



Sun Cluster Data Service for WebSphere MQ Integrator Guide for Solaris OS

SPARC Platform Edition

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Preface

Sun Cluster Data Service for WebSphere MQ Integrator Guide for Solaris OS explains how to install and configure Sun™ Cluster HA for WebSphere MQ Integrator on both SPARC® and x86 based systems.

Note – In this document, the term “x86” refers to the Intel 32-bit family of microprocessor chips and compatible microprocessor chips made by AMD.

This document is intended for system administrators with extensive knowledge of Sun software and hardware. Do not use this document as a planning or presales guide. Before reading this document, you should have already determined your system requirements and purchased the appropriate equipment and software.

The instructions in this document assume knowledge of the Solaris™ Operating System and expertise with the volume manager software that is used with Sun Cluster.

Note – Sun Cluster software runs on two platforms, SPARC and x86. The information in this document pertains to both platforms unless otherwise specified in a special chapter, section, note, bulleted item, figure, table, or example.

UNIX Commands

This document contains information about commands that are specific to installing and configuring Sun Cluster data services. The document does *not* contain comprehensive information about basic UNIX[®] commands and procedures, such as shutting down the system, booting the system, and configuring devices. Information about basic UNIX commands and procedures is available from the following sources:

- Online documentation for the Solaris Operating System
- Solaris Operating System man pages
- Other software documentation that you received with your system

Typographic Conventions

The following table describes the typographic changes that are used in this book.

TABLE P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories, and onscreen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.
AaBbCc123	What you type, contrasted with onscreen computer output	<code>machine_name%</code> su Password:
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	The command to remove a file is <code>rm filename</code> .
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . Perform a <i>patch analysis</i> . Do <i>not</i> save the file. [Note that some emphasized items appear bold online.]

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P-2 Shell Prompts

Shell	Prompt
C shell prompt	machine_name%
C shell superuser prompt	machine_name#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

Related Documentation

Information about related Sun Cluster topics is available in the documentation that is listed in the following table. All Sun Cluster documentation is available at <http://docs.sun.com>.

Topic	Documentation
Data service administration	<i>Sun Cluster Data Services Planning and Administration Guide for Solaris OS</i> Individual data service guides
Concepts	<i>Sun Cluster Concepts Guide for Solaris OS</i>
Overview	<i>Sun Cluster Overview for Solaris OS</i>
Software installation	<i>Sun Cluster Software Installation Guide for Solaris OS</i>
System administration	<i>Sun Cluster System Administration Guide for Solaris OS</i>
Hardware administration	<i>Sun Cluster 3.0-3.1 Hardware Administration Manual for Solaris OS</i> Individual hardware administration guides
Data service development	<i>Sun Cluster Data Services Developer's Guide for Solaris OS</i>

Topic	Documentation
Error messages	<i>Sun Cluster Error Messages Guide for Solaris OS</i>
Command and function reference	<i>Sun Cluster Reference Manual for Solaris OS</i>

For a complete list of Sun Cluster documentation, see the release notes for your release of Sun Cluster at <http://docs.sun.com>.

Related Third-Party Web Site References

Third-party URLs that are referenced in this document provide additional related information.

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Documentation, Support, and Training

Sun Function	URL	Description
Documentation	http://www.sun.com/documentation/	Download PDF and HTML documents, and order printed documents
Support and Training	http://www.sun.com/supporttraining/	Obtain technical support, download patches, and learn about Sun courses

Product Training

Sun Microsystems offers training in many Sun technologies through a variety of instructor-led courses and self-paced courses. For information about the training courses that Sun offers and to enroll in a class, visit Sun Microsystems Training at <http://training.sun.com/>.

Getting Help

If you have problems installing or using Sun Cluster, contact your service provider and provide the following information:

- Your name and email address (if available)
- Your company name, address, and phone number
- The model and serial numbers of your systems
- The release number of the Solaris Operating System (for example, Solaris 8)
- The release number of Sun Cluster (for example, Sun Cluster 3.0)

Use the following commands to gather information about each node on your system for your service provider.

