

Quick Beginnings for Solaris

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Welcome to WebSphere MQ Version 7.0

How to plan for the product, install it, and verify that the installation has worked

This book describes IBM® WebSphere® MQ for Sun Solaris, Version 7.0 and explains how to plan for the product, install it, and verify that the installation has worked.

See the:

- *WebSphere MQ Bibliography and Glossary* for an explanation of terms used in this book
- *WebSphere MQ System Administration Guide* for further information on using the control commands *crtmqm*, *strmqm*, and *endmqm*

[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.

[Installing a WebSphere MQ server](#)

Information describing how to install a WebSphere MQ Version 7.0 server.

[Installing a WebSphere MQ client](#)

Follow these steps to install a WebSphere MQ client.

[Installing a client on the same machine as a server](#)

[Applying maintenance](#)

How to maintain WebSphere MQ for Sun Solaris.

[Installing and uninstalling GSKit Version 8 on Solaris](#)

You might want to use GSKit Version 8 instead of or in addition to GSKit Version 7. This collection of topics gives you instructions for installing and uninstalling GSKit Version 8.

[Uninstalling WebSphere MQ](#)

[WebSphere MQ Documentation](#)

Where to find information describing WebSphere MQ.

[Notices](#)

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1. 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◀](#).

Important information for Beta driver users

If you have previously installed a WebSphere MQ Version 7.0 Beta driver, you **must** uninstall this driver and clean up any remaining files **before** you install the GA version of WebSphere MQ Version 7.0.

[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: [Welcome to WebSphere MQ Version 7.0](#)

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1.1. Important information for Beta driver users

If you have previously installed a WebSphere® MQ Version 7.0 Beta driver, you **must** uninstall this driver and clean up any remaining files **before** you install the GA version of WebSphere MQ Version 7.0.

Parent topic: [Migrating to WebSphere MQ for Solaris Version 7.0](#)

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1.2. 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](#)

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2. Installing a WebSphere MQ server

Information describing how to install a WebSphere® MQ Version 7.0 server.

This section describes how to install a WebSphere MQ Version 7.0 server. The information covers topics such as preparing for installation and verifying your installation, as well as installation itself. If you already have an installation of WebSphere MQ, and are migrating to WebSphere MQ Version 7.0 see [Migrating to WebSphere MQ for Solaris Version 7.0](#) before installing WebSphere MQ Version 7.0.

IBM® WebSphere MQ for Sun Solaris can be installed as a server or a client.

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

A WebSphere MQ client is a component that allows an application running on one system to communicate with a queue manager running on another system. The output from the call is sent back to the client, which passes it back to the application. To install a WebSphere MQ client see, [Installing a WebSphere MQ client](#).

It is possible to have both a server and a client installation on the same machine, for instructions on how to do this see, [Installing a client on the same machine as a server](#).

See the [WebSphere MQ System Administration Guide](#) for an introduction to WebSphere MQ concepts and objects.

For information on the components that can be included in the server and client installations see, [WebSphere MQ Components](#).

The installation process is divided into the following group of topics, complete all of these tasks in sequence:


[Preparing to install](#)

[Server installation procedure](#)

[Verifying the server installation](#)

This is an overview of various methods for verifying a WebSphere MQ installation.

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

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2.1. Preparing to install

Before you install WebSphere® MQ, complete the following tasks:

[Checking hardware and software requirements- SPARC platform](#)

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular

components you intend to install.

[Checking hardware and software requirements - x86-64 platform](#)

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

[Setting up the user ID and group ID](#)


[Creating WebSphere MQ file systems](#)

[Implications of a 64-bit queue manager](#)

[Resource limit configuration](#)

Configure Solaris systems with the resource limits required by WebSphere MQ.

Parent topic: [Installing a WebSphere MQ server](#)

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2.1.1. Checking hardware and software requirements- SPARC platform

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

Hardware and software requirements are set out at [System Requirements for WebSphere MQ V7.0 on Solaris SPARC](#) on the IBM Web site.

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

Prerequisite software for optional components is detailed in the following sections:

Java Messaging and SOAP transport

If you want to use Java Messaging and SOAP (Simple Object Access Protocol) Support with WebSphere® MQ, you need a Java Runtime Environment Version 1.4.2 or later.

For a list of supported JDKs, see [WebSphere MQ requirements](#).

For further information about using Java with WebSphere MQ, see [WebSphere MQ Using Java](#).

For further information about SOAP with WebSphere MQ, see [WebSphere MQ Using Web Services](#).

► If you use a JDK that is not in the list of supported JDKs you should be aware that:

- The JDK might not be FIPS level 140-2 compliant and by using it with WebSphere MQ, WebSphere MQ Version 7.0 will not comply with FIPS 140-2 standards.
- SOAP is not supported.

- ➤ The WebSphere MQ Web service deployment utility, `amqwdeployWMQService`, requires IBM Java 2 SDK. ◀



On Solaris, the 32-bit and 64-bit JDKs are typically installed to the same directory. To run a 64-bit JVM use the `-d64` or `-d32` parameters on the command line when running a Java application to ensure the correct JVM is used.


Secure Sockets Layer (SSL)

If you want to use the SSL support, you need IBM® Global Security Kit V7. This is supplied with WebSphere MQ as one of the components available for installation. If you are migrating from WebSphere MQ Version 5.3 and have no other requirement for the IBM Global Security Kit V6, you can uninstall it using the following process:

1. Login as root.
2. Enter `pkgrm gsk6bas`

The IBM Global Security Kit V6 is uninstalled.

Parent topic: [Preparing to install](#)

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2.1.2. Checking hardware and software requirements - x86-64 platform

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

Hardware and software requirements are set out at [System Requirements for WebSphere MQ V7.0 on Solaris SPARC](#) on the IBM Web site.

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

Prerequisite software for optional components is detailed in the following sections:

Java Messaging and SOAP transport

If you want to use Java Messaging and SOAP (Simple Object Access Protocol) Support with WebSphere® MQ, you need a Java Runtime Environment Version 1.4.2 or later.

For a list of supported JDKs, see [WebSphere MQ requirements](#).

For further information about using Java with WebSphere MQ, see [WebSphere MQ Using Java](#).

For further information about SOAP with WebSphere MQ, see [WebSphere MQ Using Web Services](#).

➤ If you use a JDK that is not in the list of supported JDKs you should be aware that:

- The JDK might not be FIPS level 140-2 compliant and by using it with WebSphere MQ, WebSphere MQ Version 7.0 will not comply with FIPS 140-2 standards.

- SOAP is not supported.
- **➤**The WebSphere MQ Web service deployment utility, `amqwdeployWMQService`, requires IBM Java 2 SDK. **◀**




On Solaris, the 32-bit and 64-bit JDKs are typically installed to the same directory. To run a 64-bit JVM use the `-d64` or `-d32` parameters on the command line when running a Java application to ensure the correct JVM is used.

Secure Sockets Layer (SSL)

If you want to use the SSL support, you need IBM® Global Security Kit V7. This is supplied with WebSphere MQ as one of the components available for installation.

Parent topic: [Preparing to install](#)

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2.1.3. Setting up the user ID and group ID


WebSphere® MQ requires a user ID of the name `mqm`, with a primary group of `mqm`. The `mqm` user ID owns the directories and files that contain the resources associated with the product. Create the user ID and group IDs as described in the following topics.

- [Creating the user ID and group](#)
- [Adding existing user IDs to the group](#)

[Creating the user ID and group](#)

[Adding existing user IDs to the group](#)

Parent topic: [Preparing to install](#)

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2.1.3.1. Creating the user ID and group

Create the required user ID and group ID **before** you install WebSphere® MQ. Both user ID and group ID must be set to `mqm`. For stand-alone machines, you can create the new user ID and group IDs locally; for machines administered in a network information services (NIS) domain, an administrator must create the IDs on the NIS master server machine.

➤If you intend manually setting a user ID value for user `mqm` then you must ensure that its value is less than 262143 to avoid problems with the maintenance update process. **◀**

It is also suggested that you set the `mqm` user's home directory to `/var/mqm`.

Parent topic: [Setting up the user ID and group ID](#)

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2.1.3.2. Adding existing user IDs to the group

To run administration commands, for example **crtmqm** (create queue manager) or **strmqm** (start queue manager), your user ID must be a member of the `mqm` group.

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

Parent topic: [Setting up the user ID and group ID](#)

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2.1.4. Creating WebSphere MQ file systems

The installation directory for the WebSphere® MQ product code is `/opt/mqm`. Working data is stored in `/var/mqm`. You cannot change these locations. The IBM® Global Security Kit (GSKit) must also be installed into its default location. (The GSKit enables you to use SSL security on Windows and UNIX systems.)

WebSphere MQ also writes the following files to `/usr` during the installation:

- Soft-links are written to `/usr/bin`, linking to WebSphere MQ executable files in `/opt/mqm/bin`.
- Soft-links are written to `/usr/include`, linking to include files in `/opt/mqm/inc`.
- Soft-links are written to `/usr/lib`, linking to WebSphere MQ libraries in `/opt/mqm/lib`.
- Message catalogs are written to `/usr/lib/locale`.
- Man pages are written to `/usr/share/man`, if you choose to install them.

The topics contained in this section describe how to prepare your file system for installing WebSphere MQ. Perform these tasks before installation.

[Installing into Solaris zones](#)


If you are using Solaris zones, you have a choice between installing WebSphere MQ into the global zone, or installing WebSphere MQ into a non-global zone, which can be configured in various different ways.

[Creating a file system for the product code](#)

This topic describes how to prepare the `/opt/mqm` file system into which the WebSphere MQ code will be installed should you not have enough storage space available in the file system.

[Creating a file system for the working data](#)

Parent topic: [Preparing to install](#)

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2.1.4.1. Installing into Solaris zones

If you are using Solaris zones, you have a choice between installing WebSphere® MQ into the global zone, or installing WebSphere MQ into a non-global zone, which can be configured in various different ways.

For more information about configuring zones on your system, see the *System Administration Guide: Solaris Containers-Resource Management and Solaris Zones* for your release of Solaris.

