



# Sun Cluster 3.1 Data Service for WebSphere MQ Guide

---

Sun Microsystems, Inc.  
4150 Network Circle  
Santa Clara, CA 95054  
U.S.A.650-960-1300

Part No: 817-3325-10  
October 2003, Revision A

Copyright 2003 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. All rights reserved.

This product or document is distributed under licenses restricting its use, copying, distribution, and decompilation. No part of this product or document may be reproduced in any form by any means without prior written authorization of Sun and its licensors, if any. Third-party software, including font technology, is copyrighted and licensed from Sun suppliers.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, Solstice DiskSuite, iPlanet, and Solaris are trademarks, registered trademarks, or service marks of Sun Microsystems, Inc. in the U.S. and other countries. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

The OPEN LOOK and Sun™ Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

Federal Acquisitions: Commercial Software—Government Users Subject to Standard License Terms and Conditions.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright 2001 Sun Microsystems, Inc., 901 San Antonio Road, Palo Alto, CA 94303-4900 Etats-Unis. Tous droits réservés.

Ce produit ou document est distribué avec des licences qui en restreignent l'utilisation, la copie, la distribution, et la décompilation. Aucune partie de ce produit ou document ne peut être reproduite sous aucune forme, par quelque moyen que ce soit, sans l'autorisation préalable et écrite de Sun et de ses bailleurs de licence, s'il y en a. Le logiciel détenu par des tiers, et qui comprend la technologie relative aux polices de caractères, est protégé par un copyright et licencié par des fournisseurs de Sun.

Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, Solstice DiskSuite, iPlanet, et Solaris sont des marques de fabrique ou des marques déposées, ou marques de service, de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays. Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux Etats-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc.

L'interface d'utilisation graphique OPEN LOOK et Sun™ a été développée par Sun Microsystems, Inc. pour ses utilisateurs et licenciés. Sun reconnaît les efforts de pionniers de Xerox pour la recherche et le développement du concept des interfaces d'utilisation visuelle ou graphique pour l'industrie de l'informatique. Sun détient une licence non exclusive de Xerox sur l'interface d'utilisation graphique Xerox, cette licence couvrant également les licenciés de Sun qui mettent en place l'interface d'utilisation graphique OPEN LOOK et qui en outre se conforment aux licences écrites de Sun.

LA DOCUMENTATION EST FOURNIE "EN L'ETAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFAÇON.



030730@5943



# Contents

---

<b>Installing and Configuring Sun Cluster HA for WebSphere MQ</b>	<b>5</b>
Installing and Configuring Sun Cluster HA for WebSphere MQ	5
Sun Cluster HA for WebSphere MQ Overview	6
Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration	7
Configuration Restrictions	7
Configuration Requirements	9
Installing and Configuring WebSphere MQ	14
▼ How to Install and Configure WebSphere MQ	14
Verifying the Installation and Configuration of WebSphere MQ	17
▼ How to Verify the Installation and Configuration of WebSphere MQ	17
Installing the Sun Cluster HA for WebSphere MQ Packages	18
▼ How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the Web Start Program	19
▼ How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the <code>scinstall</code> Utility	20
Registering and Configuring Sun Cluster HA for WebSphere MQ	21
▼ How to Register and Configure Sun Cluster HA for WebSphere MQ	21
Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration	23
▼ How to Verify the Sun Cluster HA for WebSphere MQ Installation and Configuration	23
Understanding Sun Cluster HA for WebSphere MQ Fault Monitor	24
Resource Properties	24
Probing Algorithm and Functionality	24
Debug Sun Cluster HA for WebSphere MQ	26
▼ How to turn debug on for Sun Cluster HA for WebSphere MQ	26



# Installing and Configuring Sun Cluster HA for WebSphere MQ

---

---

## Installing and Configuring Sun Cluster HA for WebSphere MQ

Table 1-1 lists the tasks for installing and configuring Sun Cluster HA for WebSphere MQ. Perform these tasks in the order that they are listed.

**TABLE 1-1** Task Map: Installing and Configuring Sun Cluster HA for WebSphere MQ

Task	For Instructions, Go To
Plan the installation	“Sun Cluster HA for WebSphere MQ Overview” on page 6 “Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 7
Install and configure WebSphere MQ	“How to Install and Configure WebSphere MQ” on page 14
Verify installation and configuration	“How to Verify the Installation and Configuration of WebSphere MQ” on page 17
Install Sun Cluster HA for WebSphere MQ Packages	“How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the <code>scinstall</code> Utility” on page 20
Register and Configure Sun Cluster HA for WebSphere MQ	“How to Register and Configure Sun Cluster HA for WebSphere MQ” on page 21
Verify Sun Cluster HA for WebSphere MQ Installation and Configuration	“How to Verify the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 23

**TABLE 1-1** Task Map: Installing and Configuring Sun Cluster HA for WebSphere MQ  
(Continued)

<b>Task</b>	<b>For Instructions, Go To</b>
Understand Sun Cluster HA for WebSphere MQ fault monitor	“Understanding Sun Cluster HA for WebSphere MQ Fault Monitor” on page 24
Debug Sun Cluster HA for WebSphere MQ	“How to turn debug on for Sun Cluster HA for WebSphere MQ” on page 26

---

## Sun Cluster HA for WebSphere MQ Overview

WebSphere MQ messaging software enables business applications to exchange information across different operating platforms in a way that is easy and straightforward for programmers to implement. Programs communicate using the WebSphere MQ API that assures once only delivery and time independent communications.

