience in the unlikely event of a Coupling Facility structure failure, as Version 7.0 queue managers can tolerate the failure of a CFLEVEL(3) CF structure.

Parent topic: Migrating from Version 6.0

5.7.3.7.1. CFLEVEL(4) function

Shared queues defined on a CFLEVEL(4) CF structure can hold messages of up to 100 MB. Shared queues of a lower CFLEVEL can only hold messages of up to 63 KB.

A CFSTRUCT with CFLEVEL(4) can only be backed up or recovered by a Version 6.0 or later queue manager. CF structure objects defined with CFLEVEL(4) are only usable by Version 6.0 or later queue managers.

Parent topic: CF structures

5.7.3.7.2. CFLEVEL(3) functions

Queues defined on a CFLEVEL(3) CF structure can have the INDXTYPE(GROUPID) attribute.

Persistent messages can be stored on a queue defined on a CF structure with CFLEVEL(3) and the RECOVER(YES) attribute. The MQSC commands BACKUP CFSTRUCT and RECOVER CFSTRUCT are provided to support recovery. Ensure that regular backups of such structures are taken.

To use the RECOVER CFSTRUCT command, all the active and archive log data sets, and bootstrap data sets of each queue manager in a queue-sharing group must be accessible to each other. You must ensure that your security setup allows this, and use Access Method Services to change the SHAREOPTIONS of these data sets to be (2 3), for example:

```
ALTER '++hlq++.logcopy.ds01.data' SHAREOPTIONS (2 3)
```

For information about other CFLEVELs, see the DEFINE CFSTRUCT command in WebSphere MQ Script (MQSC) Command Reference.

Parent topic: CF structures

This build: January 26, 2011 11:06:47

5.7.3.7.3. Recommendations

When all queue managers in the queue-sharing group have been migrated to Version 7.0, alter all CF structure objects to have at least CFLEVEL(3). This gives greater resilience in the unlikely event of a Coupling Facility structure failure, as Version 7.0 queue managers can tolerate the failure of a CFLEVEL(3) CF structure.

Parent topic: CF structures

This build: January 26, 2011 11:06:47

5.7.3.8. Channel initiators

This might affect Task 7 in Customizing your queue managers.

TCP/IP Interface

Parent topic: Migrating from Version 6.0

This build: January 26, 2011 11:06:47

5.7.3.8.1. TCP/IP Interface

Only one type of TCP/IP interface is now supported, which is that formerly specified by TCPTYPE=OESOCKET in the channel initiator parameters.

Migration from IUCV to OESOCKET

Migration from SNSTCPACCESS to OESOCKET

Parent topic: Channel initiators

This build: January 26, 2011 11:06:47

5.7.3.8.1.1. Migration from IUCV to OESOCKET

MQ Steps
1. Use the ALTER QMGR command to set the TCPNAME attribute to be the name of the UNIX System Services stack for TCP/IP if this is not the same name as the TCP/IP address space.

Interlink Steps
1. Ensure you are using Interlink V5.2 or greater.
2. Create an OE segment for your channel initiator's user ID.
3. Check your BPXPARMs to ensure that MAXSOCKET is set high enough (the Interlink documentation suggests MAXSOCKETS of 4096).
4. It is no longer necessary to run an IUCV job.
5. For specific details of configuration steps for UNIX System Services, check the Interlink documentation.

Parent topic: TCP/IP Interface

This build: January 26, 2011 11:06:48

5.7.3.8.1.2. Migration from SNSTCPACCESS to OESOCKET

MQ Steps

1. Change the channel initiator started task procedure (xxxxCHIN) to use hlq.SCSQMVR1 instead of hlq.SCSQMVR2.
2. Use the ALTER QMGR command to set the TCPNAME attribute to be the name of the UNIX System Services stack for TCP/IP.

Interlink Steps

1. Ensure you are using Interlink V5.2 or greater.
2. Create an OE segment for your channel initiator's user ID.
3. Check your BPXPARMs to make ensure that MAXSOCKET is set high enough (the Interlink book suggests MAXSOCKETS of 4096).
4. For specific details of configuration steps for UNIX System Services, check the Interlink documentation.

Parent topic: TCP/IP Interface

This build: January 26, 2011 11:06:48

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5.7.3.9. Commands

PCF

Security profiles

Channel Initiator

Parent topic: Migrating from Version 6.0

This build: January 26, 2011 11:06:49

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5.7.3.9.1. PCF

PCF commands, identified by a message format of MQFMT_ADMIN, are now supported.

MQSC commands put to the system command input queue with a message format of MQFMT_ADMIN were accepted in previous versions. In Version 6, such messages will be treated as PCF commands, and so will be rejected.

Applications currently using PCF will need changing to use PCF on z/OS®, to use the necessary extended command formats and handle the extended response formats. See WebSphere MQ Programmable Command Formats and Administration Interface for details.

Parent topic: Commands

This build: January 26, 2011 11:06:50

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5.7.3.9.2. Security profiles

The MQSC command DISPLAY DQM has been renamed DISPLAY CHINIT, although the old command still works as a synonym. If you have a security profile for the old command, you should rename it.

There are several new MQSC commands, and several commands now allowed outside the queue manager initialization data sets, for which you should add security profiles:

- DISPLAY CONN
- ALTER/DEFINE/DELETE PSID
- ALTER/DEFINE/DELETE BUFFPOOL
- DEFINE LOG

Most MQSC commands now have PCF equivalents. These generally use the same security profiles but there are some which need new profiles, for example Change Queue. For further information see Profiles for command security.

If you are using the WebSphere® MQ Version 6.0 Explorer or later, you need appropriate security profiles for the queues SYSTEM.MQEXPLORER.REPLY.MODEL and AMQ.EXPLORER.*. For further information see Profiles used to control access to WebSphere MQ resources.

Parent topic: Commands

This build: January 26, 2011 11:06:50

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5.7.3.9.3. Channel Initiator

Channel initiator commands (other than START CHINIT) are no longer allowed in the queue manager initialization input data set CSQINP2. They should be moved to the channel initiator initialization input data set CSQINPX. Output from these commands is written to the output data set CSQOUTX. For more details, see Task 13: Customize the initialization input data sets.

The START TRACE, DISPLAY TRACE, ALTER TRACE, and STOP TRACE commands have been changed to handle channel initiator traces better. For information about WebSphere® MQ commands, see the WebSphere MQ Script (MQSC) Command Reference manual.

Parent topic: Commands

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5.7.3.10. Initialization input data sets CSQINP1 and CSQINP2

This affects Task 6: Create procedures for the WebSphere® MQ queue manager and Task 13: Customize the initialization input data sets.

The supplied samples have been extended to provide extra object definitions. There are more samples and the contents of some have been moved to other samples. Review them and update the customized versions you are currently using as required.

In WebSphere MQ Version 7.0 the ordering of definitions becomes important. Member CSQ4MSTR of SCSQPROC provides a recommended ordering of supplied definitions in the CSQINP2 concatenation. If you are migrating from a previous release, the following ordering is important for correct publish/subscribe operation:

1. Storage class SYSLNGLV must be defined mapping to a defined pageset.
2. SYSTEM.DURABLE.SUBSCRIBER.QUEUE (which uses SYSLNGLV) is defined
3. SYSTEM.DEFAULT.SUB (a durable subscription) is defined

Parent topic: Migrating from Version 6.0

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5.7.3.11. DB2 plan names

Plan names for accessing the DB2® tables containing the WebSphere® MQ object descriptions have changed. You need to bind the new plans in order to access the tables. Member CSQ45BPL of hlq.SCSQPROC contains the plan names required for WebSphere MQ Version 7.0. Tailor this member to your environment, using your DB2 subsystem names and data set names, and submit it.

If this job fails because of a DB2 locking problem, it is probably due to contention for a DB2 resource, especially if the system is being heavily used. Resubmit the job later, preferably when the system is lightly used or quiesced.

Parent topic: Migrating from Version 6.0

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5.7.3.12. Clustering

The cluster cache can now be dynamic. See the description of CLCACHE in Using CSQ6SYSP.

Parent topic: Migrating from Version 6.0

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5.7.3.13. CICS®

Distributed queueing

Bridge

Parent topic: Migrating from Version 6.0

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5.7.3.13.1. Distributed queueing

The CICS® Mover feature, and therefore distributed queueing using CICS ISC, has been removed. You are recommended to remove any associated CICS resource definitions that you have (such as those previously supplied in the sample CSQ4D100 in thlqual.SCSQPROC) and any associated MQ object definitions (such as those previously supplied in sample CSQ4DISQ in thlqual.SCSQPROC).

Parent topic: CICS

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5.7.3.13.2. Bridge

Multiple bridge monitors can now service a single request queue, see Controlling CICS® bridge throughput. If the bridge is started by terminal input, the terminal is unlocked immediately, rather than staying locked until the transaction ends.

Parent topic: CICS

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5.7.3.14. JMS resources

JNDI .jar files are no longer supplied. Instead, you use the .jar files supplied with the JMS client. Existing JMS resources created with the IBM® JNDI facilities will continue to run. However, you cannot edit them with the JMS client JNDI facilities. You will have to recreate them using the new facilities. Similarly, you cannot delete them using the JMS client JNDI facilities. Instead you must first recreate them using the new facilities and then delete the recreated resources.

Parent topic: Migrating from Version 6.0

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5.7.4. Changing to full function WebSphere MQ

If you are migrating from the reduced function form of WebSphere® MQ V5.3.1 supplied with WebSphere Application Server, you should read all of WebSphere MQ for z/OS Concepts and Planning Guide and this book to find out about the extra functions that are available. You can continue to use your existing queue managers, including their page sets, log data sets, and object definitions. You can continue to use your existing queues, including system queues such as SYSTEM.CHANNEL.SYNCQ. Do not cold start your queue managers. If you do, you will lose all your messages and other information. However, there are some tasks that you might need to perform, depending on which of the now available features you want to use. Review all the customization tasks in Customizing your queue managers, but especially:

- Task 13: Customize the initialization input data sets
- Task 17: Tailor your system parameter module
- Task 18: Tailor the channel initiator parameters.

Also review:

- Customizing for CICS®
- Customizing for IMS™
- Setting up security.

If you are going to use queue-sharing groups, see Setting up a new queue-sharing group. If you used client channels in the reduced function WebSphere MQ, you must install the Client Attachment feature to allow them to continue to be used.
Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

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5.7.5. Reverting to previous versions

This section tells you what to do if you want to revert to using a previous version of WebSphere® MQ for z/OS® for some exceptional reason.

➤ WebSphere MQ Version 7.0.1 and later uses the OPMODE property to control reverting to previous versions. Setting the OPMODE property to a value of NEWFUNC prevents you from reverting to previous versions. For more information see Controlling new functionality and backward migration using the OPMODE property.◄

If you choose to revert to a previous version of WebSphere MQ, note that, as a general rule, data such as attributes (or in some cases, objects) relating to the new function in Version 7.0 will be lost. The more you have used the new functions of Version 7.0, the less practical it will be to go back to an earlier version.

➤If you want to revert to an earlier version of WebSphere MQ, contact your IBM® support center. The support center will provide you with the 'Backward Migration PTF', which you must apply to your system to revert to an earlier version. The information in the PTF includes a description of the data relating to new function that will be lost.◄

When you have reverted to a previous version, if you have defined a CF structure with CFLEVEL(4), that structure, queues defined to use it, and any messages on those queues are not accessible while running with a version of code earlier than Version 6.0. The queues and messages are retained, but if the Coupling Facility fails and all members of the queue-sharing group have been reverted to a previous level, messages might be lost.

Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:53

5.7.6. Migrating from an earlier unsupported release of WebSphere MQ or MQSeries®

>**Direct migration from WebSphere MQ version 5.3.1 to WebSphere MQ version 7.0**<

Migrating from earlier unsupported releases of MQSeries

Migrating to WebSphere MQ for z/OS Version 6
You might need to perform some additional tasks when migrating from a previous version, depending on which of the new features you want to use, and which level of WebSphere MQ you are migrating from. Generally, the earlier the version of WebSphere MQ you are migrating from, the more tasks you need to perform.

>**Additional steps when migrating from Version 5.3.1 to Version 6**<

Additional steps when migrating from Version 5.2 to Version 5.3.1

Additional steps when migrating from Version 2.1 to Version 5.3.1

Additional steps when migrating from Version 1.2 to Version 5.3.1

Parent topic: Upgrading to WebSphere MQ for z/OS Version 7.0

This build: January 26, 2011 11:06:41

>

5.7.6.1. Direct migration from WebSphere MQ version 5.3.1 to WebSphere MQ version 7.0

It is possible to directly migrate from WebSphere MQ version 5.3.1 to WebSphere MQ version 7.0 without having to go through the intermediate step of migrating to, and installing, WebSphere MQ version 6.0. However, if you elect to forwards migrate in this way, then there is no safe reversion path back to WebSphere MQ version 5.3.1. Backwards migration is not supported if you choose this direct form of forwards migration to WebSphere MQ version 7.0.

In addition to this restriction, coexistence support of queue managers within a queue-sharing group at different version levels is also restricted. After the first version 5.3.1 queue manager within a queue-sharing group (QSG) has been successfully migrated to version 7.0, all the remaining version 5.3.1 queue managers must also be migrated to version 7.0. The remaining queue managers in the queue-sharing group must not be restarted at version 5.3.1. Otherwise a restart of the version 7.0 queue manager in the QSG will fail the DB2 consistency check at startup.

>**Migrating a queue manager or a queue-sharing group**<

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

This build: January 26, 2011 11:06:53

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5.7.6.1.1. Migrating a queue manager or a queue-sharing group

1. Customize and run the CSQ45MTB sample JCL in thlqual.SCSQPROC supplied with PTF PK73843 for WebSphere MQ for z/OS Version 7.0. This performs the following steps:
   a. Add the new DB2 table for CSQ.EXTEND_B_QMGR.
   b. Bind the new DB2 batch plan (CSQ5B7B0) for the CSQ5PQSG utility.
   c. Grant execute authority to the DB2 plan.
   d. Run the FORCEMIG700 function of the CSQ5PQSG utility which will update DB2 tables to allow version 5.3.1 Queue Managers in a Queue Sharing Group to start at MQ version 7.0.
   e. Create the new tables required for WebSphere MQ for z/OS Version 6.0 (large message support), and z/OS WebSphere MQ version 7.0 (Topics).
   f. Modify the existing tables for WebSphere MQ Version 6.0.
   g. Bind the new DB2 read plan (CSQ5R7A0).

2. Change the JCL for the first version 5.3.1 Queue Manager to use the version 7.0 libraries and restart the Queue Manager.

3. Repeat the previous step for the remaining Queue Managers in the Queue Sharing Group.

If any version 5.3.1 Queue Manager within the Queue Sharing Group is inadvertently restarted at version 5.3.1, then rerun step 1.d of the CSQ45MTB sample above before proceeding with the migration.

Parent topic: >Direct migration from WebSphere MQ version 5.3.1 to WebSphere MQ version 7.0<

This build: January 26, 2011 11:06:53

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5.7.6.2. Migrating from earlier unsupported releases of MQSeries

For production systems, the recommended migration path from an unsupported release of MQSeries® is first to migrate to WebSphere® MQ Version 6.0, following the instructions given in the documentation for that release, and then to migrate to Version 7.0 following the instructions in this chapter. Ensure that your system is stable at Version 6.0 before migrating to Version 7.0, so that you have a system to revert to if you need to. Details about reversion are given in this chapter:

- Reverting to previous versions

For a test system, it might be appropriate to migrate straight to WebSphere MQ Version 7.0. The additional steps that you must consider when migrating from unsupported releases of MQSeries are as follows:

- Additional steps when migrating from Version 5.3.1 to Version 6
- Additional steps when migrating from Version 5.2 to Version 5.3.1
- Additional steps when migrating from Version 2.1 to Version 5.3.1
- Additional steps when migrating from Version 1.2 to Version 5.3.1

After you have migrated to WebSphere MQ Version 7.0 using this method, you cannot revert to the original version. You should take complete backups of your system to ensure you can restart from backups if you need to use the old release again.

When WebSphere MQ page sets and log data sets have been used by a queue manager running at Version 7.0, the effect of trying to use those data sets with a queue manager that has been reverted to use Version 5.3.1 or earlier is undefined and the queue manager will fail to start if it can detect this has happened.

You can restart a queue manager running at Version 5.3.1 or earlier using the full set of backups taken before migration. Any changes made to the system after the backups were taken or while running at Version 7.0 will be lost.

This collection of topics about migrating from unsupported releases has been taken verbatim from earlier versions of the *WebSphere MQ for z/OS System Setup Guide*.

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

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5.7.6.3. Migrating to WebSphere MQ for z/OS Version 6

You might need to perform some additional tasks when migrating from a previous version, depending on which of the new features you want to use, and which level of WebSphere® MQ you are migrating from. Generally, the earlier the version of WebSphere MQ you are migrating from, the more tasks you need to perform.

The functions for this release are described in the *WebSphere MQ for z/OS Concepts and Planning Guide* for WebSphere MQ Version 6.0. If you are migrating to Version 6.0 before migrating to Version 7.0, consider which of these functions you want to use before customizing WebSphere MQ because you might not need to perform all the migration tasks.

When you migrate from a previous version of WebSphere MQ for z/OS® or MQSeries® for OS/390®, you can continue to use your existing queue managers with the new version, including their page sets, log data sets, object definitions, and initialization input data sets. You can continue to use your existing queues, including system queues such as the SYSTEM.CHANNEL.SYNCQ. Do not cold start your queue managers when migrating from a previous version. If you do, you will lose all your messages and other information such as channel state.

If you use the Client Attachment feature, you must install and use the V6 feature. Previous versions of this feature will not work with WebSphere MQ Version 6.0.

If you are using CICS®, restart the CICS region after the migration to ensure that you use the new versions of any changed files. Likewise, if you are using IMS™ (other than the WebSphere MQ IMS bridge), restart the IMS control region after the migration.

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

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5.7.6.4. Additional steps when migrating from Version 5.3.1 ❯ to Version 6❮

If you are migrating from Version 5.3.1 to Version 7.0, you must consider the following when you customize your new version.

- ❯**Libraries**❮

- ❯**Migrating queue-sharing groups to Version 7.0**❮

- ❯**Setting up a new queue-sharing group**❮

- ❯**CF structures**❮

- ❯**Channel initiators**❮

- ❯**Commands**❮

- ❯**Initialization input data sets CSQINP1 and CSQINP2**❮

- ❯**DB2 plan names**❮

- ❯**Clustering**❮

> ❯**CICS**❮

> ❯**JMS resources**❮

> ❯**Changing to full function WebSphere MQ**❮

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

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5.7.6.4.1. Libraries

This might affect Task 19 in Customizing your queue managers.

The library thlqual.SCSQMVR2 is no longer used.

The Version 5.3 library thlqual.SCSQSKL is no longer used.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

This build: January 26, 2011 11:06:54

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5.7.6.4.2. Migrating queue-sharing groups to Version 7.0

This might affect Tasks 9, 10 and 16 in Customizing your queue managers.

The steps outlined below are designed to let you migrate one or more existing queue-sharing groups containing Version 5.3.1 queue managers to Version 7.0. The sequence has been designed so that at no stage is an outage of the entire queue-sharing group required. Version 5.3.1 and Version 7.0 queue managers can coexist within a queue-sharing group, however, some functions are not supported on the Version 5.3.1 queue managers and some operations are not available until all queue managers in the queue-sharing group have been migrated to Version 7.0. See Multiple queue manager versions in a queue-sharing group.

After all queue managers in the queue-sharing group have been migrated to Version 7.0 you can take full advantage of new Version 7.0 function.

> ❯**Applying MQSeries for OS/390 Version 5.3.1 migration & coexistence PTFs**❮

> ❯**Migrating DB2 tables**❮

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.2.1. Applying MQSeries® for OS/390® Version 5.3.1 migration & coexistence PTFs

Note: This step can be performed at any suitable time in preparation for a migration to WebSphere® MQ for z/OS® Version 7.0 or as part of normal maintenance. It is not dependant on Version 7.0 being available.

You cannot add a Version 7.0 queue manager to a queue-sharing group, or start an existing queue manager in a queue-sharing group at Version 7.0 level, until all the queue managers in a queue-sharing group within the DB2® data-sharing group have had a migration & coexistence PTF applied. This is because Version 7.0 requires new DB2 tables and additional changes to existing DB2 tables.

Similarly, once a Version 7.0 queue manager has been started in a queue-sharing group you cannot start a Version 5.3.1 queue manager as a member of the group unless it has a migration & coexistence PTF applied.

You need to take the following steps:
1. Apply the PTF.
2. The PTF changes some of the DB2 operations performed by the Version 5.3.1 queue manager so that it is compatible with WebSphere MQ for z/OS Version 7.0. This means that the PTF contains some replacement DBRMs. You should bind these DBRMs into new plans with a 531 version number (as detailed in the job supplied in the HOLDDATA of the PTF). The new plan names are as listed in the sample program CSQ45BPL, which is supplied with the PTF.
   This means that you have two sets of plans, for queue managers without the PTF and for queue managers with the PTF applied. Module CSQ5PLAN (and its aliases) also changes the DB2 plans to be used by WebSphere MQ in the PTF names.
3. Bind the DBRMs supplied in the PTF into new version plans using the job supplied with the PTF.
4. Grant execute authority on new DB2 plans to the same userids as for existing Version 5.3.1 plans, using the job supplied with the PTF.
5. By turn, stop each queue manager and restart it so that it picks up the new code level.
6. Perform testing of the new code level.

Parent topic: ❯Migrating queue-sharing groups to Version 7.0❮

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5.7.6.4.2.2. Migrating DB2 tables

Note: This step cannot be performed until all queue managers defined in a queue-sharing group within the DB2® data-sharing group have been started with the migration & coexistence PTF applied.

If you have queue managers defined in the queue-sharing group that cannot be started with the PTF, they can be removed from the queue-sharing group using the CSQ5PQSG utility.

If these jobs fail because of a DB2 locking problem, it is probably because of contention for a DB2 resource, especially if the system is being heavily used. Resubmit the job later, preferably when the system is lightly used or quiesced.

> ❯**To migrate the tables and all queue-sharing groups**❮
> Upgrading from WebSphere MQ V6 requires additional steps to migrate DB2 tables.

> ❯**To migrate one queue-sharing group at a time**❮
> Upgrading from WebSphere MQ Version 6 requires additional steps to migrate DB2 tables.

Parent topic: ❯Migrating queue-sharing groups to Version 7.0❮

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5.7.6.4.2.2.1. To migrate the tables and all queue-sharing groups

Upgrading from WebSphere MQ V6 requires additional steps to migrate DB2 tables.

1. ❯Customize and run the CSQ45ATB sample JCL in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0. This performs the following steps:
   a. Bind the new DB2® plan for the CSQ5PQSG utility.
   b. Grant execute authority to the DB2 plan.
   c. Check that the data-sharing group is in a state suitable for migration, using the MIGRATE DSG function.
   d. Modify the existing tables, and create the new tables required for WebSphere MQ for z/OS Version 7.0.
   ❮
2. Bind the Version 7.0 DBRMs into plans and grant execute authority to them using the supplied jobs CSQ45BPL and CSQ45GEX, as described in Task 9: Set up the DB2 environment.

Parent topic: ❯Migrating DB2 tables❮

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5.7.6.4.2.2.2. To migrate one queue-sharing group at a time

Upgrading from WebSphere MQ Version 6 requires additional steps to migrate DB2 tables.

1. Customize the CSQ45ATB sample JCL in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 7.0, editing the step that executes the MIGRATE QSG function and specifying the name of the first queue-sharing group that is to be migrated. Run the job. This performs the following steps: ❯
   a. Bind the new DB2® plan for the CSQ5PQSG utility.
   b. Grant execute authority to the DB2 plan.
   c. Check that the queue-sharing group is in a state suitable for migration, using the MIGRATE QSG function.
   d. Modify the existing tables, and create the new tables required for WebSphere MQ for z/OS Version 7.0.
   ❮
2. Bind the Version 7.0 DBRMs into plans and grant execute authority to them using the supplied jobs CSQ45BPL and CSQ45GEX, as described in Task 9: Set up the DB2 environment.
3. To migrate subsequent queue-sharing groups, use the MIGRATE QSG function of CSQ5PQSG for each queue-sharing group to be migrated. It is not necessary to run CSQ45ATB for any queue-sharing group other than the first to be migrated.

Parent topic: ❯Migrating DB2 tables❮

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5.7.6.4.3. Setting up a new queue-sharing group

This might affect Tasks 6, 9, 10, 13, 16, and 17 in Customizing your queue managers.

If you want to set up a new queue-sharing group or data-sharing group in WebSphere® MQ Version 7.0, follow these steps:

1. Review your DB2® data-sharing requirements.
   A single DB2 data-sharing group can be used to support multiple WebSphere MQ queue-sharing groups. If you intend to add this new queue-sharing group to a DB2 data-sharing group that already supports WebSphere MQ queue-sharing groups, you need to ensure that the migration & coexistence

PTF has been applied, so that the DB2 tables used by WebSphere MQ can support Version 7.0 queue managers (see Applying MQSeries for OS/390 Version 5.3.1 migration & coexistence PTFs).

2. Customize the CSQ45ATB sample JCL in thlqual.SCSQPROC supplied with WebSphere MQ for z/OS® Version 7.0, deleting or bypassing the step that executes the MIGRATE QSG function. Run the job.

3. Set up the Coupling Facility. See Task 10: Set up the Coupling Facility.

4. Add the WebSphere MQ entries to the DB2 data-sharing group using the CSQ5PQSG program. See Task 16: Add the WebSphere MQ entries to the DB2 data-sharing group.

5. Tailor the system parameter module to add DB2 data-sharing group and WebSphere MQ queue-sharing group information. See Task 17: Tailor your system parameter module.

6. Customize and include the initialization input sample thlqual.SCSQPROC (CSQ4INSS) in the CSQINP2 data set.

See the WebSphere MQ for z/OS System Administration Guide for more information about managing queue-sharing groups.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.4. CF structures

This might affect Task 10 in Customizing your queue managers.

WebSphere® MQ local queue objects defined with QSGDISP(SHARED) have their messages stored on a Coupling Facility (CF) list structure so that they can be accessed by any other queue managers within the queue-sharing group.

As with the CFSTRUCT attribute of queues, the name is specified without the initial four-character queue-sharing group name that forms the name used by z/OS®.

WebSphere MQ Version ❯6.0 or later❮ supports large messages on shared queues (up to 100 MB) and uses DB2® to store data from those messages. CF structures supporting large shared queue messages must have the new CFLEVEL(4).

❯**CFLEVEL(4) function**❮

❯**CFLEVEL(3) functions**❮

❯**Recommendations**❮
When all queue managers in the queue-sharing group have been migrated to Version 7.0, alter all CF structure objects to have at least CFLEVEL(3). This gives greater resilience in the unlikely event of a Coupling Facility structure failure, as Version 7.0 queue managers can tolerate the failure of a CFLEVEL(3) CF structure.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.4.1. CFLEVEL(4) function

Shared queues defined on a CFLEVEL(4) CF structure can hold messages of up to 100 MB. Shared queues of a lower CFLEVEL can only hold messages of up to 63 KB.

A CFSTRUCT with CFLEVEL(4) can only be backed up or recovered by a Version 6.0 or later queue manager. CF structure objects defined with CFLEVEL(4) are only usable by Version 6.0 or later queue managers.

Parent topic: ❯CF structures❮

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5.7.6.4.4.2. CFLEVEL(3) functions

Queues defined on a CFLEVEL(3) CF structure can have the INDXTYPE(GROUPID) attribute.

Persistent messages can be stored on a queue defined on a CF structure with CFLEVEL(3) and the RECOVER(YES) attribute. The MQSC commands BACKUP CFSTRUCT and RECOVER CFSTRUCT are provided to support recovery. Ensure that regular backups of such structures are taken.

To use the RECOVER CFSTRUCT command, all the active and archive log data sets, and bootstrap data sets of each queue manager in a queue-sharing group must be accessible to each other. You must ensure that your security setup allows this, and use Access Method Services to change the SHAREOPTIONS of these data sets to be (2 3), for example:

```
ALTER '++hlq++.logcopy.ds01.data' SHAREOPTIONS (2 3)
```

For information about other CFLEVELs, see the DEFINE CFSTRUCT command in WebSphere MQ Script (MQSC) Command Reference.

Parent topic: ❯CF structures❮

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5.7.6.4.4.3. Recommendations

When all queue managers in the queue-sharing group have been migrated to Version 7.0, alter all CF structure objects to have at least CFLEVEL(3). This gives greater resilience in the unlikely event of a Coupling Facility structure failure, as Version 7.0 queue managers can tolerate the failure of a CFLEVEL(3) CF structure.

Parent topic: ❯CF structures❮

This build: January 26, 2011 11:06:47

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5.7.6.4.5. Channel initiators

This might affect Task 7 in Customizing your queue managers.

> ❯**Channel initiator parameters**❮

> ❯**TCP/IP Interface**❮

> ❯**Enable or disable channel event messages**❮

> ❯**Channel attributes**❮

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.5.1. Channel initiator parameters

The channel initiator parameters, which used to be specified in a channel initiator parameter module using CSQ6CHIP, are now queue manager attributes. To migrate your parameters, use the XPARM function of the WebSphere® MQ utility program, CSQUTIL, which converts your parameter module into an **ALTER QMGR** MQSC command. The PARM parameter on START CHINIT is now obsolete. A warning message will be issued if this parameter is used, but the command will continue.

The minimum value of the TRAXTBL attribute has changed from 0 to 2 (2 MB). If your value of TRAXTBL is less than 2, CSQUTIL will change it to 2 during migration.

The initial value of the ADOPTMCA attribute has changed from NO to ALL. To retain the current behavior, use the ALTER QMGR command to change it to NO before starting the channel initiator.

For Version 5.3 users, there are new attributes RCVTIME, RCVTTYPE and RCVTMIN.

Parent topic: ❯Channel initiators❮

This build: January 26, 2011 11:06:47

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5.7.6.4.5.2. TCP/IP Interface

Only one type of TCP/IP interface is now supported, which is that formerly specified by TCPTYPE=OESOCKET in the channel initiator parameters.

> ❯**Migration from IUCV to OESOCKET**❮

> ❯**Migration from SNSTCPACCESS to OESOCKET**❮

Parent topic: ❯Channel initiators❮

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5.7.6.4.5.2.1. Migration from IUCV to OESOCKET

MQ Steps
1. Use the ALTER QMGR command to set the TCPNAME attribute to be the name of the UNIX System Services stack for TCP/IP if this is not the same name as the TCP/IP address space.

Interlink Steps

1. Ensure you are using Interlink V5.2 or greater.
2. Create an OE segment for your channel initiator's user ID.
3. Check your BPXPARMs to ensure that MAXSOCKET is set high enough (the Interlink documentation suggests MAXSOCKETS of 4096).
4. It is no longer necessary to run an IUCV job.
5. For specific details of configuration steps for UNIX System Services, check the Interlink documentation.

Parent topic: ❯TCP/IP Interface❮

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5.7.6.4.5.2.2. Migration from SNSTCPACCESS to OESOCKET

MQ Steps

1. Change the channel initiator started task procedure (xxxxCHIN) to use hlq.SCSQMVR1 instead of hlq.SCSQMVR2.
2. Use the ALTER QMGR command to set the TCPNAME attribute to be the name of the UNIX System Services stack for TCP/IP.

Interlink Steps

1. Ensure you are using Interlink V5.2 or greater.
2. Create an OE segment for your channel initiator's user ID.
3. Check your BPXPARMs to make ensure that MAXSOCKET is set high enough (the Interlink book suggests MAXSOCKETS of 4096).
4. For specific details of configuration steps for UNIX System Services, check the Interlink documentation.

Parent topic: ❯TCP/IP Interface❮

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5.7.6.4.5.3. Enable or disable channel event messages

The queue manager attributes CHLEV, BRIDGEEV and SSLEV are introduced. These attributes enable you to control whether to generate channel events, IMS™ Bridge events and SSL events. By default, all these attributes are set to "ENABLED" to retain the behavior seen in previous releases. For more information about setting these attributes, see WebSphere MQ Script (MQSC) Command Reference.

Parent topic: ❯Channel initiators❮

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5.7.6.4.5.4. Channel attributes

Heartbeat interval is now supported for server-connection channels. By default, existing such channels will have heartbeats set on with an interval of 300 seconds.

Although message retry is now supported for receiving channels, existing such channels will have message retry set to "no retry". However, if these channels are subsequently deleted and redefined they will have message retry set on.

Parent topic: ❯Channel initiators❮

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5.7.6.4.6. Commands

❯**PCF**❮

❯**Security profiles**❮

❯**Channel Initiator**❮

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.6.1. PCF

PCF commands, identified by a message format of MQFMT_ADMIN, are now supported.

MQSC commands put to the system command input queue with a message format of MQFMT_ADMIN were accepted in previous versions. In Version 6, such messages will be treated as PCF commands, and so will be rejected.

Applications currently using PCF will need changing to use PCF on z/OS®, to use the necessary extended command formats and handle the extended response formats. See WebSphere MQ Programmable Command Formats and Administration Interface for details.

Parent topic: ❯Commands❮

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5.7.6.4.6.2. Security profiles

The MQSC command DISPLAY DQM has been renamed DISPLAY CHINIT, although the old command still works as a synonym. If you have a security profile for the old command, you should rename it.

There are several new MQSC commands, and several commands now allowed outside the queue manager initialization data sets, for which you should add security profiles:

- DISPLAY CONN
- ALTER/DEFINE/DELETE PSID
- ALTER/DEFINE/DELETE BUFFPOOL
- DEFINE LOG

Most MQSC commands now have PCF equivalents. These generally use the same security profiles but there are some which need new profiles, for example Change Queue. For further information see Profiles for command security.

If you are using the WebSphere® MQ Version 6.0 Explorer or later, you need appropriate security profiles for the queues SYSTEM.MQEXPLORER.REPLY.MODEL and AMQ.EXPLORER.*. For further information see Profiles used to control access to WebSphere MQ resources.

Parent topic: ❯Commands❮

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5.7.6.4.6.3. Channel Initiator

Channel initiator commands (other than START CHINIT) are no longer allowed in the queue manager initialization input data set CSQINP2. They should be moved to the channel initiator initialization input data set CSQINPX. Output from these commands is written to the output data set CSQOUTX. For more details, see Task 13: Customize the initialization input data sets.

The START TRACE, DISPLAY TRACE, ALTER TRACE, and STOP TRACE commands have been changed to handle channel initiator traces better. For information about WebSphere® MQ commands, see the WebSphere MQ Script (MQSC) Command Reference manual.