Global zone

If you are installing into the global zone, the only change to make to the procedure described in [Installation procedure](#), is to add the `-G` option to the **pkgadd** command. The `-G` option forces all the components to install only into the global zone. Without this option, the GSKit is installed into all non-global whole root zones.

Non-global whole root zone

If you are installing into a non-global whole root zone, do not change the procedure described in [Installation procedure](#). The installation succeeds with no errors.


Check the kernel configuration manually, using the information in the topic, [Resource limit configuration](#).

Other zones

If you need to install into other non-global zones, some additional manual configuration steps are required. The extent of the manual configuration steps depends on the type of non-global zone.

Refer to the technote, [WebSphere MQ V6.0 support position regarding Solaris zones](#) for details how to install WebSphere MQ into other non-global zones. The technote is applicable to WebSphere MQ version 7, as well as version 6.

Parent topic: [Creating WebSphere MQ file systems](#)

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2.1.4.2. Creating a file system for the product code

This topic describes how to prepare the `/opt/mqm` file system into which the WebSphere® MQ code will be installed should you not have enough storage space available in the file system.

About this task

The approximate amount of storage space required for a server installation is detailed below.

Table 1. Storage requirements for a WebSphere MQ server

Storage Requirements	Storage Requirement in MB in /usr	Storage Requirement in MB in /opt
WebSphere MQ Server installation	6	247
IBM® Global Security Kit V7 (32-bit)	0	16
IBM Global Security Kit V7 (64-bit)	0	14

The WebSphere MQ product code is installed in `/opt` and `/usr`. If you cannot install the product code in `/opt` because the file system is too small to contain the product, you can do one of the following:

1. Create a new file system and mount it as `/opt/mqm`. If you choose this option, the new file system must be created and mounted before installing the product code.
2. Create a new directory anywhere on your machine, and create a symbolic link from `/opt/mqm` to this new directory. For example:


```
mkdir /bigdisk/mqm
ln -s /bigdisk/mqm /opt/mqm
```

If you choose this option, the new directory must be created, and the link created, before installing the product code.

The file system into which the code is installed can be a remote network device, for example, NFS. However, you must define the mount options defined on that device to allow **setuid** programs, including those which are **setuid** root, to run.

What to do next

Parent topic: [Creating WebSphere MQ file systems](#)

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2.1.4.3. Creating a file system for the working data

About this task

Before you install WebSphere® MQ for Sun Solaris, create and mount a file system called `/var/mqm` which is owned by `user` and is of group `mqm`. If possible, use a partition strategy with a separate volume for the WebSphere MQ data. This means that other system activity is not affected if a large amount of WebSphere MQ work builds up.

The creation of the file system must be done before installing WebSphere MQ for Sun Solaris.

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

- The maximum number of messages in the system at one time.
- Contingency for message buildups, if there is a system problem.
- The average size of the message data, plus 500 bytes for the message header.
- The number of queues.
- The size of log files and error messages.
- The amount of SSL trace that is written to the `/var/mqm/trace` directory.

Allow 130 MB as a minimum for a WebSphere MQ server and 15 MB as a minimum for a WebSphere MQ client.

Parent topic: [Creating WebSphere MQ file systems](#)

Creating separate file systems for working data



About this task

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

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

➤ If you are creating separate file systems, allow a minimum of 30 MB of storage for `/var/mqm`, 100 MB of storage for `/var/mqm/log`, and 4 MB of storage for `/var/mqm/errors`. The 100 MB minimum allowance of storage for `/var/mqm/log` is the absolute minimum required for a single queue manager and is not a recommended value. The size of a file system should be scaled according to the number of queue managers that you intend to use, the number of pages per log file, and the number of log files per queue manager.◀

If you want to use individual queues that hold more than 2 GB of data, you must enable `/var/mqm` to use large files.

The size of the log file depends on the log settings that you use. The minimum sizes above are for circular logging using the default settings. For further information about log sizes, see [Calculating the size of the log 3](#).



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2.1.5. Implications of a 64-bit queue manager

When using the 64-bit queue manager, the use of the `LIBPATH` and `LD_LIBRARY_PATH` environment variable is not advised. Setting these environment variables might result in you not being able to run any WebSphere® MQ commands. By default, the installation will operate as in

previous versions of WebSphere MQ, with symbolic links being created from `/usr/lib`, `/usr/bin` and `/usr/include` to the appropriate files within the WebSphere MQ tree structure. In the case of `/usr/lib` the symbolic links will be to the 32-bit WebSphere MQ libraries provided for customer 32-bit applications.

Note: No symbolic links are required for the 64-bit WebSphere MQ libraries required by WebSphere MQ commands.

All WebSphere MQ commands are 64-bit and have a built in path to the WebSphere MQ 64-bit libraries, however, this can be overridden by the use of `LIBPATH` and thus can cause WebSphere MQ commands to fail to run. The typical way of using WebSphere MQ commands and your applications is as follows:

- Unset `LIBPATH` and `LD_LIBRARY_PATH` and build your applications with a built in path to the appropriate WebSphere MQ libraries, this is detailed in the appropriate WebSphere MQ book for your type of WebSphere MQ application.
- If you need to set `LIBPATH` or `LD_LIBRARY_PATH`, consider not including `/usr/lib` in the path you specify in the variable. If you need to include `/usr/lib` in your `LIBPATH` or `LD_LIBRARY_PATH` then in order to avoid errors running 64-bit WebSphere MQ applications or WebSphere MQ commands, consider removing the symbolic links from `/usr/lib` to the 32-bit WebSphere MQ libraries using the **`dltmqlnk`** command. The symbolic links can be restored with the **`crtmqlnk`** command. You also need to build your applications with a built in path to the appropriate WebSphere MQ libraries. Note that both the **`dltmqlnk`** command and the **`crtmqlnk`** command are scripts, and take no parameters.
- If you cannot use either of the first two options, then run your applications in a different environment to the one which issues any WebSphere MQ commands.
Note: WebSphere MQ libraries are in the following locations: `/opt/mqm/lib` (32-bit libraries) and `/opt/mqm/lib64` (64-bit libraries).

Parent topic: [Preparing to install](#)

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2.1.6. Resource limit configuration

Configure Solaris systems with the resource limits required by WebSphere® MQ.

WebSphere MQ uses semaphores, shared memory, and file descriptors, and it is probable that the default resource limits are not adequate.

The configuration required by WebSphere MQ depends on the version of Solaris you are using.

If you are using Solaris 10:

You must change the default resource limits for each zone WebSphere MQ will be installed in. To set new default limits for all users in the `mqm` group, set up a project for the `mqm` group in each zone.

To find out if you already have a project for the `mqm` group, log in as root and enter the following command:

```
projects -l
```

If you do not already have a `group.mqm` project defined, enter the following command:

```
projadd -c "WebSphere MQ default settings"
-K "process.max-file-descriptor=(basic,10000,deny) "
-K "project.max-shm-memory=(priv,4GB,deny) "
-K "project.max-shm-ids=(priv,1024,deny) "
-K "project.max-sem-ids=(priv,1024,deny) " group.mqm
```

If a project called *group.mqm* is listed, review the attributes for that project. The attributes must include the following minimum values:

```
process.max-file-descriptor=(basic,10000,deny)
project.max-sem-ids=(priv,1024,deny)
project.max-shm-ids=(priv,1024,deny) "
project.max-shm-memory=(priv,4294967296,deny)
```

If you need to change any of these values, enter the following command:

```
projmod -s -K "process.max-file-descriptor=(basic,10000,deny) "
-K "project.max-shm-memory=(priv,4GB,deny) "
-K "project.max-shm-ids=(priv,1024,deny) "
-K "project.max-sem-ids=(priv,1024,deny) " group.mqm
```

Note that you can omit any attributes from this command that are already correct.

For example, to change only the number of file descriptors, enter the following command:

```
projmod -s -K "process.max-file-descriptor=(basic,10000,deny) " group.mqm
```

(To set only the limits for starting the queue manager under the mqm user, login as mqm and enter the command `projects`. The first listed project is likely to be `default`, and so you can use `default` instead of `group.mqm`, with the `projmod` command.)

You can find out what the file descriptor limits for the current project are, by compiling and running the following program:

```
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <stdio.h>

int main () {
    int fd;
    for (;;) {
        fd = open ("../tryfd", O_RDONLY);
        printf ("fd is %d\n", fd);
        if (fd == -1) break;
    }
}
```

To ensure that the attributes for the project *group.mqm* are used by a user session when running Websphere MQ, make sure that the primary group of that user ID is mqm. In the above examples, the *group.mqm* project ID will be used. For further information on how projects are associated with user sessions, see Sun's *System Administration Guide: Solaris Containers-Resource Management and Solaris Zones* for your release of Solaris.

If you are using Solaris 9:

Review the system's current resource limit configuration.

As the root user, load the relevant kernel modules into the running system by typing the following commands:

```
modload -p sys/msgsys
modload -p sys/shmsys
modload -p sys/semsys
```

Then display your current settings by typing the following command:

```
sysdef
```

Check that the following parameters are set to the minimum values required by WebSphere MQ, or higher. The minimum values required by WebSphere MQ are documented in the tables below.

Table 1. Minimum values for semaphores required by WebSphere MQ

Parameter	Minimum value
SEMMNI	1024
SEMAEM	16384
SEMVMX	32767
SEMMNS	16384
SEMMSL	100
SEMOPM	100
SEMMNU	16384
SEMUME	256

Table 2. Minimum values for shared memory required by WebSphere MQ

Parameter	Minimum value
SHMMAX	4294967295
SHMMNI	1024

Table 3. Minimum values for file descriptors required by WebSphere MQ

Parameter	Minimum value
rlim_fd_cur	10000
rlim_fd_max	10000

To change any parameters that are lower than the minimum value required by WebSphere MQ, edit your `/etc/system` file to include the relevant lines from the following list:


```
set shmsys:shminfo_shmmax=4294967295
set shmsys:shminfo_shmmni=1024
set semsys:seminfo_semmni=1024
set semsys:seminfo_semaem=16384
set semsys:seminfo_semvmx=32767
set semsys:seminfo_semmns=16384
set semsys:seminfo_semmsl=100
set semsys:seminfo_semopm=100
set semsys:seminfo_semmnu=16384
set semsys:seminfo_semume=256
set shmsys:shminfo_shmseg=1024
set rlim_fd_cur=10000
set rlim_fd_max=10000
```


Note:

1. These values are suitable for running WebSphere MQ, other products on the system might require higher values.
2. Do not change the value of `shmmmin` from the system default value.
3. Semaphore and swap usage does not vary significantly with message rate or persistence.
4. WebSphere MQ queue managers are generally independent of each other. Therefore system kernel parameters, for example `shmmni`, `semmni`, `semmns`, and `semmnu` need to allow for the number of queue managers in the system.