The Sun Cluster HA for WebSphere MQ data service provides a mechanism for orderly startup and shutdown, fault monitoring and automatic failover of the WebSphere MQ service. The following WebSphere MQ components are protected by the Sun Cluster HA for WebSphere MQ data service.

**TABLE 1-2** Protection of Components

<b>Component</b>	<b>Protected by</b>
Queue Manager	Sun Cluster HA for WebSphere MQ
Channel Initiator	Sun Cluster HA for WebSphere MQ
Command Server	Sun Cluster HA for WebSphere MQ
Listener	Sun Cluster HA for WebSphere MQ
Trigger Monitor	Sun Cluster HA for WebSphere MQ

---

# Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration

This section contains the information you need to plan your Sun Cluster HA for WebSphere MQ installation and configuration.

## Configuration Restrictions



---

**Caution** – Your data service configuration might not be supported if you do not observe these restrictions.

---

Consider the restrictions in this section to plan the installation and configuration of Sun Cluster HA for WebSphere MQ. This section provides a list of software and hardware configuration restrictions that apply to Sun Cluster HA for WebSphere MQ only.

For restrictions that apply to all data services, see the *Sun Cluster Release Notes*.

- **The Sun Cluster HA for WebSphere MQ data service can only be configured as a failover service** – WebSphere MQ cannot operate as a scalable service and therefore the Sun Cluster HA for WebSphere MQ data service can only be configured to run as a failover service.
- **Mount /var/mqm as a Global File System** – If you intend to install multiple instances of WebSphere MQ, then /var/mqm must be mounted as a Global File System.

This restriction is required because WebSphere MQ uses keys to build internal control structures. These keys are derived from the `ftok()` function call, and are based on the inode numbers in filesystems. If the inodes are on different filesystems, then clashes can occur. Consequently, mounting /var/mqm as a Global File System ensures that we avoid this issue.

If you do not intend to install multiple instances of WebSphere MQ, then you do not need to mount /var/mqm as a Global File System. However, we recommend that you still mount /var/mqm as a Global File System, as in the future if you want to deploy another WebSphere MQ Manager you would then need to adhere to the configuration restriction of mounting /var/mqm as a Global File System.

- **Installing WebSphere MQ onto Cluster File Systems** – Initially, the WebSphere MQ product is installed into /opt/mqm and /var/mqm. However whenever a WebSphere MQ Manager is created then the default directory locations created are

`/var/mqm/qmgrs/<qmgr_name>` and `/var/mqm/log/<qmgr_name>`. These locations can be mounted as either Failover File Systems (FFS) or Global File Systems (GFS).

If a WebSphere MQ Manager is to be deployed onto a Failover File System and you intend to deploy multiple WebSphere MQ Managers, then you must create a symbolic link from the Global File System `/var/mqm` to the Failover File System. Local nested mounts onto a Global File System are not allowed, however symbolic links to a Failover File System overcomes this issue.

---

**Note** – It is considered best practice when mounting Global File Systems to mount them with the `/global` prefix and to mount Failover File Systems with the `/local` prefix. However, be aware that this is simply viewed as best practice.

---

#### EXAMPLE 1-1 WebSphere MQ Managers with Failover File Systems

The following example shows two WebSphere MQ Managers with Failover File Systems and `/var/mqm` symbolically linked to a Global File System. The final output shows a subset of the `/etc/vfstab` entries for WebSphere MQ deployed using Solaris Volume Manager.

```
# ls -l /var/mqm
lrwxrwxrwx  1 root    other          11 Sep 17 16:53 /var/mqm ->
/global/mqm
#
# ls -l /global/mqm/qmgrs
total 6
drwxrwxr-x  8 mqm      mqm          512 Sep 17 09:57 @SYSTEM
lrwxrwxrwx  1 root    other        22 Sep 17 17:19 qmgr1 ->
/local/mqm/qmgrs/qmgr1
lrwxrwxrwx  1 root    other        22 Sep 17 17:19 qmgr2 ->
/local/mqm/qmgrs/qmgr2
#
# ls -l /global/mqm/log
total 4
lrwxrwxrwx  1 root    other        20 Sep 17 17:18 qmgr1 ->
/local/mqm/log/qmgr1
lrwxrwxrwx  1 root    other        20 Sep 17 17:19 qmgr2 ->
/local/mqm/log/qmgr2
#
# more /etc/vfstab (Subset of the output)
/dev/md/dg_d3/dsk/d30 /dev/md/dg_d3/rdisk/d30 /global/mqm
      ufs          3          yes      logging,global
/dev/md/dg_d3/dsk/d33 /dev/md/dg_d3/rdisk/d33 /local/mqm/qmgrs/qmgr1
      ufs          4          no       logging
/dev/md/dg_d3/dsk/d36 /dev/md/dg_d3/rdisk/d36 /local/mqm/log/qmgr1
      ufs          4          no       logging
/dev/md/dg_d4/dsk/d43 /dev/md/dg_d4/rdisk/d43 /local/mqm/qmgrs/qmgr2
      ufs          4          no       logging
/dev/md/dg_d4/dsk/d46 /dev/md/dg_d4/rdisk/d46 /local/mqm/log/qmgr2
      ufs          4          no       logging
```