Command	Function
<code>prtconf -v</code>	Displays the size of the system memory and reports information about peripheral devices
<code>psrinfo -v</code>	Displays information about processors
<code>showrev -p</code>	Reports which patches are installed
<code>SPARC: prtdiag -v</code>	Displays system diagnostic information
<code>scinstall -pv</code>	Displays Sun Cluster release and package version information

Also have available the contents of the `/var/adm/messages` file.

Installing and Configuring Sun Cluster HA for WebSphere MQ Integrator

This chapter explains how to install and configure Sun Cluster HA for WebSphere MQ Integrator.

This chapter contains the following sections.

- “Installing and Configuring Sun Cluster HA for WebSphere MQ Integrator” on page 11
- “Sun Cluster HA for WebSphere MQ Integrator Overview” on page 12
- “Planning the Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration” on page 13
- “Installing and Configuring Sun Cluster” on page 19
- “Verifying the Installation and Configuration of Sun Cluster” on page 19
- “Installing the Sun Cluster HA for WebSphere MQ Integrator Packages” on page 21
- “Registering and Configuring Sun Cluster HA for WebSphere MQ Integrator” on page 24
- “Verifying the Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration” on page 27
- “Upgrading Sun Cluster HA for WebSphere MQ Integrator” on page 27
- “Understanding Sun Cluster HA for WebSphere MQ Integrator Fault Monitor” on page 29
- “Debug Sun Cluster HA for WebSphere MQ Integrator” on page 31

Installing and Configuring Sun Cluster HA for WebSphere MQ Integrator

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

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

Task	For Instructions, Go To
Plan the installation	“Sun Cluster HA for WebSphere MQ Integrator Overview” on page 12 “Planning the Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration” on page 13
Install and configure Sun Cluster	“How to Install and Configure Sun Cluster” on page 19
Verify installation and configuration	“How to Verify the Installation and Configuration of Sun Cluster” on page 20
Install Sun Cluster HA for WebSphere MQ Integrator Packages	“How to Install the Sun Cluster HA for WebSphere MQ Integrator Packages using the <code>scinstall</code> Utility” on page 23
Register and Configure Sun Cluster HA for WebSphere MQ Integrator	“How to Register and Configure Sun Cluster HA for WebSphere MQ Integrator” on page 24
Verify Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration	“How to Verify the Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration” on page 27
Upgrading Sun Cluster HA for WebSphere MQ Integrator Installation and Configuration	“Upgrading Sun Cluster HA for WebSphere MQ Integrator” on page 27
Understand Sun Cluster HA for WebSphere MQ Integrator fault monitor	“Understanding Sun Cluster HA for WebSphere MQ Integrator Fault Monitor” on page 29
Debug Sun Cluster HA for WebSphere MQ Integrator	“Debug Sun Cluster HA for WebSphere MQ Integrator” on page 31

Sun Cluster HA for WebSphere MQ Integrator Overview

Sun Cluster works with WebSphere MQ messaging, extending its basic connectivity and transport capabilities to provide a powerful message broker solution. Messages are formed, routed, and transformed according to the rules defined by an easy-to-use graphical user interface (GUI).

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

TABLE 2 Protection of Components

Component	Protected by
Broker	Sun Cluster HA for WebSphere MQ Integrator
User Name Server	Sun Cluster HA for WebSphere MQ Integrator

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

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

Configuration Restrictions

This section provides a list of software and hardware configuration restrictions that apply to Sun Cluster HA for WebSphere MQ Integrator only.



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

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

- **The Sun Cluster HA for WebSphere MQ Integrator data service can be configured only as a failover service** – Sun Cluster cannot operate as a scalable service and therefore, the Sun Cluster HA for WebSphere MQ Integrator data service can be configured only to run as a failover service.
- **Installing Sun Cluster onto Cluster File Systems** – Initially, you install the Sun Cluster product into `/opt/mqs` and `/var/mqsi`.