After saving the `/etc/system` file, you must restart your system.

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2.2. Server installation procedure

This section tells you how to install the WebSphere® MQ for Sun Solaris server. If you want to install the WebSphere MQ client see [Installing a WebSphere MQ client](#).

Before you start the installation procedure, make sure you have prepared your system as described in [Preparing to install](#).

The installation method allows you to select which components you would like to install, for a list of the components and their corresponding filesets see [WebSphere MQ Components](#).

See [Installation procedure](#) for the standard installation procedure.

Alternatively, see [Silent Installation](#).

[Installation procedure](#)

[Silent Installation](#)

[WebSphere MQ Components](#)

When you install WebSphere MQ for Sun Solaris, you can choose which components to install in addition to the mandatory runtime component.

[Displaying messages in your national language](#)

After installing WebSphere MQ you can configure the LANG environment variable to display messages from a different national language message catalog.

Parent topic: [Installing a WebSphere MQ server](#)

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2.2.1. Installation procedure

Before you begin

Before you start the installation procedure, make sure that you have prepared your system as described in [Preparing to install](#).

About this task

This section describes the installation of the WebSphere® MQ for Solaris server, using the **pkgadd** program, enabling you to choose which components you want to install. The components are listed in [WebSphere MQ Components](#); you must install at least the Server component.

Note: During the installation process you must select **yes** if you are prompted to choose whether to install certain WebSphere MQ files as `setuid/setgid` files.

Procedure

1. **➤**Log in as root, or switch to the superuser using the `su` command. **◀**
2. Insert the WebSphere MQ for Solaris Server CD-ROM, and make the mount point your current directory.
3. Run the `mqlicense.sh` script to accept the license:

```
./mqlicense.sh
```

If you want to view a text-only version of the license, which can be read by a screen-reader, type:


```
./mqlicense.sh -text-only
```

The license is displayed. If you accept the license, the installation continues. If you do not accept the license, you cannot continue the installation process.

4. Enter the following command to start the installation process:

```
pkgadd -d.
```
5. You are presented with a list of the packages that are available. Enter the number of the `mqm` package, if necessary also select the GSKit packages.
6. Enter the numbers of the components that you require, separated by spaces or commas, after the list of components is displayed.
7. Answer any questions appropriately for your system.
8. A message is issued when the installation is complete. Enter **q** to exit the **pkgadd** program.

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2.2.2. Silent Installation

You can perform a silent installation of WebSphere® MQ for Sun Solaris. A script file called `silent.sh` is supplied in the `silent` directory on the CD-ROM. This script allows you to perform a non-interactive installation that requires no input and displays no output on the screen and

must be run as root.

The installation script `silent.sh` uses an `admin` file and a `response` file, both of which are supplied in the `silent` directory. You can use these files as supplied to perform a silent installation of all the components, including all the national language features.

By default, the `silent.sh` script assumes that the WebSphere MQ Server CD-ROM has been mounted at `/cdrom` and it writes all output and logs to the file `/tmp/mq.install`. If you want to alter these values, copy `silent.sh` and the `admin` and `response` files to a writable directory, make the necessary changes, and run the script from the modified location.

You also need to edit the `response` file if you want to change the components to install, for example, because you do not want all the national language features. A list of all the installable MQ components can be found at: [WebSphere MQ Components](#).

➤ Solaris does not check, during a silent install, that prerequisite components are installed. You can use the following procedure to create a response file interactively, before using it to install the product. **pkgask** prompts you for the names of the components to install.

1. Run the **mqlicense.sh** command to accept the license agreement for the product.
2. **pkgask -d path_to_install_image -r response_file mqm**

The inputs to **pkgask** are the same as those documented for **pkgadd**, but instead of the product being installed a response file is created.◀

When you have checked the script files and made any changes required, run `silent.sh` to start the install. When the installation of WebSphere MQ for Sun Solaris is complete, check the log file for any errors.

Parent topic: [Server installation procedure](#)

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2.2.3. WebSphere MQ Components

When you install WebSphere® MQ for Sun Solaris, you can choose which components to install in addition to the mandatory runtime component.

[Table 1](#) lists the installable WebSphere MQ components and other IBM® products that comprise Websphere MQ.

Table 1. WebSphere MQ components

Component	Description	Class name	Server	Client
Runtime	Libraries and other files that are common to the server and client. Must be installed on all WebSphere MQ systems.	runtime	X	X
SDK	Required for compiling applications.	base	X	X
Server	The server feature allows you to run queue managers on your computer and connect to other computers over a network. Provides messaging and queuing services to applications, and support for WebSphere MQ client connections.	server	X	
Client	The WebSphere MQ client is a small subset of WebSphere MQ, without a queue manager. Provides remote access to WebSphere MQ. Must be connected to a server. To install a client on the same machine as a server, use the Server CD-ROM; otherwise use the Clients CD-ROM.	sol_client	X	X
Man pages	UNIX man pages, in U.S. English, for the following: <ul style="list-style-type: none"> • Control commands • Message Queue Interface (MQI) commands • MQSC commands 	man	X	X
Sample programs	Provides messaging and queuing services to applications, and support for WebSphere MQ client connections.	samples	X	»X«
Java messaging	»The files needed for messaging using Java (includes Java Messaging Service).«	java	X	X
Key management support	Support for the GSKit SSL key management program.	keyman	X	X
Sun Java Runtime Environment (32-bit)	»A Java Version 5.0 runtime that is used by those parts of WebSphere MQ that are written in Java.«	jre	X	

Extended Transactional Client	<p>WebSphere MQ component that allows a client application, within the same unit of work:</p> <ul style="list-style-type: none"> • To put messages to, and get messages from, queues that are owned by the queue manager to which it is connected. • To update the resources of a resource manager other than a WebSphere MQ queue manager. 	txclient	X	
Brazilian Portuguese Message catalogs	Brazilian Portuguese message catalogs	Pt_BR	X	X
Czech Message Catalogs	Czech message catalogs	Cs_CZ	X	X
French Message catalogs	French message catalogs	Fr_FR	X	X
German Message catalogs	German message catalogs	De_DE	X	X
Hungarian Message catalogs	Hungarian message catalogs	Hu_HU	X	X
Italian Message catalogs	Italian message catalogs	It_IT	X	X
Japanese Message catalogs	Japanese message catalogs	Ja_JP	X	X
Korean Message catalogs	Korean message catalogs	Ko_KR	X	X
Polish Message catalogs	Polish message catalogs	Pl_PL	X	X
Russian Message catalogs	Russian message catalogs	Ru_RU	X	X
Spanish Message catalogs	Spanish message catalogs	Es_ES	X	X
Simplified Chinese Message catalogs	Simplified Chinese message catalogs	Zh_CN	X	X

Traditional Chinese Message catalogs	Traditional Chinese message catalogs	Zh_TW	X	X
---	--------------------------------------	-------	---	---

Table 2. Other products supplied with WebSphere MQ

Component	Description	Package name	Server	Client
IBM Global Security Kit V7	Certificate and SSL Base Runtime - 32 bit	gsk7bas	X	X
IBM Global Security Kit V7	Certificate and SSL Base Runtime - 64 bit.	gsk7bas64	X	X

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2.2.4. Displaying messages in your national language

After installing WebSphere® MQ you can configure the LANG environment variable to display messages from a different national language message catalog.

About this task

Messages in U.S. English are automatically installed with WebSphere MQ.

If you require messages in a different language, perform the following steps:


Procedure

1. Install the appropriate message catalog (see [WebSphere MQ Components](#)).
2. To select messages in a different language, ensure the **LANG** environment variable is set to the identifier for the language you want to install:

Identifier	Language
cs_CZ	Czech
de_DE	German
es_ES	Spanish
fr_FR	French
hu_HU	Hungarian
it_IT	Italian
ja_JP	Japanese
ko_KR	Korean

Identifier	Language
pl_PL	Polish
pt_BR	Brazilian Portuguese
ru_RU	Russian
zh_CN	Simplified Chinese
zh_TW	Traditional Chinese

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2.3. Verifying the server installation

This is an overview of various methods for verifying a WebSphere® MQ installation.

You must install the Samples programs component if you want to use these verification procedures. The group of topics within this section describes how to verify that the WebSphere MQ for Sun Solaris server has been correctly installed and configured. You can verify a WebSphere MQ server installation at different levels:

- To verify a local (stand-alone) installation that has no communication links with other WebSphere MQ installations, do the following:
 - To verify the installation using a single queue manager with a single queue, see: [Verifying a local installation](#).
 - To verify the installation using the Postcard application, see: [Using the Postcard application to verify a local installation](#).
- To verify a server-to-server installation that includes communication links to other WebSphere MQ installations, do the following:
 - To verify the installation using two queue managers, two queues and both a sender channel and a receiver channel, see: [Verifying a server-to-server installation](#).
 - To verify the installation using the Postcard application, see: [Using the Postcard application to verify a server-to-server installation](#).

To verify a client/server installation that includes communication links between a server and a WebSphere MQ client, see [Verifying the client installation](#).


[Verifying a local installation](#)

[Verifying a server-to-server installation](#)

[Verifying the installation using the Postcard application](#)

You can set up and use the Postcard application to verify a local installation or a server-to-server installation.

Parent topic: [Installing a WebSphere MQ server](#)

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2.3.1. Verifying a local installation

Before you begin

About this task

To verify a local installation using a simple configuration of one queue manager and one queue, complete the following steps. Once you have completed the steps below, you must test the installation as described in: [Testing the installation](#).

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

The procedures outlined in this section describe how to configure your default queue manager from the command line.