Parent topic: ❯Commands❮

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5.7.6.4.7. Initialization input data sets CSQINP1 and CSQINP2

This affects Task 6: Create procedures for the WebSphere® MQ queue manager and Task 13: Customize the initialization input data sets.

The supplied samples have been extended to provide extra object definitions. There are more samples and the contents of some have been moved to other samples. Review them and update the customized versions you are currently using as required.

In WebSphere MQ Version 7.0 the ordering of definitions becomes important. Member CSQ4MSTR of SCSQPROC provides a recommended ordering of supplied definitions in the CSQINP2 concatenation. If you are migrating from a previous release, the following ordering is important for correct publish/subscribe operation:

1. Storage class SYSLNGLV must be defined mapping to a defined pageset.
2. SYSTEM.DURABLE.SUBSCRIBER.QUEUE (which uses SYSLNGLV) is defined
3. SYSTEM.DEFAULT.SUB (a durable subscription) is defined

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.8. DB2 plan names

Plan names for accessing the DB2® tables containing the WebSphere® MQ object descriptions have changed. You need to bind the new plans in order to access the tables. Member CSQ45BPL of hlq.SCSQPROC contains the plan names required for WebSphere MQ Version 7.0. Tailor this member to your environment, using your DB2 subsystem names and data set names, and submit it.

If this job fails because of a DB2 locking problem, it is probably due to contention for a DB2 resource, especially if the system is being heavily used. Resubmit the job later, preferably when the system is lightly used or quiesced.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.9. Clustering

The cluster cache can now be dynamic. See the description of CLCACHE in Using CSQ6SYSP.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.10. CICS®

> ❯**Compilers**❮

> ❯**Bridge**❮

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

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5.7.6.4.10.1. Compilers

You can write WebSphere® MQ applications using any compiler capable of generating standard OS linkage to the WebSphere MQ stub routines. WebSphere MQ Version 7.0 introduces many new WebSphere MQ APIs; some of the data types used by these APIs are not supported on some older compilers. While efforts have been made to ensure that preexisting applications can be recompiled, if you modify applications to use new APIs, you might have to use a more recent compiler. Some known limitations are:

- Assembler copy books contain blank lines, which are not tolerated by assemblers earlier than HLASM
- Some older releases of PL/I do not support fixed bin(63) type. A macro has been provided to define such fields as char(8) when an earlier compiler is detected.
- Some older releases of COBOL do not support function-pointers, which are used by the MQCB API.

Parent topic: ❯CICS❮

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5.7.6.4.10.2. Bridge

Multiple bridge monitors can now service a single request queue, see Controlling CICS® bridge throughput. If the bridge is started by terminal input, the terminal is unlocked immediately, rather than staying locked until the transaction ends.

Parent topic: ❯CICS❮

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5.7.6.4.11. JMS resources

JNDI .jar files are no longer supplied. Instead, you use the .jar files supplied with the JMS client. Existing JMS resources created with the IBM® JNDI facilities will continue to run. However, you cannot edit them with the JMS client JNDI facilities. You will have to recreate them using the new facilities. Similarly, you cannot delete them using the JMS client JNDI facilities. Instead you must first recreate them using the new facilities and then delete the recreated resources.

Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

This build: January 26, 2011 11:06:52

5.7.6.4.12. Changing to full function WebSphere MQ

If you are migrating from the reduced function form of WebSphere® MQ V5.3.1 supplied with WebSphere Application Server, you should read all of WebSphere MQ for z/OS Concepts and Planning Guide and this book to find out about the extra functions that are available. You can continue to use your existing queue managers, including their page sets, log data sets, and object definitions. You can continue to use your existing queues, including system queues such as SYSTEM.CHANNEL.SYNCQ. Do not cold start your queue managers. If you do, you will lose all your messages and other information. However, there are some tasks that you might need to perform, depending on which of the now available features you want to use. Review all the customization tasks in Customizing your queue managers, but especially:

- Task 13: Customize the initialization input data sets
- Task 17: Tailor your system parameter module
- Task 18: Tailor the channel initiator parameters.

Also review:

- Customizing for CICS®
- Customizing for IMS™
- Setting up security.

If you are going to use queue-sharing groups, see Setting up a new queue-sharing group. If you used client channels in the reduced function WebSphere MQ, you must install the Client Attachment feature to allow them to continue to be used.
Parent topic: ❯Additional steps when migrating from Version 5.3.1 to Version 6❮

This build: January 26, 2011 11:06:52

5.7.6.5. Additional steps when migrating from Version 5.2 to Version 5.3.1

If you intend to migrate from Version 5.2 to Version 5.3.1, you must consider the following when you customize your new version (you do not need to install and customize Version 5.3):

System parameters

Queue-sharing groups

CF structures

Context profiles

Channel initiator

Objects

Libraries

CICS message table names

DEFINE MAXSMSGS command

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

This build: January 26, 2011 11:06:56

5.7.6.5.1. System parameters

This might affect Task 16 in Customizing your queue managers.

The system parameter QINDXBLD was introduced in Version 5.3. Consider whether you need to use this parameter, and change your system parameter module accordingly. If you do not need to use this parameter, you do not need to relinkedit your system parameter module.

Some system parameters can be changed while a queue manager is running. You might want to take advantage of this by setting them in the initialization input data sets.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

This build: January 26, 2011 11:06:56

5.7.6.5.2. Queue-sharing groups

If you have not previously used queue-sharing groups, do not introduce them now. Wait until you have migrated to Version 7.0. If you are using queue-

sharing groups, you must migrate them to Version 5.3.1.

This might affect Tasks 8, 9, and 15 in Customizing your queue managers.

The steps outlined below are designed to let you migrate an existing queue-sharing group containing Version 5.2 queue managers to Version 5.3.1. The sequence has been designed so that at no stage is an outage of the entire queue-sharing group required. Version 5.2 and 5.3.1 queue managers can coexist within a queue-sharing group, however, some functions are not supported on the Version 5.2 queue managers and some operations are not available until all queue managers in the queue-sharing group have been migrated to Version 5.3.1. See Coexistence on WebSphere MQ for z/OS for more information about the coexistence of different versions.

Applying MQSeries for OS/390 Version 5.2 migration & coexistence PTFs

Migrating DB2 tables

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

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5.7.6.5.2.1. Applying MQSeries for OS/390 Version 5.2 migration & coexistence PTFs

Note: This step can be performed at any suitable time in preparation for a migration to WebSphere® MQ for z/OS® Version 5.3.1 or as part of normal maintenance. It is not dependant on Version 5.3.1 being available.

You cannot add a Version 5.3.1 queue manager to a queue-sharing group, or start an existing queue manager in a queue-sharing group at Version 5.3.1 level, until all the queue managers in the DB2® data-sharing group have had a migration & coexistence PTF applied. This is because Version 5.3.1 requires new DB2 tables and additional changes to existing DB2 tables.

Similarly, once a Version 5.3.1 queue manager has been started in a queue-sharing group you cannot start a Version 5.2 queue manager as a member of the group unless it has the migration & coexistence PTF applied.

You need to take the following steps:

1. Apply the PTF.
2. The PTF changes some of the DB2 operations performed by the Version 5.2 queue manager so that it is compatible with WebSphere MQ for z/OS Version 5.3.1. This means that the PTF contains some replacement DBRMs and some new DBRMs. You should bind these DBRMs into new plans with a 221 version number (as detailed in the job supplied in the HOLDDATA of the PTF). For example:
   ```
   BIND PLAN(CSQR221) –
   MEMBER(CSQR220) –
   ...
   ```
   binds replacement DBRM CSQR220 into a new plan CSQR221.
   This means that you have two sets of plans, those with a 220 version number for queue managers without the PTF, and those with a 221 version number for queue managers with the PTF applied. Module CSQ5PLAN (and its aliases) also changes the DB2 plans to be used by WebSphere MQ in the PTF names, so after applying the migration & coexistence PTF, MQSeries® for OS/390® Version 5.2 expects plans with a 221 version number to exist.
3. Bind the DBRMs supplied in the PTF into 221 version plans using the job supplied with the PTF, CSQ45B21.
4. Grant execute authority on new DB2 plans to the same userids as for existing 220 version plans, using the job supplied with the PTF, CSQ45G21.
5. By turn, stop each queue manager and restart it so that it picks up the new code level.
6. Perform testing of the new code level.

Parent topic: Queue-sharing groups

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5.7.6.5.2.2. Migrating DB2 tables

Note: This step cannot be performed until all queue managers defined in the DB2® data-sharing group have been started with the migration & coexistence PTF applied.

If you have queue managers defined in the data-sharing group that cannot be started with the PTF, they can be removed from the data-sharing group using the CSQ5PQSG utility.

To migrate the tables:

1. Customize and run the CSQ45ATB sample JCL in thlqual.SCSQPROC supplied with WebSphere® MQ for z/OS® Version 5.3.1. This performs the following steps:
   a. Prepare the DB2 tables for the bind in the next step
   b. Bind the new DB2 plan for the CSQ5PQSG utility.
   c. Grant execute authority to the DB2 plan.
   d. Check that the data-sharing group is in a state suitable for migration.
   e. Create a temporary DB2 table and save the channel definitions.
   f. Delete the existing channel table. Create a new, larger channel definition table and reload the saved definitions.
   g. Modify the existing tables, and create the new tables required for WebSphere MQ for z/OS Version 5.3.1.
   h. Rebind the DB2 plans for MQSeries® Version 5.2.
2. Bind the Version 5.3.1 DBRMs into plans and grant execute authority to them using the supplied jobs CSQ45BPL and CSQ45GEX, as described in Task 9: Set up the DB2 environment.
3. Rebind the DBRMs supplied with the PTF, by rerunning the job CSQ45B21 supplied with that PTF.

If these jobs fail because of a DB2 locking problem, it is probably due to contention for a DB2 resource, especially if the system is being heavily used.

Resubmit the job later, preferably when the system is lightly used or quiesced.

Parent topic: Queue-sharing groups

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5.7.6.5.3. CF structures

This might affect Task 9 in Customizing your queue managers.

WebSphere® MQ local queue objects defined with QSGDISP(SHARED) have their messages stored on a Coupling Facility (CF) list structure so that they can be accessed by any other queue managers within the queue-sharing group. The Coupling Facility list structure is defined to z/OS® by the CFRM policy. Version 5.3 introduced a WebSphere MQ object called a CF structure that describes capabilities through the CFLEVEL and RECOVER attributes. The MQSC commands DEFINE CFSTRUCT, ALTER CFSTRUCT, DELETE CFSTRUCT, and DISPLAY CFSTRUCT have been added for these objects.

As with the CFSTRUCT attribute of queues, the name is specified without the initial four-character queue-sharing group name that forms the name used by z/OS; all WebSphere MQ messages now use the short form of the name.

In MQSeries® for OS/390® Version 5.2, CF structure objects were implicitly created and deleted. When the first queue naming a CF structure was defined, a CF structure object with that name was implicitly created. Similarly, when the last queue naming a CF structure was deleted, the CF structure object was deleted. These CF structure operations happened invisibly to the user. Such CF structure objects have CFLEVEL(1).

CF structure objects defined with CFLEVEL(2) (on a Version 5.3.1 queue manager) are for compatibility between Version 5.2 and Version 5.3.1 queue managers. They can be used by Version 5.2 queue managers, and they can be used and manipulated by Version 5.3.1 queue managers.

CF structure objects defined with CFLEVEL(3) are only usable by Version 5.3.1 queue managers. New function is supported for queues defined on a CFLEVEL(3) CF structure.

Once all queue managers in the queue-sharing group are at Version 5.3.1 level, you can migrate a CF structure from CFLEVEL(2) to CFLEVEL(3) using the DEFINE REPLACE or ALTER CFSTRUCT commands.

The RECOVER attribute of a CF structure specifies whether messages in the structure can be recovered if the structure fails.

There are very strict conditions that apply before a CF structure can be altered. For these conditions and all the command details see the WebSphere MQ Script (MQSC) Command Reference.

    CFLEVEL(3) functions

    Recommendations

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

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5.7.6.5.3.1. CFLEVEL(3) functions

Queues defined on a CFLEVEL(3) CF structure can have the new INDXTYPE(GROUPID) attribute.

Persistent messages can be stored on a queue defined on a CF structure with CFLEVEL(3) and the RECOVER(YES) attribute. The MQSC commands BACKUP CFSTRUCT and RECOVER CFSTRUCT are provided to support recovery. Ensure that regular backups of such structures are taken.

To use the RECOVER CFSTRUCT command, all the active and archive log data sets, and bootstrap data sets of each queue manager in a queue-sharing group must be accessible to each other. You must ensure that your security setup allows this, and use Access Method Services to change the SHAREOPTIONS of these data sets to be (2 3), for example:

```
ALTER '++hlq++.logcopy.ds01.data' SHAREOPTIONS (2 3)
```

For CF structure objects with CFLEVEL(3) only, in the unlikely event of the failure of a coupling facility structure, a Version 5.3.1 queue manager remains active. Any in-flight units of work are backed out, but units of work that have progressed beyond commit are disconnected from the applications (which can terminate normally) and are be completed when the CF structure becomes available. However, MQSeries® for OS/390® Version 5.2 queue managers will terminate abnormally.

Parent topic: CF structures

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5.7.6.5.3.2. Recommendations

It is recommended that as soon as a Version 5.3.1 queue manager is started in a mixed version queue-sharing group, you alter your CF structure objects to be CFLEVEL(2). This stops them being implicitly deleted by a Version 5.2 queue manager in the queue-sharing group.

After all queue managers in the queue-sharing group have been migrated to Version 5.3.1, alter all CF structure objects to have CFLEVEL(3). This gives greater resilience in the unlikely event of a Coupling Facility structure failure, as Version 5.3.1 queue managers can tolerate the failure of a CFLEVEL(3) CF structure.

Parent topic: CF structures

5.7.6.5.4. Context profiles

This might affect Task 10 in Customizing your queue managers.

Context profiles can now be defined for each individual queue. If you use context security, and you want to use fully qualified context profiles, you need to define a fully qualified context profile for each queue, using the form

    hlq.CONTEXT.queuename

and a generic context profile using the form

    hlq.CONTEXT.**

to cover any queues that do not have fully qualified context profiles, in addition to your existing hlq.CONTEXT profile. This new generic profile should have the same characteristics and accesses granted as your existing hlq.CONTEXT profile. The old hlq.CONTEXT profile should be kept until you have completed migration.

If you use context security and you do not want to use fully qualified context profiles, you need to define a generic profile using the form

    hlq.CONTEXT.**

for all queues belonging to the specified queue manager or queue-sharing group. This new generic profile should have the same characteristics and accesses granted as your existing hlq.CONTEXT profile. The old hlq.CONTEXT profile should be kept until you have completed migration.

If you leave your existing profiles unchanged, you will get security failure messages.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

5.7.6.5.5. Channel initiator

This might affect Task 12 in Customizing your queue managers.

The queue SYSTEM.CHANNEL.REPLY.INFO is no longer used.

A process definition is no longer required if you want channels to start automatically when messages arrive on the transmission queue.

The value returned by the CONNAME attribute of the DISPLAY CHSTATUS command has changed. It is now always the connection name; a new attribute RQMNAME reports the remote queue manager name.

The size of channel objects was increased for Version 5.3 to allow for the added Secure Sockets Layer (SSL) channel attributes. WebSphere® MQ automatically updates each of these SSL channel objects the first time that it is changed. This happens whether you are using SSL or not. However, due to the nature of space reclamation in WebSphere MQ, the space used on page set zero might increase dramatically until all these channel objects have been updated.

To avoid this, run a job on your Version 5.3.1 queue manager similar to that in Figure 1 that changes all your channel objects, enabling WebSphere MQ to update them all at the same time. This job will display channels and then use the output from this display to define replacement channels. The Channel initiator must be stopped when running this job.

Multiple channel exits are now supported. A channel auto-definition exit program could change the message, send and receive exits associated with a channel, and the user data associated with the exits, by altering the MsgExit, MsgUserData, SendExit, SendUserData, ReceiveExit and ReceiveUserData fields of the MQCD. If you have such an exit, you must change it to alter the fields addressed by MsgExitPtr, MsgUserDataPtr, SendExitPtr, SendUserDataPtr, ReceiveExitPtr and ReceiveUserDataPtr in the MQCD instead. The fields in the MQCD are described in WebSphere MQ Intercommunication.

Figure 1. Example job for migrating channel objects

```
    //STEP1     EXEC  PGM=CSQUTIL,PARM='CSQ1'
    //STEPLIB   DD    DISP=SHR,DSN=thlqual.SCSQANLE
    //          DD    DISP=SHR,DSN=thlqual.SCSQAUTH
    //OUTPUT1   DD    DISP=OLD,DSN=MY.COMMANDS(DEFS)
    //SYSPRINT  DD    SYSOUT=*
    //SYSIN     DD    *
    COMMAND DDNAME(CMDINP) MAKEDEF(OUTPUT1)
    /*
    //CMDINP    DD *
    DISPLAY CHANNEL(*) ALL
    /*
    //*    STEP2
    //*******************************************************************
    //* PERFORM A GLOBAL CHANGE ON THE OUTPUT DATA SET FROM STEP 1, THAT  *
    //* IS: MY.COMMANDS(DEFS).  CHANGE 'NOREPLACE' TO 'REPLACE'           *
    //* THE CHANGED MY.COMMANDS(DEFS) WILL BE THE INPUT FOR STEP3.        *
    //*******************************************************************
    //*
    //STEP3     EXEC  PGM=CSQUTIL,PARM='CSQ1'
    //STEPLIB   DD    DISP=SHR,DSN=thlqual.SCSQANLE
    //          DD    DISP=SHR,DSN=thlqual.SCSQAUTH
    //SYSPRINT  DD    SYSOUT=*
    //SYSIN     DD    *
    COMMAND DDNAME(DEFINES)
    /*
    //*******************************************************************
    //* THE DEFINE COMMAND FOR THE SYSTEM.COMMAND.INPUT QUEUE MIGHT FAIL,  *
    //* BUT THIS DOES NOT MATTER. ALTERNATIVELY, REMOVE THE DEFINE FOR THAT *
    //* QUEUE FROM THE OBJECT DATA SET FROM STEP 1.                        *
    //*******************************************************************
    //*
    //DEFINES   DD DISP=SHR,DSN=MY.COMMANDS(DEFS)
```

Existing channels have the following values set for the new attributes added in Version 5.3:

KAINT	AUTO
LOCLADDR	blank
BATCHHB	zero
SSLPEER	blank
SSLCIPH	blank
SSLCAUTH	REQUIRED
Extra exit names	blank
Extra user data	blank

In previous versions of the product, a channel auto-definition exit program could change the message, send and receive exits associated with a channel, and the user data associated with the exits, by altering the MsgExit, MsgUserData, SendExit, SendUserData, ReceiveExit and ReceiveUserData fields of the MQCD. However, now that multiple channel exits are supported, a channel auto-definition exit program must alter the fields addressed by MsgExitPtr, MsgUserDataPtr, SendExitPtr, SendUserDataPtr, ReceiveExitPtr and ReceiveUserDataPtr in the MQCD. The fields in the MQCD are described in WebSphere MQ Intercommunication

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

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5.7.6.5.6. Objects

This might affect Task 12 in Customizing your queue managers.

Existing objects other than channels have the following values set for new attributes added in Version 5.3:

Namelists

NLTYPE	NONE

Queue manager

SSLKEYR	NONE
SSLCRLNL	blank
SSLTASKS	blank
CONFIGEV	DISABLED
MAXUMSGS	10 000
EXPRYINT	OFF

Changes to the INDXTYPE attribute for queues take effect immediately, if possible, and no longer wait until queue manager restart.

The circumstances under which you can make a change to the INDXTYPE attribute of a queue are more restrictive in Version 5.3.1 than in previous versions. For detailed information about these circumstances, see the WebSphere MQ Script (MQSC) Command Reference.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

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5.7.6.5.7. Libraries

In previous versions and releases of this product, we recommended that you include the early code load modules in a library in the link list. This is no longer required, and we now recommend that you do not include early code libraries in the link list. This might affect Task 3 in Customizing your queue managers.

Change any WebSphere® MQ library names in all STEPLIBs if they have new names. This might affect Tasks 1, 2, 3, 6, 7, 11, 18 and 19 in Customizing your queue managers.

In consequence of the Secure Sockets Layer (SSL) support, the load library thlqual.SCSQMVR1 must be in PDS-E format, even if you do not use SSL. This might affect Task 7 in Customizing your queue managers.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

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5.7.6.5.8. CICS message table names

In SCSQPROC member CSQ4B100, CSQCMTXT has been changed to CSQFCTAB, and in CSQ4D100, CSQKMSG has been changed to CSQFKTAB. However, CICS® resource definitions using the old names will continue to work until you are notified otherwise.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

This build: January 26, 2011 11:06:58

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5.7.6.5.9. DEFINE MAXSMSGS command

This might affect Task 12 in Customizing your queue managers.

This command is superseded by the MAXUMSGS queue manager attribute, which defines the maximum number of uncommitted messages which can be put and retrieved within a syncpoint. MAXUMSGS can be set by the WebSphere® MQ ALTER QMGR command, and its value is retained across restart. The DEFINE MAXSMSGS command is retained for compatibility; it has the same effect as using ALTER QMGR, and so can no longer be issued from the CSQINP1 initialization input data set. DISPLAY MAXSMSGS is also retained for compatibility; it can no longer be issued from the CSQINP1 initialization data set.

For further information about the ALTER QMGR command, see ALTER QMGR.

Parent topic: Additional steps when migrating from Version 5.2 to Version 5.3.1

This build: January 26, 2011 11:06:59

Notices | Trademarks | Downloads | Library | Support | Feedback

5.7.6.6. Additional steps when migrating from Version 2.1 to Version 5.3.1

If you intend to migrate from Version 2.1 to Version 5.3.1, you must consider the following when you customize your new version, in addition to the tasks in the previous sections (you do not need to install and customize the intervening versions):

System parameter module

This might affect Task 16 in Customizing your queue managers.

There were several system parameters introduced in Version 5.2 (QSGDATA, RESAUDIT, DEALLCT, and UNIT2) and the MAXRTU parameter superseded the MAXALLC parameter, which is no longer used. There were also several changed parameters. Consider whether you need to use these parameters and change your system parameter module accordingly.

If you do not need to use these parameters, you do not need to relinkedit your system parameter module.

Channel initiator parameter module

This might affect Task 17 in Customizing your queue managers.

There were several channel initiator parameters introduced in Version 5.2 (ADOPTCHK, ADOPTMCA, DNSGROUP, DNSWLM, LUGROUP, OPORTMAX, and OPORTMIN). Consider whether you need to use these parameters and change your channel initiator parameter module accordingly.

If you do not need to use these parameters, you do not need to relinkedit your channel initiator parameter module.

Initialization data sets

This might affect Task 12 in Customizing your queue managers.

A sample input initialization data set for queue sharing groups called thlqual.SCSQPROC(CSQ4INSS) is supplied with WebSphere® MQ. If you are planning to use queue-sharing groups, customize and include this data set. (Queue sharing groups are described in the WebSphere MQ for z/OS Concepts and Planning Guide.)

Review sample data set thlqual.SCSQPROC(CSQ4INYG) to see if you want to use the default buffer pool, storage class, and page set definitions.

Logs

Review sample data set thlqual.SCSQPROC(CSQ4BSDS) to see if you want to use the default settings for log placement and size.

If you are using very large messages, the amount of storage required for your log and archive data sets might increase. This is described in the WebSphere MQ for z/OS Concepts and Planning Guide.

Installation verification program

The name of the samples for the IVP in thlqual.SCSQPROC have been changed to CSQ4IVPQ and CSQ4IVPR. New samples called CSQ4IVPG and CSQ4IVPS have been added for the queue-sharing group IVP. These are described in Testing your queue manager.

Migrating queues and queue definitions to shared queues

WebSphere MQ for z/OS System Administration Guide describes how to migrate your existing queues and queue definitions to be used as shared queues. You do not have to do this, but you should consider it if you are going to use shared queues.

Change log inventory utility (CSQJU003)

The STARTRBA and ENDRBA keyword value of NEWLOG must end in 000 and FFF respectively.

Return codes

MQRC_PAGESET_FULL and new return code MQRC_STORAGE_MEDIUM_FULL have the same value.

Data conversion exits

Data conversion exits written for MQSeries® for OS/390® Version 2.1 will continue to function correctly with Version 5.3.1. However, they cannot convert messages containing text using the Unicode UCS-2 coded character sets (1200, 13488, 17584) and need to be updated to do so, if you require such conversions.

Exits generated using the CSQUCVX utility need to be reassembled and link-edited, ensuring that you use the thlqual.SCSQMACS library supplied with Version 5.3.1. See the WebSphere MQ Application Programming Guide and the CSQ4BAX9 and CSQ4CAX9 samples for information about using CSQUCVX.

Other exits place calls to **MQXCNVC** to perform data conversion. If these exits need to deal with UCS-2, the *Options* parameter of this call must be updated to specify the byte order of the UCS-2 text. See the WebSphere MQ Application Programming Reference for information about **MQXCNVC** and sample exit CSQ4BAX8, which demonstrates how to calculate this parameter.

If these exits are not updated, applications cannot convert to or from Unicode UCS-2 CCSIDs. Typically, this is seen in the response from **MQGET**, which returns the message unconverted with reason code MQRC_SOURCE_INTEGER_ENC_ERROR or MQRC_TARGET_INTEGER_ENC_ERROR (this depends on the behavior of the exit).

Note: Early versions of the CSQ4BAX8 sample exit incorrectly filled in the *Options* parameter of **MQXCNVC**, and exits that have copied this behavior

might convert UCS-2 text incorrectly, without reporting a failure.

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

This build: January 26, 2011 11:06:59

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5.7.6.7. Additional steps when migrating from Version 1.2 to Version 5.3.1

If you intend to migrate from Version 1.2 to Version 5.3.1, you must consider the following when you customize your new version, in addition to the tasks in the previous sections (you do not need to install and customize the intervening versions):

System parameter module

This might affect Tasks 16 and 17 in Customizing your queue managers.

The system parameters EXITLIM, EXITTCB, and WLMTIME, and channel initiator parameters TCPTYPE, LU62ARM, and LSTRTMR, were introduced in Version 2.1. Consider whether you need to use these parameters, and change your parameter modules accordingly.

Installation process

This might affect Tasks 1, 2, 3, and 11 in Customizing your queue managers.

There are several changes to the installation process, and some additional libraries. The two distributed queuing features for the non-CICS mover have been incorporated into the base product, and the CICS® mover has been made an optional feature. The CICS bridge has also been incorporated into the base product.

These are described in the *WebSphere MQ for z/OS Program Directory*.

Automatic Restart Manager (ARM)

The z/OS® Automatic Restart Manager (ARM) is now supported. This support coexists on the same z/OS image with earlier releases that do not support ARM. The queue managers and channel initiators in the earlier releases do not register with ARM and so can not be restarted automatically.

If you do not want to use ARM with your Version 5.3.1 queue managers and channel initiators, specify RESTART_ATTEMPTS(0) for the WebSphere® MQ element in your ARM policy. Note that if you do not specify WebSphere MQ elements in your ARM policy, default ARM policies are used for WebSphere MQ.

z/OS ARM support is described in the WebSphere MQ for z/OS System Administration Guide

Clusters

This might affect Tasks 6 and 12 in Customizing your queue managers.

WebSphere MQ now supports clustering. Before you use clustering you must review all your applications to determine whether each one can operate in a clustering environment. You might have to modify your applications to remove or manage inter-message affinity. Applications that attempt to open nonexistent queues might experience delays, or might even successfully open a queue somewhere in the cluster.

You also need to create the system objects required for clustering. These are described in the WebSphere MQ for z/OS Concepts and Planning Guide.

There is a cluster workload user exit; if you use this you need to add a CSQXLIB DD statement to your queue manager started task procedure, *xxxx*MSTR, and ensure that you have access to the LE runtime library SCEERUN.

Cluster support is described in the WebSphere MQ Queue Manager Clusters manual.

Storage classes

This might affect Task 12 in Customizing your queue managers.

The supplied default for storage class SYSTEM (which was used by many of the SYSTEM queues) has been changed to page set 01, so that messages are not put on page set 00.

If you currently use the defaults supplied, this change will probably have no effect, even if you use the DEFINE REPLACE option for your storage class definitions in your initialization input data set. This is because some of the queues using that storage class (like the SYSTEM.CHANNEL.SYNCQ for example) have messages on them permanently. If you want to move the queues to another page set, follow the procedure given in the WebSphere MQ for z/OS System Administration Guide.

Initialization data sets

This might affect Task 12 in Customizing your queue managers.

The sample input initialization data sets supplied with WebSphere MQ have been reorganized and renamed.

Resource Recovery Services (RRS)

This might affect Task 18 in Customizing your queue managers.

You can migrate your existing batch/TSO WebSphere MQ applications to exploit RRS coordination with little or no application program change. If you link-edit your WebSphere MQ application with the CSQBRRSI adapter, **MQCMIT** and **MQBACK** synchronize your unit of work across WebSphere MQ and all other RRS-enabled resource managers. If you link-edit your WebSphere MQ application with the CSQBRSTB adapter, you must change **MQCMIT** and **MQBACK** to **SRRCMIT** and **SRRBACK**.

Version 5.3.1 continues to support the non-RRS managed batch adapter in addition to supporting the RRS managed adapter. Thus different versions of WebSphere MQ queue managers can coexist on the same z/OS image.

UNIX System Services sockets

This might affect Task 17 in Customizing your queue managers.

UNIX System Services sockets are now available for use as an alternative to IUCV. If you are using OS/390® Version 2.5 or later, and are using IBM® TCP/IP for distributed queuing, IUCV is not available.

You must set the TCPTYPE channel initiator parameter to OESOCKETS. Using UNIX System Services sockets, you do not need to restart the channel initiator if TCP/IP has to be restarted.

Channel initiator security

This might affect Task 10 in Customizing your queue managers.

Channel initiator user ID checking has been changed and some facilities added.

See User IDs used by the channel initiator*WebSphere MQ for z/OS System Setup Guide* for details, and review your channel definitions to ensure that you are getting the security control you want.

Channel initiator snap dumps

This might affect Task 7 in Customizing your queue managers.

The channel initiator can now record error information in a data set instead of creating a dump. Add the CSQSNAP DD statement to your channel initiator started task procedure to support this.

IMS™ language interface module

The IMS language interface module CSQ2LI00 is no longer supported. All IMS applications should use the IMS supplied DFSLI000 module.

Euro currency symbol

Support for the euro currency symbol has been added to WebSphere MQ. If you need to modify your applications to use this symbol, ensure that they use one of the coded character sets that include it. These are described in the WebSphere MQ Application Programming Reference manual. If you need to change the coded character set used by your queue manager, use the CCSID parameter of the system parameter module. This is described in Using CSQ6SYSP.

Queue object size

The size of queue objects was increased for Version 5.2 to allow for the added cluster attributes. WebSphere MQ automatically updates each of these queue objects the first time that it is changed. This happens whether you are using clustering or not. However, due to the nature of space reclamation in WebSphere MQ, the space used on page set zero might increase dramatically until all these queue objects have been updated.

To avoid this, run a job similar to that in Figure 1 that changes all your queue objects, enabling WebSphere MQ to update them all at the same time. Ensure that no applications have any queues open when you run this job.

If you do not run a job like this, applications attempting to open queues might receive return code MQRC_OBJECT_IN_USE. This includes attempts by the channel initiator to open transmission queues.

Figure 1. Example job for migrating queue objects

```
//STEP1    EXEC  PGM=CSQUTIL,PARM='CSQ1'
//STEPLIB  DD    DISP=SHR,DSN=thlqual.SCSQANLE
//         DD    DISP=SHR,DSN=thlqual.SCSQAUTH
//OUTPUT1  DD    DISP=OLD,DSN=MY.COMMANDS(DEFS)
//SYSPRINT DD    SYSOUT=*
//SYSIN    DD    *
COMMAND DDNAME(CMDINP) MAKEDEF(OUTPUT1)
/*
//CMDINP   DD *
DISPLAY QUEUE(*) TYPE(QLOCAL) ALL
DISPLAY QUEUE(*) TYPE(QMODEL) ALL
DISPLAY QUEUE(*) TYPE(QALIAS) ALL
DISPLAY QUEUE(*) TYPE(QREMOTE) ALL
/*
//*   STEP2
//************************************************************************
//* PERFORM A GLOBAL CHANGE ON THE OUTPUT DATA SET FROM STEP 1, THAT    *
//* IS: MY.COMMANDS(DEFS).  CHANGE 'NOREPLACE' TO 'REPLACE'             *
//* THE CHANGED MY.COMMANDS(DEFS) WILL BE THE INPUT FOR STEP3.          *
//************************************************************************
//*
//STEP3    EXEC  PGM=CSQUTIL,PARM='CSQ1'
//STEPLIB  DD    DISP=SHR,DSN=thlqual.SCSQANLE
//         DD    DISP=SHR,DSN=thlqual.SCSQAUTH
//SYSPRINT DD    SYSOUT=*
//SYSIN    DD    *
COMMAND DDNAME(DEFINES)
/*
//************************************************************************
//* THE DEFINE COMMAND FOR THE SYSTEM.COMMAND.INPUT QUEUE MIGHT FAIL,   *
//* BUT THIS DOES NOT MATTER. ALTERNATIVELY, REMOVE THE DEFINE FOR THAT *
//* QUEUE FROM THE OBJECT DATA SET FROM STEP 1.                         *
//************************************************************************
//*
//DEFINES  DD DISP=SHR,DSN=MY.COMMANDS(DEFS)
```

Parent topic: Migrating from an earlier unsupported release of WebSphere MQ or MQSeries

This build: January 26, 2011 11:07:00

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This topic's URL:
mi12130_

6. WebSphere MQ classes for JMS and classes for Java considerations

There are several changes to implementation of WebSphere® MQ classes for JMS and classes for Java that you might need to consider when migrating to WebSphere MQ Version 7.0.

Upgrading from previous versions of WebSphere MQ classes for JMS

Compared to previous versions of WebSphere MQ classes for JMS, most error codes and exception messages have changed in Version 7. The reason for these changes is that WebSphere MQ classes for JMS now has a layered architecture and exceptions are thrown from different layers in the code.

For example, if an application tries to connect to a queue manager that does not exist, a previous version of WebSphere MQ classes for JMS threw a JMSException exception with the following information:

    MQJMS2005: Failed to create MQQueueManager for 'localhost:QM_test'.

