



Sun Cluster Data Service for WebSphere MQ Guide for Solaris OS



Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054
U.S.A.

Part No: 819-3067-10
December 2006, Revision A

Copyright 2006 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. All rights reserved.

Sun Microsystems, Inc. has intellectual property rights relating to technology embodied in the product that is described in this document. In particular, and without limitation, these intellectual property rights may include one or more U.S. patents or pending patent applications in the U.S. and in other countries.

U.S. Government Rights – Commercial software. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

This distribution may include materials developed by third parties.

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, the Solaris logo, the Java Coffee Cup logo, docs.sun.com, SunOS is a trademark or registered trademark of Sun Microsystems, Inc. in the United States and other countries. Java, and Solaris are trademarks or registered trademarks 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.

Products covered by and information contained in this publication are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical or biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

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 2006 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. Tous droits réservés.

Sun Microsystems, Inc. détient les droits de propriété intellectuelle relatifs à la technologie incorporée dans le produit qui est décrit dans ce document. En particulier, et ce sans limitation, ces droits de propriété intellectuelle peuvent inclure un ou plusieurs brevets américains ou des applications de brevet en attente aux États-Unis et dans d'autres pays.

Cette distribution peut comprendre des composants développés par des tierces personnes.

Certains composants de ce produit peuvent être dérivés du logiciel Berkeley BSD, licenciés par l'Université de Californie. UNIX est une marque déposée aux États-Unis et dans d'autres pays; elle est licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, le logo Solaris, le logo Java Coffee Cup, docs.sun.com, SunOS is a trademark or registered trademark of Sun Microsystems, Inc. in the United States and other countries. Java et Solaris sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux États-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 États-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.

Les produits qui font l'objet de cette publication et les informations qu'il contient sont régis par la législation américaine en matière de contrôle des exportations et peuvent être soumis au droit d'autres pays dans le domaine des exportations et importations. Les utilisations finales, ou utilisateurs finaux, pour des armes nucléaires, des missiles, des armes chimiques ou biologiques ou pour le nucléaire maritime, directement ou indirectement, sont strictement interdites. Les exportations ou réexportations vers des pays sous embargo des États-Unis, ou vers des entités figurant sur les listes d'exclusion d'exportation américaines, y compris, mais de manière non exclusive, la liste de personnes qui font objet d'un ordre de ne pas participer, d'une façon directe ou indirecte, aux exportations des produits ou des services qui sont régis par la législation américaine en matière de contrôle des exportations et la liste de ressortissants spécifiquement désignés, sont rigoureusement interdites.

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.

Contents

Preface	5
Installing and Configuring Sun Cluster HA for WebSphere MQ	9
Sun Cluster HA for WebSphere MQ Overview	9
Overview of Installing and Configuring Sun Cluster HA for WebSphere MQ	10
Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration	10
Configuration Restrictions	11
Configuration Requirements	13
Installing and Configuring WebSphere MQ	16
▼ How to Install and Configure WebSphere MQ	16
Verifying the Installation and Configuration of WebSphere MQ	23
▼ How to Verify the Installation and Configuration of WebSphere MQ	23
Installing the Sun Cluster HA for WebSphere MQ Packages	26
▼ How to Install the Sun Cluster HA for WebSphere MQ Packages	26
Registering and Configuring Sun Cluster HA for WebSphere MQ	28
▼ How to Register and Configure Sun Cluster HA for WebSphere MQ	28
▼ How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Resource Group	28
▼ How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Zone	31
Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration	35
▼ How to Verify the Sun Cluster HA for WebSphere MQ Installation and Configuration	35
Upgrading Sun Cluster HA for WebSphere MQ	35
▼ How to Migrate Existing Resources to a New Version of Sun Cluster HA for WebSphere MQ	35
Understanding the Sun Cluster HA for WebSphere MQ Fault Monitor	36
Resource Properties	36
Probing Algorithm and Functionality	36
Debug Sun Cluster HA for WebSphere MQ	38
▼ How to turn on debug for Sun Cluster HA for WebSphere MQ	38

A	Deployment Example: Installing a WebSphere MQ Queue Manager in Non-Global Zones	41
	Target Cluster Configuration	41
	Software Configuration	41
	Assumptions	42
	Installing and Configuring WebSphere MQ	42
	▼ Example: Prepare the Cluster for WebSphere MQ	42
	▼ Example: Configure two Non-Global Zones	43
	▼ Example: Install WebSphere MQ in the Non-Global Zones	45
	▼ Example: Verify WebSphere MQ	46
	▼ Example: Configure Cluster Resources for WebSphere MQ	47
	▼ Example: Enable the WebSphere MQ Software to Run in the Cluster	48
	▼ Example: Verify the Sun Cluster HA for WebSphere MQ Resource Group	49
	▼ Example: Creating Multiple Instances	50
B	Deployment Example: Installing a WebSphere MQ Queue Manager in a Failover Zone	51
	Target Cluster Configuration	51
	Software Configuration	51
	Assumptions	52
	Installing and Configuring WebSphere MQ in a Failover Zone	52
	▼ Example: Prepare the Cluster for WebSphere MQ	53
	▼ Example: Configure the Failover Zone	54
	▼ Example: Install WebSphere MQ in the failover zone	55
	▼ Example: Verify WebSphere MQ	56
	▼ Example: Configure Cluster Resources for WebSphere MQ	58
	▼ Example: Enable the WebSphere MQ Software to Run in the Cluster	59
	▼ Example: Verify the Sun Cluster HA for WebSphere MQ resource group	60
	▼ Example: Creating Multiple Instances	60
	Index	61

Preface

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

Note – This Sun Cluster release supports systems that use the SPARC and x86 families of processor architectures: UltraSPARC, SPARC64, and AMD64. In this document, the label x86 refers to systems that use the AMD64 family of processor architectures.