You must mount `/var/mqsi` as a Global File System with a symbolic link for `/var/mqsi/locks` to a Local File System. It is recommended that `/opt/mqsi` be on a local disk. For a discussion of the advantages and disadvantages of installing the software on local versus cluster file system, see “Determining the Location of

the Application Binaries” on page 3 of the *Sun Cluster Data Services Installation and Configuration Guide*

- **Mount /var/mqsi as a Global File System** – Sun Cluster uses several directories within /var/mqsi, which needs to be available on all nodes within Sun Cluster as a Global File System. Generated locks must be located within a Local File System. Because of this, you must setup /var/mqsi/locks as a symbolic link to a Local File System.

Note – It is best practice to mount Global File Systems with the /global prefix and to mount Failover File Systems with the /local prefix.

The following example shows Sun Cluster with /var/mqsi mounted as a Global File System through a symbolic link to /global/mqsi, with /var/mqsi/locks setup as a symbolic link to /var/mqsi_locks on the root file system, that is, local disk.

```
# ls -l /var/mqsi
lrwxrwxrwx  1 root    other          12 Sep  5 15:32 /var/mqsi ->
/global/mqsi
#
# ls -l /global/mqsi/locks
lrwxrwxrwx  1 root    other          15 Sep 18 15:37 /global/mqsi/locks ->
/var/mqsi_locks
#
# df -k /global/mqsi/locks
Filesystem          kbytes  used  avail capacity  Mounted on
/dev/dsk/c0t0d0s0   12731708 5792269 6812122   46%      /
#
# more /etc/vfstab (Subset of the output)
/dev/md/dg_d6/dsk/d60 /dev/md/dg_d6/rdisk/d60 /global/mqsi
                        ufs      4          yes    logging,global
```

- **The Sun Cluster HA for WebSphere MQ Integrator RDBMS** – The Sun Cluster HA for WebSphere MQ Integrator data service can operate only with a local RDBMS, i.e. not a remote RDBMS and more specifically, only with DB2 and Oracle. This restriction is because the Sun Cluster HA for WebSphere MQ Integrator data service needs to manage the restart scenarios for Sun Cluster, whenever the RDBMS restarts.

Configuration Requirements

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



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

Sun Cluster components and their dependencies – You can configure the Sun Cluster HA for WebSphere MQ Integrator data service to protect a Sun Cluster Broker and UserNameServer. These components and their dependencies are described in [Table 3](#).

TABLE 3 Sun Cluster components and their dependencies (via → symbol)

Component	Description
Broker (Mandatory)	<p>→ <i>SUNW.HAStoragePlus</i> resource</p> <p>→ <i>WebSphere MQ Queue Manager</i> and <i>Listener</i> resources</p> <p>→ <i>RDBMS</i> resource</p> <p>The <i>SUNW.HAStoragePlus</i> resource manages the Sun Cluster File System Mount point, i.e. <code>/global/mqsi</code>.</p> <p>Dependency on the <i>WebSphere MQ Queue Manager</i> resource ensures that the WebSphere MQ Queue Manager is available.</p> <p>Dependency on the <i>WebSphere MQ Listener</i> resource is required only if <code>runmqtsr</code> is used instead of <code>inetd</code>.</p> <p>Dependency on the <i>RDBMS</i> resource ensures that the RDBMS is available.</p> <p>All these dependencies ensure that Sun Cluster is not started until these services are available.</p>
UserNameServer (Optional)	<p>→ <i>SUNW.HAStoragePlus</i> resource</p> <p>→ <i>WebSphere MQ Queue Manager</i> and <i>Listener</i> resources</p> <p>The <i>SUNW.HAStoragePlus</i> resource manages the Sun Cluster File System Mount point, i.e. <code>/global/mqsi</code>.</p> <p>Dependency on the <i>WebSphere MQ Queue Manager</i> resource ensures that the WebSphere MQ Queue Manager is available.</p> <p>Dependency on the <i>WebSphere MQ Listener</i> resource is required only if <code>runmqtsr</code> is used instead of <code>inetd</code>.</p>

The Sun Cluster Broker component and its dependencies must all reside within the same Resource Group. Likewise the Sun Cluster UserNameServer and its dependencies must also all reside with the same Resource Group.