**EXAMPLE 1-1** WebSphere MQ Managers with Failover File Systems (Continued)

```
#
```

**EXAMPLE 1-2** WebSphere MQ Managers with Global File Systems

The following example shows two WebSphere MQ Managers with Global File Systems and `/var/mqm` symbolically linked to a Global file System. The final output shows a subset of the `/etc/vfstab` entries for WebSphere MQ deployed using Solaris Volume Manager.

```
# ls -l /var/mqm
lrwxrwxrwx  1 root      other          11 Jan  8 14:17 /var/mqm ->
/global/mqm
#
# ls -l /global/mqm/qmgrs
total 6
drwxrwxr-x  8 mqm      mqm          512 Dec 16 09:57 @SYSTEM
drwxr-xr-x  4 root     root         512 Dec 18 14:20 qmgr1
drwxr-xr-x  4 root     root         512 Dec 18 14:20 qmgr2
#
# ls -l /global/mqm/log
total 4
drwxr-xr-x  4 root     root         512 Dec 18 14:20 qmgr1
drwxr-xr-x  4 root     root         512 Dec 18 14:20 qmgr2
#
# more /etc/vfstab (Subset of the output)
/dev/md/dg_d4/dsk/d40 /dev/md/dg_d4/rdisk/d40 /global/mqm
ufs 3 yes logging,global
/dev/md/dg_d4/dsk/d43 /dev/md/dg_d4/rdisk/d43 /global/mqm/qmgrs/qmgr1
ufs 4 yes logging,global
/dev/md/dg_d4/dsk/d46 /dev/md/dg_d4/rdisk/d46 /global/mqm/log/qmgr1
ufs 4 yes logging,global
/dev/md/dg_d5/dsk/d53 /dev/md/dg_d5/rdisk/d53 /global/mqm/qmgrs/qmgr2
ufs 4 yes logging,global
/dev/md/dg_d5/dsk/d56 /dev/md/dg_d5/rdisk/d56 /global/mqm/log/qmgr2
ufs 4 yes logging,global
#
```

## Configuration Requirements



---

**Caution** – Your data service configuration might not be supported if you do not adhere to these requirements.

---

Use the requirements in this section to plan the installation and configuration of Sun Cluster HA for WebSphere MQ. These requirements apply to Sun Cluster HA for WebSphere MQ only. You must meet these requirements before you proceed with your Sun Cluster HA for WebSphere MQ installation and configuration.

- **WebSphere MQ components and their dependencies** —The Sun Cluster HA for WebSphere MQ data service can be configured to protect a WebSphere MQ instance and its respective components. These components and their dependencies between each other, are briefly described below.

**TABLE 1-3** WebSphere MQ components and their dependencies (via → symbol)

Componet	Description
Queue Manager (Mandatory)	→ <i>SUNW.HAStoragePlus</i> resource The <i>SUNW.HAStoragePlus</i> resource manages the WebSphere MQ File System Mount points and ensures that WebSphere MQ is not started until these are mounted.
Channel Initiator (Optional)	→ <i>Queue_Manager</i> and <i>Listener</i> resources Dependency on the <i>Listener</i> is only required if <i>runmqtsr</i> is used instead of <i>inetd</i> .  By default a channel initiator is started by WebSphere MQ, however if you require different or another channel initiation queue, other than the default (SYSTEM.CHANNEL.INITQ) then you should deploy this component.
Command Server (Optional)	→ <i>Queue_Manager</i> and <i>Listener</i> resources Dependency on the <i>Listener</i> is only required if <i>runmqtsr</i> is used instead of <i>inetd</i> .  Deploy this component if you require WebSphere MQ to process commands sent to the command queue.
Listener (Optional)	→ <i>Queue_Manager</i> resource Deploy this component if you require a dedicated listener ( <i>runmqtsr</i> ) and will not use the <i>inetd</i> listener.
Trigger Monitor (Optional)	→ <i>Queue_Manager</i> and <i>Listener</i> resources Dependency on the <i>Listener</i> is only required if <i>runmqtsr</i> is used instead of <i>inetd</i> .  Deploy this component if you require a trigger monitor.

---

**Note** – For more detailed information about these WebSphere MQ components, refer to IBM's *WebSphere MQ Application Programming* manual.

---

Each WebSphere MQ component has a configuration and registration file under, */opt/SUNWscmq/xxx/util*, where *xxx* is a three character abbreviation for the respective WebSphere MQ component. These files allow you to register the WebSphere MQ components with Sun Cluster.

Within these files, the appropriate dependencies have already been applied.

**EXAMPLE 1-3** WebSphere MQ configuration and registration file for Sun Cluster

```
# cd /opt/SUNWscmq
#
# ls -l chi/util
total 4
-rwxr-xr-x  1 root    sys      720 Dec 20 14:44 chi_config
-rwxr-xr-x  1 root    sys      586 Dec 20 14:44 chi_register
#
# ls -l csv/util
total 4
-rwxr-xr-x  1 root    sys      645 Dec 20 14:44 csv_config
-rwxr-xr-x  1 root    sys      562 Dec 20 14:44 csv_register
#
# ls -l lsr/util
total 4
-rwxr-xr-x  1 root    sys      640 Dec 20 14:44 lsr_config
-rwxr-xr-x  1 root    sys      624 Dec 20 14:44 lsr_register
#
# ls -l mgr/util
total 4
-rwxr-xr-x  1 root    sys      603 Dec 20 14:44 mgr_config
-rwxr-xr-x  1 root    sys      515 Dec 20 14:44 mgr_register
#
# ls -l trm/util
total 4
-rwxr-xr-x  1 root    sys      717 Dec 20 14:44 trm_config
-rwxr-xr-x  1 root    sys      586 Dec 20 14:44 trm_register
#
#
# more mgr/util/*
::::::::::::
mgr/util/mgr_config
::::::::::::
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# This file will be sourced in by mgr_register and the parameters
# listed below will be used.
#
# These parameters can be customized in (key=value) form
#
#     RS - name of the resource for the application
#     RG - name of the resource group containing RS
#     QMGR - name of the Queue Manager
#     PORT - name of the Queue Manager port number
#     LH - name of the LogicalHostname SC resource
#     HAS_RS - name of the Queue Manager HASStoragePlus SC resource
#
RS=
RG=
```