This exception contained a linked MQException exception with the following information:

    MQJE001: Completion Code 2, Reason 2058

By comparison in the same circumstances, Version 7 of WebSphere MQ classes for JMS throws a JMSException exception with the following information:

```
Message : JMSWMQ0018: Failed to connect to queue manager 'QM_test' with
          connection mode 'Client' and host name 'localhost'.
Class : class com.ibm.msg.client.jms.DetailedJMSException
Error Code : JMSWMQ0018
Explanation : null
User Action : Check the queue manager is started and if running in client mode,
              check there is a listener running. Please see the linked exception
              for more information.
```

This exception contains a linked MQException exception with the following information:

```
Message : JMSCMQ0001: WebSphere MQ call failed with compcode '2' ('MQCC_FAILED')
          reason '2058' ('MQRC_Q_MGR_NAME_ERROR').
Class : class com.ibm.mq.MQException
Completion Code : 2
Reason Code : 2058
```

If your application parses or tests exception messages returned by the Throwable.getMessage() method, or error codes returned by the JMSException.getErrorCode() method, your application probably needs to be modified in order to use Version 7 of WebSphere MQ classes for JMS.

Tracing and error reporting in WebSphere MQ classes for JMS

WebSphere MQ classes for JMS now contains a class that an application can use to control tracing. An application can start and stop tracing, specify the required level of detail in a trace, and customize trace output in various ways. For example, you can now configure trace output by using properties that you specify in a client configuration file. For more information, see Tracing programs.

Channel exits

WebSphere MQ Version 7.0 provides new channel exit interfaces that offer improved functionality and performance.

When called from WebSphere MQ classes for JMS, channel exit programs written in C or C++ now behave in the same way as when they are called from a WebSphere MQ client. For information, see Using channel exits with WebSphere MQ classes for JMS.

You can now write channel exit classes using a new set of interfaces in the com.ibm.mq.exits package instead of using the interfaces in WebSphere MQ classes for Java. You can use the new interfaces to define classes to use as channel exits. The old channel exit interfaces are also still supported, but the new interfaces offer improved functionality and performance. For more information, see Using channel exits with WebSphere MQ classes for Java.

Relationship between WebSphere MQ classes for JMS and WebSphere MQ classes for Java

In WebSphere MQ Version 7.0, the implementation of WebSphere MQ classes for JMS is no longer dependent on WebSphere MQ classes for Java. WebSphere MQ classes for Java and WebSphere MQ classes for JMS are now peers that use a common Java interface to the MQI. For more information, see What is new in WebSphere MQ Version 7.0?

Receiving RFH2 Headers in WebSphere MQ classes for Java

In WebSphere MQ Version 6.0, using all defaults, a got MQMessage includes the RFH2 header (if present) and the message payload (for example, Hello World). If, for example, the message was sent from JMS, this RFH2 would be the standard RFH2 that is generated for a JMS Message. It is possible, though, for the RFH2 to have been generated by other means.

In WebSphere MQ Version 7.0, using all defaults, a got MQMessage does not include the RFH2 header (if present) for folders of the RFH2 that are recognized as being from JMS. If a JMS message is got it consists solely of the message payload. The RFH2 is represented in the message properties of the WebSphere MQ classes for Java message.

To preserve the WebSphere MQ Version 6.0 behavior of propagating the RFH2 to the caller, the queue attribute PROPCTL must be changed from COMPAT to FORCE.

Publish/subscribe

For WebSphere MQ classes for JMS information that is specific to publish/subscribe, see Using publish/subscribe with WebSphere MQ classes for JMS.

MQC is replaced by MQConstants

A new package, com.ibm.mq.constants, is supplied with WebSphere MQ Version 7.0. This package contains the class MQConstants, which implements a number of interfaces. MQConstants contains definitions of all the constants that were in the MQC interface and a number of new constants. The interfaces in this package closely follow the names of the constants header files used in WebSphere MQ.

For example, the interface CMQC contains a constant MQOO_INPUT_SHARED; this interface corresponds to the header file cmqc.h and the constant MQOO_INPUT_SHARED.

com.ibm.mq.constants can be used with both WebSphere MQ classes for Java and WebSphere MQ classes for JMS.

MQC is still present, and has the constants it previously had; however, for any new applications, you must use the com.ibm.mq.constants package.

Java and secret key reset

❯If you use the version of GSKit supplied with WebSphere MQ with the following Java versions and platforms, you must not set the reset count to a value other than zero. If you do set the reset count to a value other than zero, a client connection fails when it attempts to renegotiate the secret key.

- an HP or Sun V1.4.2 JDK
- any V1.4.2 JDK when using FIPS mode
- any V5.0 or later JDK

Java 5.0 is included with WebSphere MQ Version 7.0. ❮

❯If you want to use secret key reset with one of these JDKs on the Windows or UNIX platforms only, you can install GSKit Version 8. Install GSKit v8 on the queue manager side of the SSL connection to make Java SSL secret key reset work correctly. This is because the GSKit v8 SSL secret key reset behavior only takes effect at the server side of the channel. You can use GSKit v8 for SSL connections with WebSphere MQ client applications (including WebSphere MQ classes for Java and WebSphere MQ classes for JMS applications using bindings mode), but there is no difference in SSL channel behavior if GSKit v8 is installed only on the client. ❮

❯For more information see Alternative SSL and TLS support for Windows, UNIX, and Linux systems❮

Migration of JMS clients and data conversion

As a significant improvement to the JMS client in WebSphere MQ Version 7.0, the data conversion process was moved from the client JVM to the queue manager, aligning the JMS client with all other MQ clients in terms of carrying out data conversion in the queue manager. The queue manager uses operating system code page file sets to carry out data conversion, as it has done for many years.

You might find that some code page file sets required by your applications are not available to the AIX® queue managers and so applications report

MQRC_NOT_CONVERTED errors. If you receive MQRC_NOT_CONVERTED errors, you must follow steps to resolve the issue, in order of preference:

1. Install the required operating system file sets.
2. Install the latest WebSphere MQ FixPack which causes data conversion to take place in the client.
3. Instruct the JMS clients to run in "V6 mode" so that data conversion takes place in the client. This also means that all new V7 features are unavailable to the JMS clients. To run in "V6 mode", use one of the following techniques:
   a. Set the SHARECNV channel attribute to zero on server connection channels used by JMS clients.
   b. Set PROVIDERVERSION to 6. This attribute is set on either the Connection Factory (see the Properties of WebSphere MQ classes for JMS objects topic for more information) or via a JMS Client Configuration Property "com.ibm.msg.client.wmq.overrideProviderVersion" (as detailed in the The Websphere MQ classes for JMS configuration file topic). More information about PROVIDERVERSION can be found in the When to use PROVIDERVERSION topic.
   c. Set SHARECONVALLOWED to FALSE. This is a Connection Factory property - see the link in recommendation 3b for more information about connection factory properties.

NOTE: For WebSphere Application Server V7, connection factory properties are set on the WebSphere Application Server Connection Factory Panels. For WebSphere Application Server V6, the panels do not contain these properties and they are instead set as custom properties (PROVIDERVERSION and SHARECONVALLOWED).

Parent topic: Migration

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7. Integration of WebSphere MQ classes for JMS with WebSphere Application Server

You can configure WebSphere® MQ as a JMS provider for WebSphere Application Server. The way the WebSphere MQ messaging provider is configured has changed between WebSphere Application Server V6.0/6.1 and V7.0. This topic describes the changes, and different configurations you can create to run different versions of WebSphere Application Server and WebSphere MQ.

Integration changes

The way WebSphere MQ is integrated with WebSphere Application Server has changed between WebSphere Application Server V6.0/6.1 and V7.0.

WebSphere Application Server V7.0

WebSphere MQ classes for JMS are built in to WebSphere Application Server V7.0 as a JCA 1.5 resource adapter, `wmq.jmsra.rar`. To use the WebSphere MQ resource adapter as the messaging provider in WebSphere Application Server, configure activation specifications and connection factories to use the WebSphere MQ messaging provider.

`wmq.jmsra.rar` is also shipped with WebSphere MQ. It is identical to the `wmq.jmsra.rar` file shipped with WebSphere Application Server. `wmq.jmsra.rar` is shipped with WebSphere MQ to install as a JCA 1.5 resource adapter on application servers from different suppliers.

Note: The WebSphere Application Server instructions for installing JCA resource adapters from other suppliers do not apply to the WebSphere MQ resource adapter. Should you mistakenly install `wmq.jmsra.rar` on WebSphere Application Server as a JCA 1.5 resource adapter, it results in uncertainty about which version of the adapter is used.

If you do not install WebSphere MQ on the same server as WebSphere Application Server, you can use the WebSphere MQ classes for JMS in client mode only. If you install WebSphere MQ on the same server as WebSphere Application Server, you have the choice of using the WebSphere MQ classes for JMS in either client mode or bindings mode. Use the WebSphere MQ messaging provider general property **Native Library Path**, to locate the native WebSphere MQ Java libraries installed on the same server as the application server.

In bindings mode, the WebSphere MQ queue manager must be at least at fix pack 6.0.2.5 (6.0.2.7 on z/OS®). In client mode the WebSphere MQ classes for Java can connect to any queue manager at V6.0 or higher.

For full WebSphere MQ V7.0 functionality, use WebSphere Application Server V7.0 with WebSphere MQ V7.0. If the application server connects to a V6.0 queue manager, either locally or remotely, the WebSphere MQ classes for JMS run in migration mode; see Mixed configurations.

The WebSphere MQ JCA resource adapter, which is shipped with WebSphere Application Server, is maintained by applying WebSphere Application Server fix packs; see Which version of WebSphere MQ is shipped with WebSphere Application Server. Maintain the WebSphere MQ server libraries in the normal way, by applying WebSphere MQ fix packs, or PTFs on z/OS.

If you migrate profiles from WebSphere Application Server 7.0.0.0 to later maintenance levels, or from later maintenance levels to the 7.0.0.0 level, you must manually adjust the resource adapter configuration; see Maintaining the WebSphere MQ JCA resource adapter.

WebSphere Application Server V6.0/V6.1

The WebSphere MQ classes for JMS, `com.ibm.mq.jar`, `com.ibm.mqjms.jar`, and `dhbcore.jar`, are installed by WebSphere Application Server into `$WAS_INSTALL_ROOT\lib\WMQ\java\lib`. Using these classes, JMS applications connect to WebSphere MQ in client mode.

If you do not install WebSphere MQ on the same server as WebSphere Application Server, you can use the WebSphere MQ classes for JMS in client mode only. If you install WebSphere MQ on the same server as WebSphere Application Server, you have the choice of using the WebSphere MQ classes for JMS in either client mode or bindings mode.

To use the WebSphere MQ classes for JMS installed by WebSphere MQ, set the WebSphere Application Server environment variable `$MQ_INSTALL_ROOT` to point to the WebSphere MQ installation. You can then use the libraries installed by WebSphere MQ to connect to WebSphere MQ in either client or bindings mode.

You can use WebSphere MQ V7.0 with WebSphere Application Server V6.0 or V6.1. The default configuration, which uses the WebSphere MQ classes for JMS installed by WebSphere Application Server, is restricted by the client to V6.0 functionality. If you install either the WebSphere MQ V7.0 client or server on the application server, you can access WebSphere MQ V7.0 functionality. With the combination of WebSphere MQ V7.0 and WebSphere Application Server V6.0/V6/.1, you can use the integrated publish/subscribe API, shared channels, queue manager selectors, and other V7.0 enhancements; see Mixed configurations.

`wmq.jmsra.rar` is also shipped with WebSphere MQ. It is identical to the `wmq.jmsra.rar` file shipped with WebSphere Application Server. `wmq.jmsra.rar` is shipped with WebSphere MQ to install as a JCA 1.5 resource adapter on application servers from different suppliers. You must not configure a JCA resource adapter on WebSphere Application Server V6.0 or V6.1 using the WebSphere MQ resource adapter, `wmq.jmsra.rar`. If you do so, and then try to start a JMS application, it results in Java errors.

Maintain the WebSphere MQ classes for JMS shipped with WebSphere Application Server by applying WebSphere Application Server fix packs; see Which version of WebSphere MQ is shipped with WebSphere Application Server. If you are using the libraries installed by a WebSphere MQ installation by setting `$MQ_INSTALL_ROOT`, maintain the WebSphere MQ libraries in the normal way, by applying WebSphere MQ fix packs, or PTFs on z/OS.

Mixed configurations

When you upgrade WebSphere Application Server from V6.0/6.1 to V7.0 or WebSphere MQ from V6.0 to V7.0, you can run with different versions of WebSphere Application Server and WebSphere MQ, as well as upgrading both to version 7.0. You must take note of any functional and performance implications of running with a mixed configuration. Mixed configurations are supported to cater for complex migration scenarios.

WebSphere Application Server V7.0 and WebSphere MQ V6.0

WebSphere Application Server V7.0 always uses the version 7.0 WebSphere MQ classes for JMS installed with the application server as the WebSphere MQ message provider. The WebSphere MQ message provider connects to a local or remote queue manager running WebSphere MQ V6.0. The V7.0 capabilities in the WebSphere MQ resource adapter are not available when connected to the V6.0 queue manager. As a result, the WebSphere MQ classes for JMS run in migration mode, which has a performance and function cost. Migration mode is set automatically. You can configure it manually by setting the WebSphere MQ classes for JMS property `PROVIDERMODE=6`.

You must apply a fix to the WebSphere MQ resource adapter to run WebSphere MQ classes for JMS in this configuration. The minimum WebSphere Application Server fix pack required is 7.0.0.9. The WebSphere MQ resource adapter is provided by WebSphere Application Server, so you must obtain the fix pack from WebSphere Application Server rather than WebSphere MQ. If you are using a different application server, you must apply WebSphere MQ fix pack 7.0.1.1 to update `wmq.jmsra.rar` to the same level.

If you had installed WebSphere MQ V6.0 on the same server as WebSphere Application Server V6.0, you can continue to use both client and bindings mode.

With WebSphere Application Server V6.0/V6.1 and WebSphere MQ V6.0 installed, you would have set the WebSphere Application Server environment variable, $MQ_INSTALL_ROOT$, to the WebSphere MQ V6.0 installation directory. WebSphere Application Server V6.0/V6.1 loads the WebSphere MQ classes for JMS from $MQ_INSTALL_ROOT$ to resolve references to JMS classes. WebSphere Application Server V7.0 does not use $MQ_INSTALL_ROOT$. WebSphere Application Server V7.0 loads the WebSphere MQ classes for JMS from the WebSphere MQ resource adapter shipped with WebSphere Application Server V7.0.

Some behavior of the WebSphere MQ classes for JMS has changed between V6.0 and V7.0. Even if the JMS application is connected to a V6.0 queue manager, because WebSphere Application Server V7.0 uses the version 7.0 WebSphere MQ classes for JMS, there are some differences in JMS client behavior.

- The `MQException` class is packaged in `com.ibm.wmq.jmqi.jar`, not `com.ibm.mq.jar`.
  - Applications compiled with Java 1.5, or greater, automatically resolve class references to `com.ibm.mq.jmqi.jar`.
- JMS exceptions and errors are handled differently; see Migrating JMS Exception listeners.

WebSphere Application Server V6.0/6.1 and WebSphere MQ V7.0

To use WebSphere Application Server V6.0/6.1 with the version 7.0 WebSphere MQ classes for JMS, you must install either the WebSphere MQ V7.0 client, or V7.0 server, on the same server as WebSphere Application Server. Set $MQ_INSTALL_ROOT$ to the WebSphere MQ installation directory path.

You might encounter JMS application migration problems, as a result of changes to the WebSphere MQ classes for JMS. If your solution requires connection to a V7.0 queue manager, you might be able to bypass some problems by continuing to use the version 6.0 WebSphere MQ classes for JMS. Alternatively, install the version 6 WebSphere MQ client on the same server as the application server and set $MQ_INSTALL_ROOT$ to the WebSphere MQ installation directory. Connect the JMS application to the version 7.0 queue manager in client mode.

Note: You cannot connect the version 6 WebSphere MQ classes for JMS, installed with WebSphere Application Server, to WebSphere MQ V7.0 installed on the same server, in bindings mode.

The WebSphere Application Server V6.0/V6.1 administration console only configures WebSphere MQ V6.0 capabilities. To configure new WebSphere MQ V7.0 properties, you must use custom properties.

Miscellaneous changes between V6.0/V6.1 and V7.0 affecting JMS

In this section changes that affect JMS applications using the WebSphere MQ messaging provider managed by WebSphere Application Server are described. Changes to the WebSphere MQ implementation of JMS in version 7 that affect the migration of JMS applications from WebSphere MQ V6.0 to V7.0, are described in other topics.

The Target client field is no longer displayed in the WebSphere Application Server Administration Console.

The **Target client** field on a JMS destination in V6.0/V6.1 specified whether the message recipient expected the body of a JMS message was a JMS message or a WebSphere MQ message. Examples of JMS messages are JMS bytes, JMS text, and JMS object.

In WebSphere Application Server V7.0, the same function is controlled by the check box **Append RFH version 2 headers to messages sent to this destination**. See "Target client" is field not displayed in the WebSphere Application Server Administration Console V7.

If you are sending messages to a WebSphere MQ application, that does not expect JMS messages, select the check box. If you clear the check box, messages are constructed with an `RFH2` header specifying the JMS message type.

A number of JMS issues are resolved, including use of multi-instance queue managers.

A number of JMS issues are resolved in later WebSphere Application Server fix packs.

Problems using multi-instance queue managers, are fixed in WebSphere Application Server fix pack 7.0.0.13 (WebSphere MQ fix pack 7.0.1.3). Set the new custom properties, `XMSC_WMQ_CONNECTION_NAME_LIST` for connection factories, and `connectionNameList` for activation specifications, to create a comma-separated lists of `host(port)` names to connect to a multi-instance queue manager.

Automatic client reconnection is not supported by WebSphere Application Server.

Asynchronous consume, browse with mark, and Application Server Facilities

Message Driven Beans (MDBs) using Application Server Facilities (ASF) use asynchronous consume rather than polling to read messages asynchronously. Asynchronous consume is a WebSphere MQ V7.0 enhancement.

The destination is now able to browsed with mark on non z/OS platforms, eliminating problems of message contention, and lower priority messages being marooned by constantly arriving higher priority messages.

As a result ASF is more efficient on non z/OS platforms than it was with V6.0. (WebSphere MQ for z/OS efficiently received messages asynchronously in V6.0.)

Activation specifications

Use activation specifications with MDBs, rather than message listeners, to consume messages in WebSphere Application Server V7.0. Activation specifications are better than message listeners:
- Activation specifications are part of the JCA 1.5 specification standard.

- Using activation specification eliminates configuring a connection factory for inbound messages.
- Activation specifications can be defined at node or cell scope, not just server scope. If you have multiple servers, you require only one activation specification, but multiple message listener definitions.

Message listener ports are still supported. The WebSphere Application Server administration console has a wizard, and a command, to migrate a message listener to an activation specification.

Terminology

WebSphere Application Server uses the term "WebSphere MQ messaging provider". The WebSphere MQ messaging provider is the same code as the WebSphere MQ classes for JMS. WebSphere MQ also provides the WebSphere MQ classes for JMS as JCA 1.5 resource adapter for installing on other application servers. All these terms refer to the same code.

Parent topic: Migration

Related information
Rules for selecting the WebSphere MQ messaging provider mode
New features and their supported APIs for Version 7.0: JMS
When to use ASF and non-ASF modes to process messages in WebSphere Application Server
WebSphere MQ classes for JMS Application Server Facilities
Using the WebSphere MQ messaging provider in WebSphere Application Server V7: Part 1: Introducing the new WebSphere MQ messaging provider
Maintaining the WebSphere MQ resource adapter
Fix Central
Which version of WebSphere MQ is shipped with WebSphere Application Server?
PK87026: CUMULATIVE MAINTENANCE FIXPACK 6.0.2.7 FOR THE JMS FEATURE OF WEBSPHERE MQ FOR Z/OS VERSION 6
IC64098: APPLICATION DOES NOT AUTOMATICALLY RECONNECT TO THE QUEUE MANAGER IF CONNECTION IS LOST WHEN USING THE MQ RESOURCE ADAPTER

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8. WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

You can migrate publish/subscribe configuration data from WebSphere® Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 to a WebSphere MQ Version 7.0.1 or later queue manager.

You can migrate the following publish/subscribe configuration data:

- Subscriptions
- Subscription points. Subscription points are supported only when RFH2 messages are used.
- Streams
- Retained publications

Note: WebSphere MQ Version 7.0.1 does not support the content-based filtering provided in WebSphere Event Broker Version 6.0. Do not migrate if you use this function and intend to continue to do so.

There are three phases to the migration:

The rehearsal phase

This phase creates a migration log, reporting any errors that might be found, but does not change the current configurations. You can use this phase to observe what the result of a real migration would be. Rehearsing the migration also produces a file containing suggested security commands to set up a security environment in the queue manager that is equivalent to the security environment that existed in the broker. You can review the security command file and determine the actions that you need.

The initial phase

This phase creates topic objects that might be needed in the queue manager, based on the Access Control List entries that are defined in the broker. You must run this phase before you run the completion phase. The initial phase also produces a file containing suggested security commands to set up a security environment in the queue manager that is equivalent to the security environment that existed in the broker. The topic objects are created in anticipation of you executing the security commands to create ACLs for the topic objects. Before you run the completion phase you must review and modify the security command file as required and execute the commands that you need. The initial phase also creates a migration log.

Note: When the migration process attempts to create a topic object, it first checks whether a suitable topic object already exists in the queue manager; if it does, it uses that existing topic object. This ensures that if the migration process is run multiple times, it does not attempt to create multiple topic objects for the same purpose.

However, if you modify the properties of one of these topic objects (for example the wildcard property) the migration process does not take account of that and still uses the topic object, even though it no longer has the same properties that the migration process originally created for it. For this reason, with the exception of setting access permissions between the initial and completion phases, you must leave unchanged the topic objects that are created by the migration process until it has completed.

The completion phase

This phase retrieves the current publish/subscribe definitions from the broker and uses those definitions to create equivalent definitions in the publish/subscribe component of the WebSphere MQ Version 7.0.1 and later queue manager that is associated with the named broker. The details of the migration are documented in the log file. When the migration is complete, the queue manager publish/subscribe configuration is equivalent to the broker publish/subscribe configuration. The completion phase also creates a migration log.

The WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe information, which is stored in the subscription database tables, is not deleted by the migration process. This information is therefore available to use until you explicitly delete it.

Access Control List (ACL) migration
The function that migrates publish/subscribe configuration data from WebSphere Event Broker Version 6.0 to WebSphere MQ produces a file containing suggested security commands and creates topic objects as required.

Migrating publish/subscribe configuration data from WebSphere Event Broker V6
Complete these tasks to migrate publish/subscribe configuration data from WebSphere Event Broker Version 6.0 to WebSphere MQ Version 7.0.1 and later versions.

Publish/subscribe migration log file
An example publish/subscribe migration log file is provided to show you the format and some example contents.

Migrating a WebSphere Event Broker publish/subscribe collective to a WebSphere MQ publish/subscribe cluster
Complete these tasks to migrate a publish/subscribe collective from WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 to a WebSphere MQ Version 7.0.1 or later version publish/subscribe cluster.

Retained publications with headers in MQRFH format
Retained publications in MQRFH format might lose data when migrated to WebSphere MQ Version 7.0.1 or later versions.

Differences from WebSphere Message Broker Versions 6.0 and 6.1 publish/subscribe
There are a number of minor differences between the publish/subscribe support in WebSphere MQ Version 7.0.1, and that in WebSphere Message Broker Version 6.0 and 6.1.

Parent topic: Migration

Related concepts
Access Control List (ACL) migration

Related information
migmbbrk (migrate publish/subscribe information)

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8.1. Access Control List (ACL) migration

The function that migrates publish/subscribe configuration data from WebSphere® Event Broker Version 6.0 to WebSphere MQ produces a file containing suggested security commands and creates topic objects as required.

The migration process does not migrate the Access Control List (ACL). On WebSphere Event Broker Version 6.0 , the default is that all user IDs have permission to access any topic unless the ACL explicitly denies access. In WebSphere MQ, the default is that no user ID has access to any topic unless the ACL explicitly authorizes access. WebSphere MQ does not support ACL entries that deny access. Because of this difference in security approaches, the migration process cannot directly migrate a WebSphere Event Broker Version 6.0 ACL to a WebSphere MQ Version 7.0.1 or later version ACL. Instead, the rehearsal and initial phases of the migration process produce a security command file that is a best attempt at listing the security commands which, when run, create an equivalent ACL in the WebSphere MQ queue manager.

If the rehearsal or initial phase of the migration find an ACL entry that denies access, it cannot produce a WebSphere MQ equivalent command. Instead, it reports it in the security command file and advises that the ACL migration must be performed manually. You can either modify the broker security settings to match the WebSphere MQ security approach, and run the rehearsal or initial phase of the migration again to produce a new security command file, or modify the security command file as needed. You must set up a security environment in the queue manager, equivalent to the one that existed in the broker, before you run the completion phase of the migration.

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Wildcard subscriptions

If a subscription uses a wildcard scheme to subscribe to multiple topics, but access to one or more of those topics is denied by its ACL, the result of the subscription in WebSphere Event Broker differs from the result in WebSphere MQ:

- In WebSphere Event Broker the subscription succeeds, but the subscription will not receive messages that are published to topics for which access authority is denied. For example, if access to a topic USA/Alaska is permitted but access to a topic USA/Kansas is denied, in WebSphere Event Broker a subscription to USA/# or USA/+ succeeds, but the subscription will not receive messages that are published to USA/Kansas.
- In WebSphere MQ, for a subscription to succeed, it must have access authority to all of the topics to which the wildcard scheme subscribes. Therefore the subscription fails. For example, if access to a topic USA/Alaska is permitted but access to a topic USA/Kansas is denied, in WebSphere MQ a subscription to USA/# or USA/+ fails, so the subscription will not receive messages that are published to USA/Alaska or USA/Kansas.

You might therefore find, even if you have examined the security command file and taken any action that is necessary to set up a security environment that is equivalent to the one that existed in the broker, that the migration process fails to migrate subscriptions that include a wildcard, if access to one or more of those topics is denied. The solution to this is not clear-cut, because of the difference in behavior between the two products, and requires manual intervention. Depending on your security requirements you might, for example, grant the required permission to the topic USA/Kansas, if you can accept that a subscriber to USA/# or USA/+ will receive messages published to the topic. Alternatively, you might replace the wildcard subscription with multiple subscriptions lower down the topic tree.

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ACL migration on Unix platforms

On Unix platforms, it is possible for a username and groupname to have the same identifier. In this case, the migration process is unable to determine whether an ACL should apply to the username, the groupname, or both, and the ACL migration script therefore contains two setmqaut commands: a first command that applies to the username and a second command that applies to the group name. Here is an example of the commands:

```
setmqaut –m QM1 –n SAMPLE_TOPIC_OBJECT –t topic –p mquser +sub +pub
# setmqaut –m QM1 –n SAMPLE_TOPIC_OBJECT –t topic –g mquser +sub +pub
```

Note that the second command is prefixed by a number sign (#) to indicate that it is commented out. As part of reviewing the ACL migration script you should ensure that the correct command is executed.

Creation of topic objects by the migration

WebSphere Event Broker Version 6.0 provides the capability to define topic trees, but there is no capability to set specific attributes for a particular individual topic in a topic tree. WebSphere MQ Version 7.0 supports the concept of topic objects that allow you to set specific, nondefault attributes for a topic. An ACL is a property of a topic object. The initial phase of the migration creates topic objects speculatively, based on the ACL entries that are defined in the broker and in anticipation that you later run the security commands to create ACLs for the topic objects. When you have resolved what security settings you need, you might need to delete the topic objects that you do not require.

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

Related tasks
Migrating publish/subscribe configuration data from WebSphere Event Broker V6

Related information
migmbbrk (migrate publish/subscribe information)
Publish/subscribe security

This build: January 26, 2011 11:07:11

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8.2. Migrating publish/subscribe configuration data from WebSphere Event Broker V6

Complete these tasks to migrate publish/subscribe configuration data from WebSphere® Event Broker Version 6.0 to WebSphere MQ Version 7.0.1 and later versions.

Before you begin

Make sure that you are familiar with the information in WebSphere Event Broker Version 6.0 and WebSphere Message Broker Version 6.0 or 6.1 migration to WebSphere MQ Version 7.0.1 and later versions and Access Control List (ACL) migration.

Install WebSphere MQ Version 7.0.1 or a later version.

On distributed systems, set up and initialize a command environment for the WebSphere Event Broker from which you are migrating, in which WebSphere MQ commands and WebSphere Event Broker commands can run.

Set the queue manager **PSMODE** attribute to COMPAT, using the following command: ALTER QMGR PSMODE(COMPAT) - this stops the queue manager from processing any queued publish or subscribe messages.

Procedure

1. Optional: Run the rehearsal phase of the migration. For example, on supported platforms other than z/OS, use the following command to rehearse the migration from a broker named BRK1:

   migmbbrk -r -b BRK1

2. Review the contents of the log file and the security commands file to check what would happen in a real migration.

3. Run the initial phase of the migration. For example, on supported platforms other than z/OS, use the following command to run the initial phase from a broker named BRK1:

   migmbbrk -t -b BRK1

4. Review the commands in the security commands file amqmigrateacl.txt. Ensure that they will create a security environment that is equivalent to your broker security environment. If the migration rehearsal finds an ACL entry that denies access, it reports it in the security command file and advises that the ACL migration must be performed manually. There are two alternative ways that you can deal with this:

   - Modify the security commands to ensure that they would set up a security environment in the queue manager that is equivalent to the security environment that existed in the broker. Then go to step 5.
   - Revise the broker's security definitions to be similar to WebSphere MQ definitions, so that the migration can migrate them, by performing the following steps:

     a. Revise the ACL entry for the root of the topic tree to be the same as for the root of the WebSphere MQ topic tree; that is, set Deny for both publish and subscribe. This is the exact opposite of the broker default and can result in many publishers and subscribers no longer having permission to perform operations that they have been doing successfully. However, the next two steps correct this.

     b. Remove all ACL entries that deny access, apart from the entry in step 4a. Many of these entries are likely to be redundant following the previous step, however others might require more extensive changes.

     c. Add any ACL entries that are needed to grant access, to restore a correct security environment.

     d. Run the initial phase of the migration again and review the security command file. It should now create a security environment in the queue manager that is equivalent to the security environment that existed in the broker.

5. Run the security commands to set up the security environment before you run the completion phase of the migration, or the migration will fail.

6. Run the completion phase of the migration. For example, on supported platforms other than z/OS, use the following command to migrate the publish/subscribe configuration data from broker BRK1 and overwrite any subscription or retained publication that already exists in the queue manager and that has the same name as a migrating subscription or retained publication:

   migmbbrk -c -o -b BRK1

   The completion phase migrates the publish/subscribe configuration data to the queue manager, creates a new log file and a new security commands file, and shuts down the broker.
   Note: It is possible that the broker state has changed since the initial phase was run and that additional topic objects are now required. If so, the completion phase creates these topic objects as necessary. The completion phase does not delete topic objects that have become unnecessary; you might need to delete topic objects that you do not require.

7. Provide the queue manager with the name of every input queue to be monitored for publications, by adding the name of every queue that is currently named in an Event Broker MQInput node to the namelist SYSTEM.QPUBSUB.QUEUE.NAMELIST. You must do this because, in Event Broker, published messages are put to queues and are read from the queues by the broker using an MQInput node. When the migration shuts down the broker, messages cannot be read in this way. Instead, the queue manager monitors the relevant queues, but you must provide the names of the queues to monitor. To edit a namelist, use either the WebSphere MQ Explorer or the following MQSC command:

   ALTER NAMELIST

   Note: Each queue name referenced in the SYSTEM.QPUBSUB.QUEUE.NAMELIST namelist also has an associated Topic object. You must define the Topic objects before adding the associated queue name to the SYSTEM.QPUBSUB.QUEUE.NAMELIST namelist. For more information about setting up the SYSTEM.QPUBSUB.QUEUE.NAMELIST namelist, see Mapping between streams and topics.

8. Check the broker domain Event Log to confirm that the broker has been shut down.

9. Use the following command to set the **PSMODE** queue manager attribute to ENABLED.

   ALTER QMGR PSMODE(ENABLED)

   This starts the queued publish/subscribe interface so that the queue manager deals with all subsequent publish/subscribe processing.

What to do next

The migration process uses a queue called SYSTEM.TEMP.MIGMBBRK.REPLY.QUEUE to receive messages from the broker. When the process starts it checks for the existence of the queue and creates or clears it as necessary. When it has finished it attempts to delete the queue; however, because the broker also uses the queue to send replies, it might still have the queue open. If so, the migration process is unable to delete the queue. When you have completed the migration, check if SYSTEM.TEMP.MIGMBBRK.REPLY.QUEUE exists, and if it does, delete it.

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

Related information
migmbbrk (migrate publish/subscribe information)

This build: January 26, 2011 11:07:11

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8.3. Publish/subscribe migration log file

An example publish/subscribe migration log file is provided to show you the format and some example contents.

Identifying subscriptions in the log file or error messages

When the log file needs to identify a particular broker subscription in the log file or an error message, it lists its properties, including its topic string. However, the topic string can be up to 10,240 characters long, and is expressed in Unicode in the broker. This can mean that the topic string might be too long or contain characters that cannot be output in the current character set.

To provide a precise way to identify subscriptions, the migration process assigns a sequence number to every broker subscription that it encounters, starting at 1. When the migration process needs to refer to a subscription, the process includes its sequence number and anything else that is known about the subscription. You can use the mqsireportproperties broker command to list the broker's subscriptions in the same order as the migration process. Therefore, for example, the fourth subscription that the migration process counts is also the fourth that is listed by mqsireportproperties. Using this information, you can take the sequence number from the migration process's log file or error message and use it to precisely identify the subscription in the broker.