However, the Sun Cluster Broker and UserNameServer do not have to reside within the same Resource Group, they can reside in separate Resource Groups. Likewise, multiple instances of the Sun Cluster Broker can reside in separate Resource Groups. However, only one instance of the Sun Cluster UserNameServer is allowed.

Example 1 shows two Sun Cluster Brokers (XXX and YYY) and a Sun Cluster UserNameServer within different Resource Groups and shows that all Sun Cluster components (Broker and UserNameServer) use the same Global File System /global/mqsi.

EXAMPLE 1 Multiple Sun Cluster Brokers and UserNameServer .

■ **Resource Group 1** with the following *resources*

```
SUNW.HAStoragePlus resource with
-x FilesystemMountPoints=/local/db2,/global/mqm,/global/mqsi,
  /local/mqm/qmgrs/qmgr1,/local/mqm/log/qmgr1
RDBMS resource for DB2
WebSphere MQ resource for Queue Manager qmgr1
WebSphere MQ Integrator resource for Broker XXX
```

■ **Resource Group 2** with the following *resources*

```
SUNW.HAStoragePlus resource with
-x FilesystemMountPoints=/global/mqm,/global/mqsi
-x AffinityOn=FALSE
SUNW.HAStoragePlus resource with
-x FilesystemMountPoints=/local/oracle,
  /local/mqm/qmgrs/qmgr2,/local/mqm/log/qmgr2
RDBMS resource for Oracle
RDBMS resource for Oracle Listener
WebSphere MQ resource for Queue Manager qmgr2
WebSphere MQ Integrator resource for Broker YYY
```

■ **Resource Group 3** with the following *resources*

```
SUNW.HAStoragePlus resource with
-x FilesystemMountPoints=/global/mqm,/global/mqsi
-x AffinityOn=FALSE
SUNW.HAStoragePlus resource with
-x FilesystemMountPoints=/local/mqm/qmgrs/qmgr3,/local/mqm/log/qmgr3
WebSphere MQ resource for Queue Manager qmgr3
WebSphere MQ Integrator resource for UserNameServer
```

Note – For detailed information about these Sun Cluster components, refer to *IBM's Sun Cluster Introduction and Planning* manual.

Each Sun Cluster component has a configuration and registration file in /opt/SUNWscmqi/xxx/util, where xxx is a three-character abbreviation for the Sun Cluster component. These files allow you to register the Sun Cluster components with Sun Cluster.

Within these files, the appropriate dependencies have been applied.

EXAMPLE 2 Sun Cluster configuration and registration file for Sun Cluster

```
# cd /opt/SUNWscmqi
#
```


EXAMPLE 2 Sun Cluster configuration and registration file for Sun Cluster (Continued)

```
# ls -l sib/util
total 6
-rwxr-xr-x 1 root sys 1032 Dec 20 14:44 sib_config
-rwxr-xr-x 1 root sys 720 Dec 20 14:44 sib_register
#
# ls -l siu/util
-rwxr-xr-x 1 root sys 733 Dec 20 14:44 siu_config
-rwxr-xr-x 1 root sys 554 Dec 20 14:44 siu_register
#
# more sib/util/*
:::::::::::::
sib/util/sib_config
:::::::::::::
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# This file will be sourced in by sib_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 HAStoragePlus SC resource
# SC3_IN - name of the Test Message Flow (Inbound)
# SC3_OUT - name of the Test Message Flow (Outbound)
# MQSI_ID - name of the WebSphere MQI userid
# BROKER - name of the WebSphere MQI Broker
# RDBMS_ID - name of the WebSphere MQI RDBMS userid
# QMGR_RS - name of the Queue Manager SC resource
# RDBMS_RS - name of the RDBMS SC resource and listener (if Oracle)
# e.g. RDBMS_RS=<ora-rs>,<lsr-rs>
#
# +++ Optional parameters +++
#
# START_CMD - pathname and name of the renamed strmqm program
# STOP_CMD - pathname and name of the renamed endmqm program
#
#
# Note 1: Optional parameters
#
# Null entries for optional parameters are allowed if not used.
#
# Note 2: Renamed strmqm/endmqm programs
#
# This is only recommended if WebSphere MQ is deployed onto
# Global File Systems for qmgr/log files. You should specify
# the full pathname/program, i.e. /opt/mqm/bin/<renamed_strmqm>
#
#
```