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 book assume knowledge of the Solaris™ Operating System (Solaris OS) and expertise with the volume-manager software that is used with Sun Cluster software.

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.

Using 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 conventions that are used in this book.

TABLE P-1 Typographic Conventions

Typeface	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>aabcc123</i>	Placeholder: replace with a real name or value	The command to remove a file is <i>rm filename</i> .
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . <i>A cache</i> is a copy that is stored locally. Do <i>not</i> save the file. Note: Some emphasized items appear bold online.

Shell Prompts in Command Examples

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

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>
Bourne shell and Korn shell	<code>\$</code>
Bourne shell and Korn shell for superuser	<code>#</code>

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 3.1 - 3.2 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>
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.

Note – Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused or alleged to be caused by or in connection with use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- [Documentation](http://www.sun.com/documentation/) (<http://www.sun.com/documentation/>)
- [Support](http://www.sun.com/support/) (<http://www.sun.com/support/>)
- [Training](http://www.sun.com/training/) (<http://www.sun.com/training/>)

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 number and serial number of your systems
- The release number of the Solaris Operating System (for example, Solaris 10)
- The release number of Sun Cluster (for example, Sun Cluster 3.2)

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>/usr/cluster/bin/clnode show-rev</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

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

This chapter contains the following sections.

- “Sun Cluster HA for WebSphere MQ Overview” on page 9
- “Overview of Installing and Configuring Sun Cluster HA for WebSphere MQ” on page 10
- “Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 10
- “Installing and Configuring WebSphere MQ” on page 16
- “Verifying the Installation and Configuration of WebSphere MQ” on page 23
- “Installing the Sun Cluster HA for WebSphere MQ Packages” on page 26
- “Registering and Configuring Sun Cluster HA for WebSphere MQ” on page 28
- “Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 35
- “Upgrading Sun Cluster HA for WebSphere MQ” on page 35
- “Understanding the Sun Cluster HA for WebSphere MQ Fault Monitor” on page 36
- “Debug Sun Cluster HA for WebSphere MQ” on page 38

Sun Cluster HA for WebSphere MQ Overview

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

The following components can be protected by the Sun Cluster HA for WebSphere MQ data service within the global zone, whole root non-global zone or whole root failover non-global zone.

Queue Manager
Channel Initiator
Command Server
Listener
Trigger Monitor

Overview of Installing and Configuring Sun Cluster HA for WebSphere MQ

The following table summarizes the tasks for installing and configuring Sun Cluster HA for WebSphere MQ and provides cross-references to detailed instructions for performing these tasks. Perform the tasks in the order that they are listed in the table.

TABLE 1 Tasks for Installing and Configuring Sun Cluster HA for WebSphere MQ

Task	Instructions
Plan the installation	“Planning the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 10
Install and configure the WebSphere MQ software	“How to Install and Configure WebSphere MQ” on page 16
Verify the installation and configuration	“How to Verify the Installation and Configuration of WebSphere MQ” on page 23
Install Sun Cluster HA for WebSphere MQ packages	“Installing the Sun Cluster HA for WebSphere MQ Packages” on page 26
Register and configure Sun Cluster HA for WebSphere MQ resources	“How to Register and Configure Sun Cluster HA for WebSphere MQ” on page 28
Verify the Sun Cluster HA for WebSphere MQ installation and configuration	“How to Verify the Sun Cluster HA for WebSphere MQ Installation and Configuration” on page 35
Upgrade the Sun Cluster HA for WebSphere MQ data service	“Upgrading Sun Cluster HA for WebSphere MQ” on page 35
Tune the Sun Cluster HA for WebSphere MQ fault monitor	“Understanding the Sun Cluster HA for WebSphere MQ Fault Monitor” on page 36
Debug Sun Cluster HA for WebSphere MQ	“How to turn on debug for Sun Cluster HA for WebSphere MQ” on page 38

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

The configuration restrictions in the subsections that follow apply only to Sun Cluster HA for WebSphere MQ.



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

Restriction for the supported configurations of Sun Cluster HA for WebSphere MQ

The Sun Cluster HA for WebSphere MQ data service can only be configured as a failover service.

Single or multiple instances of WebSphere MQ can be deployed in the cluster.

WebSphere MQ can be deployed in the global zone, whole root non-global zone or a whole root failover non-global zone. See [“Restriction for multiple WebSphere MQ instances” on page 11](#) for more information.

The Sun Cluster HA for WebSphere MQ data service supports different versions of WebSphere MQ, however you must check that the Sun Cluster HA for WebSphere MQ data service has been verified against that version.

Restriction for the Location of WebSphere MQ files

The WebSphere MQ files are where the queue manager data files `/var/mqm/qmgr/queue-manager` and `/var/mqm/log/queue-manager` are stored.

These WebSphere MQ files needs to be placed on shared storage as either a cluster file system or a highly available local file system.

Refer to [Step 5](#) and [Step 6](#) in [“How to Install and Configure WebSphere MQ” on page 16](#) for a more information.