The broker command to list the subscriptions is as follows:

```
mqsireportproperties brokername -e default -o DynamicSubscriptionEngine -r
```

To store the results in a file called, for example, outfile.txt, the command is as follows:

```
mqsireportproperties brokername -e default -o DynamicSubscriptionEngine -r > outfile.txt
```

Example log file

The following example log files lists the actions that have been performed by a successful migration process. It shows the migration of subscriptions, ACLs and retained publications.

```
2009-01-28 11:43:54.187: Migrating Pub/Sub state from Websphere Message Broker: TEST_BROKER
2009-01-28 11:43:54.187: Into queue manager: TEST_QM
2009-01-28 11:43:54.187: Command switches:
2009-01-28 11:43:54.187:        -t
2009-01-28 11:43:54.187:        -z
2009-01-28 11:43:54.187:        -l
2009-01-28 11:43:55.484: Starting to parse subscriptions ...
2009-01-28 11:43:55.484: Migrating subscriptions for topic string RFH2/EU/France/Toison
2009-01-28 11:43:55.484: [1] Migrating subscription for:
2009-01-28 11:43:55.484:        Format: mqrfh2
2009-01-28 11:43:55.484:        Queue Manager: PSMIG_QM
2009-01-28 11:43:55.484:        Queue: PUBSUB.FRANCE.QUEUE
2009-01-28 11:46:23.968: Migrating subscriptions for topic string RFH2/EU/France/Carnac
2009-01-28 11:46:23.968: [2] Migrating subscription for:
2009-01-28 11:46:23.968:        Format: mqrfh2
2009-01-28 11:46:23.968:        Queue Manager: PSMIG_QM
2009-01-28 11:46:23.968:        Queue: PUBSUB.FRANCE.QUEUE
2009-01-28 11:46:23.968: Migrating subscriptions for topic string $SYS/STREAM/TEST_STREAM/RFH1/EU/France/Pontivy
2009-01-28 11:46:23.984: [3] Migrating subscription for:
2009-01-28 11:46:23.984:        Format: mqrfh2
2009-01-28 11:46:23.984:        Queue Manager: PSMIG_QM
2009-01-28 11:46:23.984:        Queue: PUBSUB.FRANCE.QUEUE
2009-01-28 11:46:24.031: Migrating subscriptions for topic string $SYS/Broker/+/warning/expiry/Subscription/#
2009-01-28 11:46:24.031: [4] Migrating subscription for:
2009-01-28 11:46:24.031:        Format: mqrfh2
2009-01-28 11:46:24.031:        Queue Manager: PSMIG_QM
2009-01-28 11:46:24.031:        Queue: PUBSUB.SAMPLE.QUEUE
2009-01-28 11:46:24.125: Migrating subscriptions for topic string $SYS/Broker/+/Subscription/#
2009-01-28 11:46:24.125: [5] Migrating subscription for:
2009-01-28 11:46:24.125:        Format: mqrfh2
2009-01-28 11:46:24.125:        Queue Manager: PSMIG_QM
2009-01-28 11:46:24.125:        Queue: PUBSUB.SAMPLE.QUEUE
2009-01-28 11:46:24.140: Migrating subscriptions for topic string $SYS/Broker/+/Status
2009-01-28 11:46:24.140: [6] Migrating subscription for:
2009-01-28 11:46:24.140:        Format: mqrfh2
2009-01-28 11:46:24.140:        Queue Manager: PSMIG_QM
2009-01-28 11:46:24.140:        Queue: PUBSUB.SAMPLE.QUEUE
2009-01-28 11:46:24.156: Migrating subscriptions for topic string $SYS/Broker/+/Status/ExecutionGroup/#
2009-01-28 11:46:24.156: [7] Migrating subscription for:
2009-01-28 11:46:24.156:        Format: mqrfh2
2009-01-28 11:46:24.156:        Queue Manager: PSMIG_QM
2009-01-28 11:46:24.156:        Queue: PUBSUB.SAMPLE.QUEUE
2009-01-28 11:46:24.250: Migrating subscriptions for topic string $SYS/STREAM/TEST_STREAM/RFH1/EU/France/Kersaux
2009-01-28 11:46:24.250: [8] Migrating subscription for:
2009-01-28 11:46:24.250:        Format: mqrfh2
2009-01-28 11:46:24.250:        Queue Manager: PSMIG_QM
2009-01-28 11:46:24.250:        Queue: PUBSUB.FRANCE.QUEUE
2009-01-28 11:46:24.281: ... finished parsing subscriptions
2009-01-28 11:46:24.281: Starting to parse topics ...
2009-01-28 11:46:24.281: Migrating ACLs for topic string
2009-01-28 11:46:24.281: Migrating ACLs for topic string RFH2/EU/France/Toison
2009-01-28 11:46:24.281: Migrating ACLs for topic string RFH2/EU/France/Carnac
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/STREAM/TEST_STREAM/RFH1/EU/France/Pontivy
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/Broker/+/warning/expiry/Subscription/#
2009-01-28 11:46:24.281:        None found.
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/Broker/+/Subscription/#
2009-01-28 11:46:24.281:        None found.
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/Broker/+/Status
2009-01-28 11:46:24.281:        None found.
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/Broker/+/Status/ExecutionGroup/#
```

```
2009-01-28 11:46:24.281:        None found.
2009-01-28 11:46:24.281: Migrating ACLs for topic string $SYS/STREAM/TEST_STREAM/RFH1/EU/France/Kersaux
2009-01-28 11:46:24.281: ... finished parsing topics
2009-01-28 11:46:24.281: Starting to parse retained publications ...
2009-01-28 11:46:24.296: Migrating retained publications for topic string $SYS/Broker/TEST_BROKER/Status
2009-01-28 11:46:24.296: Migrating retained publication for default subscription point.
2009-01-28 11:46:24.906: ... finished parsing retained publicatons
2009-01-28 11:46:24.968:
All Pub/Sub data has been retrieved from the broker.
2009-01-28 11:46:24.968: Applying changes to queue manager Pub/Sub state.
2009-01-28 11:46:24.972: Created topic object: MIGMBBRK.TOPIC.00004
2009-01-28 11:46:24.972: Created topic object: MIGMBBRK.TOPIC.00003
2009-01-28 11:46:24.972: Created topic object: MIGMBBRK.TOPIC.00002
2009-01-28 11:46:24.972: Created topic object: MIGMBBRK.TOPIC.00001
2009-01-28 11:46:24.977: Defining subscription [1]
2009-01-28 11:46:24.977: Defining subscription [2]
2009-01-28 11:46:24.977: Defining subscription [3]
2009-01-28 11:46:24.977: Defining subscription [4]
2009-01-28 11:46:24.993: Defining subscription [5]
2009-01-28 11:46:24.993: Defining subscription [6]
2009-01-28 11:46:24.993: Defining subscription [7]
2009-01-28 11:46:24.993: Defining subscription [8]
2009-01-28 11:46:29.996: Migration completion message written.
```

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

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8.4. Migrating a WebSphere Event Broker publish/subscribe collective to a WebSphere MQ publish/subscribe cluster

Complete these tasks to migrate a publish/subscribe collective from WebSphere® Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 to a WebSphere MQ Version 7.0.1 or later version publish/subscribe cluster.

> **Before you begin**
>
>> Install WebSphere MQ Version 7.0.1 or a later version.
>>
>> Make sure that you are familiar with the information in WebSphere Event Broker Version 6.0 migration to WebSphere MQ Version 7.0.1 and later versions and Access Control List (ACL) migration.
>>
>> Make sure that you are familiar with the first tasks to set up a new cluster and add a queue manager to it, described in WebSphere MQ Queue Manager Clusters.
>>
>> On distributed systems, set up and initialize a command environment in which WebSphere MQ commands and WebSphere Event Broker commands can run.
>>
>> Set the queue manager **PSMODE** attribute to COMPAT, using the following command: ALTER QMGR PSMODE(COMPAT)

Procedure

1. Stop all the publish/subscribe applications in the topology and allow all in-flight messages to be processed.
2. Use the MQSC command DISPLAY QUEUE(*) to check that the current depth on the following queues is zero:
   - SYSTEM.BROKER.INTERBROKER.QUEUE.1A
   - SYSTEM.BROKER.INTERBROKER.QUEUE.1N
   - SYSTEM.BROKER.INTERBROKER.QUEUE.1T
   - SYSTEM.BROKER.CONTROL.QUEUE
   - Transmit queues
   - Message flow input queues
3. Upgrade the underlying queue manager of each broker in the collective to WebSphere MQ 7.0.1 or a later version.
4. If any queue manager is currently connected using a manually defined channel and transmit queue, delete the manually defined channel now. During the removal of the transmit queues, because all applications are stopped, it is possible that messages from the WebSphere Message Broker configuration manager might be left stranded on transmit queues. However, this does not present a problem because the configuration manager automatically attempts to re-establish communication if it does not receive a timely response. When migration is complete, the configuration manager is no longer used.
   Note: If you need to roll back the publish/subscribe configuration migration, you must recreate these manually defined channels and transmit queues, or the cluster channels will be used for communication between the brokers.
5. Use MQSC commands to set up a queue manager cluster containing all the queue managers that are associated with the brokers:
   a. Decide on a cluster name
   b. Nominate two queue managers as full repository queue managers:
      ```
      ALTER QMGR REPOS('clusname')
      ```
   c. Define the cluster receiver channel on each queue manager:
      ```
      DEFINE CHANNEL('to.qmgr_name') CHLTYPE(CLUSRCVR) TRPTYPE(TCP) CONNAME('(hostname(fr_listener_port)') CLUSTER('clusname')
      ```
   d. Start the channel:
      ```
      START CHANNEL('to.qmgr_name')
      ```
   e. Define the cluster to send to the full repository on each queue manager:
      ```
      DEFINE CHANNEL('to.fr_qmgr_name') CHLTYPE(CLUSSDR) TRPTYPE(TCP) CONNAME('fr hostname(fr_listener_port)') CLUSTER('clusna
      ```
   f. Start the channel:
      ```
      START CHANNEL('to.fr_qmgr_name')
      ```
6. Create the publish/subscribe cluster. On each queue manager, alter the topic SYSTEM.BASE.TOPIC to add it to the cluster:

```
ALTER TOPIC(SYSTEM.BASE.TOPIC) CLUSTER('clusname')
```

7. Allow time for the cluster topics to propagate and then check that all queue managers are correctly participating in the cluster:

```
DISPLAY CLUSQMGR(*)
```

8. For each queue manager, migrate the publish/subscribe configuration data to WebSphere MQ. See Migrating publish/subscribe configuration data from WebSphere Event Broker V6.

9. When each broker has had its publish/subscribe configuration data migrated to the queue manager, use this MQSC command to trigger the resynchronization of proxy subscriptions with all the other queue managers in the publish/subscribe cluster:

```
REFRESH QMGR TYPE (PROXYSUB)
```

Note: If, for any reason, you have cause to roll back and rerun the broker publish/subscribe migration, you must run this resynchronization step and all the steps that follow it.

10. Allow all proxy subscriptions and retained publications to be propagated and check that the status of subscriptions and publications is what you expect to see:

   a. Check the proxy subscriptions:

   ```
   DISPLAY SUB(*) SUBTYPE(PROXY)
   ```

   b. Check retained publications:

   ```
   DISPLAY TPSTATUS('#') RETAINED
   ```

   c. Use this MQSC command to check that the current depth of the following queues is zero:

   ```
   DISPLAY QLOCAL(*)
   ```

   SYSTEM.INTER.QMGR.CONTROL
   SYSTEM.INTER.QMGR.PUBS
   SYSTEM.INTER.QMGR.FANREQ
   SYSTEM.CLUSTER.TRANSMIT.QUEUE

11. Restart your publish/subscribe applications.

What to do next

The migration process uses a queue called SYSTEM.TEMP.MIGMBBRK.REPLY.QUEUE to receive messages from the broker. When the process starts it checks for the existence of the queue and creates or clears it as necessary. When it has finished it attempts to delete the queue; however, because the broker also uses the queue to send replies, it might still have the queue open. If so, the migration process is unable to delete the queue. When you have completed the migration, check if SYSTEM.TEMP.MIGMBBRK.REPLY.QUEUE exists, and if it does, delete it.

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

This build: January 26, 2011 11:07:13

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8.5. Retained publications with headers in MQRFH format

Retained publications in MQRFH format might lose data when migrated to WebSphere MQ Version 7.0.1 or later versions.

WebSphere Message Broker and WebSphere Event Broker applications that communicate with each other by using publish/subscribe can do so regardless of the message format that they use. WebSphere Message Broker delivers the message in the format of the subscription and provides automatic conversion to ensure that a subscriber receives messages in the requested format.

WebSphere Message Broker and WebSphere Event Broker applications generally use the MQRFH2 message header, but it is possible that an application might have used the MQRFH format.

The migration of publish/subscribe information from WebSphere Message Broker or WebSphere Event Broker to WebSphere MQ Version 7.0.1 requests messages in MQRFH2 format. It is rare for WebSphere Message Broker and WebSphere Event Broker client applications to use messages in MQRFH format. However, if an application does use retained messages in MQRFH format, it is possible that some truncation of data might occur when migrated. In particular, data passed using the MQPSStringData and MQPSIntData name/value pairs is not migrated.

The migration function checks for two conditions in the data that is returned from the broker:

- One or more retained messages stored in the broker
- One or more MQRFH subscription

If both these conditions are true, the migration function displays a warning message and writes a warning message in the migration log stating that MQRFH retained publications have been migrated with a possible loss of data.

MQRFH2 retained publications are migrated correctly.

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

This build: January 26, 2011 11:07:11

Notices | Trademarks | Downloads | Library | Support | Feedback

This topic's URL:
ps22940_

8.6. Differences from WebSphere Message Broker Versions 6.0 and 6.1 publish/subscribe

There are a number of minor differences between the publish/subscribe support in WebSphere® MQ Version 7.0.1, and that in WebSphere Message Broker Version 6.0 and 6.1.

Parent topic: WebSphere Event Broker Version 6.0 or WebSphere Message Broker Version 6.0 or 6.1 publish/subscribe migration to WebSphere MQ Version 7.0.1 and later versions

Subscription names and traditional identities

In WebSphere Message Broker (and WebSphere MQ Version 6), a subscription with a subscription name (SubName) retains its traditional identity. This means that, for example, if a Deregister Subscriber message requests that all the subscriptions that have a given traditional identity are unsubscribed, the

broker unsubscribes subscriptions that have a subscription name. In WebSphere MQ Version 7.0.1, the same Deregister Subscriber request leaves subscriptions with a subscription name unchanged, because WebSphere MQ Version 7.0.1 identifies subscriptions for that traditional identity by using the subscription name that is generated by the queued publish/subscribe interface.

Using a new subscription point

To use a new subscription point in WebSphere MQ Version 7.0.1 and later versions, you must perform the following actions:

1. Create a topic object whose topic string is the name of the subscription point
2. Add the topic object to the namelist SYSTEM.QPUBSUB.SUBPOINT.NAMELIST

In WebSphere Message Broker Versions 6.0 and 6.1 these actions are not necessary.

Publications and subscription points

In WebSphere Message Broker, RFH2 publishers did not specify a subscription point tag in the `<psc>` folder. In WebSphere MQ, publishers tell the queued publish/subscribe interface which subscription point they want to publish on by adding a subscription point to their `<psc>` folder.

Putting RFH2 publications on a queue

In WebSphere MQ, complete the following steps to put an RFH2 publication on a queue so that the queued publish/subscribe interface can read them:

1. Create a queue.
2. Create a topic object with the same name as the queue.
3. Add the topic to the namelist SYSTEM.QPUBSUB.QUEUE.NAMELIST.

Publication when subscribers are added or removed

In WebSphere Message Broker Version 6.1, an application can subscribe to topics that publish a message when a subscriber is added to the system and when a subscriber is removed. WebSphere MQ has no direct equivalent. The information is available in WebSphere MQ by using MQSC or PCF commands but this information has to be polled rather than being automatically sent to interested parties.

Fields that cannot be altered

In a WebSphere Message Broker subscription, the following fields can be altered:

Topic

Filter

Destination queue

Subscription name

In WebSphere Message Broker you can alter these fields only for subscriptions that have a subscription name. Otherwise the rename request in WebSphere Message Broker has no way to refer to the original subscription and instead creates a new subscription.

In WebSphere MQ you cannot alter these fields. You can add a subscription name to a subscription that does not have one, by using the registration options property `AddName` but when it has been added it cannot be renamed and the subscription can no longer be referred to by its traditional identity.

Publication or subscription to multiple topics

In WebSphere Message Broker a single command message can publish or subscribe to multiple separate topics. In WebSphere MQ the queued publish/subscribe interface supports this but it does so by creating multiple separate publications or subscriptions. Consider, for example, a subscribing application that uses a single command message to subscribe to two topics, topic1 and topic2, and a publishing application that uses a single command to publish a single message on both topic1 and topic2. In WebSphere Message Broker, the subscribing application receives a single message, which the MQRFH2 header lists as being on topic1 and topic2. However, in WebSphere MQ Version 7.0.1 and later versions, the subscribing application receives two separate copies of the message: one on topic1 and one on topic2.

User separation of traditional identities

In WebSphere Message Broker publish/subscribe, when a user has registered a subscription using a particular traditional identity, no other user can register a subscription on the same traditional identity, unless the owning user removes their subscriptions. In WebSphere MQ there is no restriction on users creating subscriptions to the same traditional identity as other subscribers.

Persistence property of retained messages

WebSphere Message Broker and WebSphere MQ differ in how they interpret the persistence property for retained publication messages.

In WebSphere Message Broker, the persistence property controls only how the message is delivered; that is, whether it is persistent or nonpersistent when it is delivered to a subscriber. Unless the subscriber requests persistence, nonpersistent retained publications are delivered as nonpersistent. However, a persistent or nonpersistent retained publication is stored by the broker until it is explicitly deleted, either by an RFH2 delete publication message or because the expiry time for the message has passed.

In WebSphere MQ, the persistence property controls the life span of the retained publication and whether the publication message is delivered to a subscriber as persistent or nonpersistent. Unless the subscriber requests persistence, nonpersistent retained publications are delivered as nonpersistent. A persistent retained publication survives an event that would cause a nonpersistent publication to be discarded, such as restarting a queue manager. However, unlike in WebSphere Message Broker, a nonpersistent retained message is discarded when a similar event occurs.

Consequently, when a nonpersistent retained message is migrated from WebSphere Message Broker to a WebSphere MQ Version 7.0.1 queue manager, the fact that it is marked as nonpersistent causes it to be discarded at the first queue manager restart. In general, this difference in behavior is usually not significant because it is not common for retained messages to be marked as nonpersistent. However, you must code your application to recover nonpersistent messages if their recovery is required.

This build: January 26, 2011 11:07:12

9. WebSphere MQ version 6 publish/subscribe migration

Publish/subscribe function in WebSphere MQ Version 7.0 is performed by the queue manager, rather than by a separate publish/subscribe broker. When you migrate your WebSphere MQ Version 6 systems to WebSphere MQ Version 7.0, publish/subscribe function is not automatically migrated. You must upgrade publish/subscribe information to WebSphere MQ Version 7.0 separately.

➤

In WebSphere MQ V6, applications perform publish and subscribe operations by placing special request messages on certain queues. The WebSphere MQ V6 Publish/Subscribe Broker then reads and acts on these messages (for example by publishing messages to subscribing applications). State information such as who is subscribing to which publications is owned and maintained by the publish/subscribe broker. This broker is started and stopped independently from the queue manager.

In WebSphere MQ V7, newly written publish/subscribe applications do not communicate with the broker in order to publish or subscribe; they use the new API directly. The verb **MQPUT** is used to publish messages to a topic and **MQSUB** is used to subscribe. The queue manager itself performs the publish/subscribe function, so no separate publish/subscribe broker is required.

When you upgrade a queue manager from WebSphere MQ V6 to WebSphere MQ V7, the publish/subscribe broker is not upgraded. State information must be migrated from the WebSphere MQ publish/subscribe broker into the queue manager. Data that is migrated includes subscriptions, retained publications, hierarchy relations, and authorities. You migrate a queue manager by using the **strmqbrk** command, which previously started the publish/subscribe broker.

WebSphere MQ V6 publish/subscribe brokers could be connected into hierarchies so that publications and subscriptions could flow between them. After migrating (using **strmqbrk**) these hierarchies continue to function in WebSphere MQ V7. WebSphere MQ V7 also contains a new method of allowing publications and subscriptions flow between queue managers; publish/subscribe clusters. An advantage of using publish/subscribe clusters is that no queue manager provides a single point of failure to the flow of publications or subscriptions. To migrate to a publish/subscribe cluster, first migrate to a WebSphere MQ V7 hierarchy using **strmqbrk** and then convert it to a cluster by creating cluster topics and altering parent/child relations.

◀

strmqbrk (Migrate WebSphere MQ Version 6.0 broker to Version 7.0)
Migrate the persistent state of a Websphere MQ publish/subscribe broker.

Publish/subscribe command messages migration
The WebSphere MQ publish/subscribe command message interface is deprecated in version 7.0. If you have applications that use this interface directly, you should migrate those applications to use the new Version 7.0 publish/subscribe functions.

New queue manager attributes for publish/subscribe
Five attributes, formerly held in the queue manager configuration file, qm.ini, are now replaced by attributes of the queue manager.

WebSphere MQ publish/subscribe topology migration
Migrate a version 6 publish/subscribe hierarchy to a version 7 hierarchy, or convert it to a publish/subscribe cluster, before running existing version 6 publish/subscribe applications on version 7.

Differences from WebSphere MQ Version 6 publish/subscribe
Queued publish/subscribe programs and queued broker administration in version 7 differ from that in version 6. The differences in program behavior are slight; the administration differences are more extensive. Many version 6 programs coexist and interoperate with version 7, without change.

Using publish/subscribe with WebSphere MQ classes for JMS
Existing WebSphere MQ classes for JMS applications run unchanged after you upgrade your queue manager to WebSphere MQ V7.0. In some circumstances, you must specify whether WebSphere MQ classes for JMS uses WebSphere MQ Version 6.0 or Version 7.0 publish/subscribe function.

Migration implications of mapping an alias queue to a topic object
WebSphere MQ Version 7.0 introduces an extension to the alias queue object that allows an alias queue to be mapped to a topic object.

Parent topic: Migration

This build: January 26, 2011 11:07:07

Notices | Trademarks | Downloads | Library | Support | Feedback

9.1. strmqbrk (Migrate WebSphere MQ Version 6.0 broker to Version 7.0)

Migrate the persistent state of a Websphere MQ publish/subscribe broker.

Purpose

➤Use the **strmqbrk** command to migrate WebSphere® MQ Version 6.0 publish/subscribe broker's state to WebSphere MQ Version 7.0 publish/subscribe. If the queue manager has already been migrated, no action is taken.◀

In WebSphere MQ Version 6.0, **strmqbrk** started a broker. The WebSphere MQ Version 7.0 publish/subscribe engine cannot be started in this manner. To enable publish/subscribe for a queue manager, use the ALTER QMGR command. For details, see ALTER QMGR.

➤You can also use the **runmqbrk** command. This has the same parameters as **strmqbrk** and exactly the same effect.◀

➤

Syntax

AIX®, HP-UX, Linux, Solaris, and Windows

Syntax diagram format ○ Railroad diagram ○ Dotted decimal
QMgrName\n' + '4? -f \n' + '5? -l *LogFileName*\n' + '\n' + '

');break; default:document.write('

```
 \n'
+ '>>-strmqbrk--+--------------------+--+--------------+------->\n'
+ '              \'- -p --ParentQMgrName-\'  \'- -m --QMgrName-\'   \n'
+ '\n'
+ '>--+------+--+------------------+---------------------------><\n'
+ '   \'- -f -\'  \'- -l --LogFileName-\'   \n'
+ '\n'
+ '
```

');} //]]>

◄

►

Optional parameters

AIX, HP-UX, Linux, Solaris, and Windows

-p *ParentQMgrName*

   Note: This option is deprecated. **strmqbrk** migrates the parent connection automatically.

   If you specify the current parent queue manager, a warning message is issued and migration continues. If you specify a different queue manager, a error is issued and migration is not performed.

-m *QMgrName*

   The name of the queue manager to be migrated. If you do not specify this parameter, the command is routed to the default queue manager.

-f

   Force migration. This option specifies that objects created during the migration replace existing objects with the same name. If this option is not specified, if migration would create a duplicate object, a warning is issued, the object is not created, and migration continues.

-l *LogFileName*

   Log migration activity to the file specified in *LogFileName*.

◄

►

Syntax

i5/OS®

Syntax diagram format ○ Railroad diagram ○ Dotted decimal
QMgrName\n' + '\n' + '

');break; default:document.write('

```
 \n'
+ '>>-STRMQMBRK--+------------------------------+---------------->\n'
+ '              \'- -PARENTMQM--(ParentQMgrName)-\'   \n'
+ '\n'
+ '>--+---------------------+-------------------------------><\n'
+ '   \'- -MQMNAME --QMgrName-\'   \n'
+ '\n'
+ '
```

');} //]]> ◄

►

Optional parameters

AIX, HP-UX, Linux, Solaris, and Windows

-PARENTMQM*(ParentQMgrName)*

   Note: This option is deprecated.

   If you specify the current parent queue manager, a warning message is issued and migration continues. If you specify a different queue manger, a warning is issued and migration is not performed.

-MQMNAME *QMgrName*

   The name of the queue manager to be migrated. If you do not specify this parameter, the command is routed to the default queue manager.

◄

Parent topic: WebSphere MQ version 6 publish/subscribe migration

This build: January 26, 2011 11:07:10

Notices | Trademarks | Downloads | Library | Support | Feedback

9.2. Publish/subscribe command messages migration

The WebSphere® MQ publish/subscribe command message interface is deprecated in version 7.0. If you have applications that use this interface directly, you should migrate those applications to use the new Version 7.0 publish/subscribe functions.

The following sections explain how to replace existing command messages.

Identity

In WebSphere MQ Version 6 there were two ways of identifying a subscriber. These were referred to as the traditional identity and the subscription name.

The traditional identity was also used to identify a publisher. The traditional identity was a combination of queue name, queue manager name, and optional correlation identifier.

A publisher no longer has an explicit publisher identity, but can be identified in the same way as any other WebSphere MQ application, by means of its connection to the queue manager. As there is no explicit registration of a publisher, or his identity over and above what can be obtained by displaying the connections to the queue manager, there is no longer a need for the anonymous option on Register Publisher. Your application must now use the SubName

field in the MQSD to identify a subscriber.

The correlation identifier also had a secondary use which was to allow subscribers to MQGET by CorrelId to only get publications for a particular subscription, if there were multiple subscriptions all using the same queue. This is provided by using the SubCorrelId field returned in the MQSD from the MQSUB call.

Stream Name

MQPS_STREAM_NAME is deprecated because stream names are part of the full topic name. Stream names can be mapped to administrative topic objects, and then the topic name used along with the stream name can be mapped to a topic string to be concatenated with the topic string from the topic object. For example, if the application was previously using a stream queue name of SYSTEM.BROKER.RESULTS.STREAM and a topic of `Sport/Soccer/State/LatestScore/*`, then a topic object can be created whose name is SYSTEM.BROKER.RESULTS.STREAM which is defined to have a topic string of `/` and the new application will provide a two part topic name in the MQOD or MQSD using an ObjectName of SYSTEM.BROKER.RESULTS.STREAM and an ObjectString of `Sport/Soccer/State/LatestScore/*`.

If an administrative topic object that does not exist is used in place of a stream name, the error (effectively mapping to MQRCCF_STREAM_ERROR) which is given is MQRC_UNKNOWN_OBJECT_NAME.

Application migration details

When migrating to use the MQ API to do publish/subscribe, the code within any one application program must be consistent.

The application program must not contain a mixture of these deprecated APIs and the new MQ API options. An entire application suite, such as the combination of a subscribing application program and a publishing application program, does not all need to be migrated at the same time. Interaction between a publishing application program using the deprecated APIs and a subscribing application using the new MQ API is supported.

Delete Publication - Version 7 replacement
Replace the **Delete Publication** command by using the PCF **ClearTopic** command.

Deregister publisher - Version 7 replacement
Replace the **Deregister publisher** command with the MQCLOSE Message Queue Interface (MQI) call.

Deregister subscriber - Version 7 replacement
Replace the **Deregister subscriber** command with the MQCLOSE Message Queue Interface (MQI) call.

Publish - Version 7 replacement
Replace the Publish command with the MQPUT/MQPUT1 Message Queue Interface (MQI) calls.

Register publisher - Version 7 replacement

Register subscriber - Version 7 replacement

Request Update - Version 7 replacement

Parent topic: WebSphere MQ version 6 publish/subscribe migration

This build: January 26, 2011 11:07:07

9.2.1. Delete Publication - Version 7 replacement

Replace the **Delete Publication** command by using the PCF **ClearTopic** command.

The Delete Publication command message contains a number of parameters. This should be replaced by using the PCF ClearTopic command. This section details the equivalent options or fields in the PCF command message to show how you can migrate an application from using the Delete Publication command message to using the PCF ClearTopic command message.

Required parameters

MQPS_COMMAND with value MQPS_DELETE_PUBLICATION is implied when you use the ClearTopic command.

MQPS_TOPIC is provided in a field in the ClearTopic command message. If your application provided more than one MQPS_TOPIC in a single Delete Publication command message, the migrated application must now issue a separate ClearTopic call for each separate topic string.

Optional parameters

MQPS_DELETE_OPTIONS is replaced with an attribute of the ClearTopic command message.

For MQPS_STREAM_NAME see Streams and topics.

Error codes

If your application checked for any of the following error codes, the equivalent MQRC error codes are shown in the following table:

Reason codes in NameValueString of the broker response message.	MQRC equivalent
MQRCCF_STREAM_ERROR	MQRC_UNKNOWN_OBJECT_NAME
MQRCCF_TOPIC_ERROR	MQRC_OBJECT_STRING_ERROR
MQRCCF_INCORRECT_STREAM	See Note 1
Notes: 1. No equivalent because there is no need to provide the stream name twice, once in the command and once by putting it to the stream queue, so you cannot have a mismatch.	

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:03

9.2.2. Deregister publisher - Version 7 replacement

Replace the **Deregister publisher** command with the `MQCLOSE` Message Queue Interface (MQI) call.

The Deregister Publisher command message contains a number of parameters. You should replace it with the MQCLOSE verb. This section details the equivalent options or fields in the WebSphere® MQ API to show how to migrate an application from the Deregister Publisher command message to MQCLOSE.

A difference in behavior will be seen because a Register Publisher command could leave an application registered even when it was not connected, whereas the equivalent MQOPEN will only show a publisher's intent when the application is connected and keeps the handle from MQOPEN available. Even without issuing MQCLOSE, an application will be deregistered when the queue manager detects that the application's connection is lost.

Required parameters

MQPS_COMMAND with value MQPS_REGISTER_PUBLISHER is implied when closing a handle to a topic previously opened using MQOPEN with the MQOO_OUTPUT option.

Optional parameters

If your application provided a queue and queue manager name (either by using MQPS_Q_MGR_NAME and MQPS_Q_NAME in the command message, or from the ReplyToQ and ReplyToQMgr fields in MQMD of the command message), for the migrated application, these attributes are specified implicitly by providing the handle obtained when opening the topic.

MQPS_REGISTRATION_OPTIONS is replaced with options on the MQCLOSE call. See MQCLOSE for more details. Note that there are two ways you could have specified each of these options in your application, a string constant, MQPS_* or an integer constant, MQREGO_*. Both are replaced by the use of a single numeric constant.

String constant	Integer constant	MQCLOSE Options field constant
MQPS_CORREL_ID_AS_ IDENTITY	MQREGO_CORREL_ID_AS_ IDENTITY	See Queued publish/subscribe compatibility
MQPS_DEREGISTER_ALL	MQREGO_DEREGISTER_ ALL	See Note 1
Notes: 1. ❯Because only one topic can be opened by the MQOPEN call, closing the handle closes that one topic. There is no need for an equivalent option. If many topics are opened, issuing MQDISC will close them all, saving the need to MQCLOSE each handle. ❮		

For MQPS_STREAM_NAME see Streams and topics, although in this case, the stream name is specified implicitly by providing the handle obtained when opening the topic. MQPS_TOPIC is implied by the provision of the handle obtained when opening the topic.

Error codes

If your application checked for any of the following error codes, the equivalent MQRC error codes are shown in the following table:

Reason codes in NameValueString of the broker response message.	MQRC equivalent
MQRCCF_STREAM_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_TOPIC_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_NOT_REGISTERED	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_Q_MGR_NAME_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_Q_NAME_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_DUPLICATE_IDENTITY	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_UNKNOWN_STREAM	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_REG_OPTIONS_ERROR	MQRC_OPTIONS_ERROR
Notes: 1. This error code implies the same type of problem, but because, for the migrated application, all of these fields are specified implicitly by providing the handle obtained when opening the topic, this is the only equivalent error.	

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:03

Notices | Trademarks | Downloads | Library | Support | Feedback

9.2.3. Deregister subscriber - Version 7 replacement

Replace the **Deregister subscriber** command with the `MQCLOSE` Message Queue Interface (MQI) call.

The Deregister Subscriber command message contains a number of parameters. This should be replaced by using the MQCLOSE verb. This section details the equivalent options or fields in the MQ API to show how an application would migrate from using the Deregister Subscriber command message to using MQCLOSE. If the Deregister Subscriber command message was used in a different program from that of the Register Subscriber command message, the application must now first use the MQSUB call with the MQSO_RESUME option to get a handle to the subscription, in order to deregister it.

Required parameters

MQPS_COMMAND with value MQPS_DEREGISTER_SUBSCRIBER is replaced by the use of the MQCLOSE verb with the option MQCO_REMOVE_SUB.

Optional parameters

If your application provided a queue and queue manager name (either by using MQPS_Q_MGR_NAME and MQPS_Q_NAME in the command message, or from the ReplyToQ and ReplyToQMgr fields in MQMD of the command message), after migrating the application, these attributes are specified implicitly by

providing the handle obtained when subscribing to the topic.

MQPS_REGISTRATION_OPTIONS is replaced with Options on the MQCLOSE call. See MQCLOSE for more details. Note that there are two ways you could have specified each of these options in your application, a string constant, MQPS_* or an integer constant, MQREGO_*. Both are replaced by the use of a single numeric constant.

String constant	Integer constant	MQCLOSE Options field constant
MQPS_CORREL_ID_AS_IDENTITY	MQREGO_CORREL_ID_AS_IDENTITY	See Note 1
MQPS_DEREGISTER_ALL	MQREGO_DEREGISTER_ALL	See Note 2
MQPS_FULL_RESPONSE	MQREGO_FULL_RESPONSE	See Note 3
MQPS_LEAVE_ONLY	MQREGO_LEAVE_ONLY	See Note 4
MQPS_VARIABLE_USER_ID	MQREGO_VARIABLE_USER_ID	See Note 1

Notes:

1. This option is implied by the provision of the handle obtained when subscribing to the topic.
2. Because only one topic can be subscribed to by the MQSUB call, closing the handle closes that one topic. There is no need for an equivalent option. If many topics are opened, issuing MQDISC will close them all, saving the need to close each handle.
3. Use of this option is implied in the use of the MQSUB verb. The fields returned in the response message are now populated in the MQSD structure. See MQSUB for more details. Because an MQSUB call must be made in order to obtain the handle to pass to the MQCLOSE call, this option is deprecated.
4. Use of these options are deprecated.

For MQPS_STREAM_NAME see Streams and topics, although in this case, the stream name is specified implicitly by providing the handle obtained when subscribing to the topic. MQPS_SUBSCRIPTION_NAME is replaced by the field in the MQSD called SubName and is therefore implied by the provision of the handle obtained when subscribing to the topic. MQPS_TOPIC is provided in a field in the MQSD called ObjectString, and is therefore implied by the provision of the handle obtained when subscribing to the topic.