EXAMPLE 2 Sun Cluster configuration and registration file for Sun Cluster (Continued)

```
#

RS=
RG=
QMGR=
PORT=
LH=
HAS_RS=
SC3_IN=
SC3_OUT=
MQSI_ID=
BROKER=
RDBMS_ID=
QMGR_RS=
RDBMS_RS=
START_CMD=
STOP_CMD=

:::::::::::::
sib_register
:::::::::::::
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
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#

. `dirname $0`/sib_config

scrgadm -a -j $RS -g $RG -t SUNW.gds \
-x Start_command="/opt/SUNWscmqi/sib/bin/start-broker \
-R $RS -G $RG -Q $QMGR -I $SC3_IN -O $SC3_OUT \
-U $MQSI_ID -B $BROKER -D $RDBMS_ID \
-S '$START_CMD' -E '$STOP_CMD' " \
-x Stop_command="/opt/SUNWscmqi/sib/bin/stop-broker \
-R $RS -G $RG -Q $QMGR -I $SC3_IN -O $SC3_OUT \
-U $MQSI_ID -B $BROKER -D $RDBMS_ID \
-S '$START_CMD' -E '$STOP_CMD' " \
-x Probe_command="/opt/SUNWscmqi/sib/bin/test-broker \
-R $RS -G $RG -Q $QMGR -I $SC3_IN -O $SC3_OUT \
-U $MQSI_ID -B $BROKER -D $RDBMS_ID \
-S '$START_CMD' -E '$STOP_CMD' " \
-y Port_list=$PORT/tcp -y Network_resources_used=$LH \
-x Stop_signal=9 \
-y Resource_dependencies=$HAS_RS,$QMGR_RS,$RDBMS_RS
```

Installing and Configuring Sun Cluster

▼ How to Install and Configure Sun Cluster

Use this procedure to install and configure Sun Cluster.

Note – For this section, follow *IBM's WebSphere MQ Integrator for Sun Solaris — Installation Guide* to install and create a Broker and UserNameServer.

Steps 1. **Mount the Sun Cluster Cluster File Systems.**

Before installing Sun Cluster within Sun Cluster, ensure that the Cluster File System `/var/mqsi`, or `/global/mqsi` if you have setup a symbolic link, is mounted as a Global File System.

2. **Install Sun Cluster onto all nodes within Sun Cluster.**

It is recommended that you install Sun Cluster binaries onto local disks on `/opt/mqsi`. For a discussion of the advantages and disadvantages of installing the software on local versus cluster file system, see "Determining the Location of the Application Binaries" on page 3 of the *Sun Cluster Data Services Installation and Configuration Guide*.

3. **Create your Sun Cluster Broker.**

After you have installed Sun Cluster onto all nodes within Sun Cluster that will run Sun Cluster, create your Sun Cluster Broker.

Verifying the Installation and Configuration of Sun Cluster

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

Note – Refer to *IBM's WebSphere MQ Intercommunication* and *IBM's WebSphere MQ Command Reference* manuals to create queues and channels for communication between the Broker(s) and UserNameServer within Sun Cluster and the Configuration Manager on Windows NT.

▼ How to Verify the Installation and Configuration of Sun Cluster

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.

Note – The Sun Cluster HA for WebSphere MQ Integrator data service requires that a message flow has been setup within the Broker.

This section requires that the WebSphere MQ queue manager Logical Hostname IP address be available. This should have been setup if you have completed the Sun Cluster HA for IBM WebSphere MQ data service installation. Ensure that you have completed the installation of the Sun Cluster HA for IBM WebSphere MQ data service before you continue with the next steps.