Restriction for multiple WebSphere MQ instances

The Sun Cluster HA for WebSphere MQ data service can support multiple WebSphere MQ instances, potentially with different versions.

If you intend to deploy multiple WebSphere MQ instances with different versions you will need to consider deploying WebSphere MQ in separate whole root non-global zones.

The purpose of the following discussion is to help you decide how to use whole root non-global zones to deploy multiple WebSphere MQ instances and then to determine what `NodeList` entries are required.

Within these examples:

- There are two nodes within the cluster, `node1` and `node2`.
- Both nodes have two non-global zones each named `z1` and `z2`.
- Each example listed simply shows the required `NodeList` property value, via the `-n` parameter, when creating a failover resource group.
- Benefits and drawbacks are listed within each example as `+` and `-`.

Note – Although these examples show non-global zones `z1` and `z2`, you may also use `global` as the zone name or omit the zone entry within the `NodeList` property value to use the global zone.

EXAMPLE 1 Run multiple WebSphere MQ instances in the same failover resource group.

Create a single failover resource group that will contain all the WebSphere MQ instances in the same non-global zones across `node1` and `node2`.

```
# clresourcegroup create -n node1:z1,node2:z1 RG1
```

- `+` Only one non-global zone per node is required.
- `-` Multiple WebSphere MQ instances do not have independent failover as they are all within the same failover resource group.

EXAMPLE 2 Run multiple WebSphere MQ instances in separate failover resource groups.

Create multiple failover resource groups that will each contain one WebSphere MQ instance in the same non-global zones across `node1` and `node2`.

```
# clresourcegroup create -n node1:z1,node2:z1 RG1
```

```
# clresourcegroup create -n node1:z1,node2:z1 RG2
```

- `+` Only one non-global zone per node is required.
- `+` Multiple WebSphere MQ instances have independent failover in separate failover resource groups.

EXAMPLE 3 Run multiple WebSphere MQ instances within separate failover resource groups and zones.

Create multiple failover resource groups that will each contain one WebSphere MQ instance in separate non-global zones across `node1` and `node2`.

```
# clresourcegroup create -n node1:z1,node2:z1 RG1
```

```
# clresourcegroup create -n node1:z2,node2:z2 RG2
```

- `+` Multiple WebSphere MQ instances have independent failover in separate failover resource groups and separate non-global zones.
- `+` All WebSphere MQ instances are isolated within their own separate non-global zones.

EXAMPLE 3 Run multiple WebSphere MQ instances within separate failover resource groups and zones.
(Continued)

- - Each resource group requires a unique non-global zone per node.

EXAMPLE 4 Run multiple WebSphere MQ instances in separate failover resource groups that contain separate failover zones across node1 and node2.

Create multiple failover resource groups that will each contain a failover zone. Each failover zone can then contain one or more WebSphere MQ instances.

```
# clresourcegroup create -n node1,node2 RG1
# clresourcegroup create -n node1,node2 RG2
```

- + Multiple WebSphere MQ instances have independent failover within separate failover resource groups and separate failover zones.
- + The same failover zone per resource group is used per node.
- + Each failover zone is only active on one node at a time.
- - Each resource group requires a unique failover zone per node.

Note – If your requirement is simply to make WebSphere MQ highly available you should consider choosing a global or non-global zone deployment over a failover zone deployment. Deploying WebSphere MQ within a failover zone will incur additional failover time to boot/halt the failover zone.

Configuration Requirements

The configuration requirements in this section apply only to Sun Cluster HA for WebSphere MQ.



Caution – If your data service configuration does not conform to these requirements, the data service configuration might not be supported.

Determine which Solaris zone WebSphere MQ will use

Solaris zones provides a means of creating virtualized operating system environments within an instance of the Solaris 10 OS. Solaris zones allow one or more applications to run in isolation from other activity on your system. For complete information about installing and configuring a Solaris Container, see *System Administration Guide: Solaris Containers-Resource Management and Solaris Zones*.

You must determine which Solaris zone WebSphere MQ will run in. WebSphere MQ can run within a global zone, non-global zone or in a failover zone configuration. [Table 2](#) provides some reasons to help you decide.

Note – WebSphere MQ can be deployed within the global zone, whole root non-global zone or whole root failover non-global zone, also referred to as a failover zone.

TABLE 2 Choosing the appropriate Solaris Zone for WebSphere MQ

Zone type	Reasons for choosing the appropriate Solaris Zone for WebSphere MQ
Global Zone	Only one instance of WebSphere MQ will be installed. Non-global zones are not required.
Non-global Zone	Several WebSphere MQ instances need to be consolidated and isolated from each other. Different versions of WebSphere MQ will be installed. Failover testing of WebSphere MQ between non-global zones on the same node is required.
Failover Zone	You require WebSphere MQ to run in the same zone regardless of which node the failover zone is running on.

Note – If your requirement is simply to make WebSphere MQ highly available you should consider choosing a global or non-global zone deployment over a failover zone deployment. Deploying WebSphere MQ within a failover zone will incur additional failover time to boot/halt the failover zone.

Requirements if multiple WebSphere MQ instances are deployed on cluster file systems.

If a cluster file system is being used for the WebSphere MQ files, it is possible to manually start the queue manager on one node of the cluster and at the same time to also manually start the same queue manager on another node of the cluster.

Note – Although it is possible, you should not attempt this as doing so will cause severe damage to the WebSphere MQ files.

Although it is expected that no-one will manually start the same queue manager on separate nodes of the cluster at the same time the Sun Cluster HA for WebSphere MQ provides a mechanism to prevent someone from doing so, albeit by mistake.