See MQSD for more details

Error codes

If your application checked for any of the following error codes, the equivalent MQRC error codes are shown in the following table:

Reason codes in NameValueString of the broker response message.	MQRC equivalent
MQRCCF_STREAM_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_TOPIC_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_NOT_REGISTERED	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_Q_MGR_NAME_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_Q_NAME_ERROR	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_DUPLICATE_IDENTITY	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_UNKNOWN_STREAM	MQRC_HOBJ_ERROR (See note 1)
MQRCCF_REG_OPTIONS_ERROR	MQRC_OPTIONS_ERROR

Notes:

1. This error code implies the same type of problem, but because all of these fields are now implied by the provision of the handle obtained when opening the topic, this is the only equivalent error.

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:04

Notices | Trademarks | Downloads | Library | Support | Feedback

9.2.4. Publish - Version 7 replacement

Replace the Publish command with the MQPUT/MQPUT1 Message Queue Interface (MQI) calls.

The Publish command message contains a number of parameters. The command message is replaced by using the MQPUT/MQPUT1 calls. This information details the equivalent options or fields in the MQI to show how an application would migrate from using the Publish command message to using MQPUT/MQPUT1.

Required parameters

MQPS_COMMAND with value MQPS_PUBLISH is implied when putting a message to an object handle that was obtained by opening a topic for MQOO_OUTPUT.

There is no equivalent to registering a publisher for new applications and registering it as an anonymous publisher. To achieve the same result of not passing a reply-to destination to subscribers, set the **MQPMO** option MQPMO_SUPPRESS_REPLYTO.

MQPS_TOPIC is provided in a field in the MQOD called ObjectString. See MQOD - Object Descriptor for more details. If your application provided more than one MQPS_TOPIC in a single Register Publisher command message, it must now issue a separate MQOPEN call for each separate topic string.

Optional parameters

MQPS_INTEGER_DATA can be replaced with the message property mqpse.Sid or its synonym MQPubStrIntData.

MQPS_PUBLICATION_OPTIONS is replaced with the *Options* field in the MQPMO structure. See MQPMO for more details. There are two ways you could have specified each of these options in your application; a string constant, MQPS_* or an integer constant, MQPUBO_*. Both are replaced by the use of a single numeric constant.

String constant	Integer constant	Version 7 replacement

`MQPS_CORREL_ID_ AS_IDENTITY`	`MQPUBO_CORREL_ID_ AS_IDENTITY`	See Queued publish/subscribe compatibility for more information
`MQPS_IS_RETAINED_ PUBLICATION`	`MQPUBO_IS_RETAINED_ PUBLICATION`	This option is replaced with the message property mqps.Ret or its synonym MQIsRetained
`MQPS_NO_ REGISTRATION`	`MQPUBO_NO_ REGISTRATION`	This option is deprecated because publishers are no longer registered
`MQPS_OTHER_ SUBSCRIBERS_ONLY`	`MQPUBO_OTHER_ SUBSCRIBERS_ONLY`	This option is deprecated. If an application does not want to receive its own publications it can subscribe using the option `MQPMO_NOT_OWN_SUBS` on the `MQPUT/MQPUT1` calls.
`MQPS_RETAIN_ PUBLICATION`	`MQPUBO_RETAIN_ PUBLICATION`	`MQPMO_RETAIN`

`MQPS_Q_MGR_NAME` is replaced by the ReplyToQMgr in the `MQMD` of the publication. If the publisher specifies `MQPMO_SUPPRESS_REPLYTO` the ReplyToQMgr field is not set to the publishers queue manager name by the queue manager, otherwise it is.◄

`MQPS_Q_NAME` is replaced by the ReplyToQ in the `MQMD` of the publication. If the publisher does not set the ReplyToQ, it is not available.

`MQPS_REGISTRATION_OPTIONS` is replaced with Options in the `MQPMO` structure. See MQPMO for more details. These options are the same as for the Register Publisher command.

`MQPS_SEQUENCE_NUMBER` is replaced with the message property mqpse.Seq or its synonym MQPubSeqNum.

For `MQPS_STREAM_NAME`, see Streams and topics.

`MQPS_STRING_DATA` is replaced with the message property mqpse.Sid or its synonym MQPubStrIntData.

Parent topic: Publish/subscribe command messages migration

Related information
Publish/subscribe message properties

This build: January 26, 2011 11:07:05

Notices | Trademarks | Downloads | Library | Support | Feedback

9.2.5. Register publisher - Version 7 replacement

The Register Publisher command message contains a number of parameters. This should be replaced by using the `MQOPEN` verb. This section details the equivalent options or fields in the MQI to show how an application would migrate from using the Register Publisher command message to using `MQOPEN`. A difference in behaviour will be seen because a Register Publisher command could leave an application registered even when it was not connected, whereas `MQOPEN` will only show a publishers intent when the application is connected and keeps the handle from `MQOPEN` available.

Required parameters

`MQPS_COMMAND` with value `MQPS_REGISTER_PUBLISHER` is implied when opening a topic for `MQOO_OUTPUT`. If your application did not use Register Publisher, see the description of the Publish command message for details of remaining unregistered.

`MQPS_TOPIC` is provided in a field in the `MQOD` called ObjectString. See MQOD - Object Descriptor for more details. If your application provided more than one MQPS_TOPIC in a single Register Publisher command message, it must now issue a separate MQOPEN call for each separate topic string.

Optional parameters

If your application provided a queue and queue manager name (either by using `MQPS_Q_MGR_NAME` and `MQPS_Q_NAME` in the command message, or from the ReplyToQ and ReplyToQMgr fields in `MQMD` of the command message) in order for subscribing applications to be able to directly contact the publisher, then your application must now provide these details on each published message.

`MQPS_REGISTRATION_OPTIONS` is replaced with Options in the `MQPMO`. See MQPMO for more details. Note that there are two ways you could have specified each of these options in your application, a string constant, `MQPS_*` or an integer constant, `MQREGO_*`. Both are replaced by the use of a single numeric constant.

String constant	Integer constant	MQCLOSE Options field constant
`MQPS_ANONYMOUS`	`MQREGO_ANONYMOUS`	See Queued publish/subscribe compatibility
`MQPS_CORREL_ID_ AS_IDENTITY`	`MQREGO_CORREL_ID_ AS_IDENTITY`	See Queued publish/subscribe compatibility
`MQPS_DIRECT_ REQUEST`	`MQREGO_DIRECT_ EQUEST`	See note 1
`MQPS_LOCAL`	`MQREGO_LOCAL`	`MQPMO_SCOPE_QMGR`

> **Note:**
> 1. ►
>   Use of this option (that provides a queue for reply messages from subscribers) is implied if either the ReplyToQ or ReplyToQMgr field is set in the `MQMD` of a publication message.
>   If these fields are not provided, the queue manager sets the ReplyToQMgr to the queue manager local to the publisher, but does not set the ReplyToQ.
>   To make the publication anonymous, the publishing application should use `MQPMO_SUPPRESS_REPLYTO`.
>   ◄

For `MQPS_STREAM_NAME` see Streams and topics.

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:05

Notices | Trademarks | Downloads | Library | Support | Feedback

9.2.6. Register subscriber - Version 7 replacement

The Register Subscriber command message contains a number of parameters. This should be replaced by using the MQSUB verb. This section details the equivalent options or fields in the MQ API to show how an application would migrate from using the Register Subscriber command message to using MQSUB.

Required parameters

MQPS_COMMAND with value MQPS_REGISTER_SUBSCRIBER is replaced by the use of the MQSUB verb. If your application did not use Register Subscriber then the use of the MQSUB verb is not required for equivalent behaviour.

MQPS_TOPIC is provided in a field in the MQSD called ObjectString. See MQSD for more details. If your application provided more than one MQPS_TOPIC in a single Register Subscriber command message, it must now issue a separate MQSUB call for each separate topic string.

Optional parameters

If your application provided a non-local queue name and/or a queue manager name other than the one connected to (either by using MQPS_Q_MGR_NAME and MQPS_Q_NAME in the command message, or from the ReplyToQ and ReplyToQMgr fields in MQMD of the command message) then your application must now provide an object handle, which has been returned by a MQOPEN call for that queue, in the Hobj parameter of the MQSUB verb.

If your application provided the name of a queue local to the queue manager it connected to, it now has the option to request that the queue manager manage where the publications are sent. This can be done by using the MQSO_MANAGED option in the field in the MQSD called Options.

MQPS_REGISTRATION_OPTIONS is replaced with a field in the MQSD called Options. See MQSD for more details. Note that there are two ways you could have specified each of these options in your application, a string constant, MQPS_* or an integer constant, MQREGO_*. Both are replaced by the use of a single numeric constant.

String constant	Integer constant	MQCLOSE Options field constant
MQPS_ADD_NAME	MQREGO_ADD_NAME	See Note 1
MQPS_ANONYMOUS	MQREGO_ANONYMOUS	See Identity
MQPS_CORREL_ID_AS_ IDENTITY	MQREGO_CORREL_ID_ AS_IDENTITY	See Identity (also see Note 7)
MQPS_DUPLICATES_OK	MQREGO_DUPLICATES_OK	See Note 2
MQPS_FULL_RESPONSE	MQREGO_FULL_RESPONSE	See Note 3
MQPS_INCLUDE_STREAM_ NAME	MQREGO_INCLUDE_ STREAM_NAME	See Note 4
MQPS_INFORM_IF_ RETAINED	MQREGO_INFORM_IF_ RETAINED	See Note 5
MQPS_JOIN_EXCLUSIVE	MQREGO_JOIN_ EXCLUSIVE	See Note 6
MQPS_JOIN_SHARED	MQREGO_JOIN_SHARED	See Note 6
MQPS_LOCAL	MQREGO_LOCAL	MQSO_SCOPE_QMGR
MQPS_LOCKED	MQREGO_LOCKED	See Note 6
MQPS_NEW_ PUBLICATIONS_ONLY	MQREGO_NEW_PUB LICATIONS_ONLY	MQSO_NEW_ PUBLICATIONS_ONLY
MQPS_NO_ALTERATION	MQREGO_NO_ ALTERATION	MQSO_RESUME
MQPS_NON_PERSISTENT	MQREGO_NON_ PERSISTENT	MQSO_NON_PERSISTENT
MQPS_PERSISTENT	MQREGO_PERSISTENT	MQSO_PERSISTENT
MQPS_PERSISTENT_AS_ PUBLISH	MQREGO_PERSISTENT_ AS_PUBLISH	MQSO_PERSISTENT_AS_ PUBLISH
MQPS_PERSISTENT_AS_Q	MQREFO_PERSISTENT_ AS_Q	MQSO_PERSISTENT_AS_ QUEUE_DEF
MQPS_PUBLISH_ON_ REQUEST_ONLY	MQREGO_PUBLISH_ON_ REQUEST_ONLY	MQSO_PUBLICATIONS_ ON_REQUEST
MQPS_VARIABLE_USER_ID	MQREGO_VARIABLE_ USER_ID	MQSO_ANY_USERID, (also see Note 7)

Notes:
1. Use of this option is deprecated because the only identity of a subscription is the SubName. See Queued publish/subscribe compatibility.
2. Use of this option is deprecated because the queued interface has been removed.
3. Use of this option is implied in the use of the MQSUB verb. The fields returned in the response message are now populated in the MQSD structure. See MQSD for more details.
4. Use of this option is deprecated because stream names are part of the full topic name.
5. Use of this option is deprecated because the information about whether a publication is a retained publication or not is a message property that is always present.
6. Use of these options are deprecated.
7. This option is also relevant for Request Update.

For MQPS_STREAM_NAME see Streams and topics, although in this case, the stream name is implied by the provision of the handle obtained when subscribing to the topic.

MQPS_SUBSCRIPTION_NAME is replaced by the field in the MQSD called SubName. See MQSD for more details.

MQPS_SUBSCRIPTION_USER_DATA is replaced by the field in the MQSD called SubUserData. See MQSD for more details.

Error codes

If your application checked for any of the following error codes, the equivalent MQRC error codes are shown in the following table:

Reason codes in NameValueString of the broker response message.	MQRC equivalent
MQRCCF_STREAM_ERROR	
MQRCCF_TOPIC_ERROR	
MQRCCF_Q_MGR_NAME_ERROR	
MQRCCF_Q_NAME_ERROR	
MQRCCF_DUPLICATE_IDENTITY	MQRC_IDENTITY_MISMATCH
MQRCCF_CORREL_ID_ERROR	
MQRCCF_NOT_AUTHORIZED	
MQRCCF_UNKNOWN_STREAM	
MQRCCF_REG_OPTIONS_ERROR	
MQRCCF_DUPLICATE_SUBSCRIPTION	➤MQRC_SUB_ALREADY_EXISTS◀
MQRCCF_SUB_NAME_ERROR	
MQRCCF_SUB_IDENTITY_ERROR	See note 1
MQRCCF_SUBSCRIPTION_IN_USE	➤MQRC_SUBSCRIPTION_IN_USE◀
MQRCCF_SUBSCRIPTION_LOCKED	See note 1
MQRCCF_ALREADY_JOINED	See note 1

Notes:

1. There is no equivalent because the use of SubIdentity is deprecated, because the only identity of a subscription is the SubName. See Queued publish/subscribe compatibility.

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:06

9.2.7. Request Update - Version 7 replacement

The Request Update command message contains a number of parameters. This should be replaced by using the MQSUBRQ verb. This section details the equivalent options or fields in the MQ API to show how an application would migrate from using the Request Update command message to using MQSUBRQ.

Required parameters

MQPS_COMMAND with value MQPS_REQUEST_UPDATE is replaced by the use of the MQSUBRQ verb.

MQPS_TOPIC is implied by the use of the Hsub handle returned from the MQSUB call which is used as a parameter on the MQSUBRQ call.

Optional parameters

QMgrName, QName and StreamName are used in exactly the same way in Request Update command messages as they are in Register Subscriber command messages.

See Register subscriber - Version 7 replacement for details of how to migrate the use of these fields.

See Register subscriber - Version 7 replacement for details of how to migrate your application's use of MQPS_REGISTRATION_OPTIONS in this command message.

For MQPS_STREAM_NAME see Streams and topics.

MQPS_SUBSCRIPTION_NAME is implied by the use of the Hsub handle returned from the MQSUB call which is used as a parameter on the MQSUBRQ call.

Parent topic: Publish/subscribe command messages migration

This build: January 26, 2011 11:07:06

9.3. New queue manager attributes for publish/subscribe

Five attributes, formerly held in the queue manager configuration file, qm.ini, are now replaced by attributes of the queue manager.

In WebSphere MQ Version 6.0, the attributes listed in the following table were held in the Brokers stanza of the `qm.ini` file (or the registry in Windows). In WebSphere MQ Version 7.0, they are replaced by the queue manager attributes listed, which can be set by the MQSC command **ALTER QMGR** or the PCF command **Change Queue Manager**.

Table 1.

Attribute in qm.ini	Queue manager attribute (PCF parameter name)	MQSC parameter name
MaxMsgRetryCount	PubSubMaxMsgRetryCount	PSRTYCNT
DiscardNonPersistentInputMsg	PubSubNPInputMsg	PSNPMSG
DLQNonPersistentResponse DiscardNonPersistentResponse	PubSubNPResponse	PSNPRES

SyncPointIfPersistent	PubSubSyncPoint	PSSYNCPT

Parent topic: WebSphere MQ version 6 publish/subscribe migration

This build: January 26, 2011 11:07:11

Notices | Trademarks | Downloads | Library | Support | Feedback

◄►

9.4. WebSphere MQ publish/subscribe topology migration

Migrate a version 6 publish/subscribe hierarchy to a version 7 hierarchy, or convert it to a publish/subscribe cluster, before running existing version 6 publish/subscribe applications on version 7.

Publish/subscribe clusters and hierarchies offer different ways to connect queue managers together in a publish/subscribe topology. Their characteristics are different. Weigh up the merits of simply migrating a version 6 publish/subscribe hierarchy to a version 7 hierarchy or whether to convert the hierarchy to a cluster. You might consider breaking a hierarchy up into multiple clusters, perhaps joined in a hierarchy. You might also consider creating a publish/subscribe cluster using new queue managers, and then running the version 6 publish/subscribe applications on the new cluster, rather than converting the hierarchy to a cluster.

If your principle objective is to upgrade to version 7, with the least change to operational behavior, use **strmqbrk** to migrate from a version 6 publish/subscribe hierarchy to a version 7 hierarchy. See Migrate a WebSphere® MQ version 6 publish/subscribe hierarchy to a version 7 hierarchy.

After running **strmqbrk**, you can continue to use version 6 publish/subscribe applications, write new version 7 publish/subscribe programs, and later decide to convert from using the hierarchy to using clusters.

New version 7 publish/subscribe applications are more likely to use clusters than hierarchies. What advantages do clusters have over hierarchies that might prompt you to convert from a hierarchy to a cluster?

Robustness

The failure of a queue manager can affect the transmission of publications and subscriptions between other queue managers in the hierarchy. In a cluster every queue manager is connected to every other queue manager. A failure in one queue manager does not affect the connection between two other queue managers.

Simpler channel administration

A hierarchy uses manually configured channel connections between queue managers in the hierarchy. You need to maintain these connections, adding and removing channels as queue managers are added and removed from the hierarchy. In a publish/subscribe cluster, queue managers are connected by automatically maintained cluster connections.

Ease of use

Cluster publication topics, subscriptions, and their attributes are replicated to every member of a cluster. You can display and modify cluster topics and subscriptions attributes using the WebSphere MQ Explorer. Your changes are replicated to other members of the cluster.

Consistency

In general, you must not connect the same queue managers together with hierarchies and clusters. If you have decided that new publish/subscribe applications are to use publish/subscribe clusters, avoid queue managers being part of both a hierarchy and a cluster. You need to convert existing hierarchies to clusters.

The principle reasons for continuing to use a hierarchy, despite the advantages of publish/subscribe clusters, are twofold:

1. **strmqbrk** performs the migration to a version 7 hierarchy automatically. To convert the hierarchy to a cluster, you must do several manual tasks in addition to running **strmqbrk**.
2. You do not need to complete the migration of the whole hierarchy to version 7, before resuming your publish/subscribe applications using a hierarchy. In contrast, the whole hierarchy must be converted to a cluster before resuming your publish/subscribe applications using a cluster.

Treat the conversion of a version 6 publish/subscribe hierarchy to using clusters as a two-stage process. First, migrate all the queue managers in the hierarchy to use a version 7 publish/subscribe hierarchy, and then convert the version 7 hierarchy to a cluster.

Migrate a WebSphere MQ version 6 publish/subscribe hierarchy to a version 7 hierarchy
Migrate queue managers in a version 6 publish/subscribe hierarchy to version 7, a queue manager, or server at a time.

Convert a WebSphere MQ version 6 publish/subscribe hierarchy to a version 7 publish/subscribe cluster
Convert a version 6 publish/subscribe hierarchy to a cluster by migrating it to a version 7 hierarchy, and then converting to a cluster. Conversion to a cluster requires manual steps and the whole hierarchy needs to be converted at the same time.

Parent topic: WebSphere MQ version 6 publish/subscribe migration

Related information
Publish/subscribe topologies
strmqbrk (Migrate WebSphere MQ Version 6.0 broker to Version 7.0)

This build: January 26, 2011 11:07:03

Notices | Trademarks | Downloads | Library | Support | Feedback

◄►

9.4.1. Migrate a WebSphere MQ version 6 publish/subscribe hierarchy to a version 7 hierarchy

Migrate queue managers in a version 6 publish/subscribe hierarchy to version 7, a queue manager, or server at a time.

Before you begin

You can migrate a version 6 publish/subscribe hierarchy to version 7 one server at a time. You do not need to migrate the whole hierarchy at once. The hierarchy continues to work with some queue managers at version 6, and some at version 7.

Consider how you are going to upgrade multiple queue managers on one server to version 7. Do you need to upgrade the queue managers one at a time, or can you follow the simpler course and upgrade them altogether? All the queue managers on a server share the same WebSphere® MQ libraries and therefore are at the same release level. You cannot upgrade some queue managers on the same server to version 7, leaving others on version 6.

Consider these two alternatives, if you are running multiple queue managers on the same server.

1. The simpler approach to migrating publish/subscribe to version 7 is to upgrade WebSphere MQ on the server to version 7.
   Migrate the publish/subscribe broker for each queue manager on the server to version 7 publish/subscribe, one queue manager at a time.

2. If you want to upgrade the queue managers to version 7 one at a time, you must perform a "side-by-side" upgrade rather than an "in-place" upgrade.
   In a side-by-side upgrade:
   a. Install WebSphere MQ version 7 on a new server.
   b. Transfer a queue manager to the new server.
   c. Migrate its version 6 broker to version 7.
   d. Repeat, one queue manager at a time, until all the queue managers are running on the new server, and none are left on the old server.

About this task

In this task, we assume that you have already upgraded a queue manager to version 7. You now want to migrate the publish/subscribe broker to version 7.

You might be migrating the first publish/subscribe broker in the hierarchy, or the last. Follow the same procedure. At any point in the conversion, of all the publish/subscribe brokers in the hierarchy, the hierarchy, and your applications continue to work.

Procedure

1. Start the queue manager.

   `STRMQM -m QMgrName`

2. Run the **strmqbrk** command to migrate all publish/subscribe configuration data for the queue manager to WebSphere MQ Version 7

   `strmqbrk -m QMgrName`

3. Check the migration log to verify that the migration was successful.
   The migration log is in the queue manager data directory: the default locations are `/var/mqm/qmgrs/QMgrName/psmigr.log` on UNIX or `C:\Program Files\IBM\WebSphereMQ\qmgrs\QMgrName\psmigr.log` on Windows.

4. **strmqbrk** starts queued publish/subscribe when it completes, by switching the queue manager attribute **PSMODE** from its default value of `COMPAT` to `ENABLED`.

Parent topic: WebSphere MQ publish/subscribe topology migration

Related information
strmqbrk (Migrate WebSphere MQ Version 6.0 broker to Version 7.0)

This build: January 26, 2011 11:07:07

Notices | Trademarks | Downloads | Library | Support | Feedback

9.4.2. Convert a WebSphere MQ version 6 publish/subscribe hierarchy to a version 7 publish/subscribe cluster

Convert a version 6 publish/subscribe hierarchy to a cluster by migrating it to a version 7 hierarchy, and then converting to a cluster. Conversion to a cluster requires manual steps and the whole hierarchy needs to be converted at the same time.

Before you begin

Advise users that the publish/subscribe system is not available while conversion takes place. The conversion takes time. All the queue managers in the hierarchy have to be converted together. Publications that are being processed are not lost, but all running publish/subscribe applications that use the hierarchy must be stopped. There are manual configuration tasks to be performed, some of which are not automatic transformations, before applications can be restarted.

To minimize disruption, plan, prepare, and test scripts to do the manual steps, and review which topic objects are to be clustered with the publish/subscribe application owners.

About this task

The task is organized to minimize disruption. In step, 1 only one queue manager is impacted at a time. Step 2 can be done in advance, without disrupting applications. Stop applications between steps 3 to 6 inclusive.

In step 6, you need to define cluster topic objects on the cluster topic host. There are administrative advantages of using cluster topic objects, but that is not the reason for defining cluster topic objects during the conversion task. The principle reason for defining cluster topic objects as part of the conversion task to restore existing publish/subscribe applications to a fully working state.

Existing publish/subscribe applications that use a hierarchy do not work in a cluster, unless you identify and define the correct cluster topics. In hierarchical publish/subscribe, subscriptions are propagated to every queue manager in the hierarchy, as long as the subscription is registered with **SUBSCOPE**(ALL). In clustered publish/subscribe no subscriptions are propagated to the cluster, unless the subscription resolves to a topic with the attribute **CLUSTER** (*clusterName*) set, and **SUBSCOPE**(ALL).

Part of the migration procedure is to identify or create topic objects that are to be given the cluster attribute. Application knowledge is required to choose the correct topics to associate with cluster topic objects. Here is some guidance to help you in choosing which topics to cluster.

- If your version 6 publish/subscribe applications used streams, part of the migration to version 7 is to create topic objects corresponding to the streams. These topic objects are prime candidates to be made into cluster topic objects.
  The migration process creates one topic object for each stream that is defined on a version 6 queue manager. Thus, depending on what streams are defined on what queue managers, you might find different topic objects created on different queue managers.
  Unlike any other clustered topic object, you must define the topic objects that correspond to streams on every queue manager in the cluster. Do *not* follow the typical procedure, and define the topic object only on the cluster topic host. The queued publish/subscribe daemon requires a locally defined topic object corresponding to the name of the stream in `SYSTEM.QPUBSUB.QUEUE.NAMELIST`. You must set the **CLUSTER** attribute on each of the automatically defined local topic objects. The cluster attribute causes subscriptions to topics that resolve to a stream topic object to be propagated to other members of the cluster. The attributes of the topic object are resolved to the cluster topic object that is locally defined, and not to the latest cluster topic object to be defined.

- Identify or create as few topic objects to be clustered as the application design requires. Allow other topics to inherit from these topic objects. To this

end, look for topics near the root of the topic trees of your publish/subscribe applications, and make them clustered.

- Identify any version 6 publish/subscribe applications that are going to be hard to migrate from a hierarchy to a cluster.
  Applications that use the default stream and have a flat topic space, or do not have topics you can clearly identify as the root of their topic trees, are hard to migrate. It might be difficult to know how to define cluster topic objects associated with the topics an application uses. Do *not*, except as a last resort, set the cluster attribute on SYSTEM.BASE.TOPIC as a way of causing all topics to inherit the cluster attribute. It might be worthwhile to convert your existing version 6 publish/subscribe applications that use the default stream, to use named streams. Then each stream converts to a defined topic object that you can cluster.
  Note: If you set the cluster attribute on SYSTEM.BASE.TOPIC, you do not need to set it on any other topics that inherit from SYSTEM.BASE.TOPIC.

Procedure

1. Migrate all the queue managers from the version 6 hierarchy to version 7.
   a. Carry out the procedure described in Migrate a WebSphere® MQ version 6 publish/subscribe hierarchy to a version 7 hierarchy, to convert all the queue managers in the hierarchy from version 6 to version 7.

2. Create a cluster and add all the queue managers in the hierarchy to the cluster.
   a. Create a cluster or nominate an existing cluster, which does not need to be an existing publish/subscribe cluster.
      Use WebSphere MQ Script commands (MQSC), or any other type of administration command or utility that is available on your platform, such as the WebSphere MQ Explorer. These methods are described in Using WebSphere MQ commands with clusters.
   b. Ensure that each queue manager is in the cluster by using the MQSC command DISPLAY CLUSQMGR(*), described in WebSphere MQ Script (MQSC) Command Reference. If a queue manager is not in the cluster, add it. For more information, refer to Using WebSphere MQ commands with clusters

3. Stop publish/subscribe applications, allowing current work to complete.
   a. Stop all publish/subscribe publishers from putting new work into the system.
      Do not stop new work by disabling the input stream queues - the input streams are needed to process publications that remain in the hierarchy. You must stop the applications themselves.
   b. Switch off queued publish/subscribe on all the queue managers in the hierarchy. Leave version 7 integrated publish/subscribe running. Run the following MQSC command on all the queue managers in the hierarchy.
      ```
      ALTER QMGR PSMODE(COMPAT)
      ```
   c. Wait for the transmission queues and channels used to connect queue managers in the hierarchy to finish processing publications that are already in the system.
      When no more publications are left in transmission queues and channels, all the publications have reached their destination queue manager. The queue manager delivers the publications to subscribers when queued publish/subscribe is re-enabled.

4. Delete all the channels and transmission queues used to connect queue managers in the hierarchy.
   a. Stop all the channels used to connect the queue managers in the hierarchy.
      Run the following MQSC command on all the queue managers in the hierarchy.
      ```
      STOP CHANNEL(SenderChanName) MODE(QUIESCE)
      ```
   b. Delete all the channels used to connect the queue managers in the hierarchy.
      Run the following MQSC command on all the queue managers in the hierarchy.
      ```
      DELETE CHANNEL(SenderChanName)
      DELETE CHANNEL(ReceiverChanName)
      ```
   c. Delete the transmission queues associated with the channels that were deleted.
      Run the following MQSC command on all the queue managers in the hierarchy.
      ```
      DELETE QLOCAL(xmitQName)
      ```

5. Delete the queue manager hierarchy.
   a. Enable queued publish/subscribe on each queue manager in the hierarchy using the MQSC command:
      ```
      ALTER QMGR PSMODE(ENABLE)
      ```
   b. Run the following MQSC command on each queue manager in the hierarchy, except the uppermost parent in the hierarchy which has no parent.
      ```
      ALTER QMGR PARENT(' ')
      ```
      Alternatively, on I5/OS run the following commands to remove queue managers from the hierarchy.
      i. Run **WRKMQMPS PUBSUBNAME**(parentQmgrName) to display the hierarchy.
      ii. Use **option 4=Remove** to remove the parent from the hierarchy.
      iii. Use **option 34=Work with Pub/Sub** to move down the subhierarchy
      iv. Repeat options **4** and **34** until there are no child queue managers displayed.
   c. Before proceeding to the next step confirm that all the hierarchical relationships have been canceled.
      Run the following MQSC command on each queue manager.
      ```
      DISPLAY PUBSUB TYPE(ALL)
      ```

6. Set the **CLUSTER** attribute on the topic objects that you have decided to make clustered.
   a. If you need to create cluster topic objects, define them on the cluster topic host.
      Define cluster topic objects on only one queue manager.
   b. If you are setting the cluster attribute on existing topic objects, created by **strmqbrk**, set the cluster attribute on the topic object defined on the cluster topic host. Delete the topic object from the other queue managers.
      Multiple definitions of a cluster topic object on multiple queue managers in a cluster can lead to problems.
   c. Review whether to delete any topic objects that were created by **strmqbrk** that are not clustered.
      Subscriptions that inherit from these topic objects do not get propagated to other queue managers in the cluster.

7. Restart publish/subscribe applications.

Parent topic: WebSphere MQ publish/subscribe topology migration

Related information
Creating a new cluster

This build: January 26, 2011 11:07:08

Notices | Trademarks | Downloads | Library | Support | Feedback

9.5. Differences from WebSphere MQ Version 6 publish/subscribe

Queued publish/subscribe programs and queued broker administration in version 7 differ from that in version 6. The differences in program behavior are slight; the administration differences are more extensive. Many version 6 programs coexist and interoperate with version 7, without change.

There are many changes in the implementation of version 7 queued publish/subscribe from the implementation in version 6. Queued publish/subscribe in version 7 uses integrated publish/subscribe. Only the changes that might affect your applications or administration procedures are described here. The use of queued publish/subscribe is deprecated in version 7.

Administration

The version 6 WebSphere® MQ publish/subscribe broker is integrated into version 7 publish/subscribe. The commands you used to control a version 6 publish/subscribe broker are obsolete, and replace by commands to control version 7 publish/subscribe. The new commands, as they relate to controlling queued publish/subscribe, are described in Controlling queued publish/subscribe. Table 1. Broker command differences relates the old and new commands.

Table 1. WebSphere Message Broker command differences

Operation	WebSphere MQ Version 6	WebSphere MQ Version 7
Remove broker from hierarchy	**clrmqbrk**	See Disconnect a queue manager from a broker hierarchy for instructions how to disconnect a version 7 queue manager from a hierarchy.
Delete broker	**dltmqbrk**	There is no publish/subscribe broker in version 7. The **dltmqbrk** command removes version 6 broker resources after running the command **strmqbrk** to migrate the version 6 broker to version 7 publish/subscribe.
Display broker	**dspmqbrk**	Use the **runmqsc** command DISPLAY PUBSUB to display publish/subscribe status.
Stop broker	**endmqbrk**	See Stopping queued publish/subscribe for instructions how to stop queued publish/subscribe in version 7.
Migrate broker to WebSphere Message Broker	**migmqbrk**	Run the **migmqbrk** command on a version 6 queue manager. Once you have upgraded to Version 7 there is *no migration* from version 7 publish/subscribe to the version 6.1 WebSphere Message Broker publish/subscribe broker.
Start broker	**strmqbrk**	In version 7, the **strmqbrk** command migrates the version 6 broker to version 7. See Starting queued publish/subscribe for instructions how to start queued publish/subscribe in version 7.

Configuration data

The broker stanza parameters in WebSphere MQ Version 6 publish/subscribe are described in Broker configuration stanza. They are replaced with queue manager attributes, which are described in New queue manager attributes for publish/subscribe.

Local and global publications and subscriptions

The local or global publication scope is set by defining the scope of a subscription or a publication to QMGR or ALL. With this flag you can control, on a publication, whether it is propagated locally or globally. On a subscription, you can control whether it has an interest in publications made locally or globally. The flow of publications you observe is a result of the interplay of both these flags.

There has been a subtle change in the behavior between version 6 and version 7 if the publication and subscription flags are set to different options.

- In version 7: if you specify that a subscription is only for local publications, the subscription receives any publications that are created on the local queue manager.
- In version 6: if you set the same subscription option, you would receive only publications that have been created on this queue manager and are flagged for local publication only. Thus no publications are received if the publication scope is global, even if the publisher is local.
- In version 7: if you specify that a publication is for global distribution, a subscription to the publication on any queue manager is eligible to receive the publication. Successful subscriptions include a subscription for local publications made on the same queue manager as the publisher.
- In version 6: setting the same option, only subscribers that are eligible to receive global publications receive the publication. Thus no subscribers on the same queue manager as the publisher receive the publication, if their subscription has local scope.

The operation of publication and subscription scope in version 6 and version 7 is described by Table 2.

Notice that if you specify opposite subscription scopes for the publisher and subscriber, it makes no difference which scope the publication or subscription is given. Either way round, in either version, the set of publications received is the same. In version 6 no publications are received, and in version 7 local publications are received.

Table 2. Version 6 and version 7 publication and subscription scope truth table

Publisher Subscriber	QMGR		ALL	
	Version 6	**Version 7**	**Version 6**	**Version 7**
QMGR	No change: publications go to local subscribers		No publications are delivered	Only subscribers local to the publisher receive publications
ALL	No publications are delivered	Publications go to subscribers local to the publisher	No change: publications go to all subscribers	

Interoperation with WebSphere Message Broker

You cannot connect the WebSphere Message Broker V6.1 publish/subscribe broker to WebSphere MQ Version 7 using clusters or broker hierarchies. No messages flow between the broker and WebSphere MQ, because no cluster or hierarchy connection can be established. Subscriptions and publications are not passed directly between the broker publication node and the WebSphere MQ queue manager.

Metatopics

Metatopics are a special set of topics recognized by the WebSphere MQ Version 6 broker. See Metatopics.

Metatopics are *not* provided by WebSphere MQ Version 7. Instead you can inquire on the list of topic names, and on individual topics and subscriptions.