**EXAMPLE 1-3** WebSphere MQ configuration and registration file for Sun Cluster  
(Continued)

```
QMGR=
PORT=
LH=
HAS_RS=
:::::::::::::
mgr/util/mgr_register
:::::::::::::
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#

. `dirname $0`/mgr_config

scrgadm -a -j $RS -g $RG -t SUNW.gds \
-x Start_command="/opt/SUNWscmq/mgr/bin/start-qmgr \
-R $RS -G $RG -Q $QMGR " \
-x Stop_command="/opt/SUNWscmq/mgr/bin/stop-qmgr \
-R $RS -G $RG -Q $QMGR " \
-x Probe_command="/opt/SUNWscmq/mgr/bin/test-qmgr \
-R $RS -G $RG -Q $QMGR " \
-y Port_list=$PORT/tcp -y Network_resources_used=$LH \
-x Stop_signal=9 \
-y Resource_dependencies=$HAS_RS
#
```

■ **WebSphere MQ Manager protection—**

Currently, WebSphere MQ is unable to determine if a Queue Manager is already running on *another node* within Sun Cluster if Global File Systems are being used for the WebSphere MQ instance, that is /global/mqm/qmgrs/<qmgr> and /global/mqm/log/<qmgr>

Under normal conditions, the Sun Cluster HA for WebSphere MQ data service manages the startup and shutdown of the Queue Manager, regardless of what Cluster File System is being used (for example FFS or GFS).

However, albeit by mistake, it is possible that someone could manually start the Queue Manager on another node within Sun Cluster if the WebSphere MQ instance is running on a Global File System.

---

**Note** – This bug has been reported to IBM and a fix is being worked on.

---

In order to protect against this happening, two options are available.

1. Use Failover File Systems for the WebSphere MQ instance

This is the *recommended approach* because the WebSphere MQ instance files would only be mounted on one node at a time. With this configuration, WebSphere MQ is able to determine if the Queue Manager is already running.

2. Create a symbolic link for `strmqm/endsmqm` to `check-start` (Provided script)

The script `/opt/SUNWscmq/mgr/bin/check-start` provides a mechanism to prevent the WebSphere MQ Manager from being started or stopped by mistake.

The `check-start` script will verify that the WebSphere MQ Manager is being started or stopped by Sun Cluster, and will report an error if an attempt is made to start or stop the WebSphere MQ Manager manually.

**EXAMPLE 1-4** Manual attempt to start the WebSphere MQ Manager by mistake.

The following command shows a manual attempt to start the WebSphere MQ Manager. The response was generated by the `check-start` script.

```
# strmqm qmgr1
# Request to run </usr/bin/strmqm qmgr1> within SC3.0 has been refused
#
```

This solution is only required if you require a Global File System for the WebSphere MQ instance. The following details the steps that you must take to achieve this.

**EXAMPLE 1-5** Create a symbolic link for `strmqm` and `endsmqm` to `check-start`

```
# cd /opt/mqm/bin
#
# mv strmqm strmqm_sc3
# mv endsmqm endsmqm_sc3
#
# ln -s /opt/SUNWscmq/mgr/bin/check-start strmqm
# ln -s /opt/SUNWscmq/mgr/bin/check-start endsmqm
#
```

Edit the `/opt/SUNWscmq/mgr/etc/config` file and change the following entries for `START_COMMAND` and `STOP_COMMAND`. In our example we have chosen to suffix the command names with `_sc3`, however you can choose another name.

```
# cat /opt/SUNWscmq/mgr/etc/config
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# Usage:
#   DEBUG=<RESOURCE_NAME> or ALL
#   START_COMMAND=/opt/mqm/bin/<renamed_strmqm_program>
#   STOP_COMMAND=/opt/mqm/bin/<renamed_endsmqm_program>
#
DEBUG=
START_COMMAND=/opt/mqm/bin/strmqm_sc3
```

**EXAMPLE 1-5** Create a symbolic link for `strmqm` and `endmqm` to check-start  
(Continued)

```
STOP_COMMAND=/opt/mqm/bin/endmqm_sc3  
#
```



---

**Caution** – The above steps need to be done on each node within the cluster that will host the Sun Cluster HA for WebSphere MQ data service. However, *do not perform* this procedure until you have created your Queue Manager(s), because `crtmq` will call `strmqm` and `endmqm` on its behalf.

---

---

**Note** – Be aware that if you implement this workaround then you will need to back it out whenever you need to apply any maintenance to WebSphere MQ. Afterwards, you would need to reapply this workaround. It is for this reason, that the *recommended approach* is to use Failover File Systems for the WebSphere MQ instance, until a fix has been made to WebSphere MQ.

---

---

## Installing and Configuring WebSphere MQ

This section contains the procedures you need to install and configure WebSphere MQ.

### ▼ How to Install and Configure WebSphere MQ

Use this procedure to install and configure WebSphere MQ.