- Steps**
- 1. Create the communication links between the Broker queue manager and Configuration Manager queue manager.**

Set up queues and channels between the Broker queue manager(s) and the Configuration Manager queue manager, so that the message flows and rules setup on the Configuration Manager can be deployed from the Configuration Manager to the Broker queue manager(s) within Sun Cluster.

See *Chapter 4* in *IBM's WebSphere MQ Integrator for Sun Solaris — Installation Guide*. Refer to the section *Starting your broker domain*.
 - 2. Create the communication links between the Broker queue manager and UserNameServer (UNS) queue manager.**

If you are using a UNS, then you need to setup queues and channels between the Broker queue manager(s) and the UserNameServer.
 - 3. Test the communication links between the queue managers.**

After you setup all queues and channels between the Broker, UserNameServer and Configuration Manager, test that all the queue managers can communicate with each other.
 - 4. Create and deploy a message flow on the Configuration Manager.**

After you setup and test all queues between the Broker, UserNameServer and Configuration Manager, create a message flow and deploy it to the Broker queue manager. You will need a separate message flow for each Broker queue manager.

a. Create a message flow.

Create a simple message flow, that uses two queues, to receive a message from an input queue and put it to an output queue. Within the Control Center on Windows NT, you can use the IBMPrimitives MQInput and MQOutput to achieve this message flow.

See *Chapter 5 — Verifying your installation* within *IBM's WebSphere MQ Integrator for Sun Solaris — Installation Guide*. In particular, refer to the section *Building and using a message flow*.

b. Deploy the message flow to the broker.

Note – The message flow and message flow queues that you create will be used by the Sun Cluster HA for WebSphere MQ Integrator data service to probe Sun Cluster Broker.

Installing the Sun Cluster HA for WebSphere MQ Integrator Packages

If you did not install the Sun Cluster HA for WebSphere MQ Integrator packages during your 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 Integrator 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 Software Installation Guide for Solaris OS*.

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

- Web Start program
- `scinstall` utility

Note – If you are using Solaris 10, install these packages *only* in the global zone. To ensure that these packages are not propagated to any local zones that are created after you install the packages, use the `scinstall` utility to install these packages. Do *not* use the Web Start program.

▼ How to Install the Sun Cluster HA for WebSphere MQ Integrator Packages 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.

- Steps**
1. **On the cluster node where you are installing the Sun Cluster HA for WebSphere MQ Integrator 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. **Insert 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/cdrom0` directory.
 4. **Change to the Sun Cluster HA for WebSphere MQ Integrator component directory of the CD-ROM.**

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

```
# cd /cdrom/cdrom0/components/SunCluster_HA_MQI_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 the instructions on the screen to install the Sun Cluster HA for WebSphere MQ Integrator 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. **Remove 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 Integrator Packages using the `scinstall` Utility

Use this procedure to install the Sun Cluster HA for WebSphere MQ Integrator packages by using the `scinstall` utility. You need the Sun Java Enterprise System Accessory CD Volume 3 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 Integrator packages as part of your initial Sun Cluster installation, proceed to [“Registering and Configuring Sun Cluster HA for WebSphere MQ Integrator”](#) on page 24.

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

- Steps**
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 Integrator

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

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

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 Integrator packages as part of your initial Sun Cluster installation, go to [“How to Install the Sun Cluster HA for WebSphere MQ Integrator Packages using the `scinstall` Utility”](#) on page 23.

The Sun Cluster Broker component is dependent on WebSphere MQ and an RDBMS. All resources for the Sun Cluster Broker component, WebSphere MQ components, and the RDBMS must reside within the same Resource Group. For example, refer to [Example 1](#).

The Sun Cluster UserNameServer component is dependent only on WebSphere MQ. All resources for the Sun Cluster UserNameServer component, WebSphere MQ components and the RDBMS must reside within the same Resource Group, For example, refer to [Example 1](#)

Currently only local RDBMS support for DB2 or Oracle is supported. Refer to [“Configuration Restrictions”](#) on page 13, in particular to *Sun Cluster HA for WebSphere MQ Integrator RDBMS* for a description of this restriction.

- Steps**
1. Become superuser on one of the nodes in the cluster that will host Sun Cluster.
 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 Sun Cluster Disk Storage.

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

6. Enable the failover resource group that now includes the Sun Cluster Disk Storage resource.

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

7. Create and register each required Sun Cluster component.

Note – This section requires that you have installed the Sun Cluster HA for WebSphere MQ and RDBMS data services and that their resources are online within Sun Cluster. Ensure that you have done this before you continue with this step.

Perform this step for the Broker component (`sib`), then repeat for the optional `UserNameServer` component, replacing `sib` with:

```
siu - UserNameServer
```

```
# cd /opt/SUNWscmqi/sib/util
```

Edit the `sib_config` file and follow the comments within that file. For example:

```
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# This file will be sourced in by sib_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 HAStoragePlus SC resource
# SC3_IN - name of the Test Message Flow (Inbound)
# SC3_OUT - name of the Test Message Flow (Outbound)
# MQSI_ID - name of the WebSphere MQI userid
# BROKER - name of the WebSphere MQI Broker
# RDBMS_ID - name of the WebSphere MQI RDBMS userid
# QMGR_RS - name of the Queue Manager SC resource
```

```

# RDBMS_RS - name of the RDBMS SC resource and listener (if Oracle)
#           e.g. RDBMS_RS=<ora-rs>,<lsr-rs>
#
#           +++ Optional parameters +++
#
# START_CMD - pathname and name of the renamed strmqm program
# STOP_CMD  - pathname and name of the renamed endmqm program
#
#
# Note 1: Optional parameters
#
#           Null entries for optional parameters are allowed if not used.
#
# Note 2: Renamed strmqm/endmqm programs
#
#           This is only recommended if WebSphere MQ is deployed onto
#           Global File Systems for qmgr/log files. You should specify
#           the full pathname/program, i.e. /opt/mqm/bin/<renamed_strmqm>
#
#

```

The following is an example for Sun Cluster Broker XXX, with WebSphere Integrator MQ Manager qmgr1.

```

RS=wmq-broker-res
RG=wmq-rg
QMGR=qmgr1
PORT=1414
LH=wmq-lh-res
HAS_RS=wmqi-has-res
SC3_IN=SC3_IN
SC3_OUT=SC3_OUT
MQSI_ID=mqsi1
BROKER=XXX
RDBMS_ID=db2
QMGR_RS=wmq-qmgr-res
RDBMS_RS=wmq-rdbms-res
START_CMD=
STOP_CMD=

```

After editing `sib_config`, you must register the resource.

```
# ./sib_register
```

8. Enable each Sun Cluster resource.

Repeat this step for each Sun Cluster component.

```
# scstat
```

```
# scswitch -e -j Sun Cluster-resource
```

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

- Steps**
1. Become superuser on one of the nodes in the cluster that will host Sun Cluster.
 2. Ensure all the Sun Cluster resources are online with `scstat`.

```
# scstat
```

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

```
# scswitch -e -j Sun Cluster- resource
```

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

```
# scswitch -z -g Sun Cluster-failover-resource-group -h node2
```

Upgrading Sun Cluster HA for WebSphere MQ Integrator

Additional configuration parameters for Sun Cluster HA for WebSphere MQ Integrator were introduced in Sun Cluster 3.1 9/04. If you need to set a value for a parameter, you must upgrade Sun Cluster HA for WebSphere MQ Integrator.

You might deploy a WebSphere MQ queue manager's `qmgr` files and log files on a global file system. In this situation, rename the `strmqm` program and the `endmqm` program to prevent the queue manager from being manually started on another node. If you rename these programs, the Sun Cluster framework manage the startup of WebSphere MQ queue manager. For more information, see *Sun Cluster Data Service for WebSphere MQ Guide for Solaris OS*.

The following parameters for enabling Sun Cluster to manage the startup of WebSphere MQ queue manager were introduced in Sun Cluster 3.1 9/04. Null values are defined for these parameters.

<code>START_CMD=start-program</code>	Specifies the full path name and filename of the renamed <code>strmqm</code> program.
<code>STOP_CMD=stop-program</code>	Specifies the full path name and filename of the renamed <code>endmqm</code> program.

▼ How to Upgrade Sun Cluster HA for WebSphere MQ Integrator

If you need to set a value for a parameter, you must remove and reregister the Sun Cluster HA for WebSphere MQ Integrator resource for which you are changing the parameter.

The parameters that are introduced in Sun Cluster 3.1 9/04 apply to the resources for all components, namely:

- Broker component
- User Name Server component

Perform this task for each WebSphere MQ Integrator resource that you are modifying.

Note – Perform this task *only* if you are setting or modifying parameters that are introduced in Sun Cluster 3.1 9/04.

Steps 1. Save the resource definitions.