If you send a subscription to a metatopic, the subscription is ignored.

Register Publisher and Deregister Publisher commands

The **Register Publisher** and **Deregister Publisher** commands do nothing in version 7, except return a successful response message to a request. Your publisher program is *not* affected by the change.

Publish/subscribe exit

The WebSphere MQ Version 6 publish/subscribe has an exit for customizing and routing publications, which is described in WebSphere Message Broker exit.

The exit is renamed the Publish exit and is available in WebSphere MQ Version 7.0.1 onwards; see Publish exit. It was not available in WebSphere MQ V7.0.0.*x*.

The publish/subscribe exit capability is largely replaced by using subscription levels. Using the `MQSD sublevel` field, an intermediate subscriber can intercept publications to customize or block them, before they arrive at the ultimate subscribers, see Intercepting publications.

The function provided by intercepting publications using the `MQSD sublevel` field, and using the Publish exit is similar. The main differences to be aware of are twofold:

1. If you use the subscription level mechanism, the intercepting application is a regular publish\subscribe application. You subscribe to the publications you intend to intercept. Publications are delivered to the intercepting application, which then must publish them again if they are to reach their intended destination.
   The Publish exit is written as an exit program and is called by the queue manager.

2. Intercept all publications from a publisher by using the subscription level mechanism. Run the intercepting application on the queue manager that the publisher is connected to.
   Intercept a publication just before it is delivered to a subscriber by using a Publish exit. Configure the exit on the queue manager the subscriber is connected to.

Streams

There are significant changes in how streams are implemented in WebSphere MQ version 7.

Streams are not supported by the integrated publish/subscribe MQI interface. However, version 6 queued publish/subscribe applications using streams interoperate *without change* with version 7 integrated publish/subscribe applications. Streams are mapped to the topic space in version 7, see Streams and topics

Altering fields in a subscription

In version 7 it is not possible to alter the topic, destination queue, and subscription name of a subscription once the fields are defined. In version 6, these fields are only alterable for a subscription with a subscription name.

Multi-topic publications and subscriptions

A single command message can publish a publication to multiple topics. Suppose a subscriber subscribes to both topics. A version 6 subscriber receives one publication. A version 7 subscriber receives two copies of the publication.

Variable user ID and traditional identity

Subscriptions are tied to a particular user unless you specify that other users are able to alter the subscription. Other users are able to alter the subscription, subject to access control checks, by setting the variable user ID field.

In version 6, subscriptions are tied to a traditional identity. The traditional identity is a combination of queue name, queue manager name, and optional correlation identifier. Only the user who created a subscription to a traditional identity is permitted to modify it, unless you specify that other users can modify the subscription. Subscriptions created by another user, which result in publications to the same combination of queue name, queue manager name, and optional correlation identifier, might not succeed. They only succeed if the original subscription has allowed other users to modify their original subscription to this traditional identity.

In version 7, subscriptions are not tied to a traditional identity. Any subscription can result in publications being sent to destinations with any combination of queue, queue manager, and correlation identifier. Modifications to a subscription are still restricted to the user that created the subscription unless the `MQSUB MQSO_ANY_USERID` subscription option is set. Setting the option to `MQSO_FIXED_USERID` does not prevent other subscriptions delivering publications to the same destination.

Wildcards

The wildcard schemes used by version 6 and version 7 publish subscribe are different.

The earlier WebSphere MQ Version 6 publish/subscribe scheme, uses the characters described in Character-based wildcard scheme.

To use the version 6 wildcard scheme when subscribing with a version 7 subscriber, set the `MQSO_WILDCARD_CHAR` option.

For more information about how WebSphere Message Broker handles WebSphere MQ Version 6 wildcards, see Wildcard characters.

Parent topic: WebSphere MQ version 6 publish/subscribe migration

This build: January 26, 2011 11:07:13

9.6. Using publish/subscribe with WebSphere MQ classes for JMS

❯Existing WebSphere® MQ classes for JMS applications run unchanged after you upgrade your queue manager to WebSphere MQ V7.0. In some circumstances, you must specify whether WebSphere MQ classes for JMS uses WebSphere MQ Version 6.0 or Version 7.0 publish/subscribe function.◄

❯The circumstances in which you must specify whether WebSphere MQ classes for JMS uses WebSphere MQ Version 6.0 or Version 7.0 publish/subscribe function are described later in this topic. The advantages of using WebSphere MQ Version 7.0 publish/subscribe function, compared with WebSphere MQ Version 6.0 Publish/Subscribe, WebSphere Event Broker, or WebSphere Message Broker, are introduced in What is new in WebSphere MQ Version 7.0?.◄

WebSphere MQ messaging provider

The WebSphere MQ messaging provider has two modes of operation:
- *WebSphere MQ messaging provider normal mode*
- *WebSphere MQ messaging provider migration mode*

The WebSphere MQ messaging provider normal mode uses all the features of the WebSphere MQ Version 7.0 queue managers to implement JMS. This mode is used only to connect to a WebSphere MQ queue manager and can connect to WebSphere MQ Version 7.0 queue managers in either client or bindings mode. The WebSphere MQ messaging provider normal mode is optimized to use the new WebSphere MQ Version 7.0 function.

The WebSphere MQ messaging provider migration mode is based on WebSphere MQ Version 6.0 function and uses only features that were available in the WebSphere MQ Version 6.0 queue manager to implement JMS. You can connect to a WebSphere MQ Version 7.0 queue manager using WebSphere MQ messaging provider migration mode but you cannot use any of the Version 7.0 optimizations. This mode allows connections to either of the following queue manager versions:
- WebSphere MQ Version 7.0 queue manager in bindings or client mode, but this mode uses only those features that were available to a WebSphere MQ Version 6.0 queue manager
- WebSphere MQ Version 6.0 or earlier queue manager in client mode

If you want to connect to WebSphere Event Broker or WebSphere Message Broker using either WebSphere MQ Enterprise Transport or WebSphere MQ Real-Time Transport, use the WebSphere MQ messaging provider migration mode. If you use WebSphere MQ Real-Time Transport, the WebSphere MQ messaging provider migration mode is automatically selected, because you have explicitly selected properties in the connection factory object. Connection to WebSphere Event Broker or WebSphere Message Broker using the WebSphere MQ Enterprise Transport follows the general rules for mode selection described in Rules for selecting the WebSphere MQ messaging provider mode.

Rules for selecting the WebSphere MQ messaging provider mode

If you are not using WebSphere MQ Real-Time Transport, the mode of operation used is determined primarily by the PROVIDERVERSION property of the connection factory. If you cannot change the connection factory you are using, you can use a client configuration property called com.ibm.msg.client.wmq.overrideProviderVersion, which overrides any setting on the connection factory. This override applies to all connection factories in the JVM but the actual connection factory objects are not modified. You can set PROVIDERVERSION to three possible values: 7, 6, or unspecified:

PROVIDERVERSION=7

Uses the WebSphere MQ messaging provider normal mode.

If you set PROVIDERVERSION to 7 only the WebSphere MQ messaging provider normal mode of operation is available. If the queue manager that is connected to as a result of the other settings in the connection factory is not a Version 7.0 queue manager, the createConnection() method fails with an exception.

The WebSphere MQ messaging provider normal mode uses the sharing conversations feature, and the number of conversations that can be shared is controlled by the SHARECNV() property on the server connection channel. If this property is set to 0, you cannot use WebSphere MQ messaging provider normal mode and the createConnection() method fails with an exception.

PROVIDERVERSION=6

Uses the WebSphere MQ messaging provider migration mode.

The WebSphere MQ classes for JMS use the features and algorithms supplied with WebSphere MQ Version 6.0. If you want to connect to WebSphere Event Broker or WebSphere Message Broker using WebSphere MQ Enterprise Transport, you must use this mode. You can connect to a WebSphere MQ Version 7.0 queue manager using this mode, but none of the new features of a Version 7.0 queue manager are used, for example, read ahead or streaming.

PROVIDERVERSION=unspecified

This is the default value and the actual text is "unspecified".

A connection factory that was created with a previous version of WebSphere MQ classes for JMS in JNDI takes this value when the connection factory is used with V7.0 of WebSphere MQ classes for JMS. The following algorithm is used to determine which mode of operation is used. This algorithm is used when the createConnection() method is called and uses other aspects of the connection factory to determine if WebSphere MQ messaging provider normal mode or WebSphere MQ messaging provider migration mode is required.

- Firstly, an attempt to use WebSphere MQ messaging provider normal mode is made.
- If the queue manager connected is not WebSphere MQ Version 7.0, the connection is closed and WebSphere MQ messaging provider migration mode is used instead.
- If the SHARECNV() property on the server connection channel is set to 0, the connection is closed and WebSphere MQ messaging provider migration mode is used instead.
- If BROKERVER is set to V1 or unspecified, WebSphere MQ messaging provider normal mode continues to be used, and therefore any publish/subscribe operations use the new WebSphere MQ V7.0 features.
  If WebSphere Event Broker or WebSphere Message Broker are used in compatibility mode (and you want to use Version 6.0 publish/subscribe function rather than the WebSphere MQ Version 7 publish/subscribe function), set PROVIDERVERSION to 6 to ensure WebSphere MQ messaging provider migration mode is used.
- If BROKERVER is set to V2 and BROKERQMGR is nonblank, this means BROKERQMGR has been explicitly changed from the default, so the assumption is the connection factory is intended for use with WebSphere Event Broker or WebSphere Message Broker and WebSphere MQ Enterprise Transport. Therefore WebSphere MQ messaging provider migration mode is used.
- If BROKERVER is set to V2, BROKERQMGR is blank, the specified BROKERCONQ command queue exists and can be opened for output (that is, MQOPEN for output succeeds), and PSMODE on the queue manager is set to COMPAT or DISABLED, WebSphere MQ messaging provider migration mode is used.

You can find further guidance about using PROVIDERVERSION in When to use PROVIDERVERSION.

When to use PROVIDERVERSION

There are two scenarios where you cannot use the algorithm described in Rules for selecting the WebSphere MQ messaging provider mode; consider using PROVIDERVERSION in these scenarios.

1. If WebSphere Event Broker or WebSphere Message Broker is in compatibility mode, you must specify PROVIDERVERSION for them to work correctly.
2. If you are using WebSphere Application Server Version 6.0.1, Version 6.0.2, or Version 6.1, you define connection factories using the WebSphere Application Server administrative console.
   In WebSphere Application Server the default value of the BROKERVER property on a connection factory is V2. The default BROKERVER property for connection factories created by using JMSAdmin or WebSphere MQ Explorer is V1. This property is now "unspecified" in WebSphere MQ Version 7.0.

If BROKERVER is set to V2 (either because it was created by WebSphere Application Server or the connection factory has been used for publish/subscribe before) and the existing queue manager has a BROKERCONQ defined (because it has been used for publish/subscribe messaging before), the WebSphere MQ messaging provider migration mode is used.

However, if you want the application to use peer-to-peer communication and the application is using an existing queue manager that has previously been used for publish/subscribe, and has a connection factory with BROKERVER set to 2 (which is the default if the connection factory was created in WebSphere Application Server), the WebSphere MQ messaging provider migration mode is used. Using WebSphere MQ messaging provider migration mode in this case is unnecessary; use WebSphere MQ messaging provider normal mode instead. You can use one of the following methods to work around this:

- Set BROKERVER to V1 or unspecified. This is dependent on your application.
- Set PROVIDERVERSION to 7; this is a custom property in WebSphere Application Server Version 6.1. The option to set custom properties in WebSphere Application Server Version 6.1 and later is not currently documented in the WebSphere Application Server Information Center. Alternatively, use the client configuration property (see Rules for selecting the WebSphere MQ messaging provider mode for details about how you can specify this system property for all environments), or modify the queue manager connected so it does not have the BROKERCONQ, or make the queue unusable.

Subscription name migration on the JMS client
On the JMS client, if the ConnectionFactory property brokerPubQ is not the default, WebSphere MQ adds the stream name to the subscription name.

Parent topic: WebSphere MQ version 6 publish/subscribe migration

This build: January 26, 2011 11:06:36

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9.6.1. Subscription name migration on the JMS client

On the JMS client, if the ConnectionFactory property brokerPubQ is not the default, WebSphere® MQ adds the stream name to the subscription name.

In WebSphere MQ Version 6.0, a subscription name needed to be unique only within the stream and not across the queue manager. In WebSphere MQ Version 7.0, a subscription name must be unique across the queue manager. Therefore to migrate WebSphere MQ Version 6.0 durable subscriptions to WebSphere MQ Version 7.0, the subscription names must be unique. WebSphere MQ does this when it migrates the queue manager, by appending the stream name to the existing subscription name. For any existing durable subscription that uses a stream other than the default of "SYSTEM.BROKER.DEFAULT.STREAM" the migration process appends the stream name to the subscription name.

On the JMS client, if the ConnectionFactory property brokerPubQ is not the default, it is assumed that a WebSphere MQ Version 6.0 durable subscription is being resumed, and WebSphere MQ Version 7.0 appends the stream name to match the action of the migration process. Subscription names that use the default stream are migrated across with the subscription name unchanged.

Parent topic: Using publish/subscribe with WebSphere MQ classes for JMS

📖 This build: January 26, 2011 11:07:01

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9.7. Migration implications of mapping an alias queue to a topic object

WebSphere MQ Version 7.0 introduces an extension to the alias queue object that allows an alias queue to be mapped to a topic object.

The new TARGTYPE attribute allows you to specify that a queue alias resolves to a queue or a topic. The TARGQ attribute, defined in WebSphere MQ Version 6.0 as the name of the queue to which the alias queue resolves, is renamed to TARGET in WebSphere MQ Version 7.0 and generalized to allow you to specify the name of either a queue or a topic. The attribute name TARGQ is retained for compatibility with your existing programs.

This feature is useful for migrating your existing applications to a publish/subscribe message model.

A useful example of this feature is the queue to which statistics messages are written. Before WebSphere MQ Version 7.0 there could be only a single consumer of a statistic message because a single statistics message only was written to a queue and got from a queue.

By defining a queue alias that points to a topic object, it is possible for each person interested in processing statistics messages to subscribe to the topic, rather than getting from the queue, allowing multiple consumers of the statistics information.

Within a queue sharing group it is possible to define a queue alias as a group object - this means that each queue manager in the queue sharing group will create a queue alias definition with the same name and the same properties as the QSGDISP(GROUP) object.

The new TARGTYPE attribute may be set or altered in a QSGDISP(GROUP) object by a new Version 7.0 queue manager, so that the queue alias refers to a topic object. However, any Version 6 queue managers in the queue sharing group do not understand and will ignore the new TARGTYPE attribute. A V6 queue manager will interpret the queue alias as referring to a queue object, regardless of the setting of TARGTYPE.

Defining a queue alias is described in Working with alias queues.

Parent topic: WebSphere MQ version 6 publish/subscribe migration

📖 This build: January 26, 2011 11:07:01

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10. Upgrading and migrating WebSphere MQ clients from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0

This section contains topics that describe how to upgrade and migrate clients from WebSphere® MQ Version 6.0 to Version 7.0.

Upgrading a WebSphere MQ client from Version 6.0 to Version 7.0
You can upgrade a WebSphere MQ Version 6.0 client to a WebSphere MQ Version 7.0 client without migrating.

Migration and client channel definition tables
In general, the internal format of the client channel definition table might change from one release level of WebSphere MQ to the next. Because of this, a WebSphere MQ client can use a client channel definition table only when it has been prepared by a server queue manager that is at the same release level as the client, or at an earlier release level.

Change in behavior of MQPUT1
A client **MQPUT1** call within sync point in a default configuration of WebSphere MQ Version 7.0 can appear to succeed, with failures being returned to the application later, when it calls **MQCMIT**.

Parent topic: Migration

📖 This build: January 26, 2011 11:06:37

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10.1. Upgrading a WebSphere MQ client from Version 6.0 to Version 7.0

You can upgrade a WebSphere® MQ Version 6.0 client to a WebSphere MQ Version 7.0 client without migrating.

However, if you are using SSL on Windows you must **migrate** a WebSphere MQ Version 5.3 client to WebSphere MQ Version 7.0 because of changes made to SSL support for WebSphere MQ Version 6.0. See Migrating Windows Secure Sockets Layer (SSL) connections for further guidance.

❯The Websphere MQ client configuration file is introduced in WebSphere MQ Version 7.0. For more information see WebSphere MQ client configuration file. This has a number of implications:

- It is no longer possible to use a client qm.ini on i5/OS and UNIX systems, or the Windows registry, to enable TCP KeepAlive for client applications. Use the KeepAlive attribute in the client configuration file instead.
- At WebSphere MQ V7.0, the ClientExitPath is configured using the client configuration file. Existing values for ClientExitPath, which are held in mqs.ini on UNIX and i5/OS, and in the registry on Windows, are moved to the client configuration file when you migrate. Any values subsequently added to mqs.ini or the Windows registry are ignored.
- Use of the Java System property com.ibm.mq.exitClasspath is deprecated. Use the JavaExitsClasspath attribute in the WebSphere MQ client configuration file instead.

❮

AIX
During client installation on AIX® , you can choose to upgrade your client using the SMIT tool. Change the **Automatically install requisite software** to **No** and **Overwrite same or newer versions** to **Yes**.

Windows

During client installation on Windows, you can choose to upgrade your client in the following way:

If the current version of WebSphere MQ client is already installed, the Program Maintenance panel is displayed with two options: Modify or Remove.

1. If you select Modify, see Modifying the client installation.
2. If you select Remove, see Uninstalling WebSphere MQ client using the installation process.

Parent topic: Upgrading and migrating WebSphere MQ clients from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0

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10.2. Migration and client channel definition tables

In general, the internal format of the client channel definition table might change from one release level of WebSphere® MQ to the next. Because of this, a WebSphere MQ client can use a client channel definition table only when it has been prepared by a server queue manager that is at the same release level as the client, or at an earlier release level.

A Version 7.0 WebSphere MQ client can use a client channel definition table that has been prepared by a Version 6.0 queue manager but a Version 6.0 client cannot use a client channel definition table that has been prepared by a Version 7.0 queue manager.

Parent topic: Upgrading and migrating WebSphere MQ clients from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0

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10.3. Change in behavior of MQPUT1

A client **MQPUT1** call within sync point in a default configuration of WebSphere® MQ Version 7.0 can appear to succeed, with failures being returned to the application later, when it calls **MQCMIT**.

For example, in one specific scenario in WebSphere MQ Version 7.0 an **MQPUT1** call can succeed where a similar call in WebSphere MQ Version 6.0 fails with Completion code 2 and Reason code 2085.

The WebSphere MQ API call sequence is as follows:

1. **MQCONN** to queue manager using a server-connection channel
2. **MQPUT1** to a nonexistent queue with the MQPMO_SYNCPOINT option
3. **MQDISC**

On WebSphere MQ version 6.0 the **MQPUT1** call ends with CompCode=MQCC_FAILED and ReasonCode=MQRC_UNKNOWN_OBJECT_NAME. On WebSphere MQ version 7.0 the **MQPUT1** call ends with ReasonCode=MQRC_NONE and CompCode=MQCC_OK.

This result occurs when all the following conditions are met:

- Both client and queue manager are WebSphere MQ version 7.0
- The application program is connected to the queue manager as a client application
- MQPMO_SYNCPOINT is set in the Put Message Options structure, MQPMO

To make WebSphere MQ version 7.0 behave like version 6.0, set Put1DefaultAlwaysSync=YES in the CHANNELS stanza of the client configuration file.

Parent topic: Upgrading and migrating WebSphere MQ clients from WebSphere MQ Version 6.0 to WebSphere MQ Version 7.0

Related information
CHANNELS stanza of the client configuration file

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11. Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

All of the topics in this section are specific to a WebSphere® MQ Version 5.3 to WebSphere MQ Version 7.0 migration only. This section highlights some of the main areas that are believed to impact users and gives some guidance on the type of action you will need to take to continue 'business as usual'.

Note: Before you install or migrate any software, you are recommended to make a full backup of your system to ensure that you can recreate the system to its original working environment should any problems occur.

Specific information about migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 6.0 was provided in the WebSphere MQ Version 6.0 documentation. Refer to *Migration Information* and the *Quick Beginnings* for your platform. For z/OS®, refer to *WebSphere MQ for z/OS System Setup Guide* and the *WebSphere MQ for z/OS Program Directory*. You can download this information from the WebSphere MQ library Web site: http://www.ibm.com/software/integration/wmq/library/library60.html

Some general considerations
The following lists some of the general issues to consider when making a migration plan.

- Develop a backup plan in which you back up the relevant information on the queue manager and server.
- Read the latest README file for the product you are working with. You can find these files on the IBM® home pages for the relevant products.
- Do you need to have the queue manager active all the time? If this is the case, and you are unable to shut down the system running this queue manager, you might need to consider a different migration approach. This will mean performing the migration using the following general steps:
    - Copy all resources from the server concerned to another server.
    - Perform a migration on the duplicate server.
    - Switch over to the new server and queue manager at a convenient time.
- Be prepared to record a number of details about the existing system topology, including such things as the names of the queue managers and their queues, clients, channels and so on.
- This is also a good time to check through all existing queue managers to see whether there are any queues that are no longer needed, and whether there are any queue managers that are no longer required. You might also decide that you want to keep certain queue managers at an earlier level and administer them from a migrated system.
- After you migrate a queue manager to WebSphere MQ Version 7.0, you must start that queue manager to migrate your file system structure before you start any WebSphere MQ listener associated with that queue manager. Otherwise, you will not be able to start WebSphere MQ listeners after migration.

Migrating from a beta version

If you have previously installed a WebSphere MQ Version 7.0 beta driver, you MUST uninstall this driver BEFORE you install the GA (general availability) version of WebSphere MQ Version 7.0.

Supported environments

The supported environments vary according to the changes to the product. Check each of the sections for details of the environment that is impacted.

Any queue managers from previous versions of WebSphere MQ (for example WebSphere MQ Version 5.3 and MQSeries® Version 5.2) are supported, provided that they are put onto a supported platform of a WebSphere MQ Version 7.0 system.

The operating system on which you want to run a migrated WebSphere MQ Version 7.0 queue manager must be a supported WebSphere MQ Version 7.0 platform as documented on the Supported Environment Web page at: http://www.ibm.com/software/integration/wmq/requirements/.

All advice in the WebSphere MQ Version 7.0 documentation about migration also applies to any previous versions of WebSphere MQ.

Note: Where WebSphere MQ Version 5.3 is stated, the information also applies to WebSphere MQ Version 5.3.1 on z/OS. For all distributed platforms, where WebSphere MQ Version 5.3 is stated, the information also applies to any previous versions of WebSphere MQ.

64-bit queue manager migration information
This section provides you with information regarding the changes that might be necessary for applications to work with the 64-bit queue manager in WebSphere MQ Version 7.0 .

Internet Protocol Version 6 (IPv6) migration
This section deals with using IPv4 and IPv6 when you are planning to install WebSphere MQ Version 7.0

Migrating Windows Secure Sockets Layer (SSL) connections
This section deals with migrating Windows Secure Sockets Layer (SSL) connections from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0.

Additional migration information
This section gives additional information if you are migrating directly from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0.

Considerations for migrating from WebSphere MQ for Linux Version 5.3

Considerations for migrating from WebSphere MQ for Windows Version 5.3

PL/I support in WebSphere MQ for Windows
This section gives information in relation to PL/I support in WebSphere MQ Version 6.0 and later.

Migrating from UDP

Java archive (JAR) file com.ibm.mqbind.jar
This section gives information about the com.ibm.mqbind.jar file.

Notices

Parent topic: Migration

This build: January 26, 2011 11:06:37

Notices | Trademarks | Downloads | Library | Support | Feedback

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11.1. 64-bit queue manager migration information

This section provides you with information regarding the changes that might be necessary for applications to work with the 64-bit queue manager in

WebSphere® MQ Version 7.0 .

Introduction

The 64-bit queue manager, which was introduced in WebSphere MQ Version 6.0 for some distributed platforms, removes many of the 32-bit addressing limitations. It gives a large increase to the amount of memory available for applications and WebSphere MQ, and the number and size of shared storage segments is also increased.

This move to 64-bit queue managers has no effect on most applications. However, a small number of 32-bit applications might not work as expected and will require some form of modification. This migration documentation provides information to help you identify those applications and those files that are needed as 64-bit.

Where other changes have been made, and where these could have an impact on your current installation without your applications requiring a change (for example, performance), these have also been identified. As a general rule, 32-bit applications do not need to be modified, but 32-bit switches and exits must be rebuilt.

Queue manager environments

The queue manager is 64-bit on the following WebSphere MQ Version 7.0 platforms. Both 32-bit and 64-bit applications are supported in all of these environments:

- AIX® platform
- HP-UX Itanium platform
- HP-UX PA-RISC platform
- Linux POWER® platform
- Linux x86-64 platform
- Linux zSeries® (s390x) platform
- Sun Solaris SPARC platform
- Sun Solaris x86-64 platform

The queue manager is 32-bit on the following WebSphere MQ Version 7.0 platforms:

- Microsoft Windows platforms (from WebSphere MQ Version 7.0, 64-bit applications are also supported)
- Linux x86 platform

On i5/OS®, the queue manager supports teraspace addressing.

API implications

Applications built using an earlier version of WebSphere MQ do not need to be recompiled when a new version of WebSphere MQ is installed, even when the installation of the new version of WebSphere MQ changes the queue manager from being 32-bit to 64-bit. This is because all versions of WebSphere MQ continue to support 32-bit applications. When the queue manager is 64-bit, all versions of WebSphere MQ also support 64-bit applications. When WebSphere MQ for Windows is installed on a 64-bit version of the operating system, from Websphere MQ Version 7.0, you can build WebSphere MQ applications as 64-bit.

Although the API has not changed, you need to be aware that in WebSphere MQ Version 5.3 and earlier versions, an `MQLONG`, an `int`, a `long`, and a `size_t` were all 32-bit so effectively interchangeable in their use. In WebSphere MQ Version 7.0 this is no longer true because a `long`, and a `size_t` are now 64-bit on at least some platforms.

You also need to be aware that pointers for 64-bit applications and 64-bit MQ exits are 64-bit. If your user-exits were storing pointers in a WebSphere MQ exit `ExitUserArea`, which is an `MQBYTE16`, you are now able to store only two pointers. This does not cause you a problem if you have written your user-exit to store a pointer to a block of pointers in the `ExitUserArea`. If your exits have not been written in this way, you must rewrite them to use this approach if there is now no longer enough room in `ExitUserArea` to store the pointers that your application needs.

The following table gives you the sizes of the basic 'C' types to aid you to see where similar problems might occur.

Table 1. Data type platform sizes for 32-bit and 64-bit applications (Bracketed figures are for 64-bit size)

Data type	Sun Solaris	HP-UX	AIX	Linux (POWER platform)	Linux (x86-64 platform)	Linux (zSeries 64-bit platform)	Microsoft Windows XP Professional x64
char	1 byte (1 byte)	1 byte (1 byte)	1 byte (1 byte)	1 byte (1 byte)	1 byte (1 byte)	1 byte (1 byte)	1 byte (1 byte)
short	2 bytes (2 bytes)	2 bytes (2 bytes)	2 bytes (2 bytes)	2 bytes (2 bytes)	2 bytes (2 bytes)	2 bytes (2 bytes)	2 bytes (2 bytes)
int	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)
long	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (4 bytes)
float	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)
double	8 bytes (8 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)
long double	16 bytes (16 bytes)[1]	16 bytes (16 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)	12 bytes (16 bytes)	8 bytes (8 bytes)	8 bytes (8 bytes)
pointer	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)
ptrdiff_t	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)
size_t	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)
time_t	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)
clock_t	4 bytes (8 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (8 bytes)	4 bytes (4 bytes)
wchar_t	4 bytes (4 bytes)	4 bytes (4 bytes)	2 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	4 bytes (4 bytes)	2 bytes (2 bytes)
Note: 1. A 32-bit long double on Sun Solaris for x86-64 is 12 bytes.							

WebSphere MQ Version 7.0 bindings: UNIX systems and Windows

On UNIX systems, three sets of bindings are provided for 64-bit applications: isolated, standard and fastpath bindings. For 32-bit applications only isolated and standard bindings are available. If a 32-bit application tries to connect to the queue manager using a fastpath binding it is silently downgraded to standard bindings. This will cause a noticeable loss of performance (it has virtually identical performance as when connecting directly with a standard binding) to anyone currently using fastpath and who is unwilling or unable to port the application to 64-bit. If you require to connect your 32-bit applications using fastpath bindings because performance is an issue, and you intend to keep your applications as 32-bit applications, then you must remain with WebSphere MQ Version 5.3.

In contrast, on Windows, two sets of bindings are provided for 64-bit applications: isolated and standard bindings. For 32-bit applications isolated and standard and fastpath bindings are available. If a 64-bit application tries to connect to the queue manager using a fastpath binding it is silently downgraded to standard bindings.

EXTSHM on WebSphere MQ for AIX

On AIX, 32-bit applications can attach only 10 shared storage segments concurrently. When an application connects to WebSphere MQ, typically two storage segments are attached. However, the number of shared storage segments needed might increase depending on the workload of the queue manager. If, when connecting to WebSphere MQ, your 32-bit application fails to connect because it cannot attach all of the shared storage segments, consider setting the environment variable EXTSHM=ON in the environment of the queue manager. Set EXTSHM=ON before running the **strmqm** command and in the environment of your 32-bit applications. Alternatively you can connect to the queue manager using isolated bindings, which use only a single shared storage segment when connecting to the queue manager. Do this by replacing MQCONN calls with MQCONNX calls and specifying MQCNO_ISOLATED_BINDING in the MQCNO parameter of the MQCONNX calls.

There is virtually no limit to the number of shared storage segments attached by 64-bit applications.

> **32-bit and 64-bit files**
> This section provides you with information that helps you to identify where you need to replace your 32-bit files with 64-bit versions.

> **COBOL copybooks**
> This section provides you with information in relation to the changes to the COBOL copybooks supplied with WebSphere MQ Version 7.0.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:15

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11.1.1. 32-bit and 64-bit files

This section provides you with information that helps you to identify where you need to replace your 32-bit files with 64-bit versions.

Executable files and libraries

The majority of WebSphere® MQ Version 7.0 files are built as 64-bit files on the following platforms:

- WebSphere MQ for AIX®
- WebSphere MQ for HP-UX
- WebSphere MQ for Sun Solaris
- WebSphere MQ for Linux (POWER® platform)
- WebSphere MQ for Linux (x86–64 platform)
- WebSphere MQ for Linux (zSeries® s390x platform)

All the executable files in `/xxx/mqm/bin` and `/xxx/mqm/samp/bin` are 64-bit.

Most of the WebSphere MQ Version 7.0 libraries are 64-bit and put into `/xxx/mqm/lib64` There are no symbolic links to the `/xxx/mqm/lib64` directory. Any existing 64-bit client applications will continue to work.

The few libraries that are required by 32-bit applications are installed as usual in `/xxx/mqm/lib` and any current customer 32-bit applications will continue to work (subject to changes needed to exits and switches, see below) after upgrading to WebSphere MQ Version 7.0.

If you are using 64-bit applications, you might encounter problems if your LIBPATH or LD_LIBRARY_PATH variable includes the /usr/lib directory. The /usr/lib directory contains symbolic links to the 32-bit WebSphere MQ libraries, which do not work with 64-bit applications. Either remove /usr/lib from the library path that is used by your 64–bit application or remove the symbolic links from /usr/lib. For more information, see the *Quick Beginnings* guide for your platform.

Exits and switch load files

On UNIX platforms, when using 32-bit applications with a 64-bit queue manager, some types of exit and XA switch load files also need to have a 64-bit version available for use by the queue manager. If the 64-bit version of the exit or XA switch load file is required and is not available, then the relevant API call or command fails.

On UNIX platforms, two attributes are supported in the qm.ini file for `ExitPath`. These are `ExitsDefaultPath=/var/mqm/exits` and `ExitsDefaultPath64=/var/mqm/exits64`. Using these ensures that the appropriate library can be found. If an exit is used in a WebSphere MQ cluster, this also ensures that the appropriate library on a remote system can be found.

The WebSphere MQ for Windows Version 7.0 queue manager processes are 32-bit, therefore when using 64-bit applications, some types of exit and XA switch load files also need to have a 32-bit version available for use by the queue manager. If the 32-bit version of the exit or XA switch load file is required and is not available, then the relevant API call or command fails.

On WebSphere MQ for Windows Version 7.0, two attributes are supported in the qm.ini file for `ExitPath`. These are `ExitsDefaultPath=install_location\exits` and `ExitsDefaultPath64=install_location\exits64`. Using these ensures that the appropriate library can be found. If an exit is used in a WebSphere MQ cluster, this also ensures that the appropriate library on a remote system can be found.

Where you have used your own directory and use a fully qualified path, you are advised to create a symbolic link from the `ExitsDefaultPath` and `ExitsDefaultPath64` to the appropriate library. If this is not provided, WebSphere MQ Version 7.0 searches for the library and uses the first matching library in the search path. If the library is still not found an error message is generated.

The following table lists the different types of Exit and Switch load files and notes whether 32-bit or 64-bit versions, or both, are required, according to

whether 32-bit or 64-bit applications are being used:

File types	32-bit applications	64-bit applications
API-crossing exit	32-bit	32-bit and 64-bit
Data conversion exit	32-bit	64-bit
Server Channel exits (all types)	32-bit	32-bit
Client Channel exits (all types)	32-bit	64-bit
Installable service exit	32-bit	32-bit
Service trace module	32-bit	32-bit and 64-bit
Cluster WLM exit	32-bit	32-bit
Pub/Sub routing exit	32-bit	32-bit
Database switch load files	32-bit	32-bit and 64-bit
External Transaction Manager AX libraries	32-bit	64-bit

Communications protocols

The only supported communications protocols for 64-bit applications are TCP and LU 6.2. Applications require the appropriate communications libraries to be available to them.

- A 32-bit client application requires the 32-bit communication library.
- A 64-bit client application requires the 64-bit communication library.
- On a 64-bit queue manager, the MQ channel processes are 64-bit and require the 64-bit communication library.

Note: With TCP, SSL is available for both 32-bit and 64-bit applications.

Internal Transactional Manager XA support

WebSphere MQ Version 7.0 no longer supports versions of databases that do not include 64-bit support. You must rebuild your switch load files for these databases to support 64-bit processing as well as upgrading the databases to 64-bit versions. If you fail to do this, you will get an error when you start the queue manager and your application will fail to do any work with the database.

Parent topic: 64-bit queue manager migration information

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11.1.2. COBOL copybooks

This section provides you with information in relation to the changes to the COBOL copybooks supplied with WebSphere® MQ Version 7.0.