1. **Determine how WebSphere MQ will be deployed in Sun Cluster – Here you need to determine how WebSphere MQ will be deployed.**
  - Determine how many WebSphere MQ instances will be deployed.
  - Determine what Cluster File System will be used by each WebSphere MQ instance.
2. **Mount WebSphere MQ Cluster File Systems – After you have determined how WebSphere MQ will be deployed within Sun Cluster, you must ensure the Cluster File Systems are mounted.**

---

**Note** – If Failover File Systems will be used by the WebSphere MQ instance, you must mount these manually.

---

3. **Install WebSphere MQ onto all nodes within Sun Cluster – It is recommended that WebSphere MQ is installed onto local disks, however for a discussion of the advantages and disadvantages of installing the software on a local versus a cluster file system, see “Determining the Location of the Application Binaries” on page 3 of the *Sun Cluster Data Services Installation and Configuration Guide*.**
  - Install WebSphere MQ onto *all* nodes within Sun Cluster that will run WebSphere MQ, regardless of the location of the application binaries. This is required because the `pkgadd` for WebSphere MQ additionally sets up several symbolic links on the host.

---

**Note** – Follow *IBM’s WebSphere MQ for Sun Solaris — Quick Beginnings* manual to install WebSphere MQ.

---

4. **Create your WebSphere MQ Manager(s) – After WebSphere MQ has been installed onto all nodes within Sun Cluster that will run WebSphere MQ, you should create your WebSphere MQ Manager(s).**

WebSphere MQ V5.3 has a bug when the default setting, `LogDefaultPath=/var/mqm/log`, is used when issuing `crtmqm` to create your WebSphere MQ Manager. The problem can be seen in the following example, for example the `crtmqm` command complains with `AMQ7064: Log path not valid or inaccessible`.

To workaroud this you must specify the `-ld` parameter when creating the WebSphere MQ Manager, for example `crtmqm -ld /global/mqm/log/<qmgr>`  
`<qmgr>`

This will cause another `<qmgr>` directory to appear, that is `/global/mqm/log/<qmgr>/<qmgr>`, however it overcomes this bug.

**EXAMPLE 1-6** Create your WebSphere MQ V5.3 Manager with the `-ld` parameter

```
# crtmqm qmgr1
AMQ7064: Log path not valid or inaccessible.
#
# crtmqm -ld /global/mqm/log/qmgr1 qmgr1
WebSphere MQ queue manager created.
Creating or replacing default objects for qmgr1 .
Default objects statistics : 31 created. 0 replaced. 0 failed.
Completing setup.
Setup completed.
#
# cd /global/mqm/log/qmgr1
#
```

**EXAMPLE 1-6** Create your WebSphere MQ V5.3 Manager with the -ld parameter  
(Continued)

```
# ls -l
total 2
drwxrwx---  3 mqm      mqm          512 Jan 10 11:44 qmgr1
#
# cd qmgr1
#
# ls -l
total 12
drwxrwx---  2 mqm      mqm          512 Jan 10 11:44 active
-rw-rw----  1 mqm      mqm         4460 Jan 10 11:44 amqhlctl.lfh
#
# pwd
/global/mqm/log/qmgr1/qmgr1
#
# cd /global/mqm/qmgrs/qmgr1
#
# more qm.ini
*****#
** Module Name: qm.ini                               **
** Type       : MQSeries queue manager configuration file **
** Function   : Define the configuration of a single queue manager **
**                               **
*****#
** Notes      :                               **
** 1) This file defines the configuration of the queue manager **
**                               **
*****#
ExitPath:
  ExitsDefaultPath=/var/mqm/exits/
**
**
Log:
  LogPrimaryFiles=3
  LogSecondaryFiles=2
  LogFilePages=1024
  LogType=CIRCULAR
  LogBufferPages=0
  LogPath=/global/mqm/log/qmgr1/qmgr1/
  LogWriteIntegrity=TripleWrite
Service:
  Name=AuthorizationService
  EntryPoints=10
ServiceComponent:
  Service=AuthorizationService
  Name=MQSeries.UNIX.auth.service
  Module=/opt/mqm/lib/amqzfu
  ComponentDataSize=0
#
```

---

**Note** – This bug, of having to specify the `-ld` parameter when `LogDefaultPath=/var/mqm/log` is being used, has been reported to IBM and a fix is being worked on.

---

---

## Verifying the Installation and Configuration of WebSphere MQ

This section contains the procedure you need to verify the installation and configuration.

### ▼ How to Verify the Installation and Configuration of WebSphere MQ

Use this procedure to verify the installation and configuration. This procedure does not verify that your application is highly available because you have not installed your data service yet.

#### 1. Start the WebSphere MQ Manager and check the installation.

```
# su - mqm
Sun Microsystems Inc.   SunOS 5.8           Generic February 2000
$ strmqm qmgr1
WebSphere MQ queue manager 'qmgr1' started.
$
$ runmqsc qmgr1
5724-B41 (C) Copyright IBM Corp. 1994, 2002.  ALL RIGHTS RESERVED.
Starting WebSphere MQ script Commands.

def ql(test) defpsist(yes)
  1 : def ql(test) defpsist(yes)
AMQ8006: WebSphere MQ queue created.
end
  2 : end
One MQSC command read.
No commands have a syntax error.
All valid MQSC commands were processed.
$
$ /opt/mqm/samp/bin/amqsput TEST qmgr1
Sample AMQSPUT0 start
target queue is TEST
test test test test test test test
```

```
Sample AMQSPUT0 end
$
$ /opt/mqm/samp/bin/amqsget TEST qmgr1
Sample AMQSGET0 start
message <test test test test test test test>
^C$
$
$ runmqsc qmgr1
5724-B41 (C) Copyright IBM Corp. 1994, 2002. ALL RIGHTS RESERVED.
Starting WebSphere MQ script Commands.
```

```
delete ql(test)
  1 : delete ql(test)
AMQ8007: WebSphere MQ queue deleted.
end
  2 : end
One MQSC command read.
No commands have a syntax error.
All valid MQSC commands were processed.
$
```