To prevent against this happening you must implement one of the following two solutions.

1. Use a highly available local file system for the WebSphere MQ files.

This is the recommended approach as the WebSphere MQ files would be mounted only on one node of the cluster at a time. This then limits starting the queue manager on only one node of the cluster at a time.

2. Create a symbolic link for `/opt/mqm/bin/strmqm` and `/opt/mqm/bin/endmqm` to `/opt/SUNWscmq/mgr/bin/check-start`.

`/opt/SUNWscmq/mgr/bin/check-start` provides a mechanism to prevent manually starting or stopping the queue manager, by verifying that the start or stop is being attempted by the Sun Cluster HA for WebSphere MQ data service.

`/opt/SUNWscmq/mgr/bin/check-start` will report the following error if an attempt to manually start or stop the queue manager.

```
$ strmqm qmgr1
$ Request to run </usr/bin/strmqm qmgr1> within Sun Cluster has been refused
```

If a cluster file system is used for the WebSphere MQ files, you must create a symbolic link for `strmqm` and `endmqm` to `/opt/SUNWscmq/mgr/bin/check-start` and inform the Sun Cluster HA for WebSphere MQ data service of this change.

To do this, you must perform the following on each node of the cluster.

```
# cd /opt/mqm/bin
#
# mv strmqm strmqm_sc3
# mv endmqm endmqm_sc3
#
# ln -s /opt/SUNWscmq/mgr/bin/check-start strmqm
# ln -s /opt/SUNWscmq/mgr/bin/check-start endmqm
```

After renaming `strmqm` and `endmqm` you must use these new program names (`strmqm_sc3` and `endmqm_sc3`) for the `START_CMD` and `STOP_CMD` variables when you edit the `/opt/SUNWscmq/mgr/util/mgr_config` file in [Step 7](#) in “[How to Register and Configure Sun Cluster HA for WebSphere MQ](#)” on page 28

Note – If you implement this workaround, then you must back it out whenever you need to apply any maintenance to WebSphere MQ. Afterwards, you must again apply this workaround.

Instead the recommended approach is to use a highly available local file system for the WebSphere MQ files.

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

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

1 Determine how many WebSphere MQ instances will be used.

Refer to “[Restriction for multiple WebSphere MQ instances](#)” on page 11 for more information.

2 Determine which Solaris zone to use.

Refer to “[Determine which Solaris zone WebSphere MQ will use](#)” on page 13 for more information.

3 If a zone will be used, create the whole root non-global zone or failover zone.

Refer to *System Administration Guide: Solaris Containers-Resource Management and Solaris Zones* for complete information about installing and configuring a zone.

Refer to *Sun Cluster Data Service for Solaris Containers Guide* for complete information about creating a failover zone.

4 If a non-global zone or failover zone is being used, ensure the zone is booted.

Repeat this step on all nodes of the cluster for a non-global zone and on one node of the cluster if a failover zone is being used.

Boot the zone if it is not running.

```
# zoneadm list -v
# zoneadm -z zonename boot
```

5 Determine how WebSphere MQ should be deployed in the cluster.

WebSphere MQ can be deployed onto a cluster file system or highly available file system on the cluster. The following discussion will help you determine the correct approach to take.

Within this section, a single instance or multiple instances of WebSphere MQ will be considered within a global zone, non-global zone, or failover zone.

In each scenario, file system options for `/var/mqm` and the WebSphere MQ files will be listed together with a recommendation.

a. Single Instance of WebSphere MQ

i. Global zone deployment

`/var/mqm`

Can be deployed on a cluster file system, highly available local file system or on local storage on each cluster node.

It is recommended to deploy `/var/mqm` on local storage on each cluster node.

`/var/mqm/qmgrs/queue-manager` and `/var/mqm/log/queue-manager`

Can be deployed on a cluster file system or highly available local file system.

It is recommended to deploy `/var/mqm/qmgrs/queue-manager` and

`/var/mqm/log/queue-manager` on highly available local file system.

ii. Non-global zone deployment

`/var/mqm`

Can be deployed on a highly available local file system or on non-global zone local storage on each cluster node.

It is recommended to deploy `/var/mqm` on non-global local storage on each cluster node.

`/var/mqm/qmgrs/queue-manager` and `/var/mqm/log/queue-manager`

Must be deployed on a highly available local file system.

iii. Failover zone deployment

If considering a failover zone, you must be aware that a failover zone will incur additional failover time to boot/halt the failover zone.

`/var/mqm`

Can be deployed on a highly available local file system or in failover zone's zonepath.

It is recommended to deploy `/var/mqm` on the failover zone's zonepath.

`/var/mqm/qmgrs/queue-manager` and `/var/mqm/log/queue-manager`

Must be deployed on a highly available local file system.

b. Multiple Instances of WebSphere MQ

i. Global zone deployment

`/var/mqm`

Can be deployed on a cluster file system or on local storage on each cluster node.

It is recommended to deploy `/var/mqm` on local storage on each cluster node.

`/var/mqm/qmgrs/queue-manager` and `/var/mqm/log/queue-manager`

Can be deployed on a cluster file system or highly available local file system.

It is recommended to deploy `/var/mqm/qmgrs/queue-manager` and

`/var/mqm/log/queue-manager` on highly available local file system.

ii. Non-global zone deployment

`/var/mqm`

Must be deployed on non-global zone local storage on each cluster node.