Due to the size of structures with pointers growing on 64-bit platforms, the lengths defined in some of the COBOL copybooks supplied with earlier versions of WebSphere MQ are incorrect for 64-bit applications. Updated COBOL copybooks are being supplied with WebSphere MQ Version 7.0 as follows:

WebSphere MQ for z/OS®

64-bit COBOL copybooks are not shipped in this release of the product.

WebSphere MQ for AIX®

All 32-bit COBOL copy books will be installed in the directory `/usr/mqm/inc/cobcpy32`.

Symbolic links to all the 32-bit COBOL copy books will be created in directory `/usr/mqm/inc`.

All 64-bit COBOL copy books will be installed in the directory `/usr/mqm/inc/cobcpy64`.

All other UNIX platforms

All 32-bit COBOL copy books will be installed in the directory `/opt/mqm/inc/cobcpy32`.

Symbolic links to all the 32-bit COBOL copy books will be created in directory `/opt/mqm/inc`.

All 64-bit COBOL copy books will be installed in the directory `/opt/mqm/inc/cobcpy64`.

WebSphere MQ for Windows

All 32-bit COBOL copy books will be installed in the directory `C:\Program Files\IBM\WebSphere MQ\Tools\cobol\copyBook`.

Note: `C:\Program Files\IBM\WebSphere MQ` is the default directory for the installation of WebSphere MQ for Windows. If you install it in a different directory, you will adjust the specified path to take this into account.

Parent topic: 64-bit queue manager migration information

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11.2. Internet Protocol Version 6 (IPv6) migration

This section deals with using IPv4 and IPv6 when you are planning to install WebSphere® MQ Version 7.0

General introduction

The Internet Protocol Version 6 (IPv6) is designed by the Internet Engineering Task Force (IETF) to replace the current version Internet Protocol, Version 4 (IPv4). IPv4 has been around for over 20 years and is one of the primary methods for machines to communicate to 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 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 while this transition period exists. IPv6 also simplifies header formats and improves support for extensions and options, flow labeling capability, and consolidated authentication and privacy capabilities

WebSphere MQ Version 6.0 introduced the ability for queue managers to communicate using the IPv6 protocol in addition to the existing, IPv4, protocol.

You can use Internet Protocol Version 6 (IPv6) addresses in your WebSphere MQ classes for JMS and WebSphere MQ classes for Java applications.

Further information on IPv6 can be found at http://www.ipv6.org/ and http://www.ipv6forum.com/.

Key points in migrating to IPv6 and using WebSphere MQ Version 7.0
This section lists some key points to be aware of when you are planning to install WebSphere MQ Version 7.0 and using IPv6.

Considerations when implementing IPv6 in a network
This section lists some things that you must consider when you are planning to install WebSphere MQ Version 7.0 on an IPv6 network.

Migrating a queue manager to IPv6
This section deals with migrating a queue manager when you are planning to install WebSphere MQ Version 7.0 on an IPv6 network.

Migrating a cluster to IPv6
This section deals with migrating clusters when you are planning to install WebSphere MQ Version 7.0 on an IPv6 capable network.

Abbreviated migration scenarios
This section gives some abbreviated scenarios for when you are planning to install WebSphere MQ Version 7.0.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:17

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11.2.1. Key points in migrating to IPv6 and using WebSphere MQ Version 7.0

This section lists some key points to be aware of when you are planning to install WebSphere® MQ Version 7.0 and using IPv6.

- WebSphere MQ Version 7.0 now 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 (CONNAME) you specify for a given channel determines the IP protocol for the channel making a connection.

Parent topic: Internet Protocol Version 6 (IPv6) migration

This build: January 26, 2011 11:06:17

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11.2.2. Considerations when implementing IPv6 in a network

This section lists some things that you must consider when you are planning to install WebSphere® MQ Version 7.0 on an IPv6 network.

- To ensure consistency across the network, you must 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 does not 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 WebSphere MQ Version 7.0 on does not support IPv6, WebSphere MQ Version 7.0 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 a WebSphere MQ network, each host name that is used in a channel definition must resolve to the same address (or addresses), regardless of which DNS is used.
- If the host name that is used in a channel definition resolves to a system that hosts a queue manager from WebSphere MQ Version 5.3 or earlier, the hostname must resolve to an IPv4 address only.

Parent topic: Internet Protocol Version 6 (IPv6) migration

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11.2.3. Migrating a queue manager to IPv6

This section deals with migrating a queue manager when you are planning to install WebSphere® MQ Version 7.0 on an IPv6 network.

The IPv6 protocol can be utilized only by WebSphere MQ Version 6.0 or later. To make use of the IPv6 protocol, install WebSphere MQ 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 has an effect only 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 WebSphere MQ Version 7.0.
3. Add two entries to the DNS table in order to resolve the host name of the system that is to be migrated, one entry for its IPv4 address and one for its 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 WebSphere 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 WebSphere MQ Version 7.0.
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 because 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 WebSphere MQ Version 5.3 or earlier queue manager, 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, because 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 WebSphere MQ Version 5.3 or earlier queue manager on the system. Although it is not recommended to run this type of configuration, provided that 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 WebSphere MQ Version 7.0.
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 WebSphere MQ Version 7.0.
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.

Parent topic: Internet Protocol Version 6 (IPv6) migration

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11.2.4. Migrating a cluster to IPv6

This section deals with migrating clusters when you are planning to install WebSphere® MQ Version 7.0 on an IPv6 capable network.

The following gives an overview of approaches that can be taken when migrating a cluster to WebSphere MQ Version 7.0 from WebSphere MQ Version 5.3. Because of the variations that can occur in a cluster, the detail and guidance on the likely course of action you will need to take are deliberately general.

Migration scenarios (cluster topology)

Where an IPv6 capable system is to be added to a WebSphere 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 WebSphere MQ Version 5.3 or earlier cluster 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 WebSphere MQ Version 5.3 or earlier cluster 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_IPv4.ibm.com and system1_IPv6.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.
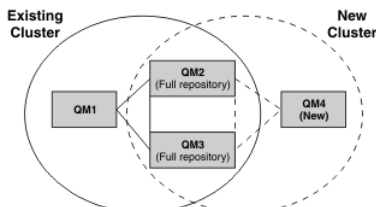
Note: There are both IPv4 and IPv6 definitions connecting the full repositories so that definitions for both new and existing cluster definitions are replicated between them. Also be aware that the queue managers QM1 and QM4 cannot communicate directly because they do not share a common network. They 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.

Parent topic: Internet Protocol Version 6 (IPv6) migration

This build: January 26, 2011 11:06:18

Notices | Trademarks | Downloads | Library | Support | Feedback

11.2.5. Abbreviated migration scenarios

This section gives some abbreviated scenarios for when you are planning to install WebSphere® MQ Version 7.0.

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 1. 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
	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
	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 3 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 following table lists the abbreviations used in Table 3. The abbreviations in this table are combined in Table 3 to give the configuration of the systems involved in trying to establish communication. For example:

- v53 + IPv6: Represents a WebSphere MQ Version 5.3 or earlier queue manager on a system with a TCP/IP version 6 stack
- v7 + Dual: Represents a WebSphere MQ Version 7.0 queue manager on system with a dual TCP/IP version 4 and version 6 stack

Table 2. Abbreviations used in system configurations

Abbreviation	Meaning
v53	a WebSphere MQ Version 5.3 or earlier queue manager
v7	a WebSphere MQ Version 7.0 queue manager
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 3. System configurations

Originating queue manager		Responding queue manager			Result
Queue manager and Stack	LOCLADDR	IPADDRV	Queue Manager and Stack	DNS Return	
v53 + IPv6	Any	Not applicable			IP Error
v53 + IPv4 or v53 + Dual	Both LOCLADDR4 & LOCLADDR6	Not applicable	v53 + IPv4 or v53 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v53 + IPv4 or v53 + Dual	Blank or LOCLADDR4	Not applicable	v53 + IPv4 or v53 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v53 + IPv4 or v53 + Dual	Blank or LOCLADDR4	Not applicable	v53 + Dual	IPv6DNS	Unable to resolve CONNAME
v53 + IPv4 or v53 + Dual	Blank or LOCLADDR4	Not applicable	v53 + Dual or v7 + Dual v7 + IPv4	IPv4DNS or DualDNS	IPv4 connection can be established
v53 + IPv4 or v53 + Dual	LOCLADDR6	Not applicable			IP Error
v53 + IPv4 or v53 + Dual	Blank or LOCLADDR4 or both LOCLADDR4 & LOCLADDR6	Not applicable	v7 + IPv6	IPv6DNS	Unable to resolve CONNAME
v7 + IPv4	Blank or LOCLADDR4	Not specified	v53 + IPv4 or v53 + Dual or v7 + IPv4	IPv4DNS or DualDNS	IPv4 connection can be established
v7 + IPv4	LOCADD6	Not specified			Unable to resolve LOCLADDR
v7 + IPv4	Blank or LOCLADDR4	Not specified	v7 + IPv6	IPv6DNS	Unable to resolve CONNAME
v7 + IPv6	Blank or LOCLADDR6	Not specified	v53 + Dual	DualDNS	Attempts to start IPv6 channel and fails as there will be no IPv6 listener available
v7 + IPv6	Blank or LOCLADDR6	Not specified	v53 + IPv4	IPv4DNS	Attempts to start IPv6 channel and fails as there will be no IPv6 listener available
v7 + IPv6 or v7 + Dual	LOCLADDR6	Blank or IPADDR6	v7 + IPv6 or v7 + Dual	IPv6DNS or DualDNS	IPv6 connection can be established
v7 + Dual	LOCLADDR6	IPADDR4	v7 + Dual	IPv4DNS or DualDNS	IPv6 connection can be established where mapped addressing can be used

v7 + Dual	Blank or LOCLADDR4	IPADDR4	v53 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v7 + Dual	Both LOCLADDR4 & LOCLADDR6	Blank or IPADDR4	v53 + Dual	IPv4DNS or DualDNS	IPv4 connection can be established
v7 + Dual	LOCLADDR4	IPADDR4			Unable to resolve LOCLADDR
v7 + Dual	LOCLADDR6 or both LOCLADDR4 & LOCLADDR6	Blank or IPADDR6	v7 + IPv6 or v7 + Dual	IPv6DNS or DualDNS	IPv6 connection can be established

Parent topic: Internet Protocol Version 6 (IPv6) migration

This build: January 26, 2011 11:06:21

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This topic's URL:
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11.3. Migrating Windows Secure Sockets Layer (SSL) connections

This section deals with migrating Windows Secure Sockets Layer (SSL) connections from WebSphere® MQ Version 5.3 to WebSphere MQ Version 7.0.

General Introduction

WebSphere MQ Version 7.0 provides the Global Security Toolkit (GSKit) on Windows platforms for improved SSL (Secure Sockets Layer) support for queue manager and WebSphere MQ client channels. Follow the guidance in this section to determine whether WebSphere MQ Version 5.3 queue managers or clients have been set up to use SSL connections, and to ensure these channels continue to work with WebSphere MQ Version 7.0. The migration process causes a copy of the certificates stored in the WebSphere MQ Certificate Stores used by WebSphere MQ Version 5.3, to be migrated to a GSKit Key database.

Points to consider

- If you are intending to uninstall WebSphere MQ Version 5.3 before installing WebSphere MQ Version 7.0, you must do the following:
    - Before uninstalling WebSphere MQ Version 5.3, check that the certificate chains are complete. If they are not, use the **AMQMCERT** utility supplied with WebSphere MQ Version 5.3 to complete the chains.
    - After installing WebSphere MQ Version 7.0, run the **AMQTCERT** command from the command line to migrate your certificate stores.

  If you install WebSphere MQ Version 7.0 after uninstalling WebSphere MQ Version 5.3, the certificate chain checker cannot then check the chains and **AMQMCERT** is no longer available to repair them. This also means that the processes used in the installation to migrate the stores cannot find them and you must manually check the chains and manually migrate the stores. See the Control commands for details of the AMQMCERT and AMQTCERT commands.

- The Pre-installation Launchpad is run at the beginning of the installation process. From this the Check WebSphere MQ Certificate Store Wizard can be run. This checks that the certificate chains in the certificate stores are complete, that is, that each certificate in the chain is signed by the entity identified by the next certificate in the chain, terminating with a root CA certificate signed by the CA itself. If you elect not to run the Check WebSphere MQ Certificate Store Wizard, the Post-installation Prepare Wizard does not present any migration panels and your certificate stores can not be scheduled for automatic migration.

- The chain checker application used to verify that all the required certificates are there, before migrating certificates from the WebSphere MQ for Windows V5.3 store to the GSKit store, is available in WebSphere MQ V5.3 Fix Pack 10 (CSD10) or later.

- On client installation, the Check WebSphere MQ Certificate Store Wizard is run from the Install panels directly because there is no launchpad on the client installation to run it from.

- The Check WebSphere MQ Certificate Store Wizard and the Post-installation Prepare Wizard for scheduling certificate migration are made available only if you are migrating from a WebSphere MQ Version 5.3 installation directly to a WebSphere MQ Version 7.0 installation. If you uninstall WebSphere MQ Version 5.3 and then install WebSphere MQ Version 7.0, the installation process is not aware that the previous version was WebSphere MQ Version 5.3 and will not present the Check WebSphere MQ Certificate Store Wizard or any of the SSL migration panels to you. In this situation, you might consider running the Pre-installation Launchpad and the Check WebSphere MQ Certificate Store Wizard before uninstalling WebSphere MQ Version 5.3. This confirms the completeness of the certificate chains and allows you to import them using **AMQTCERT** after installing WebSphere MQ Version 7.0.

- If you are installing WebSphere MQ Version 7.0 silently, there are options which can be passed to the Post-installation Prepare Wizard silently to have it schedule certificate migration for you. If you follow this process, the Check WebSphere MQ Certificate Store Wizard is not run to check the certificate chains. If you are intending to run a silent installation, you should either run the Pre-installation Launchpad and the Check WebSphere MQ Certificate Store Wizard to check the completeness of the certificate chains or check the stores manually using **AMQCCERT** prior to the installation.

Certificates that are not migrated

A number of certificates are not migrated during this process. These are:

- Certificates that match GSKit's default supplied set. These are not migrated as GSKit provides its own set which are assumed to be the same or more up to date.
- Orphaned certificates that do not have a full valid Certification Authority certificate chain. A certificate can only be imported into a GSkit key database file if a certificate from its certification authority is already present or if it is a root certificate. Certificates can only be added to the GSkit key database starting with the root Certification Authority certificate, proceeding down the chain of intermediate Certification Authority certificates, if any exist, and ending with the personal certificate issued by the lowest member of the Certification Authority chain, again if any exists.
- Certificates that have expired.

Types of certificate migration

There are two types of certificate migration.

- Automatic migration. For a queue manager the actual migration occurs when the queue manager is started for the first time. When the migration has completed, it is not attempted again even if the migration process failed. The queue manager attempts to start, irrespective of the success or failure of the migration. For a client, the actual migration occurs when the client first connects to the queue manager using an SSL channel. If the migration completes successfully then it is not attempted again. The starting of the client is dependent on the outcome of the migration; if the migration fails then so does the client. Where a certificate store has been successfully validated in the pre-installation phase, the Post-installation Prepare Wizard uses the automatic migration method for each of the queue managers and client stores specified.
- Manual migration. This occurs at the time the new Transfer Certificates (AMQTCERT) control command is run. Manual migration requires you to use

AMQTCERT for each queue manager and client. You must specify the location and name stem of the WebSphere MQ Certificate Store and the GSKit key database to be used.

Automatic migration has the advantage that you do not need to specify the location and names for all the WebSphere MQ Certificates Stores and their corresponding GSKit key databases for all the queue managers and the clients because this is derived from the information gathered during the pre-installation processing.

Friendly Name attribute

In the WebSphere MQ Certificate Store file there is one certificate assigned to the queue manager or client. During migration, the copy of this certificate is modified before it is imported into the GSKit database. The modification sets the certificate's Friendly Name attribute to the string ibmwebspheremq followed in lower case by the queue manager name or the client logon ID. This Friendly Name value becomes the label of the certificate in the GSKit key database. The previous Friendly Name value, if any, is lost.

Working with migrated certificates

When WebSphere MQ Version 7.0 has been fully installed, and the certificates from the WebSphere MQ Certificate Stores have been migrated to the GSKit database, you can use the IBM® Key Management (iKeyman) utility to view and manage your certificates. Full details of the iKeyman utility can be found in the WebSphere MQ Security book. Alternatively, you can use the command line interfaces iKeycmd and GSKCapiCmd to manage keys and digital certificates. These interfaces are described in Managing keys and certificates .

> **Determining whether SSL connections have been set up**
> This section deals with determining whether SSL connections have been set up for WebSphere MQ.

> **SSL migration steps**
> This section deals with steps for migrating Secure Sockets Layer (SSL) connections to work with WebSphere MQ Version 7.0.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:21

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11.3.1. Determining whether SSL connections have been set up

This section deals with determining whether SSL connections have been set up for WebSphere® MQ.

- For channel definitions see the section "Checking whether channel definitions have been SSL-enabled".
- For channels set up using client application MQCONNX calls, see the section "Checking whether client-connection channels set up using MQCONNX calls have been SSL-enabled".

Checking whether channel definitions have been SSL-enabled

For each queue manager on the computer you are working with, you must check whether any channels have been defined to use SSL. Display the SSLCIPH (CipherSpec) value for each channel defined on the queue manager. To do this you must have the queue manager running and have started the RUNMQSC environment. Enter **DIS CHL(*) CHLTYPE SSLCIPH** to display the channel details. The output should be similar to the following:

```
AMQ8414: Display Channel details.
CHANNEL(SYSTEM.DEF.SENDER) CHLTYPE(SDR) SSLCIPH( )
AMQ8414: Display Channel details.
CHANNEL(SYSTEM.DEF.SERVER) CHLTYPE(SVR) SSLCIPH( )
AMQ8414: Display Channel details.
CHANNEL(TO.QM4) CHLTYPE(CLUSRCVR) SSLCIPH(RC4_MD5_EXPORT)
AMQ8414: Display Channel details.
CHANNEL(TO.QM5) CHLTYPE(CLUSSDR) SSLCIPH(RC4_MD5_EXPORT)
AMQ8414: Display Channel details.
CHANNEL(TO.QM6) CHLTYPE(SVR) SSLCIPH( )
AMQ8414: Display Channel details.
CHANNEL(TO.QM7) CHLTYPE(CLNTCONN) SSLCIPH(NULL_SHA)
AMQ8414: Display Channel details.
CHANNEL(TO.QM7) CHLTYPE(SVRCONN) SSLCIPH(NULL_SHA)
```

Channel definitions that have a value in the brackets after SSLCIPH are SSL channels. If there are any SSL channels the section "SSL migration steps" will apply. In the above example, the 'TO.QM4', 'TO.QM5', and both 'TO.QM7' channel definitions have a value for SSLCIPH.

Any client channel definition tables copied from another computer or accessed as a shared file on another computer will also need to be checked for SSLCIPH values. To check these values, either:

- Use **DIS CHL(*) CHLTYPE SSLCIPH** on the queue manager they were defined on
- ▶If your client is running on a system that has a local queue manager, change the MQCHLLIB and MQCHLTAB environment variables which relate to RUNMQSC to specify the directory path and file name of the relevant client channel definition table, then use the **DIS CHL(*) CHLTYPE SSLCIPH** command on the local queue manager. (Note: You should return the MQCHLLIB and MQCHLTAB settings to their previous values after completing this check.)◀

Any client-connection channel definitions that have been imported into Active Directory will also need to be checked for non-null SSLCIPH values. Display these definitions using the command **setmqscp –d**.

Checking whether client-connection channels set up using MQCONNX calls are SSL-enabled

For each client application that uses an MQCONNX call, search the MQCD channel definition structure for the optional SSLCipherSpec field, which provides equivalent values to SSLCIPH.

If the value of the SSLCipherSpec field is not null, the MQI channel used by the client application is an SSL channel and the section "SSL migration steps" will apply.

Parent topic: Migrating Windows Secure Sockets Layer (SSL) connections

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11.3.2. SSL migration steps

This section deals with steps for migrating Secure Sockets Layer (SSL) connections to work with WebSphere® MQ Version 7.0.

Migrating SSL connections to work with WebSphere MQ Version 7.0 consists of several steps:

1. Ensuring WebSphere MQ certificate stores contain complete certificate chains
2. Migrating SSL certificates to Global Security Toolkit key database files
3. Converting Certificate Revocation Lists
4. Ensuring SSLPEER values have correctly ordered OU entries

Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains
This section deals with ensuring that complete certificate chains exist in the WebSphere MQ certificate store. This should be completed before installing WebSphere MQ Version 7.0.

Step 2: Migrating SSL certificates into Global Security Toolkit database files
This section deals with migrating SSL certificates into Global Security Toolkit key database files and must be performed after installing WebSphere MQ Version 7.0.

Step 3: Converting Certificate Revocation Lists and Authority Revocation Lists
This section describes how to convert the Certificate Revocation Lists and Authority Revocation Lists.

Step 4: Ensuring SSLPEER values have correctly ordered Organizational Unit entries
This section describes how to check that the SSLPEER Organizational Unit (OU) values are in the correct order and how to change them if they are not.

Parent topic: Migrating Windows Secure Sockets Layer (SSL) connections

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11.3.2.1. Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This section deals with ensuring that complete certificate chains exist in the WebSphere® MQ certificate store. This should be completed before installing WebSphere MQ Version 7.0.

WebSphere MQ Version 7.0 uses the Global Security Toolkit (GSKit) to manage SSL certificates. Before installing WebSphere MQ Version 7.0 you must ensure that all WebSphere MQ certificate stores contain complete certificate chains.

In Step 2: Migrating SSL certificates to Global Security Toolkit key database files, it gives guidance on migrating certificates used by WebSphere MQ Version 5.3 queue managers and WebSphere MQ clients into key database files for use with Global Security Toolkit.

As an alternative to Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains and Step 2: Migrating SSL certificates to Global Security Toolkit key database files, you can manually configure a key database for each queue manager and WebSphere MQ client and import SSL certificates directly into it without migrating them. See Working with the Secure Sockets Layer (SSL) on UNIX and Windows systems for details of how to do this. You will still need to complete Step 3: Ensuring Certificate Revocation Lists are in the correct format and Step 4: Ensuring SSLPEER values have correctly ordered OU entries.

The following sections give the background and necessary steps for "Ensuring WebSphere MQ certificate stores contain complete certificate chains":

- SSL certificates and certificate chains
- Why you must ensure complete SSL certificate chains exist before installation
- Where to locate WebSphere MQ certificate stores
- How to check WebSphere MQ certificate stores contain complete certificate chains
- How to add missing certification authority certificates into WebSphere MQ certificate stores
- What to do if WebSphere MQ version 7.0 has already been installed

SSL certificates and certificate chains
This section explains what SSL certificates are, what a complete certificate chain is and why WebSphere MQ certificate stores need them.

Why you must ensure complete SSL certificate chains exist before installation
During the installation of WebSphere MQ Version 7.0, the **AMQMCERT** command line interface and the Manage SSL Certificates graphical interface, which provide access to WebSphere MQ Version 5.3 certificate stores, are removed, and you will not be able to add any missing certification authority certificates to these stores after installation.

Where WebSphere MQ certificate stores are located
This section gives details on where you can find the WebSphere MQ certificate stores installed on your systems.

How to check WebSphere MQ certificate stores contain complete certificate chains
This section details how you can check if the SSL certificate chains that exist in your SSL certificate store are complete.

Adding missing certification authority certificates into WebSphere MQ certificate stores
This section gives the commands necessary to add SSL certificates into WebSphere MQ certificate stores to complete the certificate chains before migrating to WebSphere MQ Version 7.0.

If WebSphere MQ Version 7.0 has already been installed
This section deals with the issue of having upgraded to WebSphere MQ Version 7.0 without having complete certificate chains.

Parent topic: SSL migration steps

This build: January 26, 2011 11:06:22

11.3.2.1.1. SSL certificates and certificate chains

This section explains what SSL certificates are, what a complete certificate chain is and why WebSphere® MQ certificate stores need them.

Personal certificates (certificates issued to an individual or a company) can be used by queue managers and WebSphere MQ clients to uniquely identify themselves when they are involved in starting an SSL connection.

Certification authority certificates are used by queue managers and WebSphere MQ clients to verify the authenticity of any personal certificate they receive during an SSL handshake (certification authority certificates are sometimes referred to as Certification Authority (CA) or signer certificates in other WebSphere MQ documentation.)

Each personal certificate has zero or more certificate chains of certification authority certificates that extend back to the root certification authority.

For example:

```
    Certificate R (Root Certification Authority)
       |
       | represents issuer of
       V
    Certificate I1 (Intermediate Certification Authority)
       |
       | represents issuer of
       V
    Certificate I2 (A subsidiary Intermediate Certification Authority)
       |
       | represents issuer of
       V
    Certificate I3 (A further subsidiary Intermediate Certification Authority)
       |
       | represents issuer of
       V
    Certificate P (A personal certificate that is used to identify its owner
                    on an SSL handshake)
```

Certificate chains are used to verify the authenticity of each certificate in that chain, including the personal certificate. Each certificate in the chain is validated using its 'parent' certificate, which in turn is validated using the next certificate up the chain, and so on, from the personal certificate up to the root certification authority certificate.

The Global Security Toolkit (provided by WebSphere MQ Version 7.0) promotes good certificate housekeeping by automatically verifying the authenticity of any personal certificate it manages. For this reason, it requires a complete set (or chain) of certification authority certificates to be stored with each personal certificate.

WebSphere MQ Version 5.3 on Windows allows personal certificates to be held in certificate stores without a complete certificate chain. If you attempt to migrate such certificates to a Global Security Toolkit key database this migration will fail, and your SSL channel connections will no longer work.

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This build: January 26, 2011 11:06:22

11.3.2.1.2. Why you must ensure complete SSL certificate chains exist before installation

During the installation of WebSphere® MQ Version 7.0, the **AMQMCERT** command line interface and the Manage SSL Certificates graphical interface, which provide access to WebSphere MQ Version 5.3 certificate stores, are removed, and you will not be able to add any missing certification authority certificates to these stores after installation.

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This build: January 26, 2011 11:06:23

11.3.2.1.3. Where WebSphere MQ certificate stores are located

This section gives details on where you can find the WebSphere® MQ certificate stores installed on your systems.

In WebSphere MQ Version 5.3 for Windows, certificates are held in a WebSphere MQ Certificate Store and are stored in a (store) file that has the suffix .sto.

The path name for each of the WebSphere MQ certificate stores can be found by looking in the following attributes and variables:

- for WebSphere MQ queue managers, this is the value of the SSLKEYR attribute
- for WebSphere MQ clients, this is the value of the MQSSLKEYR environment variable
- for applications using MQCONNX calls, this is the value of the KeyRepository field in the MQSCO structure

The store file usually contains the following:

- The certificate assigned to the queue manager or client
- The chain of certification authority certificates
- Any other certificates that were loaded by default

- Any other personal or certification authority certificates.

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This build: January 26, 2011 11:06:23

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11.3.2.1.4. How to check WebSphere MQ certificate stores contain complete certificate chains

This section details how you can check if the SSL certificate chains that exist in your SSL certificate store are complete.

In WebSphere® MQ Version 7.0, a new command is supplied that will check to see if the certificate chains are complete. This command is **AMQCCERT** (Check Certificate Chains) and can either be run from a command line or batch file, or as part of a wizard. This section will only deal with the use of the wizard. For information on using **AMQCCERT** from a command line or batch file, see the *WebSphere MQ System Administration Guide*.

The wizard is used to select the queue managers and clients that have certificate stores to migrate. It will run the **AMQCCERT** command against the certificate stores that have been specified and allows you to check the results of the command. If the wizard has been run previously, any queue managers and clients that were previously selected, will display again.

The wizard also allows you to specify that a queue manager does not use SSL connections and the certificate store (if it exists) will not be checked or migrated.

Identify the queue managers or clients that are using SSL channels. See "Determining whether SSL connections have been set up" for guidance on how this is done.

1. Insert the WebSphere MQ Version 7.0 installation CD into the machine where the certificate store to be checked resides.
2. Run the WebSphere MQ Pre-install Launchpad.
3. Select the SSL tab in the WebSphere MQ Pre-install Launchpad.
4. From the WebSphere MQ Pre-install Launchpad, run the Check WebSphere MQ Certificate Store Wizard.
5. Use the Check WebSphere MQ Certificate Store Wizard to check all the certificate chains in your certificate stores. There is help information in the wizard to assist in each of the steps.

When the Check WebSphere MQ Certificate Store Wizard shows which certificate stores have passed and which have failed, the wizard allows you to look at the details of why a certificate store might have failed. The following is an example of the type of information shown when you display the details of why a certificate store might have failed:

```
C:\ssl\client
5724-B41 (C) Copyright IBM Corp. 1994, 2005. ALL RIGHTS RESERVED.
The number of certificates in the Microsoft Certificate Store
                                    'c:\ssl\client' is '13'.

The signer certificate 'GlobalSign Primary Class 1 CA' is missing for
                                    the following certificate.

Microsoft Certificate Store: 'c:\ssl\client'.
Certificate Subject:         'GlobalSign PersonalSign Class 1 CA'.
Certificate Issuer:          'GlobalSign Primary Class 1 CA'.
Certificate Serial Number:   '0400 0000 0000 FA3D EEE9 D9'.
Certificate Valid From:      '22/01/2004' to '28/01/2009'.

The signer certificate 'GlobalSign PersonalSign Class 1 CA' is missing
                                    for the following certificate.

Microsoft Certificate Store: 'c:\ssl\client'.
Certificate Subject:         'wm.shakespeare@hamlet.com'.
Certificate Issuer:          'GlobalSign PersonalSign Class 1 CA'.
Certificate Serial Number:   '0100 0000 0001 0170 978B 1E'.
Certificate Valid From:      '14/01/2005' to '14/02/2005'.

Certificate chain checking has completed with some failures.
The Check Certificate Chains (amqccert) command has completed.
```

As well as being visible through the wizard, this information, along with other progress information, is also written into a log file. This log file is located in the WebSphere MQ data directory and is named `amqmsccw.txt`.

At this point you have the ability to replace out of date certificates or add missing ones and then go back to the wizard and recheck the stores to ensure they now pass. The wizard will only complete when all the selected certificate stores have been checked and have passed.

Note: If the state `UNTESTED` is displayed for the certificate stores, it indicates that the wizard was unable to launch AMQCCERT to test the given stores. The most likely cause of this is that AMQCCERT or one of its dependent libraries is not available. Check that the WebSphere MQ `bin` directory is available in the path.

Note: ►AMQMCERT and the Services GUI provided with WebSphere MQ Version 5.3 can be used to work with the certificate stores to correct any errors before migrating them.◄

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

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11.3.2.1.5. Adding missing certification authority certificates into WebSphere MQ certificate stores

This section gives the commands necessary to add SSL certificates into WebSphere® MQ certificate stores to complete the certificate chains before migrating to WebSphere MQ Version 7.0.

Missing certificates can be obtained from the certification authority that issues them. To import a certification authority certificate into a WebSphere MQ certificate store, issue the **AMQMCERT** command at a command prompt.

- For a queue manager enter:

  amqmcert −a −s *CertificateFilename* −m *queueManager*

  To list all certificates in the WebSphere MQ queue manager certificate store, enter:

  amqmcert −l −m *queueManager*

  Where:
  - ❯CertificateFilename is the fully qualified file name of the file where the certification authority certificate is stored in (certification authority certificates are usually provided in files with extensions .DER, .pb7, or .CER)❮
  - queueManager is the name of the queue manager that requires the certificate to be added to its certificate store

- For a client (which uses the WebSphere MQ client certificate store identified by the MQSSLKEYR environment variable) enter:

  amqmcert −a −s *CertificateFilename*

  To list all certificates in the WebSphere MQ client certificate store, enter:

  amqmcert −l

  Where:
  - ❯CertificateFilename is the fully qualified file name of the file where the certification authority certificate is stored in (certification authority certificates are usually provided in files with extensions .DER, .pb7, or .CER)❮

- For client applications that use MQCONNX calls enter:

  amqmcert −a −s *CertificateFilename* −k *KeyRepository*

  To list all certificates in the WebSphere MQ client certificate store, enter:

  amqmcert −l −k *KeyRepository*

  Where:
  - ❯CertificateFilename is the fully qualified file name of the file where the certification authority certificate is stored in (certification authority certificates are usually provided in files with extensions .DER, .pb7, or .CER)❮
  - KeyRepository is the value (the fully qualified stem name of the repository file) stored in the MQSCO structure

For full details of the **AMQMCERT** command see the "WebSphere MQ Version 5.3 System Administration Guide".

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This build: January 26, 2011 11:06:24

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mi10320_

11.3.2.1.6. If WebSphere MQ Version 7.0 has already been installed

This section deals with the issue of having upgraded to WebSphere® MQ Version 7.0 without having complete certificate chains.

If you have installed WebSphere MQ version 7.0 without completing Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains, you will not be able to use **AMQMCERT** to add any missing certification authority certificates.

You should still use AMQTCERT (Transfer Certificates) command as detailed in Step 2: Migrating SSL certificates to Global Security Toolkit key database files, to attempt certificate migration. Any certificates that have an incomplete certificate chain will fail the migration, and will be copied into a special directory.

If this occurs you will need to:

1. Individually import each certification authority certificate in the failed certificates issuer chain in the correct order
2. Import the failed certificate from the special directory

For more details of these steps, see Reasons and remedies for failed certificate migration.

Parent topic: Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains

This build: January 26, 2011 11:06:24

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11.3.2.2. Step 2: Migrating SSL certificates into Global Security Toolkit database files

This section deals with migrating SSL certificates into Global Security Toolkit key database files and must be performed after installing WebSphere® MQ Version 7.0.

The Global Security Toolkit (GSKit) requires SSL certificates to be stored in key database files that it creates and manages. This can be achieved by migrating the SSL certificates held in certificate stores used by WebSphere MQ Version 5.3 queue managers and WebSphere MQ clients into key database files.

This section details how to do this using the Prepare WebSphere MQ Wizard, and the **AMQTCERT** (Transfer Certificates) command.

Perform Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains, before installing WebSphere MQ Version 7.0.

The following sections describe the process for migrating your SSL certificates to the GSKit database files:

- Using the Prepare WebSphere MQ Wizard to schedule certificate migration
- Using the AMQTCERT (Transfer Certificates) command

Note: You cannot schedule certificate migration using the Prepare WebSphere MQ Wizard unless you have run the Check WebSphere MQ Certificate Stores Wizard. AMQTCERT can be run without completing Step 1, but you are advised to complete Step 1 before moving on to Step 2.

Using the Prepare WebSphere MQ Wizard to schedule certificate migration
This section describes the use of the Prepare WebSphere MQ Wizard which can schedule the migration of your certificate stores and also prompts you to alter other system features for WebSphere MQ Version 7.0 SSL.