## 2. Stop the WebSphere MQ Manager

```
# su - mqm
Sun Microsystems Inc. SunOS 5.8 Generic February 2000
$
$ endmqm -i qmgr1
WebSphere MQ queue manager 'qmgr1' ending.
WebSphere MQ queue manager 'qmgr1' ended.
$
```

---

# Installing the Sun Cluster HA for WebSphere MQ Packages

If you did not install the Sun Cluster HA for WebSphere MQ packages during your initial Sun Cluster installation, perform this procedure to install the packages. Perform this procedure on each cluster node where you are installing the Sun Cluster HA for WebSphere MQ packages. To complete this procedure, you need the Sun Cluster Agents CD-ROM.

If you are installing more than one data service simultaneously, perform the procedure in “Installing the Software” in *Sun Cluster 3.1 10/03 Software Installation Guide*.

Install the Sun Cluster HA for WebSphere MQ packages by using one of the following installation tools:

- The Web Start program
- The `scinstall` utility

---

**Note** – The Web Start program is *not* available in releases earlier than Sun Cluster 3.1 Data Services 10/03.

---

## ▼ How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the Web Start Program

You can run the Web Start program with a command-line interface (CLI) or with a graphical user interface (GUI). The content and sequence of instructions in the CLI and the GUI are similar. For more information about the Web Start program, see the `installer(1M)` man page.

1. **On the cluster node where you are installing the Sun Cluster HA for WebSphere MQ packages, become superuser.**

2. **(Optional) If you intend to run the Web Start program with a GUI, ensure that your `DISPLAY` environment variable is set.**

3. **Load the Sun Cluster Agents CD-ROM into the CD-ROM drive.**

If the Volume Management daemon `vold(1M)` is running and configured to manage CD-ROM devices, it automatically mounts the CD-ROM on the `/cdrom/scdataservices_3_1_vb` directory.

4. **Change to the Sun Cluster HA for WebSphere MQ component directory of the CD-ROM.**

The Web Start program for the Sun Cluster HA for WebSphere MQ data service resides in this directory.

```
# cd /cdrom/scdataservices_3_1_vb/components/SunCluster_HA_MQS_3.1
```

5. **Start the Web Start program.**

```
# ./installer
```

6. **When you are prompted, select the type of installation.**

- To install only the C locale, select Typical.
- To install other locales, select Custom.

7. **Follow instructions on the screen to install the Sun Cluster HA for WebSphere MQ packages on the node.**

After the installation is finished, the Web Start program provides an installation summary. This summary enables you to view logs that the Web Start program created during the installation. These logs are located in the

`/var/sadm/install/logs` directory.

8. **Exit the Web Start program.**
9. **Unload the Sun Cluster Agents CD-ROM from the CD-ROM drive.**
  - a. **To ensure that the CD-ROM is not being used, change to a directory that does *not* reside on the CD-ROM.**
  - b. **Eject the CD-ROM.**

```
# eject cdrom
```

## ▼ How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the `scinstall` Utility

Use this procedure to install the Sun Cluster HA for WebSphere MQ packages. You need the Sun Cluster Agents CD-ROM to perform this procedure. This procedure assumes that you did not install the data service packages during your initial Sun Cluster installation.

If you installed the Sun Cluster HA for WebSphere MQ packages as part of your initial Sun Cluster installation, proceed to “Registering and Configuring Sun Cluster HA for WebSphere MQ” on page 21.

Otherwise, use this procedure to install the Sun Cluster HA for WebSphere MQ packages. Perform this procedure on all nodes that can run Sun Cluster HA for WebSphere MQ.

1. **Load the Sun Cluster Agents CD-ROM into the CD-ROM drive.**
2. **Run the `scinstall` utility with no options.**

This step starts the `scinstall` utility in interactive mode.
3. **Choose the menu option, Add Support for New Data Service to This Cluster Node.**

The `scinstall` utility prompts you for additional information.
4. **Provide the path to the Sun Cluster Agents CD-ROM.**

The utility refers to the CD as the “data services cd.”
5. **Specify the data service to install.**

The `scinstall` utility lists the data service that you selected and asks you to confirm your choice.
6. **Exit the `scinstall` utility.**
7. **Unload the CD from the drive.**

---

# Registering and Configuring Sun Cluster HA for WebSphere MQ

This section contains the procedures you need to configure Sun Cluster HA for WebSphere MQ.

## ▼ How to Register and Configure Sun Cluster HA for WebSphere MQ

Use this procedure to configure Sun Cluster HA for WebSphere MQ as a failover data service. This procedure assumes that you installed the data service packages during your initial Sun Cluster installation.

If you did not install the Sun Cluster HA for WebSphere MQ packages as part of your initial Sun Cluster installation, go to “How to Install the Sun Cluster HA for WebSphere MQ Packages by Using the `scinstall` Utility” on page 20.

Otherwise, use this procedure to configure the Sun Cluster HA for WebSphere MQ data service.