To verify your installation you must first perform this task. From a shell window, use these steps to create a queue manager and a queue:

Procedure

1. Log in as a user in the `mqm` group
2. Create a default queue manager called `venus.queue.manager` by entering the following command:

```
crtmqm -q venus.queue.manager
```

You will see messages telling you that the queue manager has been created, and that the default WebSphere MQ objects have been created.

3. To start the queue manager, type:

```
strmqm
```

A message tells you when the queue manager has started.

4. Enable MQSC commands by typing:

```
runmqsc
```

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

5. Define a local queue called `ORANGE.QUEUE` by entering the following command:

```
define qlocal (orange.queue)
```

A message tells you when the queue has been created.

6. Stop MQSC by typing:

```
end
```

You will see some messages, followed by the command prompt.

What to do next

You have now defined:


- A default queue manager called `venus.queue.manager`

- A queue called `ORANGE.QUEUE`

Now proceed to [Testing the installation](#) to verify your installation.

[Testing the installation](#)

Parent topic: [Verifying the server installation](#)

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2.3.1.1. Testing the installation

Before you begin

Before completing this task you must have created a queue manager called `venus.queue.manager` and a local queue called `ORANGE.QUEUE`. For instructions on how to do this see [Verifying a local installation](#).

About this task

To test the queue manager and queue, use the **amqsput** sample program to put a message on the queue, and the **amqsget** sample program to get the message back from the queue:

Procedure

1. Log on as a user in group `mqm`, if you are not already.
2. Change into the `/opt/mqm/samp/bin` directory, which contains the sample programs.
3. Put a message on the queue using the following command:

```
./amqsput ORANGE.QUEUE
```

The following messages are displayed:

```
Sample AMQSPUT0 start
target queue is ORANGE.QUEUE
```

4. Type some message text, on one or more lines, followed by a blank line. The following message is displayed:

```
Sample AMQSPUT0 end
```

Your message is now on the queue and the command prompt is displayed again.

5. To get the message from the queue, use the following command:


```
./amqsget ORANGE.QUEUE
```

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

What to do next

You have now successfully verified your local installation.

Parent topic: [Verifying a local installation](#)

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2.3.2. Verifying a server-to-server installation

To verify a server-to-server installation using two servers, one as a sender and one as a receiver, complete the following tasks.

- [Setting up the sender server](#)
- [Setting up the receiver server](#)
- [Testing communication between the servers](#)

To verify a server-to-server installation you need to check the communications link between the two machines. Before you can do this, you must ensure that the communications protocol has been installed and configured on both systems. WebSphere® MQ for Sun Solaris supports both TCP and SNA. The tasks in this section explain how to verify your installation and use TCP in the examples; if you are using an alternative protocol, refer to the [WebSphere MQ Intercommunication](#) manual.

The verification procedure assumes that both systems are UNIX machines; if this is not the case, some of the commands are different (for details, refer to the documentation for that system).


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

[Setting up the sender server](#)

[Setting up the receiver server](#)

[Testing communication between the servers](#)

Parent topic: [Verifying the server installation](#)

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2.3.2.1. Setting up the sender server

About this task

In order to verify a server-to-server installation you must first set up a sender server. From a shell window, follow these steps to set up the sender server.

Procedure

1. Log in as a user in the `mqm` group.
2. Create a default queue manager called `saturn.queue.manager` with the following command:

```
crtmqm -q saturn.queue.manager
```

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

3. To start the queue manager, type:

```
strmqm
```

A message tells you when the queue manager has started.

4. Start MQSC commands by typing:

```
runmqsc
```

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

5. Define a local queue called `TRANSMIT1.QUEUE` (to be used as a transmission queue) by entering the following command:

```
define qlocal (transmit1.queue) usage (xmitq)
```

A message tells you when the queue has been created.

6. Define a local definition of the remote queue with the following command:

```
define qremote (local.def.of.remote.queue) rname (orange.queue)  
rqmname ('venus.queue.manager') xmitq (transmit1.queue)
```

The name specified by the **rname** parameter must be the same as the name of the queue to which you are sending the message (`ORANGE.QUEUE` on the receiver workstation).

7. Define a sender channel with the following command:

```
define channel (first.channel) chltype (sdr)  
conname ('con-name(port)') xmitq (transmit1.queue) trdtype (tcp)
```

The value `con-name` is the TCP address of the receiver workstation, and `port` is the port number, port 1414 is the default port number.

8. End MQSC by typing:

```
end
```

Some messages are displayed, followed by the command prompt.

Results

You have now defined the following objects:

- A default queue manager called `saturn.queue.manager`
- A transmission queue called `TRANSMIT1.QUEUE`
- A local definition of a remote queue called `LOCAL.DEF.OF.REMOTE.QUEUE`
- A sender channel called `FIRST.CHANNEL`

What to do next

Now to set up the receiver server so that you can verify your server-to-server installation, see [Setting up the receiver server](#).

Parent topic: [Verifying a server-to-server installation](#)

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2.3.2.2. Setting up the receiver server

About this task

After you have completed the task, [Setting up the sender server](#), follow these steps to set up the receiver server:

Procedure

1. Log in as a user in the `mqm` group.

2. Create a default queue manager called `venus.queue.manager` by entering the following command:

```
crtmqm -q venus.queue.manager
```

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

3. To start the queue manager, type:

```
strmqm
```

A message tells you when the queue manager has started.

4. Enable MQSC commands by typing:

```
runmqsc
```

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

5. Define a local queue called `ORANGE.QUEUE` by entering the following command:

```
define qlocal (orange.queue)
```

A message tells you when the queue has been created.

6. Define a listener by entering the following command:

Note: If you do not specify the port that the listener should listen on, the default of 1414 is used. If you specified a port other than 1414 in step 7 of [Setting up the sender server](#), you must include the port parameter in the command, as shown below.

```
define listener (listener1) trptype (tcp) control (qmgr) port (port_number)
```

Where

port_number

is the name of the port the listener should run on. This must be the same as the number used when defining your sender channel.

7. Start the listener by entering the following command:

```
start listener (listener1)
```

Note: It is not recommended to start the listener in the background from any shell that automatically lowers the priority of background processes.

8. Define a receiver channel with the following command:

```
define channel (first.channel) chltype (rcvr) trptype (tcp)
```

A message tells you when the channel has been created.

9. End MQSC by typing:

```
end
```

Some messages are displayed, followed by the shell prompt.

Results

You have now defined the following objects:


- A default queue manager called `venus.queue.manager`
- A queue called `ORANGE.QUEUE`
- A listener called `LISTENER1`

- A receiver channel called `FIRST.CHANNEL`

What to do next

Now to test communications between your sender and receiver workstations, see [Testing communication between the servers](#).

Parent topic: [Verifying a server-to-server installation](#)

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2.3.2.3. Testing communication between the servers

About this task

After completing, [Setting up the sender server](#), and [Setting up the receiver server](#), use this topic to test communications between sender and receiver workstations using sample programs. Use the **amqsput** sample program to put a message from the sender server to a queue at the receiver server, and the **amqsget** sample program on the receiver server to get the message from the queue:

Procedure

1. Log in to both servers as a user in the `mqm` group.
2. If the queue managers on the two servers have stopped, restart them now by typing the following on both servers:

```
strmqm
```

3. Enable MQSC commands by typing:

```
runmqsc
```

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

4. On the **sender** server, type **runmqsc** at the command line, then type:

```
START CHANNEL(FIRST.CHANNEL)
```

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

5. End MQSC by typing:

```
end
```

Some messages are displayed, followed by the command prompt.

6. On the **sender** server, change into the `/opt/mqm/samp/bin` directory, which contains the sample programs.

7. To put a message on the local definition of the remote queue (which in turn specifies the name of the remote queue), use the following command:

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

You will see the following messages:

```
Sample amqsput0 start
target queue is LOCAL.DEF.OF.REMOTE.QUEUE
```

8. Type some message text on one or more lines, followed by a blank line. You will see the following message:

```
Sample amqsput0 end
```

Your message is now on the queue and the command prompt is displayed again.

9. On the **receiver** server, change into the `/opt/mqm/samp/bin` directory, which contains the sample programs.
10. To get the message from the queue at the receiver, enter the following command:

```
./amqsget ORANGE.QUEUE
```

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

Results

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

Parent topic: [Verifying a server-to-server installation](#)

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2.3.3. Verifying the installation using the Postcard application

You can set up and use the Postcard application to verify a local installation or a server-to-server installation.

Use the Postcard application to verify that WebSphere® MQ is successfully installed, and to verify that the associated communication links are working properly.

To use the Postcard application to verify a *local* installation (which does not have any communication links with other WebSphere MQ installations), see [Using the Postcard application to verify a local installation](#).

To use the Postcard application to verify communication between your server and the server of another named user, where that server is running WebSphere MQ and using TCP/IP, see [Using the Postcard application to verify a server-to-server installation](#).

[Using the Postcard application to verify a local installation](#)

Sending messages successfully between two Postcard applications verifies a local installation.


[Using the Postcard application to verify a server-to-server installation](#)

You can use two instances of the Postcard application to verify that a server-to-server installation is working correctly.

[Using the Postcard application to verify a local installation using further steps](#)

Sending messages successfully between two Postcard applications verifies a local installation with these further optional steps.

Parent topic: [Verifying the server installation](#)

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2.3.3.1. Using the Postcard application to verify a local installation

Sending messages successfully between two Postcard applications verifies a local installation.

About this task

To verify that the local installation is working, you can run two instances of the Postcard application on the same server and send messages between the applications. Successful sending and receiving of messages verifies that WebSphere® MQ is installed and working correctly on the server.

Note:

- The Postcard application has a graphical interface. To view this interface, your system requires the ability to view a graphical display.
- Before you can run the Postcard application, you must ensure that you are a member of the WebSphere MQ administrators group (mqm).