Using the AMQTCERT (Transfer Certificates) command
This section describes the use of the **AMQTCERT** (Transfer Certificates) command, which can be used to create key database files and transfer existing SSL certificates held in certificate stores used by queue managers and WebSphere MQ clients.

Parent topic: SSL migration steps

This build: January 26, 2011 11:06:24

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.1. Using the Prepare WebSphere MQ Wizard to schedule certificate migration

This section describes the use of the Prepare WebSphere MQ Wizard which can schedule the migration of your certificate stores and also prompts you to alter other system features for WebSphere® MQ Version 7.0 SSL.

The Prepare WebSphere MQ Wizard has two functions in relation to SSL certificate migration:

- It offers to schedule the migration for all certificate stores checked by the Check WebSphere MQ Certificate Stores Wizard during Step 1: Ensuring WebSphere MQ certificate stores contain complete certificate chains
- It also prompts you to check that Step 3: Ensuring Certificate Revocation Lists are in the correct format and Step 4: Ensuring SSLPEER values have correctly ordered OU entries have been completed correctly.

The Prepare WebSphere MQ Wizard is automatically launched at the end of the installation of WebSphere MQ Version 7.0, and can also be launched from the Start Menu.

After starting the Prepare WebSphere MQ Wizard, follow the instructions on each of the panels to schedule the migration or to check that the scheduling of the migration of the certificates has been successful.

Note: The Prepare WebSphere MQ Wizard only offers the certificate stores checked by the Check WebSphere MQ Certificate Stores Wizard. Certificate chains checked manually using **AMQCCERT** are not presented for selection in the Prepare WebSphere MQ Wizard.

Parent topic: Step 2: Migrating SSL certificates into Global Security Toolkit database files

This build: January 26, 2011 11:06:24

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2. Using the AMQTCERT (Transfer Certificates) command

This section describes the use of the **AMQTCERT** (Transfer Certificates) command, which can be used to create key database files and transfer existing SSL certificates held in certificate stores used by queue managers and WebSphere® MQ clients.

The AMQTCERT (Transfer Certificates) command can be used to schedule migration for the next time the queue manager is started, or the next time the WebSphere MQ client connects to a queue manager using an SSL channel. The migration includes:

- Deriving the names of the source certificate store and target key database file from the queue manager SSLKeyRepository attribute (for queue managers)
- Creating the target key database file
- Attempting to migrate all SSL certificates found in the source certificate store

❯For details of all the options available for this command, including the options to specify key database file names, list certificate stores, and cancel scheduled transfers, see the WebSphere MQ Version 7.0 System Administration Guide.❮

Changing migration state

If you have set a queue manager or client to migrate their stores automatically, it sometimes becomes necessary to migrate the certificate store manually. AMQTCERT can be used to cancel the migration for all or individual queue managers or clients, providing that the migration has not taken place. See the WebSphere MQ Version 7.0 System Administration Guide for details of how to use AMQTCERT to accomplish this.

Automatically transferring SSL certificates used by all queue managers
This section gives an example of using the AMQTCERT command to automatically transfer the SSL certificates from all WebSphere MQ Version 5.3 queue managers certificate stores (on the current system).

Automatically transferring SSL certificates used by a specified queue manager
This section gives an example of using the AMQTCERT command to automatically transfer the SSL certificates from a specified WebSphere MQ Version 5.3 queue manager certificate store.

Automatically transferring SSL certificates used by WebSphere MQ clients
This section gives an example of using the **AMQTCERT** command to automatically transfer the SSL certificates from a WebSphere MQ client certificate store.

Manually transferring SSL certificates used by a specified queue manager
This section gives an example of using the **AMQTCERT** command to manually transfer the SSL certificates from a WebSphere MQ queue manager certificate store.

Reasons and remedies for failed certificate transfer
This section gives some reasons and classifications for a failed certificate transfer and how to remedy some of them.

Parent topic: Step 2: Migrating SSL certificates into Global Security Toolkit database files

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2.1. Automatically transferring SSL certificates used by all queue managers

This section gives an example of using the AMQTCERT command to automatically transfer the SSL certificates from all WebSphere® MQ Version 5.3 queue managers certificate stores (on the current system).

You can schedule the transfer of SSL certificates used by all queue managers on the computer by entering at a command prompt:

      amqtcert -a -m * -p *password* -e *passwordExpiry*

Where:

- password is the password for all key databases created
- passwordExpiry is the number of days until new passwords are required

For details of all the options available for this command, see the Version 7.0 *WebSphere MQ System Administration Guide*.

Transfer of certificates will occur for each queue manager when it next starts. For each queue manager, the path and stem of where the source WebSphere MQ certificate store and the target GSKit key database file are, is determined by the SSLKeyRepository queue manager attribute.WebSphere MQ client certificate stores will not be transferred by this command.

Parent topic: Using the AMQTCERT (Transfer Certificates) command

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2.2. Automatically transferring SSL certificates used by a specified queue manager

This section gives an example of using the AMQTCERT command to automatically transfer the SSL certificates from a specified WebSphere® MQ Version 5.3 queue manager certificate store.

You can schedule the transfer of SSL certificates used by a specified queue manager on the computer by entering at a command prompt:

      amqtcert -a -m *queueManager* -p *password* -e *passwordExpiry*

Where:

- queueManager is the name of the queue manager whose certificate store is to be migrated
- password is the password for all key databases created
- passwordExpiry is the number of days until new passwords are required

For details of all the options available for this command, see the Version 7.0 *WebSphere MQ System Administration Guide*.

Transfer of certificates will occur when the queue manager next starts. For the queue manager, the path and stem of where the source WebSphere MQ certificate store and the target GSKit key database file are, is determined by the SSLKeyRepository queue manager attribute.WebSphere MQ client certificate stores will not be transferred by this command.

Parent topic: Using the AMQTCERT (Transfer Certificates) command

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2.3. Automatically transferring SSL certificates used by WebSphere MQ clients

This section gives an example of using the **AMQTCERT** command to automatically transfer the SSL certificates from a WebSphere® MQ client certificate store.

You can schedule the transfer of SSL certificates used by a WebSphere MQ client on the local system by entering at a command prompt:

      amqtcert -a -c clientStoreFilename -p password -e passwordExpiry

Where:

- ❯clientStoreFilename is the fully qualified file name (excluding the .sto suffix) of the WebSphere MQ client certificate store.❮
- password is the password for all key databases created
- passwordExpiry is the number of days until new passwords are required

For details of all the options available for this command, see the Version 7.0 *WebSphere MQ System Administration Guide*.

Transfer of certificates will occur the next time a WebSphere MQ client process which uses a key repository value matching clientStoreFilename connects to a queue manager using an SSL channel.

Parent topic: Using the AMQTCERT (Transfer Certificates) command

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2.4. Manually transferring SSL certificates used by a specified queue manager

This section gives an example of using the **AMQTCERT** command to manually transfer the SSL certificates from a WebSphere® MQ queue manager certificate store.

You can manually transfer SSL certificates used by a WebSphere MQ queue manager on the computer by entering at a command prompt:

```
amqtcert -m QM1
-w "C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM1\SSL\key"
-g "C:\Program Files\IBM\WebSphere MQ\Qmgrs\QM1\SSL\key"
-p MyPassword
```

Where:

- -m specifies the name of the queue manager for the certificate store to be migrated
- ➤-w specifies the fully qualified file name (excluding the .sto suffix) of the WebSphere MQ Certificate Store◄
- ➤-g specifies the fully qualified file name (excluding the .kdb suffix) of GSKit key database◄
- -p states the password to be set for the GSKit key database

Note:
1. The command should appear on a single line, but has been displayed as above for the purposes of this documentation
2. ➤The GSKit key database must not exist before using this command as this command will create it◄

For details of all the options available for this command, see the Version 7.0 *WebSphere MQ System Administration Guide*.

Parent topic: Using the AMQTCERT (Transfer Certificates) command

This build: January 26, 2011 11:06:25

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.2.2.5. Reasons and remedies for failed certificate transfer

This section gives some reasons and classifications for a failed certificate transfer and how to remedy some of them.

The **AMQTCERT** command has 2 classifications for why certificates fail to be transferred:

Orphan Certificates

Orphan certificates do not have a complete certificate chain. When the **AMQTCERT** command detects an orphan certificate, it:

- Creates an OrphanCertificates subdirectory in the directory containing the key database file if one doesn't exist already
- Exports personal certificates into .pfx files
- Exports certification authority certificates into .cer files
- Outputs an error message to the amqerr01.log for each orphaned certificate, identifying the file, the certificate, and its issuer

To remedy this situation you will need to use the Global Security Toolkit to import the certificates missing from the orphaned certificate chain in strict order from root certification authority to the issuer of the orphaned certificate. Then import the orphan certificate from its file. For more details on how to do this see the Version 7.0 *WebSphere MQ Security*.

Failed Certificates

Failed certificates fail to transfer for reasons other than incomplete certificate chains, for example, the certificate having become corrupted. When the **AMQTCERT** command detects a failed certificate, it:

- Creates an ImportFailedCertificates subdirectory in the directory containing the key database file if one doesn't exist already
- Exports personal certificates into .pfx files
- Exports certification authority certificates into .cer files
- Outputs an error message to the amqerr01.log for each failed certificate, identifying the file, the certificate, and its issuer

To try to remedy this situation you can get a new copy of the certificate from the certification authority. You will then need to use the Global Security Toolkit to import the certificates in strict order from root certification authority to the personal certificate. For more details on how to do this see the Version 7.0 *WebSphere MQ Security*.

Parent topic: Using the AMQTCERT (Transfer Certificates) command

This build: January 26, 2011 11:06:25

Notices | Trademarks | Downloads | Library | Support | Feedback

11.3.2.3. Step 3: Converting Certificate Revocation Lists and Authority Revocation Lists

This section describes how to convert the Certificate Revocation Lists and Authority Revocation Lists.

Certificate revocation lists (CRLs) and Authority Revocation Lists (ARLs) are available from Certification Authorities in 2 formats:

- DER-format

- PEM-format

WebSphere® MQ Version 5.3 for Windows platforms allows CRLs and ARLs to be in PEM-format. In WebSphere MQ Version 7.0, the Global Security Toolkit requires CRLs and ARLs to be in DER-format and you must ensure that any CRLs and ARLs that you have in PEM-format are changed to be in DER-format.

You can change the PEM-format CRLs and ARLs before or after installing WebSphere MQ Version 7.0.

Changing Certificate Revocation Lists and Authority Revocation Lists into DER-format

You can change PEM-format CRLs and ARLs into DER-format in several ways. Two of these are:

- Obtain replacement CRLs and ARLs in DER-format from your Certification Authority or authorities
- Use a commercial format conversion tool to convert your existing CRLs and ARLs

For each LDAP server that has been configured to hold CRL and ARL information used by WebSphere MQ, you must edit the appropriate LDIF file and update the certificateRevocationList; binary field with the DER-format CRL and ARL data. For further information on configuring and updating LDAP servers with CRL and ARL information, see Working with CRLs and ARLs.

Parent topic: SSL migration steps

This build: January 26, 2011 11:06:26

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11.3.2.4. Step 4: Ensuring SSLPEER values have correctly ordered Organizational Unit entries

This section describes how to check that the SSLPEER Organizational Unit (OU) values are in the correct order and how to change them if they are not.

Note: If you have already installed Fix Pack level 8 or higher for WebSphere® MQ Version 5.3, you can ignore this step.

SSL-enabled channels that use the optional SSLPEER field to filter Distinguished Names must be checked to ensure multiple Organizational Unit entries (OUs) have been correctly ordered. This section contains information on why this check is needed, and how to do it.

Why you need to check that SSLPEER values have correctly ordered OU entries
This section details why you have to change the order of your SSLPEER values if you are migrating from a WebSphere MQ Version 5.3 Fix Pack 7 or earlier installation.

How to display and change SSLPEER values
This section details how you can display the SSLPEER values that you have set and gives an example of how to change them.

Parent topic: SSL migration steps

This build: January 26, 2011 11:06:26

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11.3.2.4.1. Why you need to check that SSLPEER values have correctly ordered OU entries

This section details why you have to change the order of your SSLPEER values if you are migrating from a WebSphere® MQ Version 5.3 Fix Pack 7 or earlier installation.

Every SSL certificate contains a Distinguished Name (DN), used to uniquely identify the person or organization the certificate was issued to. The following attribute types are commonly found in the certificate's Distinguished Name field:

CN
  Common Name
T
  Title
O
  Organization Name
OU
  Organizational Unit Name
L
  Locality Name
ST (or SP or S)
  State or Province Name
C
  Country

The certificate Distinguished Name can contain multiple OU attributes, listed in descending hierarchical order. For example, a certificate Distinguished Name could be specified as:

```
CN='QM2', O='IBM', C='GB', L='Hursley', OU='Software Group', OU='Middleware', OU='MQ'
```

If a WebSphere MQ SSL channel has been configured with an optional SSLPEER value, after an SSL handshake, this value is compared to the Distinguished Name in any certificate received. If these values match then the connection is allowed, otherwise the connection is refused. In WebSphere MQ Version 5.3 Fix Pack 7 or earlier, channel definitions containing SSLPEER values with multiple OUs were entered in ascending hierarchical order on Windows only. All other platforms were in descending hierarchical order. For example on Windows:

```
CN='QM2', O='IBM', C='GB', L='Hursley', OU='MQ', OU='Middleware', OU='Software Group'
```

These differing approaches to specifying multiple OUs were resolved at Fix Pack 8 - multiple OUs are now always specified in descending hierarchical order in the SSLPEER value on all platforms.

Parent topic: Step 4: Ensuring SSLPEER values have correctly ordered Organizational Unit entries

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11.3.2.4.2. How to display and change SSLPEER values

This section details how you can display the SSLPEER values that you have set and gives an example of how to change them.

Before you begin
Ensure that the queue manager you are changing the SSLPEER values for is running.

Procedure
1. Start the WebSphere® MQ command processor. You can do this by entering `runmqsc queueManager` at a command prompt where queueManager is the name of the queue manager you want to work with.
2. Display the SSLPEER value for each channel defined on the queue manager. You can do this by entering

   ```
   DIS CHL(*) CHLTYPE SSLPEER
   ```

   The output should look similar to this:

   ```
   AMQ8414: Display Channel details.
   CHANNEL(SYSTEM.DEF.SENDER) CHLTYPE(SDR) SSLPEER( )
   AMQ8414: Display Channel details.
   CHANNEL(SYSTEM.DEF.SERVER) CHLTYPE(SVR) SSLPEER( )
   AMQ8414: Display Channel details.
   CHANNEL(TO.QM7) CHLTYPE(CLNTCONN) SSLPEER(CN='QM7', O='IBM', C='GB',
                   L='Hursley', OU='MQ', OU='Middleware', OU='Software Group')[1]
   AMQ8414: Display Channel details.
   CHANNEL(TO.QM8) CHLTYPE(SVR) SSLPEER(CN='QM2', O='IBM', C='GB',
                   L='Hursley', OU='MQ', OU='Middleware', OU='Software Group')[1]
   ```

3. Where the installation is from WebSphere MQ Version 5.3 Fix Pack 7 or earlier and the SSLPEER values contain multiple organizational unit names (OUs), you will need to reverse the order of these names. You can use the MQSC or the WebSphere MQ Explorer graphical interface to do this. For example, to change the SSLPEER value for the client-connection channel definition 'TO.QM7' in the above example, at the WebSphere MQ command processor prompt, enter

   ```
   ALTER CHL(TO.QM7) CHLTYPE(CLNTCONN) SSLPEER(CN='QM7', O='IBM', C='GB',
                   L='Hursley', OU='Software Group', OU='Middleware', OU='MQ')[1]
   ```

   Note: 1. These lines have been deliberately split to ensure they fit on the page. In the command line interface, all of these should appear on a single line unless the display forces them to wrap on the screen.

Parent topic: Step 4: Ensuring SSLPEER values have correctly ordered Organizational Unit entries

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11.4. Additional migration information

This section gives additional information if you are migrating directly from WebSphere® MQ Version 5.3 to WebSphere MQ Version 7.0.

The information in the following topics is provided as guidance to areas that have changed in WebSphere MQ Version 7.0. In some cases you do not need to make any changes to your applications, but it might be beneficial to do so in the future.

Channels implemented as queue manager objects on distributed platforms
This section gives information about moving channels to queue manager objects in WebSphere MQ Version 7.0 on distributed platforms.

Setting the MQCD Version field
The effect of initializing an MQCD to MQCD_DEFAULT has changed. You might need to change how you set the Version.

DCE support in WebSphere MQ
This section gives information in relation to the removal of DCE support in WebSphere MQ Version 6.0 and later.

External Transaction Manager XA support
This section gives information in relation to changes for external Transaction Manager XA support.

Queue manager attributes SCHINIT and SCMDSERV

Starting and stopping services and listeners

UNIX directory permissions

High availability clustering
This section gives information on considerations for migrating high availability (HA) clusters.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

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11.4.1. Channels implemented as queue manager objects on distributed platforms

This section gives information about moving channels to queue manager objects in WebSphere® MQ Version 7.0 on distributed platforms.

In versions of WebSphere MQ before Version 6.0, channels on distributed platforms were stored collectively in a single channel definition file and secured by mqm or QMQMADM permissions. From WebSphere MQ Version 6.0, channels are implemented as queue manager objects in a similar way to objects such as queues and namelists. Two of the main advantages are that channel definitions are recoverable from media images stored in the queue manager logs and that authority to channel objects can be granted on a per object basis like any other object. To be able to recover a channel from a media image, you must first record an image of the channel. If you issue the **rcdmqimg** command with the `-t all` parameter, this happens automatically. If you specify particular types of object, you must add commands to record channel and clntconn objects. There are two new object authorities relevant to channel objects; control (ctrl) and control extended (ctrlx). You must have the appropriate authority in order to start, stop, ping, resolve and reset channels. Any user with ALLADM authority has the required authorities implicitly. Details of changes to media recovery and authority commands to support the new objects can be found in the WebSphere MQ System Administration Guide.

Migration of the channels

Migration to queue manager objects is carried out the first time the queue manager is started after installing WebSphere MQ Version 7.0. A message (AMQ8047) summarizing the total number of channels successfully migrated is displayed and is also written to the queue manager error logs. If channel migration fails, set the AMQ_MIGFORCE_CHANNEL environment variable to force remigration the next time the queue manager is started. Once migration has completed, the channel definition file is renamed from `amqrfcda.dat` to `amqrfcda.old` or from `AMQRFCD4(AMQRFCD4)` to `AMQRFOLD(AMQRFOLD)` on i5/OS®.

Parent topic: Additional migration information

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11.4.2. Setting the MQCD Version field

The effect of initializing an MQCD to MQCD_DEFAULT has changed. You might need to change how you set the Version.

In versions of WebSphere® MQ before Version 6.0, initializing the MQCD to the macro variables MQCD_DEFAULT or MQCD_CLIENT_CONN_DEFAULT set the Version field in the MQCD to MQCD_CURRENT_VERSION, which equates to 7 for WebSphere MQ Version 5.3, 8 for WebSphere MQ Version 6.0, and 9 for WebSphere MQ Version 7.0.

In WebSphere MQ Version 6.0, MQCD_DEFAULT and MQCD_CLIENT_CONN_DEFAULT set the Version to 6. In WebSphere MQ Version 7.0, to take advantage of features of the MQCD introduced in WebSphere MQ Version 5.3, 6.0, or 7.0, set Version in the MQCD explicitly to 7, 8, or 9 as appropriate, or to MQCD_CURRENT_VERSION. If you intend your applications to be portable between several environments, use a newer version MQCD only if all of those environments support that version.

Parent topic: Additional migration information

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11.4.3. DCE support in WebSphere MQ

This section gives information in relation to the removal of DCE support in WebSphere® MQ Version 6.0 and later.

Support for DCE exits and the DCE name service has been withdrawn from WebSphere MQ and the executables and libraries to allow the use of these will no longer be provided. On HP-UX, the executables and libraries that were built using DCE threads will also no longer be provided.

Consider using SSL (Secure Sockets Layer) or other types of channel exit to secure your channels. For further information see *WebSphere MQ Security*.

Parent topic: Additional migration information

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mi10520_

11.4.4. External Transaction Manager XA support

This section gives information in relation to changes for external Transaction Manager XA support.

Although there are no migration issues in relation to the support for external Transaction Manager XA, in WebSphere® MQ Version 6.0 and later, the WebSphere MQ Server will be brought in line with the enhancements that have been made in earlier releases to the Extended Transactional Client. For example: a single generic library which supports all transaction managers except CICS®; xa_open string support of QMNAME, TPM and AXLIB.

In WebSphere MQ Version 6.0 and later a generic XA library is supplied. This is for the server and client, and is in 32-bit form on all UNIX platforms and in 64-bit form in WebSphere MQ for AIX®, WebSphere MQ for HP-UX, WebSphere MQ for Sun Solaris, and WebSphere MQ for Linux (POWER® platform).

The CICS XA libraries will be 32-bit until CICS changes to 64-bit processing.

As the UNIX library is now a shared library and not an archive library you are recommended to rebuild your applications. Not to do so means that you will remain at a level of code from when you last built your applications and will not pick up the changes to the library as it is enhanced through changes to functionality and fixes. To rebuild your applications using this library would be a one time exercise as the applications would then use the library files that are shipped with the product in this and any future releases.

Parent topic: Additional migration information

This build: January 26, 2011 11:06:28

This topic's URL:
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11.4.5. Queue manager attributes SCHINIT and SCMDSERV

❱The new queue manager attributes SCHINIT and SCMDSERV control whether the channel initiator and command server start automatically when the queue manager starts. A queue manager migrated from WebSphere MQ V5.3 to V7 has SCMDSERV set to MANUAL. The value of the queue manager attribute can be altered using the MQSC command **ALTER QMGR** specifying the parameter **SCMDSERV.**◀

Parent topic: Additional migration information

This build: January 26, 2011 11:06:28

This topic's URL:
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11.4.6. Starting and stopping services and listeners

You can now start and stop listeners and services using the **START** and **STOP** MQSC commands. However, the old commands **strmqcsv**, **endmqcsv**, **runmqchi**, **runmqlsr**, **endmqlsr**, and **runmqtrm** are still supported.

Parent topic: Additional migration information

This build: January 26, 2011 11:06:28

This topic's URL:
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11.4.7. UNIX directory permissions

❱On UNIX systems, queue manager directory permissions are changed to be stricter in WebSphere® MQ Version 7.0 than in WebSphere MQ Version 5.3. The change will be made automatically when the queue manager is first started after migration. Any user applications which require access to the queue manager directories (for example, error logs, FDCs) should run under the authority of a user ID in the **mqm** group. ◀

Parent topic: Additional migration information

This build: January 26, 2011 11:06:28

This topic's URL:
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11.4.8. High availability clustering

This section gives information on considerations for migrating high availability (HA) clusters.

To update an HA cluster, plan the order of migration so that a system running WebSphere® MQ Version 5.3 code can never access the files for a queue manager that is already running with Version 7.0 code. Implementing this rolling migration strategy to minimize total downtime will probably require you to disable failover between some systems in the cluster during the upgrade process.

Because channels are objects in WebSphere MQ Version 7.0, the channels and clntconn directories must be replicated between nodes for channel definitions. (The client channel table file is unchanged.)

On Windows HA systems, the certificate stores must be migrated to GSKit on all nodes which host a WebSphere MQ Version 7.0 queue manager.

Parent topic: Additional migration information

This build: January 26, 2011 11:06:28

This topic's URL:
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11.5. Considerations for migrating from WebSphere MQ for Linux Version 5.3

This section gives information on considerations for migrating from WebSphere® MQ for Linux Version 5.3

Migrating from earlier versions of WebSphere MQ for Linux

WebSphere MQ Explorer for Version 7.0 - error connecting to a migrated queue manager

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:37

This topic's URL:
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11.5.1. Migrating from earlier versions of WebSphere MQ for Linux

If you are migrating from a previous version of WebSphere® MQ for Linux, you must uninstall your current version before installing WebSphere MQ Version 7.0.

If you are migrating from a previous level of this product, you **cannot** revert to your previous level, so back up your system **before** you install WebSphere MQ Version 7.0. This will enable you to back out the upgrade if necessary. If you back out the upgrade, however, you cannot recover any work performed by WebSphere MQ Version 7.0.

The use of RPM upgrade tools to migrate directly from one version of WebSphere MQ to another is not supported.

If you have already tried to upgrade WebSphere MQ using `rpm -U` or `rpm -F`, you might have deleted your old WebSphere MQ package entries from the RPM database without removing the product from your system. You might also have partially installed WebSphere MQ Version 7.0.

To continue upgrading to WebSphere MQ Version 7.0:
1. Find out which WebSphere MQ packages still have entries in your RPM database using: `rpm -qa | grep MQSeries`
2. Remove all remaining WebSphere MQ packages of any level from your system using: `rpm -e <package name>`
3. Remove the /opt/mqm directory by typing: `rm -rf /opt/mqm`
4. Install WebSphere MQ Version 7.0 using the instructions provided in Installing a WebSphere MQ server

Parent topic: Considerations for migrating from WebSphere MQ for Linux Version 5.3

This build: January 26, 2011 11:06:29

Notices | Trademarks | Downloads | Library | Support | Feedback

11.6. Considerations for migrating from WebSphere MQ for Windows Version 5.3

This section gives information on considerations for migrating from WebSphere® MQ for Windows Version 5.3

Customizing your queue managers

Migrating from Windows NT

Installable features

WebSphere MQ service objects
This section gives information about service objects in WebSphere MQ for Windows.

WebSphere MQ Explorer - migrating from Version 5.3 to 7.0

Migrating WebSphere MQ Services

Publish/Subscribe users

Saved views with WebSphere MQ Explorer

MSCS migration issues
If you migrate an MSCS configuration from WebSphere MQ V5.3 to WebSphere MQ V7.0, you must take steps to migrate the SSL keystore and to deal with changes to the registry format.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:38

Notices | Trademarks | Downloads | Library | Support | Feedback

11.6.1. Customizing your queue managers

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

This build: January 26, 2011 11:07:00

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11.6.2. Migrating from Windows NT

If you have an earlier version of WebSphere® MQ installed on a Windows NT machine, you will need to migrate the operating system to Windows XP, Windows 2003, , Windows Vista, or Windows Server 2008. Be aware that your current access control lists (ACLs) for your domain resources might become invalid.

On Windows NT, WebSphere MQ user account details are stored as security identifiers (SIDs) in your ACLs. When you migrate to a new Windows platform these SIDs are lost, invalidating the ACLs. This causes WebSphere MQ commands to fail, and you lose registry permissions and the WebSphere MQ Administration (mqm) security group.

You have the following options:
- To avoid losing WebSphere MQ user account access rights, remap the ACLs on your domain resources.
  Consult your operating system documentation on migration from Windows NT for details about how to remap the ACLs on your domain resources. You do not need to reinstall WebSphere MQ if you choose this option.
- If you do not want to remap your ACLs, and would like to start afresh, do the following:

1. Uninstall WebSphere MQ from Windows NT.
2. Migrate from Windows NT to your new Windows platform.
3. Install WebSphere MQ on your new Windows platform.

You must redefine your operating system user accounts and security groups as required, if you choose this option.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

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11.6.3. Installable features

WebSphere® MQ for z/OS® comprises the following features:

Base

This is required; it comprises all the main functions, including

- Administration and utilities
- Support for CICS®, IMS™ and batch type applications using the WebSphere MQ Application Programming Interface, or C++
- Distributed queuing facility (supporting both TCP/IP and APPC communications)

National language features

These contain error messages and panels in all the supported national languages. Each language has a language letter associated with it. The languages and letters are:

C

Simplified Chinese

E

U.S. English (mixed case)

K

Japanese

U

U.S. English (uppercase)

You must install the US English (mixed case) option. You can also install one or more other languages. (The installation process for other languages requires US English (mixed case) to be installed, even if you are not going to use US English (mixed case).)

Client Attachment feature

This is optional; it is only required if you are going to attach clients to your subsystem. When you have installed this feature, there are no configuration parameters to set before you can attach clients to WebSphere MQ for z/OS. Administration for clients is available even if you do not install this feature.

Java Support feature

This is optional; it is only required if you want to use Java and the Java Message Service. This is described in WebSphere MQ Using Java.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

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11.6.5. WebSphere MQ Explorer - migrating from Version 5.3 to 7.0

Previous versions of the WebSphere® MQ Explorer used Microsoft Management Console (MMC) based snap-ins and were part of the Server feature during installation. In WebSphere MQ Version 7.0 the WebSphere MQ Explorer component is provided as a separate feature and is no longer a part of the Server feature. Therefore when you want to migrate the WebSphere MQ Explorer from WebSphere MQ Version 5.3 to 7.0, you must choose a Custom installation. The Update installation can not install Version 7.0 of the WebSphere MQ Explorer because the Update installation tries to update the features installed at the previous level of WebSphere MQ.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

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11.6.6. Migrating WebSphere MQ Services

WebSphere® MQ services define one or more commands to be run when a queue manager is started or stopped. Examples of a service include:

- Listener
- Channel initiator
- Trigger monitor
- Command server
- Channel
- Queue manager custom service

When migrating from a version of WebSphere MQ earlier than Version 6, the WebSphere MQ services are automatically migrated into WebSphere MQ Objects. (For more information about WebSphere MQ Objects see the WebSphere MQ System Administration Guide.) These objects can then be administered in the WebSphere MQ Explorer.

Examples of the migration of services to WebSphere MQ Objects are:

- A listener is migrated to a WebSphere MQ listener object, equivalent to one defined by the `DEFINE LISTENER ...` MQSC command.
- A trigger monitor is migrated to a WebSphere MQ service object with `STARTCMD` set to `runmqtrm`.
- A channel is migrated to a WebSphere MQ service object with `STARTCMD` set to `runmqchl`.

It is important to note that after migration all services will run **after** the queue manager with which they are associated starts. This is the case even if the service previously ran before the associated queue manager started.

Only services that are associated with queue managers will be migrated. ROOT custom services, which are services that are not associated with a particular queue manager, are not migrated and they will remain as they were.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

This build: January 26, 2011 11:07:17

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11.6.7. Publish/Subscribe users

WebSphere® MQ Version 7.0 contains components that provide Publish/Subscribe support that were previously shipped in SupportPac MA0C and included in Fix Pack 8 for WebSphere MQ Version 5.3. If you install WebSphere MQ Version 7.0, you no longer need the SupportPac and you must not install it. The files included with WebSphere MQ Version 7.0 supersede those in the SupportPac.

If you are using SupportPac MA0C with your previous version of WebSphere MQ, uninstall before you install WebSphere MQ Version 7.0. Uninstall by selecting **Start** > **Settings** > **Control Panel** > **Add or Remove Programs** > **IBM MQSeries Publish/Subscribe**, and then selecting **Remove**.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

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11.6.8. Saved views with WebSphere MQ Explorer

WebSphere® MQ Version 5.3 uses Microsoft Management Console (MMC) based snap-ins to provide the WebSphere MQ Explorer. MMC allows you to save the current configuration or 'view' as a .msc file.

WebSphere MQ Version 7.0 no longer uses MMC. Therefore, any views that you have previously saved will not work with the WebSphere MQ Explorer.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

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11.6.9. MSCS migration issues

If you migrate an MSCS configuration from WebSphere MQ V5.3 to WebSphere MQ V7.0, you must take steps to migrate the SSL keystore and to deal with changes to the registry format.

SSL Keystore Migration

During the installation phase, WebSphere MQ attempts to migrate any SSL keystores (.sto) defined to WebSphere MQ V7.0 SSL key repositories (.kdb). However, for this to succeed, the installation needs access to the queue manager SSL keystore. A queue manager under MSCS control has its keystore defined on the shared drive, which, at the time of the installation, is not accessible by the Passive node. It is therefore not possible to automatically migrate any WebSphere MQ V5.3 SSL keystores for queue managers under MSCS control as part of the installation process. Instead, export any certificates from the keystore before migration, and after migration is complete import them into the new WebSphere MQ V7.0 key repository.

MSCS Registry Checkpointing

When you upgrade from WebSphere MQ V5.3, two changes are made to registry settings. However, as a consequence of the registry checkpointing behavior within MSCS, these changes are overwritten when the newly migrated node is brought online. MSCS restores the registry values to those present on the other node and thus the install time modifications are lost.

The changes in registry settings from WebSphere MQ V5.3 to V7.0 are as follows:

- `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\MQSeries\CurrentVersion\ Configuration\Services\`*qmname*`\Channel Initiator`
  moves to
  `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\MQSeries\CurrentVersion\ Configuration\QueueManager\`*qmname*`\QueueManagerStartup`
- `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\MQSeries\CurrentVersion\ Configuration\Services\`*qmname*`\Command Server`
  moves to
  `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\MQSeries\CurrentVersion\ Configuration\QueueManager\`*qmname*`\InstanceData`

In both these cases, the **Chinit** and **CmdServer** values after migration are set to Yes or No depending on the **Startup** value under the **Services** key before migration. As a result, these changes are lost and so any configured startup settings for the command server and channel initiator are lost after migration. To resolve this, apply APAR IC54088. Note that this APAR must be applied after installation and maintenance has been applied but before starting the queue manager on that node. Alternatively, you can alter the startup values using runmqsc after migration is complete.

Parent topic: Considerations for migrating from WebSphere MQ for Windows Version 5.3

Related information
runmqsc (run MQSC commands)

This build: January 26, 2011 11:07:01

11.7. PL/I support in WebSphere MQ for Windows

This section gives information in relation to PL/I support in WebSphere® MQ Version 6.0 and later.

Support for PL/I has been withdrawn from WebSphere MQ for Windows. It continues to be supported for WebSphere MQ for z/OS®.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:29

11.8. Migrating from UDP

The UDP protocol is no longer supported for channels. Use TCP instead. To migrate channels using UDP, stop the channels at both ends and issue the command `ALTER CHANNEL(CHANNEL.NAME) CHLTYPE(type) TRPTYPE(TCP)`. Change your channel definitions before installing WebSphere® MQ for AIX®, Version 7.0, as otherwise the UDP channels will not be migrated and will have to be defined again.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:29

11.9. Java archive (JAR) file com.ibm.mqbind.jar

This section gives information about the com.ibm.mqbind.jar file.

The Java archive (JAR) file com.ibm.mqbind.jar has been deprecated and is no longer supplied in WebSphere® MQ Version 6.0 and later versions. If your Java applications have been relying on the contents of this file, you will need to change them to use the file com.ibm.mq.jar when you migrate to WebSphere MQ, Version 7.0.

Parent topic: Migrating from WebSphere MQ Version 5.3 to WebSphere MQ Version 7.0

This build: January 26, 2011 11:06:28