```
# scrgadm -pvv -j resource > file1
```

2. Disable the resource.

```
# scswitch -n -j resource
```

3. Remove the resource.

```
# scrgadm -r -j resource
```

4. Configure and register the resource.

- a. Go to the directory that contains the configuration file and the registration file for the resource.

```
# cd /opt/SUNWscmqi/prefixutil
```

b. Edit the configuration file for the resource.

```
vi prefix_config
```

c. Run the registration file for the resource.

```
# ./prefix_register
```

prefix denotes the component to which the file applies, as follows:

- *sib* denotes the Broker component.
- *siu* denotes the User Name Server component.

5. Save the resource definitions.

```
# scrgadm -pvv -j resource > file2
```

6. Compare the updated definitions to the definitions that you saved before you updated the resource.

Comparing these definitions enables you to determine if any existing extension properties have changed, for example, time-out values.

```
# diff file1 file2
```

7. Amend any resource properties that were reset.

```
# scrgadm -c -j resource -x|y resource
```

8. Bring online the resource.

```
# scswitch -e -j resource
```

Understanding Sun Cluster HA for WebSphere MQ Integrator Fault Monitor

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

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

Resource Properties

Sun Cluster HA for WebSphere MQ Integrator 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

- **Sun Cluster Broker**
 - Sleeps for `Thorough_probe_interval`.
 - Test the RDBMS or Queue Manager has been restarted. If the RDBMS has been restarted, then the whole Resource Group will be restarted. If the Queue Manager has been restarted, then the Broker is stopped and waits until the Queue Manager is restarted, after which the Broker is restarted.
 - If the RDBMS and Queue Manager have not been restarted, then a check against `bipservice` is made. If `bipservice` is lost, then the probe will restart the Broker.
 - If `bipservice` is available, then the probe checks that the queue names for `SC3_IN` and `SC3_OUT` are valid and empty, puts a test message to `SC3_IN`, and checks that the message flows to `SC3_OUT` by checking that the `CURDEPTH` for `SC3_OUT` is equal to 1. If this test fails, then the probe will restart the Broker.
 - If the Broker 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.
- **Sun Cluster UserNameServer**
 - Sleeps for `Thorough_probe_interval`
 - If `bipservice` for the `UserNameServer` is lost, then the probe will restart the `UserNameServer`.
 - If the `UserNameServer` 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.

Debug Sun Cluster HA for WebSphere MQ Integrator

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

Each Sun Cluster component has a `DEBUG` file under `/opt/SUNWscmqi/xxx/etc`, where `xxx` is a three-character abbreviation for the respective Sun Cluster component.

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

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

Steps 1. 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`. The output below, from the command `grep daemon /etc/syslog.conf`, shows that `daemon.debug` has 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/SUNWscmqi/sib/etc/config`

Perform this step for the Broker component (`sib`), then repeat for the optional UsernameServer (`siu`) that requires debug output, on each node of Sun Cluster.

Edit `/opt/SUNWscmqi/sib/etc/config` and change `DEBUG=` to `DEBUG=ALL` or `DEBUG=resource`

```
# cat /opt/SUNWscmqi/sib/etc/config
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# Usage:
#     DEBUG=<RESOURCE_NAME> or ALL
#
DEBUG=ALL
#
```

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

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