Procedure

1. Start the Postcard application:
 - a. Log on as a user in group mqm.
 - b. Change directory to `/opt/mqm/java/bin`
 - c. Run the Postcard shell script: `./postcard`
2. At the Postcard - Sign On window, type in a nickname to use to send messages within the Postcard application (for example, `User1`).
3. Select the queue manager to use as the mailbox:
 - If the only queue manager on your server is the default queue manager that you created by running the Default Configuration wizard, this queue manager is used automatically as your mailbox for postcards.
 - If you have created one or more of your own queue managers, but you have not run the Default Configuration wizard, select the appropriate queue manager from the list displayed.
 - If you do not have any queue managers, you will be prompted to either launch the Default Configuration or close the Postcard application. Launching the Default Configuration will create a default queue manager.
 - If you have run the Default Configuration wizard and you want to use the default queue manager, but there is more than one queue manager on your server, select the **Advanced** checkbox, then select **Use Default Configuration as mailbox**.
 - If you have run the Default Configuration wizard and also created one or more of your own queue managers, and you do not want to use the default queue manager, select the **Advanced** checkbox, select **Choose queue manager as mailbox**, then select the appropriate queue manager from the list displayed.


When your selection is complete, click **OK** to display your first Postcard window.

4. Run the Postcard shell script again in a different shell window. This opens a second Postcard window.
5. The Postcard - Sign On panel is displayed again. Type a second nickname to use to send messages within the Postcard application (for example, `User2`).

6. Repeat the selection of the queue manager that you want to use as the mailbox (as described in step 3). The queue manager you select for this second Postcard must either be the same queue manager, be in the same cluster as the queue manager for the first postcard, or communication links must have been set up between them. You now have two Postcards, one with the nickname `User1` and one with the nickname `User2`.
7. In one of the Postcards (for example, `User1`), enter the nickname for the other Postcard application in the **To:** field and the queue manager it is using in the **On:** field.
8. Type a message in the **Message:** field and click **Send**.
9. The **Postcards sent and received** area of the Postcard shows details of the message. In the sending Postcard, the message is displayed as *sent*. In the receiving postcard, the message is displayed as *received*.
10. From the receiving postcard, double-click the message in the **Postcards sent and received** area to view it. When this message arrives, this verifies that WebSphere MQ is correctly installed.

Example

Parent topic: [Verifying the installation using the Postcard application](#)

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2.3.3.2. Using the Postcard application to verify a server-to-server installation

You can use two instances of the Postcard application to verify that a server-to-server installation is working correctly.

Before you begin

To verify that a server-to-server installation is working on two servers, the sender of the message and the receiver, you can use an instance of the Postcard application on the sender server, and an instance of the Postcard application on the receiver server, and send messages between the two Postcard applications. Successful sending and receiving of messages verifies that WebSphere® MQ is successfully installed, and that communication between the two servers is working correctly. Both servers must use TCP/IP.

To use the Postcard application for this type of verification, one of the following must be true:

- Both queue managers must be in the same cluster; this is the simplest method. To ensure that both queue managers are in the same cluster, you can run the Postcard application before creating any local queue managers on each server. The Postcard application detects that there are no local queue managers defined for that server, and displays the Default Configuration wizard so that you can create the default queue managers and link them to the default cluster.

You can use the Postcard application with existing queue managers, as long as both queue managers belong to the same cluster. If you have already completed the Default Configuration wizard but did not put the two queue managers into the same cluster you can create your own new queue managers on both servers, create a cluster, and ensure that the queue managers that you create on each server belong to the same cluster.

- Alternatively, if the queue managers are not in the same cluster, you can configure channels to communicate between the two servers. For instructions on how to set up the channels, see [Setting up the sender server](#) and [Setting up the receiver server](#). When you have set up communication, you can use the Postcard application..

Note:

- The Postcard application has a graphical interface. To view this interface, your systems require the ability to view a graphical display.
- Before you can run the Postcard application on each server, you must ensure that you are a member of the WebSphere MQ administrators group (mqm) on each server.

Parent topic: [Verifying the installation using the Postcard application](#)

On the sender server

Procedure

1. Start the Postcard application:
 - a. Log on as a user in group mqm.
 - b. Change directory to `/opt/mqm/java/bin`
 - c. Run the Postcard shell script: `./postcard`
2. At the Postcard - Sign On window, type in a nickname to use to send messages within the Postcard application (for example, `User 1`).
3. Select the queue manager to use as the mailbox (You can use the Postcard application with existing queue managers, as long as both queue managers belong to the same cluster. If your existing queue manager does not belong to the appropriate cluster refer to the introduction of this topic for information on how to proceed):
 - If the only queue manager on your server is the default queue manager that you created by running the Default Configuration wizard, this queue manager is used automatically as your mailbox for postcards.
 - If you have created one or more of your own queue managers, but you have not run the Default Configuration wizard, select the appropriate queue manager from the list displayed.
 - If you do not have any queue managers, you will be prompted to either launch the Default Configuration or close the Postcard application. Launching the Default Configuration will create a default queue manager.
Work through the Default Configuration wizard. When you get to the option to join the queue manager to the default cluster, tick the checkbox. On the next screen select **yes, make it the repository for the cluster**. Once you have completed the wizard you are taken back to the Postcard - Sign On window.
 - If you have run the Default Configuration wizard and you want to use the default queue manager, but there is more than one queue manager on your server, select the **Advanced** checkbox, then select **Use Default Configuration as mailbox**.
 - If you have run the Default Configuration wizard and also created one or more of your own queue managers, and you do not want to use the default queue manager, select the **Advanced** checkbox, select **Choose queue manager as mailbox**, then select the appropriate queue manager from the list displayed.

When your selection is complete, click **OK** to display your first Postcard window.

On the receiver server

Procedure


1. Start the Postcard application:
 - a. Log on as a user in group mqm.
 - b. Change directory to `/opt/mqm/java/bin`
 - c. Run the Postcard shell script: `./postcard`
2. At the Postcard - Sign On window, type in a nickname to use to send messages within the Postcard application (for example, `User 2`).
3. Select the queue manager to use as the mailbox (You can use the Postcard application with existing queue managers, as long as both queue managers belong to the same cluster. If your existing queue manager does not belong to the appropriate cluster refer to the introduction of this topic for information on how to proceed):
 - If the only queue manager on your server is the default queue manager that you created by running the Default Configuration wizard, this queue manager is used automatically as your mailbox for postcards.
 - If you have created one or more of your own queue managers, but you have not run the Default Configuration wizard, select the appropriate queue manager from the list displayed.
 - If you do not have any queue managers, you will be prompted to either launch the Default Configuration or close the Postcard application. Launching the Default Configuration will create a default queue manager.
Work through the Default Configuration wizard. When you get to the option to join the queue manager to the default cluster, tick the checkbox. On the next screen select **yes, make it the repository for the cluster**. Once you have completed the wizard you are taken back to the Postcard - Sign On window.
 - If you have run the Default Configuration wizard and you want to use the default queue manager, but there is more than one queue manager on your server, select the **Advanced** checkbox, then select **Use Default Configuration as mailbox**.
 - If you have run the Default Configuration wizard and also created one or more of your own queue managers, and you do not want to use the default queue manager, select the **Advanced** checkbox, select **Choose queue manager as mailbox**, then select the appropriate queue manager from the list displayed.

When your selection is complete, click **OK** to display your second Postcard window.

4. In one of the Postcards (for example, `User1`), type the nickname for the other Postcard application in the **To:** field and the queue manager it is using in the **On:** field.
5. Type a message in the **Message:** field and click **Send**.
6. The **Postcards sent and received** area of the Postcard shows details of the message. In the sending Postcard, the message is displayed as *sent*. In the receiving Postcard, the message is displayed as *received*.
7. In the sent and received area of the Postcard, details of the new message are displayed. double-click the message in the **Postcards sent and received** area to view it. When this message arrives, this verifies that WebSphere MQ is correctly installed and that your communication link between the two servers is working correctly.

Results

When all installation and verification is complete, you are ready to start using WebSphere MQ (see the [WebSphere MQ System Administration Guide](#)).

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2.3.3.3. Using the Postcard application to verify a local installation using further steps


Sending messages successfully between two Postcard applications verifies a local installation with these further optional steps.

About this task

Depending on your situation, you might want to do the following:

- Install WebSphere® MQ on other servers. Follow the same installation procedure that you used for the first server. Ensure that you use the Join Default Cluster window in the Default Configuration wizard to add the other servers to your first server's cluster.
- Install the WebSphere MQ client on other servers. See the [Installing a WebSphere MQ client](#).
- Continue with further administration tasks. See the [WebSphere MQ System Administration Guide](#).

Parent topic: [Verifying the installation using the Postcard application](#)

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3. Installing a WebSphere MQ client

Follow these steps to install a WebSphere® MQ client.

This section describes how to install a WebSphere MQ Version 7.0 client. The information covers topics such as preparing for installation and verifying your installation, as well as installation itself. If you already have an installation of WebSphere MQ, and are migrating to WebSphere MQ Version 7.0 see [Migrating to WebSphere MQ for Solaris Version 7.0](#) before installing WebSphere MQ Version 7.0.

WebSphere MQ for Sun Solaris can be installed as a server or a client.

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

A WebSphere MQ server is an installation of one or more queue managers that provide queuing services to one or more clients. All the WebSphere MQ objects, for example queues, exist only on the queue manager machine (the WebSphere MQserver machine), and not the client. A WebSphere MQ server can also support local WebSphere MQ applications. To install a WebSphere MQ server see, [Installing a WebSphere MQ server](#).

It is possible to have both a server and a client installation on the same machine, for instructions on how to do this see, [Installing a client on the same machine as a server](#).

See the [WebSphere MQ System Administration Guide](#) for an introduction to WebSphere MQ concepts and objects.

For information on the components that can be included in the server and client installations

see, [WebSphere MQ Components](#).

The group of topics within this section take you through the process of installing a WebSphere MQ client.


- [Checking hardware and software requirements- SPARC platform](#)
- [Checking hardware and software requirements - x86-64 platform](#)
- [Installing the client](#)
- [Verifying the client installation](#)

[Preparing to install](#)

[Installing the client](#)

[Verifying the client installation](#)

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

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3.1. Preparing to install

Before you install WebSphere® MQ, complete the following tasks.

- [Checking hardware and software requirements- SPARC platform](#)
- [Checking hardware and software requirements - x86-64 platform](#)
- [Creating WebSphere MQ file systems](#)
- [Setting up the user ID and group ID](#)

Additionally, if you require messages in a language other than U.S. English see, [Displaying messages in your national language](#).