**1. Become superuser on one of the nodes in the cluster that will host WebSphere MQ.**

**2. Register the SUNW.gds resource type.**

```
# scrgadm -a -t SUNW.gds
```

**3. Register the SUNW.HAStoragePlus resource type.**

```
# scrgadm -a -t SUNW.HAStoragePlus
```

**4. Create a failover resource group .**

```
# scrgadm -a -g WebSphere MQ-failover-resource-group
```

**5. Create a resource for the WebSphere MQ Disk Storage.**

```
# scrgadm -a -j WebSphere MQ-has-resource \  
-g WebSphere MQ-failover-resource-group \  
-t SUNW.HAStoragePlus \  
-x FilesystemMountPoints=WebSphere MQ- instance-mount-points
```

**6. Create a resource for the WebSphere MQ Logical Hostname.**

```
# scrgadm -a -L -j WebSphere MQ-lh-resource \  
-g WebSphere MQ-failover-resource-group \  
-l WebSphere MQ-logical-hostname
```

7. **Enable the failover resource group that now includes the WebSphere MQ Disk Storage and Logical Hostname resources.**

```
# scswitch -Z -g WebSphere MQ-failover-resource-group
```

8. **Create and register each required WebSphere MQ component.**

Perform this step for the Queue Manager component (`mqr`), then repeat for each of the optional WebSphere MQ components that are used, replacing `mqr` with one of the following,

`chi` - Channel Initiator

`csv` - Command Server

---

**Note** – The `lsr` component allows for multiple ports. To specify multiple ports you must specify multiple port numbers separated by / for each port entry required for the `PORT` parameter within `/opt/SUNWscmq/lsr/util/lsr_config`. This will cause the `lsr` component to start multiple `runmqlsr` programs for different port entries. However, if multiple port entries are required, before running `/opt/SUNWscmq/lsr/util/lsr_register` you must amend the `PORT_LIST` entry within the `lsr_register` file to only contain one port number, for example `PORT_LIST=1414/tcp`. This will be fixed in subsequent releases.

---

`lsr` - Dedicated Listener

---

**Note** – The `trm` component allows for multiple trigger monitors. To specify multiple trigger monitors you must specify `file` for the `TRMQ` parameter within `/opt/SUNWscmq/trm/util/trm_config` before you run `/opt/SUNWscmq/trm/util/trm_register`. This will cause the `trm` component to start multiple trigger monitor entries from `/opt/SUNWscmq/trm/etc/<qmgr>_trm_queues`, which must contain trigger monitor queue names, where `<qmgr>` is the name of your Queue Manager. This file is required on each node within Sun Cluster that will run Sun Cluster HA for WebSphere MQ, alternatively this could be a symbolic link to a Global File System.

---

`trm` - Trigger monitor

```
# cd /opt/SUNWscmq/mgr/util
```

Edit the `mqr_config` file and follow the comments within that file, for example

```
# These parameters can be customized in (key=value) form
#
#     RS - name of the resource for the application
#     RG - name of the resource group containing RS
#     QMGR - name of the Queue Manager
#     PORT - name of the Queue Manager port number
#     LH - name of the LogicalHostname SC resource
```

```
# HAS_RS - name of the Queue Manager HASToragePlus SC resource
#
```

The following is an example for WebSphere MQ Manager `qmgr1`.

```
RS=wmq-qmgr-res
RG=wmq-rg
QMGR=qmgr1
PORT=1414
LH=wmq-lh-res
HAS_RS=wmq-has-res
```

After editing `mgr_config` you must now register the resource.

```
# ./mgr_register
```

#### 9. Enable WebSphere MQ Manager protection (if required).

You should only implement WebSphere MQ Manager protection if you have deployed WebSphere MQ onto a Global File System. Refer back to “Configuration Requirements” on page 9 for more details to implement WebSphere MQ Manager protection and in particular to Example 1–5. Otherwise skip to the next step.

Furthermore, you must repeat this on each node within Sun Cluster that will host Sun Cluster HA for WebSphere MQ.

#### 10. Enable each WebSphere MQ resource.

Repeat this step for each WebSphere MQ component as in the previous step.

```
# scstat
```

```
# scswitch -e -j WebSphere MQ-resource
```

---

## Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration

This section contains the procedure you need to verify that you installed and configured your data service correctly.

### ▼ How to Verify the Sun Cluster HA for WebSphere MQ Installation and Configuration

Use this procedure to verify that you installed and configured Sun Cluster HA for WebSphere MQ correctly.

1. Become superuser on one of the nodes in the cluster that will host WebSphere MQ.

2. Ensure all the WebSphere MQ resources are online with `scstat`.

```
# scstat
```

For each WebSphere MQ resource that is not online, use the `scswitch` command as follows.

```
# scswitch -e -j WebSphere MQ-resource
```

3. Run the `scswitch` command to switch the WebSphere MQ resource group to another cluster node, such as `node2`.

```
# scswitch -z -g WebSphere MQ-failover-resource-group -h node2
```

---

## Understanding Sun Cluster HA for WebSphere MQ Fault Monitor

Use the information in this section to understand Sun Cluster HA for WebSphere MQ fault monitor. This section describes the Sun Cluster HA for WebSphere MQ fault monitor's probing algorithm or functionality, states the conditions, messages, and recovery actions associated with unsuccessful probing, and states the conditions and messages associated with unsuccessful probing.

For conceptual information on fault monitors, see the *Sun Cluster Concepts Guide*.