/var/mqm/qmgrs/queue-manager and */var/mqm/log/queue-manager*
Must be deployed on a highly available local file system.

iii. Failover zone deployment

If considering a failover zone, you must be aware that a failover zone will incur additional failover time to boot/halt the failover zone.

/var/mqm

Can be deployed on a highly available local file system or on failover zone's zonepath.

It is recommended to deploy */var/mqm* on the failover zone's zonepath.

/var/mqm/qmgrs/queue-manager and */var/mqm/log/queue-manager*
Must be deployed on a highly available local file system.

Note – Refer to [Appendix A](#) for Deployment Example: Installing a WebSphere MQ Queue Manager in Non-Global Zones and [Appendix B](#) for Deployment Example: Installing a WebSphere MQ Queue Manager in a Failover Zone for examples on how to set up the WebSphere MQ files.

6 Create a cluster file system or highly available local file system for the WebSphere MQ files.

Within this step you will create file systems for the WebSphere MQ files and */var/mqm*. Once you have determined how WebSphere MQ should be deployed in the cluster, you can choose one of the sub steps below.

- Create the WebSphere MQ files and */var/mqm* on cluster file systems by using [Step a](#).
- Create the WebSphere MQ files on SVM highly available local file systems and */var/mqm* on cluster file system by using [Step b](#).
- Create the WebSphere MQ files on ZFS highly available local file systems and */var/mqm* on local storage or within a failover zone's zonepath by using [Step c](#).

a. WebSphere MQ files and */var/mqm* on cluster file systems.

Within this deployment:

- The WebSphere MQ files are deployed on cluster file systems.
- The WebSphere MQ instances are *qmgr1* and *qmgr2*.
- */var/mqm* uses a cluster file system with a symbolic link for */var/mqm/qmgrs/@SYSTEM* to a local file (*/var/mqm_local/qmgrs/@SYSTEM*) on each node in the cluster.

Note – Refer to [Step d](#) for more information about setting up this symbolic link.

```
# ls -l /var/mqm
lrwxrwxrwx 1 root  other      11 Jan  8 14:17 /var/mqm ->
/global/mqm
#
# ls -l /global/mqm/qmgrs
```

```

total 6
lrwxrwxrwx  1 root    other          512 Dec 16 09:57 @SYSTEM ->
/var/mqm_local/qmgrs/@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

```

b. WebSphere MQ files on SVM highly available local file systems and /var/mqm on cluster file system.

Within this deployment:

- The WebSphere MQ files are deployed on SVM highly available local file systems.
- The WebSphere MQ instances are qmgr1 and qmgr2.
- /var/mqm uses a cluster file system with a symbolic link for /var/mqm/qmgrs/@SYSTEM to a local file (/var/mqm_local/qmgrs/@SYSTEM) on each node in the cluster.

Note – Refer to [Step d](#) for more information about setting up this symbolic link.

```

# ls -l /var/mqm
lrwxrwxrwx  1 root    other          512 Sep 17 16:53 /var/mqm ->
/global/mqm
#
# ls -l /global/mqm/qmgrs
total 6
lrwxrwxrwx  1 root    other          512 Sep 17 09:57 @SYSTEM ->
/var/mqm_local/qmgrs/@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_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 /local/mqm/qmgrs/qmgr1
ufs 4 no logging
/dev/md/dg_d4/dsk/d46 /dev/md/dg_d4/rdisk/d46 /local/mqm/log/qmgr1
ufs 4 no logging
/dev/md/dg_d5/dsk/d53 /dev/md/dg_d5/rdisk/d53 /local/mqm/qmgrs/qmgr2
ufs 4 no logging
/dev/md/dg_d5/dsk/d56 /dev/md/dg_d5/rdisk/d56 /local/mqm/log/qmgr2
ufs 4 no logging
```

c. WebSphere MQ files on ZFS highly available local file systems and /var/mqm on local storage or within a failover zone's zonepath.

Within this deployment:

- The WebSphere MQ files are deployed on ZFS highly available local file systems.
- The WebSphere MQ instances are qmgr1 and qmgr2.
- /var/mqm uses local storage on each cluster node or the zonepath of a failover zone.

As /var/mqm is on a local file system you must copy /var/mqm/mqs.ini from the node where the queue managers was created to all other nodes or zones in the cluster where the queue manager will run.

Note – Refer to [Step 10](#) for more information about copying /var/mqm/mqs.ini.

```
# df -k /var/mqm
Filesystem      kbytes  used  avail capacity  Mounted on
/                59299764 25657791 33048976   44%  /
#
# ls -l /var/mqm/qmgrs
total 6
drwxrwsr-x  2 mqm  mqm      512 Sep 11 11:42 @SYSTEM
lrwxrwxrwx  1 mqm  mqm      14 Sep 11 11:45 qmgr1 -> /ZFSwmq1/qmgrs
lrwxrwxrwx  1 mqm  mqm      14 Sep 11 11:50 qmgr2 -> /ZFSwmq2/qmgrs
#
# ls -l /var/mqm/log
total 4
lrwxrwxrwx  1 mqm  mqm      12 Sep 11 11:44 qmgr1 -> /ZFSwmq1/log
```

```

lrwxrwxrwx  1 mqm      mqm          12 Sep 11 11:54 qmgr2 -> /ZFSwmq2/log
#
# df -k /ZFSwmq1
Filesystem      kbytes    used    avail capacity  Mounted on
HAZpool1        4096453   13180  4083273     1%    /ZFSwmq1
#
# df -k /ZFSwmq2
Filesystem      kbytes    used    avail capacity  Mounted on
HAZpool2        4096453   13133  4083320     1%    /ZFSwmq2

```

d. Cluster file system is used for /var/mqm.