[Checking hardware and software requirements- SPARC platform](#)

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

[Checking hardware and software requirements - x86-64 platform](#)

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.


[Setting up the user ID and group ID](#)

[Creating WebSphere MQ file systems](#)

[Displaying messages in your national language](#)

This describes how to display messages from a different national language message catalog.

Parent topic: [Installing a WebSphere MQ client](#)

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3.1.1. Checking hardware and software requirements- SPARC platform

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

Hardware and software requirements are set out at [System Requirements for WebSphere MQ V7.0 on Solaris SPARC](#) on the IBM Web site.

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

Prerequisite software for optional components is detailed in the following sections:

Java Messaging and SOAP transport

If you want to use Java Messaging and SOAP (Simple Object Access Protocol) Support with WebSphere® MQ, you need a Java Runtime Environment Version 1.4.2 or later.

For a list of supported JDKs, see [WebSphere MQ requirements](#).

For further information about using Java with WebSphere MQ, see [WebSphere MQ Using Java](#).

For further information about SOAP with WebSphere MQ, see [WebSphere MQ Using Web Services](#).

- If you use a JDK that is not in the list of supported JDKs you should be aware that:
- The JDK might not be FIPS level 140-2 compliant and by using it with WebSphere MQ,

WebSphere MQ Version 7.0 will not comply with FIPS 140-2 standards.

- SOAP is not supported.
- ➤The WebSphere MQ Web service deployment utility, `amqwdeployWMQService`, requires IBM Java 2 SDK.◀



On Solaris, the 32-bit and 64-bit JDKs are typically installed to the same directory. To run a 64-bit JVM use the `-d64` or `-d32` parameters on the command line when running a Java application to ensure the correct JVM is used.


Secure Sockets Layer (SSL)

If you want to use the SSL support, you need IBM® Global Security Kit V7. This is supplied with WebSphere MQ as one of the components available for installation. If you are migrating from WebSphere MQ Version 5.3 and have no other requirement for the IBM Global Security Kit V6, you can uninstall it using the following process:

1. Login as root.
2. Enter `pkgrm gsk6bas`

The IBM Global Security Kit V6 is uninstalled.

Parent topic: [Preparing to install](#)

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3.1.2. Checking hardware and software requirements - x86-64 platform

Before you install WebSphere MQ for Solaris, check that your system meets the hardware and operating system software requirements set for this product and the particular components you intend to install.

Hardware and software requirements are set out at [System Requirements for WebSphere MQ V7.0 on Solaris SPARC](#) on the IBM Web site.

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

Prerequisite software for optional components is detailed in the following sections:

Java Messaging and SOAP transport

If you want to use Java Messaging and SOAP (Simple Object Access Protocol) Support with WebSphere® MQ, you need a Java Runtime Environment Version 1.4.2 or later.

For a list of supported JDKs, see [WebSphere MQ requirements](#).

For further information about using Java with WebSphere MQ, see [WebSphere MQ Using Java](#).

For further information about SOAP with WebSphere MQ, see [WebSphere MQ Using Web Services](#).

➤If you use a JDK that is not in the list of supported JDKs you should be aware that:

- The JDK might not be FIPS level 140-2 compliant and by using it with WebSphere MQ, WebSphere MQ Version 7.0 will not comply with FIPS 140-2 standards.
- SOAP is not supported.
- **➤**The WebSphere MQ Web service deployment utility, amqwdployWMQService, requires IBM Java 2 SDK.**◀**




On Solaris, the 32-bit and 64-bit JDKs are typically installed to the same directory. To run a 64-bit JVM use the `-d64` or `-d32` parameters on the command line when running a Java application to ensure the correct JVM is used.

Secure Sockets Layer (SSL)

If you want to use the SSL support, you need IBM® Global Security Kit V7. This is supplied with WebSphere MQ as one of the components available for installation.

Parent topic: [Preparing to install](#)

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3.1.3. Setting up the user ID and group ID


WebSphere® MQ requires a user ID of the name `mqm`, with a primary group of `mqm`. The `mqm` user ID owns the directories and files that contain the resources associated with the product. Create the user ID and group IDs as described in the following topics.

- [Creating the user ID and group](#)
- [Adding existing user IDs to the group](#)

[Creating the user ID and group](#)

[Adding existing user IDs to the group](#)

Parent topic: [Preparing to install](#)

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3.1.3.1. Creating the user ID and group


Create the required user ID and group ID **before** you install WebSphere® MQ. Both user ID and group ID must be set to `mqm`. For stand-alone machines, you can create the new user ID and group IDs locally; for machines administered in a network information services (NIS) domain, an administrator must create the IDs on the NIS master server machine.

➤If you intend manually setting a user ID value for user `mqm` then you must ensure that its value

is less than 262143 to avoid problems with the maintenance update process.◀

It is also suggested that you set the mqm user's home directory to `/var/mqm`.

Parent topic: [Setting up the user ID and group ID](#)

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3.1.3.2. Adding existing user IDs to the group

If you want to run administration commands, for example **crtmqm** (create queue manager) or **strmqm** (start queue manager), your user ID must be a member of the `mqm` group.

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

Parent topic: [Setting up the user ID and group ID](#)

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3.1.4. Creating WebSphere MQ file systems

The installation directory for the WebSphere® MQ product code is `/opt/mqm`. Working data is stored in `/var/mqm`. You cannot change these locations. The GSKit must also be installed into its default location. (The IBM® Global Security Kit (GSKit) enables you to use SSL security on Windows and UNIX systems.)

WebSphere MQ also writes the following files to `/usr` during the installation:

- Soft-links are written to `/usr/bin`, linking to WebSphere MQ executable files in `/opt/mqm/bin`.
- Soft-links are written to `/usr/include`, linking to include files in `/opt/mqm/inc`.
- Soft-links are written to `/usr/lib`, linking to WebSphere MQ libraries in `/opt/mqm/lib`.
- A message catalog is written to `/usr/lib/locale`.
- Man pages are written to `/usr/share/man`, if you choose to install them.

The topics contained in this section describe how to prepare your file system for installing WebSphere MQ. Perform these tasks before installation.

[Installing into Solaris zones](#)

If you are using Solaris zones, you have a choice between installing WebSphere MQ into the global zone, or installing WebSphere MQ into a non-global zone, which can be configured in various different ways.


[Creating a file system for the product code](#)

This topic describes how to prepare the `/opt/mqm` file system into which the WebSphere

MQ code will be installed and what to do should you not have enough storage space available in the file system.

[Creating a file system for the working data](#)

Parent topic: [Preparing to install](#)

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3.1.4.1. Installing into Solaris zones

If you are using Solaris zones, you have a choice between installing WebSphere® MQ into the global zone, or installing WebSphere MQ into a non-global zone, which can be configured in various different ways.

For more information about configuring zones on your system, see the *System Administration Guide: Solaris Containers-Resource Management and Solaris Zones* for your release of Solaris.

Global zone

If you are installing into the global zone, the only change to make to the procedure described in [Installing the client](#), is to add the `-G` option to the **pkgadd** command. The `-G` option forces all the components to install only into the global zone. Without this option, the GSKit is installed into all non-global whole root zones.

Non-global whole root zone

If you are installing into a non-global whole root zone, do not change the procedure described in [Installing the client](#). The installation succeeds with no errors.


Check the kernel configuration manually, using the information in the topic, [Resource limit configuration](#).

Other zones

If you need to install into other non-global zones, some additional manual configuration steps are required. The extent of the manual configuration steps depends on the type of non-global zone.

Refer to the technote, [WebSphere MQ V6.0 support position regarding Solaris zones](#) for details how to install WebSphere MQ into other non-global zones. The technote is applicable to WebSphere MQ version 7, as well as version 6.

Parent topic: [Creating WebSphere MQ file systems](#)

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3.1.4.2. Creating a file system for the product code

This topic describes how to prepare the `/opt/mqm` file system into which the WebSphere® MQ code will be installed and what to do should you not have enough storage space available in the file system.

About this task

The WebSphere MQ product code is installed in `/opt/mqm`. If you cannot install the product code in the `/opt/mqm` file system because the file system is too small to contain the product, you can do one of the following:

1. Create a new file system and mount it as `/opt/mqm`. If you choose this option, the new file system must be created and mounted before installing the product code.
2. Create a new directory anywhere on your machine, and create a symbolic link from `/opt/mqm` to this new directory. For example:

```
mkdir /bigdisk/mqm
ln -s /bigdisk/mqm /opt/mqm
```

If you choose this option, the new directory must be created, and the link created, before installing the product code.

The file system into which the code is installed can be a remote network device, for example, NFS. However, you must define the mount options defined on that device to allow **setuid** programs, including those which are **setuid** root, to run.

What to do next

Parent topic: [Creating WebSphere MQ file systems](#)

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3.1.4.3. Creating a file system for the working data

About this task

Before you install WebSphere® MQ for Sun Solaris, create and mount a file system called `/var/mqm`. For a client installation, the file system can be mounted on a remote network device, for example NFS.

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

- The size of the error log files written to the `/var/mqm/errors` directory
- The amount of trace that is written to the `/var/mqm/trace` directory


If you are performing both a client and a server installation, the requirements of the server installation take precedence over the requirements of the client installation. For details about the requirements of the server installation, see [Creating a file system for the working data](#).

➤ Allow 130 MB as a minimum for a WebSphere MQ server and 15 MB as a minimum for a WebSphere MQ client. These values are the absolute minimum values for a single queue manager and are not recommended values. The size of a file system should be scaled depending on the number of queue managers that you intend to use, the number of pages per log file, and the number of log files per queue manager.◀

➤ A new sample WebSphere MQ client configuration file is created in the `var/mqm` directory, by the C client package, during installation, but only if this file does not already exist. This file contains the `ClientExitPath` stanza. An example `mqlclient.ini` file is shown in [WebSphere MQ client configuration file](#). ◀

Note, that if you are using a common configuration file for multiple clients, either in the WebSphere MQ installation directory or in another location using the `MQCLNTCF` environment variable, you should grant read access to all user identifiers under which the WebSphere MQ client applications run. If, for any reason, the file cannot be read, the failure is traced and the search logic continues as if the file had not existed.