### Resource Properties

Sun Cluster HA for WebSphere MQ fault monitor uses the same resource properties as resource type `SUNW.gds`. Refer to the `SUNW.gds(5)` man page for a complete list of resource properties used.

### Probing Algorithm and Functionality

- **WebSphere MQ Manager**
  - Sleeps for `Thorough_probe_interval`
  - Connects to the Queue Manager, creates a temporary dynamic queue, puts a message to the queue and then disconnects from the Queue Manager. If this fails then the probe will restart the Queue Manager.

- If all Queue Manager processes have died, pmf will interrupt the probe to immediately restart the Queue Manager.
  - If the Queue Manager is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is initiated for the Resource Group onto another node.
- **Other WebSphere MQ components (chi, csv & trm)**

---

**Note** – The probing algorithm and functionality for the Channel Initiator, Command Server and Trigger Monitor all behave the same. Therefore the following text simply refers to these components as *resource*.

---

- Sleeps for `Thorough_probe_interval`
  - Dependent on the Queue Manager, if the Queue Manager fails the *resource* will fail and get restarted after the Queue Manager is available again.
  - If the *resource* has died, pmf will interrupt the probe to immediately restart the *process*.
  - If the *resource* is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is not initiated onto another node because `Failover_enabled=FALSE` has been set, the *resource* will instead be restarted. However, this behavior is scheduled to be enhanced at a later date to allow the *resource* to be marked as `Offline` instead of repeatedly restarted.
- **WebSphere MQ Listener**
- Sleeps for `Thorough_probe_interval`
  - Check if the `runmq1sr` process associated with the Queue Manager and Port is running.
  - The listener can accommodate several port numbers under the same `pmftag`. If a listener for a particular port is found to be missing, the probe will initiate a restart of that listener without affecting the other listeners.
- So, although the resource can accommodate several listeners, all listeners would need to have failed before the resource is restarted. This provides a granular restart mechanism for a resource that has several listeners running.
- If the *resource* is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is not initiated onto another node because `Failover_enabled=FALSE` has been set, the *resource* will instead be restarted. However, this behavior is scheduled to be enhanced at a later date to allow the *resource* to be marked as `Offline` instead of repeatedly restarted.

---

# Debug Sun Cluster HA for WebSphere MQ

## ▼ How to turn debug on for Sun Cluster HA for WebSphere MQ

Use the information in this section to understand how to turn on debug for Sun Cluster HA for WebSphere MQ.

Sun Cluster HA for WebSphere MQ can be used by multiple WebSphere MQ instances. However, it is possible to turn debug on for all WebSphere MQ instances or a particular WebSphere MQ instance.

Each WebSphere MQ component has a `DEBUG` file under `/opt/SUNWscmqqs/xxx/etc`, where `xxx` is a three character abbreviation for the respective WebSphere MQ component.

These files allow you to turn debug on for all WebSphere MQ instances or for a specific WebSphere MQ instance on a particular node with Sun Cluster. If you require debug to be turned on for Sun Cluster HA for WebSphere MQ across the whole Sun Cluster, you will need to repeat this step on all nodes within Sun Cluster.

Perform this step for the Queue Manager component (`mqr`), then repeat for each of the optional WebSphere MQ components that requires debug output, on each node of Sun Cluster as required.

### 1. Edit `/etc/syslog.conf`

Edit `/etc/syslog.conf` and change `daemon.notice` to `daemon.debug`

```
# grep daemon /etc/syslog.conf
*.err;kern.debug;daemon.notice;mail.crit      /var/adm/messages
*.alert;kern.err;daemon.err                  operator
#
```

Change the `daemon.notice` to `daemon.debug` and restart `syslogd`. Note that the output below, from the command `grep daemon /etc/syslog.conf`, shows that `daemon.debug` has now been set.

```
# grep daemon /etc/syslog.conf
*.err;kern.debug;daemon.debug;mail.crit      /var/adm/messages
*.alert;kern.err;daemon.err                  operator
#
# pkill -1 syslogd
#
```

### 2. Edit `/opt/SUNWscmqqs/mqr/etc/config`

Edit `/opt/SUNWscmq/mgr/etc/config` and change `DEBUG=` to `DEBUG=ALL` or `DEBUG=resource`

```
# cat /opt/SUNWscmq/mgr/etc/config
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# Usage:
#     DEBUG=<RESOURCE_NAME> or ALL
#     START_COMMAND=/opt/mqm/bin/<renamed_strmqm_program>
#     STOP_COMMAND=/opt/mqm/bin/<renamed_endmqm_program>
#
DEBUG=ALL
START_COMMAND=
STOP_COMMAND=
#
```

---

**Note** – To turn off debug, simply reverse the steps above.

---



# Index

---

## **C**

C locale, 19  
commands  
    scinstall, 20  
    scrgadm, 21  
    scstat, 23  
    scswitch, 21  
configuration  
    requirements, 9  
    restrictions, 7

## **D**

debug, 26

## **F**

fault monitor, 24  
files, installation logs, 19

## **I**

installing  
    Sun Cluster HA for WebSphere MQ  
        by using Web Start program, 19  
        log files created, 19  
    WebSphere MQ, 14

## **L**

locales, 19  
log files, installation, 19

## **R**

registering, Sun Cluster HA for WebSphere  
    MQ, 21

## **V**

/var/sadm/install/logs directory, 19  
verifying  
    Sun Cluster HA for WebSphere MQ, 23  
    WebSphere MQ, 17

## **W**

Web Start program, 19  
WebSphere MQ, 6