Within this deployment:

- If /var/mqm is placed on shared storage as a cluster file system, a symbolic link is made from /var/mqm/qmgrs/@SYSTEM to local file /var/mqm_local/qmgrs/@SYSTEM.
- You must perform this step on all nodes in the cluster *only* if /var/mqm is a cluster file system.

```

# mkdir -p /var/mqm_local/qmgrs/@SYSTEM
# mkdir -p /var/mqm/qmgrs
# ln -s /var/mqm_local/qmgrs/@SYSTEM /var/mqm/qmgrs/@SYSTEM

```

This restriction is required because WebSphere MQ uses keys to build internal control structures. Mounting /var/mqm as a cluster file system with a symbolic link for /var/mqm/qmgrs/@SYSTEM to a local file ensures that any derived shared memory keys are unique on each node.

If multiple queue managers are required and your queue manager was created before you setup a symbolic link for /var/mqm/qmgrs/@SYSTEM, you must copy the contents, with permissions, of /var/mqm/qmgrs/@SYSTEM to /var/mqm_local/qmgrs/@SYSTEM before creating the symbolic link.

You must stop all queue managers before doing this and perform this on each node of the cluster.

```

# mkdir -p /var/mqm_local/qmgrs/@SYSTEM
# cd /var/mqm/qmgrs
# cp -rp @SYSTEM/* /var/mqm_local/qmgrs/@SYSTEM
# rm -r @SYSTEM
# ln -s /var/mqm_local/qmgrs/@SYSTEM @SYSTEM

```

7 Mount the highly available local file system

Perform this step on one node of the cluster.

a. If a non ZFS highly available file system is being used for the WebSphere MQ files.

Ensure the node has ownership of the disk set or disk group.

For Solaris Volume Manager.

```
# metaset -s disk-set -t
```

For Veritas Volume Manager.

```
# vxdg -C import disk-group
# vxdg -g disk-group startall
```

i. If the global zone is being used for WebSphere MQ.

```
# mount websphere-mq-highly-available-local-file-system
```

ii. If a non-global zone or failover zone is being used for WebSphere MQ.

Create the mount point on all zones of the cluster that are being used for WebSphere MQ.

Mount the highly available local file system on one of the zones being used .

```
# zlogin zonename mkdir websphere-mq-highly-available-local-file-system
#
# mount -F lofs websphere-mq-highly-available-local-file-system \
> /zonepath/root/websphere-mq-highly-available-local-file-system
```

b. If a ZFS highly available file system is being used for WebSphere MQ.

```
# zpool export -f HAZpool
# zpool import -R /zonepath/root HAZpool
```

8 Install WebSphere MQ on all nodes or zones of the cluster.

After you have created and mounted the appropriate file systems for the WebSphere MQ files and `/var/mqm`, you must install WebSphere MQ on *each* node of the cluster, either in the global zone and/or the non-global zone or failover zone as required.

Follow the IBM *WebSphere MQ for Sun Solaris Quick Beginnings* manual to install WebSphere MQ.

9 Create the WebSphere MQ queue manager.

Follow the IBM *WebSphere MQ for Sun Solaris Quick Beginnings* manual to create a WebSphere MQ queue manager.

10 If a local file system is used for `/var/mqm` copy `/var/mqm/mqs.ini` to all nodes or zones of the cluster.

Within this deployment:

- If `/var/mqm/mqs.ini` is placed on local storage as a local file system, you must copy `/var/mqm/mqs.ini` from the node or zone where the queue manager was created to all other nodes or zones in the cluster where the queue manager will run.
- You must perform this step on all nodes or zones in the cluster *only* if `/var/mqm` is a local file system.

a. If the global zone is being used for WebSphere MQ.

```
# rcp /var/mqm/mqs.ini remote-node:/var/mqm/mqs.ini
```

- b. If a non-global zone or failover zone is being used for WebSphere MQ.

```
# rcp /zonepath/root/var/mqm/mqs.ini \
> remote-node:/zonepath/root/var/mqm/mqs.ini
```

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

This procedure does not verify that your application is highly available because you have not yet installed your data service.

Perform this procedure on one node or zone of the cluster unless a specific steps indicates otherwise.

- 1 **Ensure the zone is booted, if a non-global zone or failover zone is being used.**

Repeat this step on all nodes on the cluster for a non-global zone and on one node of the cluster if a failover zone is being used.

Boot the zone if it is not running.

```
# zoneadm list -v
# zoneadm -z zonename boot
```

- 2 **Login to the zone, if a non-global zone or failover zone is being used.**

```
# zlogin zonename
```

- 3 **Start the queue manager, create a persistent queue and put a test message to that queue.**

```
# su - mqm
$ strmqm queue-manager
$ runmqsc queue-manager
def ql(sc3test) defpsist(yes)
end
$
$ /opt/mqm/samp/bin/amqspout SC3TEST queue-manager
test test test test test
^C
```

- 4 **Stop the queue manager.**

```
$ endmqm -i queue-manager
$ exit
```

5 Logout from the zone, if a non-global zone or failover zone is being used.

```
# exit
```

6 Unmount the highly available local file system.

Perform this step in the global zone only.