Parent topic: [Creating WebSphere MQ file systems](#)

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3.1.5. Displaying messages in your national language

This describes how to display messages from a different national language message catalog.

About this task

Messages in U.S. English are automatically installed with WebSphere® MQ.

If you require messages in a different language, perform the following steps:

Procedure


1. Install the appropriate message catalog (see [WebSphere MQ Components](#)).
2. To select messages in a different language, use the following command with the identifier for the language you want to install:

```
export LANG=message identifier
```

The message identifiers for the message catalogs are as follows:

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

Parent topic: [Preparing to install](#)

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3.2. Installing the client

This collection of topics tells you how to install the WebSphere® MQ for Sun Solaris client. If you want to install the WebSphere MQ server see [Installing a WebSphere MQ server](#).

Before you start the installation procedure, make sure you have prepared your system as described in [Preparing to install](#).

There are two types of WebSphere MQ clients:

Client with SSL

This is the standard WebSphere MQ client with additional code for SSL support. You can install the client with SSL from either the client or the server CD.

Extended Transactional Client

This is additional code to allow a client application within the same unit of work to:

- To put messages to, and get messages from, queues that are owned by the queue manager to which it is connected.
- To update the resources of a resource manager other than a WebSphere MQ queue manager.

You can only install this from the server CD.

For more information about SSL, see the [WebSphere MQ Security](#) book.

To install a WebSphere MQ server, see [Installation procedure](#).

If you want to install the client on the same machine as a WebSphere MQ server, see [Installing a client on the same machine as a server](#).

[Installation procedure](#)

[WebSphere MQ Components](#)

A list all of the installable WebSphere MQ components and other IBM® products that comprise WebSphere MQ.

Parent topic: [Installing a WebSphere MQ client](#)

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3.2.1. Installation procedure

Before you begin

Before you start the installation procedure, make sure that you have prepared your system

as described in [Preparing to install](#).

About this task

This installation procedure uses the **pkgadd** program, enabling you to choose which components you want to install. The components (or filesets) are listed in [WebSphere MQ Components](#); you must install at least the Client component.

Procedure

1. Log in as root.
2. Insert the WebSphere MQ Client CD-ROM, and make the mount point your current directory.
3. Run the `mqlicense.sh` script to accept the license:

```
./mqlicense.sh
```

If you want to view a text-only version of the license, which can be read by a screen-reader, type:

```
./mqlicense.sh -text-only
```


The license is displayed. If you accept the license, the installation continues. If you do not accept the license, you cannot continue the installation process.

4. To start the installation process, enter the following, for example for a WebSphere MQ client:

```
pkgadd -d mqclient.img
```

5. You are presented with a list of the packages that are available. Enter the number of the `mqm` package, if necessary also select the GSKit packages
6. You receive a number of messages, after which a list of components is displayed. Enter the numbers of the components that you require separated by spaces or commas.
7. Answer any questions appropriately for your system.
8. A message tells you when installation is complete. Enter **q** to exit the **pkgadd** program.

Parent topic: [Installing the client](#)

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3.2.2. WebSphere MQ Components

A list all of the installable WebSphere MQ components and other IBM® products that comprise WebSphere MQ.

When you install WebSphere® MQ for Sun Solaris, you can choose which components to install.

Table 1. WebSphere MQ components


Component	Description	Server	Client
►Runtime◄	► Libraries and other files that are common to the server and client. Must be installed on all WebSphere MQ systems. ◄	X	X
Client	The WebSphere MQ client is a small subset of WebSphere MQ, without a queue manager. Provides remote access to WebSphere MQ. Must be connected to a server. To install a client on the same machine as a server, use the Server CD; otherwise use the Clients CD.	X	X
Man pages	UNIX man pages, in U.S. English, for the following: <ul style="list-style-type: none"> • Control commands • Message Queue Interface (MQI) commands • MQSC commands 	X	X
Sample programs	Provides messaging and queuing services to applications, and support for WebSphere MQ client connections.	X	►X◄
WebSphere MQ Client Libraries	Client libraries. The files needed for messaging using Java (includes Java Messaging Service). Support for SSL key management	X	X
Brazilian Portuguese Message catalogs	Brazilian Portuguese message catalogs	X	X
Czech Message Catalogs	Czech message catalogs	X	X
French Message catalogs	French message catalogs	X	X
German Message catalogs	German message catalogs	X	X
Hungarian Message catalogs	Hungarian message catalogs	X	X
Italian Message catalogs	Italian message catalogs	X	X
Japanese Message catalogs	Japanese message catalogs	X	X
Korean Message catalogs	Korean message catalogs	X	X
Polish Message catalogs	Polish message catalogs	X	X

Russian Message catalogs	Russian message catalogs	X	X
Spanish Message catalogs	Spanish message catalogs	X	X
Simplified Chinese Message catalogs	Simplified Chinese message catalogs	X	X
Traditional Chinese Message catalogs	Traditional Chinese message catalogs	X	X

Table 2. Other products supplied with WebSphere MQ

Component	Description	Fileset	Server	Client
IBM Global Security Kit V7	Certificate and SSL Base Runtime - 32 bit	gsk7bas	X	X
IBM Global Security Kit V7	Certificate and SSL Base Runtime - 64 bit.	gsk7bas64	X	X

Parent topic: [Installing the client](#)

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3.3. Verifying the client installation

The group of topics within this section describes how to verify that the WebSphere® MQ for Sun Solaris client has been correctly installed and configured.

To verify your WebSphere MQ client installation, you need a WebSphere MQ server with communication links with your client workstation. You can then complete the following tasks in order:

- [Setting up the server workstation](#)
- [Setting up the client workstation](#)
- [Testing communication between workstations](#)

The verification procedure assumes that:

- TCP/IP is configured and initialized on both the server and the client machines. If you are using SNA, refer to the [WebSphere MQ Intercommunication](#) manual.
- The WebSphere MQ server is installed on a Linux or UNIX machine; if this is not the case, some of the commands will be different (for details, refer to the [WebSphere MQ Clients](#) book).


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

[Setting up the server workstation](#)

[Setting up the client workstation](#)

[Testing communication between workstations](#)

Parent topic: [Installing a WebSphere MQ client](#)

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3.3.1. Setting up the server workstation

Before you begin

About this task

In order to verify your installation you must first perform this task. From a shell window, use these steps to install a queue manager and a queue on the server:

Procedure

1. Create a default queue manager called `saturn.queue.manager` by entering the following command:

```
crtmqm -q saturn.queue.manager
```

You will see messages telling you that the queue manager has been created, and that the default WebSphere® MQ objects have been created.

2. To start the queue manager, type:

```
strmqm
```

A message tells you when the queue manager has started.

3. Enable MQSC commands by typing:

```
runmqsc
```

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

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

```
define qlocal (queue1)
```

A message tells you when the queue has been created.

5. Define a server-connection channel by entering the following command on one line:

```
define channel (channel1) chltype (svrconn) trptype (tcp) mcauser ('mqm')
```

Note: Once you have set the **mcauser** attribute to `mqm`, you MUST set the attribute back to its default value after you have verified the installation to prevent any security vulnerabilities, as described in: [Testing communication between workstations](#).

A message tells you when the channel has been created.

6. Define a listener by entering the following command:

Note: If you do not specify the port that the listener should listen on, by omitting the port parameter from the command below, the default of 1414 is used. If you want to specify a port other than 1414, you must include the port parameter in the command, as shown.

```
define listener (listener1) trptype (tcp) control (qmgr) port (port_number)
```

Where

port_number

is the name of the port the listener should run on. This must be the same as the number used when defining your client-connection channel in [Setting up the client workstation](#).

7. Start the listener by entering the following command:

```
start listener (listener1)
```

8. Stop MQSC by typing:

```
end
```

You will see some messages, followed by the command prompt.

Results

You have now defined the following objects on the server:

- A default queue manager called `saturn.queue.manager`
- A local queue called `QUEUE1`
- A server-connection channel called `CHANNEL1`

What to do next

To continue with the verification process, see [Setting up the client workstation](#).

Parent topic: [Verifying the client installation](#)

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3.3.2. Setting up the client workstation

Before you begin

Before you complete this task you must have completed, [Setting up the server workstation](#).

About this task

When a WebSphere® MQ application is run on the WebSphere MQ client, the following information is required:

- The name of the MQI channel that connects the client to the server
- The communications protocol
- The address of the server

You provide this information by defining a client-connection channel with the name used for the server-connection channel defined on the server. This example uses the `MQSERVER` environment variable to define the client-connection channel.

Procedure

1. Before starting, use the **ping** command to check that your TCP/IP software is correctly configured, and that your WebSphere MQ client and server TCP/IP sessions have been initialized. From the client, enter:

```
ping server-hostname
or
ping n.n.n.n
```

where

server-hostname

Is the host name of the server

n.n.n.n

Is the network address of the server

2. Press **Ctrl-C** to stop the **ping** command.
3. To create a client-connection channel, set the `MQSERVER` environment variable as follows:

```
export MQSERVER='CHANNEL1/TCP/server-hostname(port)'
```

where

CHANNEL1

Is the name of the server-connection channel already defined on the server

TCP

Is the communications protocol.

server-address

Is the TCP/IP host name of the server.

port

Is optional and is the port number that the server is listening on, you specified this in step 6 of [Setting up the server workstation](#). If you do not give a port number, WebSphere MQ uses:


- The one specified in the `qm.ini` file.
- If no value is specified in the `qm.ini` file, WebSphere MQ uses the port number identified in the TCP/IP services file for the service name WebSphere MQ. If this entry in the services file does not exist, a default value of 1414 is used.

The client-connection channel and server listener program must use the same port number.

What to do next

To continue with the verification process, see [Testing communication between workstations](#).

Parent topic: [Verifying the client installation](#)

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3.3.3. Testing communication between workstations

Before you begin

Before you complete this task you must have completed, [Setting up the client workstation](#).

About this task

On the WebSphere® MQ client workstation, use the **amqsputc** sample program to put a message on the queue at the server workstation. Use the **amqsgetc** sample program to get the message from the queue back to the client:

Procedure

1. Change into the `/opt/mqm/samp/bin` directory, which contains the sample programs.
2. Put a message on the queue at the server using the following command:

```
./amqsputc QUEUE1 saturn.queue.manager
```

amqsputc displays the following messages:

```
Sample amqsput0 start  
target queue is QUEUE1
```

3. Type some message text on one or more lines, followed by a blank line. You see the following message:

```
Sample amqsput0 end
```

Your message is now on the queue and the command prompt is displayed again.