You should unmount the highly available file system you mounted in [Step 7](#) in “How to Install and Configure WebSphere MQ” on page 16

a. If a non ZFS highly available local file system is being used for WebSphere MQ.

i. If the global zone is being used for WebSphere MQ.

```
# umount websphere-mq-highly-available-local-file-system
```

ii. If a non-global zone or failover zone is being used for WebSphere MQ.

Unmount the highly available local file system from the zone.

```
# umount /zonepath/root/websphere-mq-highly-available-local-file-system
```

b. If a ZFS highly available file system is being used for WebSphere MQ.

```
# zpool export -f HAZpool
```

7 Relocate the shared storage to other node.

Perform this step on another node of the cluster.

a. If a non ZFS highly available local file system is being used for the WebSphere MQ files.

Ensure the node has ownership of the disk set or disk group.

For Solaris Volume Manager.

```
# metaset -s disk-set -t
```

For Veritas Volume Manager.

```
# vxdg -C import disk-group
```

```
# vxdg -g disk-group startall
```

i. If the global zone is being used for WebSphere MQ.

```
# mount websphere-mq-highly-available-local-file-system
```

ii. If a non-global zone or failover zone is being used for WebSphere MQ.

Create the mount point on all zones of the cluster that are being used for WebSphere MQ.

Mount the highly available local file system on one of the zones being used .

```
# zlogin zonename mkdir websphere-mq-highly-available-local-file-system
```

```
#
```

```
# mount -F lofs websphere-mq-highly-available-local-file-system \
```



```
> /zonepath/root/websphere-mq-highly-available-local-file-system
```

b. If a ZFS highly available file system is being used for WebSphere MQ.

```
# zpool import -R /zonepath/root HAZpool
```

8 Login to the zone, if a non-global zone or failover zone is being used.

Perform this step on the other node of the cluster.

```
# zlogin zonename
```

9 Start the queue manager, get the test message and delete the queue.

Perform this step on the other node or zone of the cluster.

```
# su - mqm
$ strmqm queue-manager
$ /opt/mqm/samp/bin/amqsget SC3TEST queue-manager
^C
$ runmqsc queue-manager
delete ql(sc3test)
end
```

10 Stop the queue manager.

Perform this step on the other node or zone of the cluster.

```
$ endmqm -i queue-manager
$ exit
```

11 Logout from the zone, if a non-global zone or failover zone is being used.

```
# exit
```

12 Unmount the highly available local file system.

Perform this step in the global zone only.

You should unmount the highly available file system you mounted in [Step 7](#) in “[How to Install and Configure WebSphere MQ](#)” on page 16

a. If a non ZFS highly available local file system is being used for WebSphere MQ.

i. If the global zone is being used for WebSphere MQ.

```
# umount websphere-mq-highly-available-local-file-system
```

ii. If a non-global zone or failover zone is being used for WebSphere MQ.

Unmount the highly available local file system from the zone.

```
# umount /zonepath/root/websphere-mq-highly-available-local-file-system
```

b. If a ZFS highly available file system is being used for WebSphere MQ.

```
# zpool export -f HAZpool
```

13 Shutdown the zone, if a failover zone is being used.

Note – This step is *only* required if a failover zone is being used.

```
# zlogin zonename halt
```

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. To install the packages, use the Sun Java™ Enterprise System Installation Wizard.

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

Perform this procedure on each cluster node where you are installing the Sun Cluster HA for WebSphere MQ packages.

You can run the Sun Java Enterprise System Installation Wizard 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.

Note – Even if you plan to configure this data service to run in non-global zones, install the packages for this data service in the global zone. The packages are propagated to any existing non-global zones and to any non-global zones that are created after you install the packages.

Before You Begin Ensure that you have the Sun Java Availability Suite DVD-ROM.

If you intend to run the Sun Java Enterprise System Installation Wizard with a GUI, ensure that your DISPLAY environment variable is set.

1 On the cluster node where you are installing the data service packages, become superuser.

2 Load the Sun Java Availability Suite DVD-ROM into the DVD-ROM drive.

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

3 Change to the Sun Java Enterprise System Installation Wizard directory of the DVD-ROM.

- **If you are installing the data service packages on the SPARC® platform, type the following command:**

```
# cd /cdrom/cdrom0/Solaris_sparc
```

- **If you are installing the data service packages on the x86 platform, type the following command:**

```
# cd /cdrom/cdrom0/Solaris_x86
```

4 Start the Sun Java Enterprise System Installation Wizard.

```
# ./installer
```

5 When you are prompted, accept the license agreement.

If any Sun Java Enterprise System components are installed, you are prompted to select whether to upgrade the components or install new software.

6 From the list of Sun Cluster agents under Availability Services, select the data service for WebSphere MQ.

7 If you require support for languages other than English, select the option to install multilingual packages.

English language support is always installed.

8 When prompted whether to configure the data service now or later, choose Configure Later.

Choose Configure Later to perform the configuration after the installation.

9 Follow the instructions on the screen to install the data service packages on the node.

The Sun Java Enterprise System Installation Wizard displays the status of the installation. When the installation is complete, the wizard displays an installation summary and the installation logs.

10 (GUI only) If you do not want to register the product and receive product updates, deselect the Product Registration option.