4. To get the message from the queue located on the server, enter the following command:

```
./amqsgetc QUEUE1 saturn.queue.manager
```

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

Results

You have now successfully verified the client installation.

What to do next

You must now set the **mcauser** attribute back to its default value:

1. Start MQSC commands by entering the following command:

```
runmqsc
```

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

2. In the MQSC window, set the **mcauser** attribute to its default value by entering the following command:

```
alter channel(channel1) chltype (svrconn) mcauser('')
```

3. Stop MQSC by typing:

```
end
```

You see some messages, followed by the command prompt.

You have now set the **mcauser** attribute back to its default value.

Parent topic: [Verifying the client installation](#)

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4. Installing a client on the same machine as a server

To install a WebSphere® MQ for Sun Solaris client on a server machine, use the WebSphere MQ Server CD-ROM. Choose the Client component on the Server CD-ROM to install the client code on the server machine, and use the installation procedure described in [Installation procedure](#).

If you install a WebSphere MQ client on the same machine as a WebSphere MQ server, the client is not connected to the server automatically. Configure the communication channel (an MQI channel) between the client and the server, as described in [Verifying the client installation](#).

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

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5. Applying maintenance

How to maintain WebSphere® MQ for Sun Solaris.

[Applying maintenance](#)

How to apply maintenance updates by stopping WebSphere MQ and using **pkgadd**.

[Restoring the previous maintenance level](#)

How to restore a previous maintenance level by stopping WebSphere MQ and using **pkgrm**.

[▶Applying maintenance to a running queue manager◀](#)

Use multi-instance queue managers to reduce the outage caused by applying maintenance updates. Follow these steps to apply maintenance to a multi-instance queue manager.

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

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5.1. Applying maintenance

How to apply maintenance updates by stopping WebSphere MQ and using **pkgadd**.

About this task

Maintenance updates require hard disk space for installation. In addition, the installation process requires an identical amount of disk space to save the previous level. For example, a 16 MB maintenance update requires 32 MB of space. This extra space allows a maintenance level to

be removed, and the previous level to be restored automatically.

To apply maintenance named *patchname*:

Procedure

1. Stop all WebSphere MQ applications on the machine and the applications accessing remote machines. ➤Any applications on the machine that are linked with the WebSphere MQ shared libraries must also be stopped before applying WebSphere MQ maintenance.◀➤The topic, [Applying maintenance to a running queue manager](#), describes how to apply maintenance to a multi-instance queue manager while keeping the queue manager running on a different server.◀

2. End all WebSphere® MQ activity:

- a. ➤Log in as a user in group `mqm`.◀

- 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 beginnings `amq` or `runmq`. Ignore any that start with `amqi`.

3. Log in as root

4. Change into the directory containing the maintenance packages.

5. Enter the following:

```
pkgadd -d packagename
```

where `packagename` corresponds to the image file name, for example,

```
mqm-U1234.img
```

For further information about using **pkgadd** to install software packages, refer to the Solaris documentation.

6. Follow the on-screen instructions.

Parent topic: [Applying maintenance](#)

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5.2. Restoring the previous maintenance level

How to restore a previous maintenance level by stopping WebSphere MQ and using **pkgrm**.

About this task

To restore the previous maintenance level:

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 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:

```
endmqmlsr -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 beginnings `amq` or `runmq`. Ignore any that start with `amqi`.

3. Log in as root.
4. Use the **pkgrm** command to remove the latest maintenance update from the system:

```
pkgrm packagename
```


where *packagename* is the name of the package that you want to remove for example: `mqm-V1234.img`.

Note: Ignore any error messages of the form `<shared pathname not removed>`.

Details of the **pkgrm** command can be found in the Solaris documentation, or by using the **man pkgrm** command.

5. If you have installed a WebSphere MQ client, and the client was updated after installing the maintenance level that is being removed, you must specifically update your WebSphere MQ client installation again, after the maintenance level has been removed.

Parent topic: [Applying maintenance](#)

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5.3. Applying maintenance to a running queue manager

Use multi-instance queue managers to reduce the outage caused by applying maintenance updates. Follow these steps to apply maintenance to a multi-instance queue manager.



Before you begin

Maintenance is applied to the WebSphere® MQ installation on a server and not to individual queue managers. You need to stop all the queue managers, and any WebSphere MQ service, on a server before you apply maintenance.

If you want a queue manager to keep running while maintenance is applied, you need to configure it as a *multi-instance* queue manager, and have a standby instance running on another server. If a queue manager is an existing single instance queue manager, you need to convert it to a multi-instance queue manager. See the topic, [Multi-instance queue managers](#) for pre-requisites and guidance how to create a multi-instance queue manager.

You can create a multi-instance queue manager from v7.0.1 onwards. If you are running multi-instance queue managers, you then can apply a maintenance update to a *running* queue manager by switching the active instance to a different server.

Typically active and standby installations are maintained at the same maintenance level. Consult the maintenance instructions for each upgrade. Check if it is possible to run the active and standby instances at different maintenance levels. Check if fail over from higher to

lower, or only lower to higher maintenance level is possible.

The instructions for applying a maintenance update might require you to stop a multi-instance queue manager completely.

If you have a primary server for running active queue manager instances, and a secondary server that runs standby instances, you have a choice of updating the primary or secondary server first. If you update the secondary server first, you need to switch back to the primary server once both servers have been updated.

If you have active and standby instances on several servers, you need to plan in what order you update the servers to minimize the disruption caused by ending the active instances on each server you update.



About this task

Combine the steps in this task with the maintenance update procedure for applying maintenance to a WebSphere MQ server installation.


Procedure

1. Where the maintenance update procedure instructs you to use the **endmqm** command to stop all running queue managers, do the following instead:
 - a. If the queue manager is running as standby, end the standby with the **endmqm -x QMgrName** command.
 - b. If the queue manager is running as the active instance, end the instance and transfer control to the standby instance with the **endmqm -shutdown_option -s QMgrName** command. If there is no standby instance running, the command fails, and you need to start a standby instance on a different server.
 - c. If a queue manager is running as a single instance queue manager, you have no alternative but to stop the queue manager before applying the maintenance update.

When you complete this step, no queue manager instances are left running on the server you intend to update.

2. Continue with the maintenance update procedure, following the step to issue the **endmqm** command, and apply maintenance to the WebSphere MQ server.
3. When you have completed the maintenance update, restart all the queue managers on the WebSphere MQ server, permitting standby instances, using the **strmqm -x QmgrName** command.
4. Repeat the procedure on the standby server, to update its maintenance level.
5. If necessary, switch the active instances back to the primary servers, using the **endmqm -shutdown_option -s QMgrName** command, and the restart the instances using the **strmqm -x QmgrName** command.

Parent topic: [Applying maintenance](#)

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6. Installing and uninstalling GSKit Version 8 on Solaris

You might want to use GSKit Version 8 instead of or in addition to GSKit Version 7. This collection of topics gives you instructions for installing and uninstalling GSKit Version 8.

The subcomponent that provides support for SSL and TLS on Windows, UNIX, and Linux systems is called GSKit. If you select SSL and TLS support when you install WebSphere® MQ V7.0.1, GSKit Version 7 is installed and run by default. Versions of WebSphere MQ V7.0.1 from Fix Pack 7.0.1.4 and later also contain an alternative, separate copy of GSKit, at Version 8. You can install and run this version instead of, or in addition to, GSKit Version 7.

[►Installing GSKit Version 8 on Solaris◀](#)

Compressed versions of the GSKit V8 packages are supplied. Uncompress and install them.


[►Uninstalling GSKit Version 8 on Solaris◀](#)

If you no longer need the functions provided by GSKit Version 8, and are not using it to provide the SSL or TLS infrastructure for products other than WebSphere MQ, you can uninstall it.

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

Related information

[Alternative SSL and TLS support for Windows, UNIX, and Linux systems](#)

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6.1. Installing GSKit Version 8 on Solaris

Compressed versions of the GSKit V8 packages are supplied. Uncompress and install them.

About this task

Compressed versions (.tar files) of the GSKit Version 8 runtime packages are placed in the directory into which you expand your WebSphere MQ fix pack. Files providing both 32-bit and 64-bit support are provided. Uncompress and install all these files.

Procedure

1. Log in as root.
2. Change to the directory into which you expanded the Fix Pack.
3. Uncompress the .tar files by using the following commands:


```
zcat gskcrypt32-8.0.14.6.sun.sparc.tar.Z | tar -xf -
zcat gskssl32-8.0.14.6.sun.sparc.tar.Z | tar -xf -
zcat gskcrypt64-8.0.14.6.sun.sparc.tar.Z | tar -xf -
zcat gskssl64-8.0.14.6.sun.sparc.tar.Z | tar -xf -
```

The string *8.0.14.6* represents the version number of GSKit being installed and can vary as new modifications of GSKit are released.

4. Install GSKit v8 by using the following command:

```
pkgadd -d. gsk8cry32 gsk8ssl32 gsk8cry64 gsk8ssl64
```

Parent topic: [►Installing and uninstalling GSKit Version 8 on Solaris◀](#)

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6.2. Uninstalling GSKit Version 8 on Solaris

If you no longer need the functions provided by GSKit Version 8, and are not using it to provide the SSL or TLS infrastructure for products other than WebSphere® MQ, you can uninstall it.

Procedure

Uninstall GSKit v8 by using the following command:

```
pkgrm gsk8ssl32 gsk8cry32 gsk8ssl64 gsk8cry64
```

Parent topic: [►Installing and uninstalling GSKit Version 8 on Solaris◀](#)

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7. 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 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 **dspmqs** 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:

```
endmqmlsr -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: [Welcome to WebSphere MQ Version 7.0](#)

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8. WebSphere MQ Documentation

Where to find information describing WebSphere MQ.

See the [main information center page](#).

Parent topic: [Welcome to WebSphere MQ Version 7.0](#)

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