The Product Registration option is not available with the CLI. If you are running the Sun Java Enterprise System Installation Wizard with the CLI, omit this step

11 Exit the Sun Java Enterprise System Installation Wizard.

12 Unload the Sun Java Availability Suite DVD-ROM from the DVD-ROM drive.

- To ensure that the DVD-ROM is not being used, change to a directory that does *not* reside on the DVD-ROM.**

- Eject the DVD-ROM.**

```
# eject cdrom
```

Next Steps See [“Registering and Configuring Sun Cluster HA for WebSphere MQ” on page 28](#) to register Sun Cluster HA for WebSphere MQ and to configure the cluster for the data service.

Registering and Configuring Sun Cluster HA for WebSphere MQ

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

Some procedures within this section require you to use certain Sun Cluster commands. Refer to the relevant Sun Cluster command man page for more information about these command and their parameters.

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

Determine if a single or multiple WebSphere MQ instances will be deployed.

Refer to [“Restriction for multiple WebSphere MQ instances” on page 11](#) to determine how to deploy a single or multiple WebSphere MQ instances.

Once you have determined how WebSphere MQ will be deployed, you can chose one or more of the steps below.

1 Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Resource Group.

Use [“How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Resource Group” on page 28](#) for Example 1, Example 2 and Example 3.

2 Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Zone.

Use [“How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Zone” on page 31](#) for Example 4.

▼ How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Resource Group

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” on page 26](#).

Note – Perform this procedure on one node of the cluster only.

1 On a cluster member, become superuser or assume a role that provides `solaris.cluster.modify RBAC` authorization.

2 Register the following resource types.

```
# clresourcetype register SUNW.HASStoragePlus
# clresourcetype register SUNW.gds
```

3 Create a failover resource group for WebSphere MQ.

Note – Refer to “[Restriction for multiple WebSphere MQ instances](#)” on page 11 for more information on the *nodelist* entry.

```
# clresourcegroup create -n nodelist websphere-mq-resource-group
```

4 Create a resource for the WebSphere MQ Logical Hostname.

```
# clreslogicalhostname create -g websphere-mq-resource-group \
> -h websphere-mq-logical-hostname \
> websphere-mq-logical-hostname-resource
```

5 Create a resource for the WebSphere MQ Disk Storage.**a. If a ZFS highly available local file system is being used.**

```
# clresource create -g websphere-mq-resource-group \
> -t SUNW.HASStoragePlus \
> -p Zpools=websphere-mq-zspool \
> websphere-mq-hastorage-resource
```

b. If a cluster file system or a non ZFS highly available local file system is being used.

```
# clresource create -g websphere-mq-resource-group \
> -t SUNW.HASStoragePlus \
> -p FilesystemMountPoints=websphere-mq-file-system-mountpoint \
> websphere-mq-hastorage-resource
```

6 Bring online the failover resource group for WebSphere MQ that now includes the Logical Hostname and Disk Storage resources.

```
# clresourcegroup online -M websphere-mq-resource-group
```

7 Create a resource for the WebSphere MQ queue manager.

Edit /opt/SUNWscmq/mgr/util/mgr_config and follow the comments within that file. After you have edited mgr_config, you must register the resource.

```
# cd /opt/SUNWscmq/mgr/util
# vi mgr_config
# ./mgr_register
```

The following deployment example has been taken from [Step 1 in Appendix A](#) and shows `/opt/SUNWscmq/mgr/util/mgr_config` that has been edited to configure a queue manager resource.

```
Vigor5# cat > /var/tmp/mgr1_config <<-EOF
# +++ Required parameters +++
RS=wmq1-qmgr
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
LSR_RS=
CLEANUP=YES
SERVICES=NO
USERID=mqm

# +++ Optional parameters +++
DB2INSTANCE=
ORACLE_HOME=
ORACLE_SID=
START_CMD=
STOP_CMD=

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=
PROJECT=default
TIMEOUT=300
EOF

Vigor5# /opt/SUNWscmq/mgr/util/mgr_register -f /var/tmp/mgr1_config
```

8 Enable the resource.

```
# clresource enable websphere-mq-resource
```

9 Create and register a resource for any other WebSphere MQ components.

Repeat this step for each WebSphere MQ component that is required.

Edit `/opt/SUNWscmq/xxx/util/xxx_config` and follow the comments within that file. Where `xxx` represents one of the following WebSphere MQ components:

```
chi      Channel Initiator
csv      Command Server
lsr      Listener
trm      Trigger Monitor
```

After you have edited `xxx_config`, you must register the resource.

```
# cd /opt/SUNWscmq/xxx/util/
# vi xxx_config
# ./xxx_register
```

The following deployment example has been taken from [Step 4 in Appendix A](#) and shows `/opt/SUNWscmq/lsr/util/lsr_config` that has been edited to configure a listener resource.

```
Vigor5# cat > /var/tmp/lsr1_config <<-EOF
# +++ Required parameters +++
RS=wmq1-lsr
RG=wmq1-rg
QMGR=qmgr1
PORT=1414
IPADDR=
BACKLOG=100
LH=wmq1-lh
QMGR_RS=wmq1-qmgr
USERID=mqm

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=
PROJECT=default
EOF

Vigor5# /opt/SUNWscmq/lsr/util/lsr_register -f /var/tmp/lsr1_config
```

10 Enable the WebSphere MQ component resources.

```
# clresource enable websphere-mq-resource
```

Next Steps See “[Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration](#)” on page 35

▼ How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Zone

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](#)” on page 26.

Note – Perform this procedure on one node of the cluster only.

1 Create a failover resource group for WebSphere MQ.

Follow steps 1, 2, 3, 4, 5 and 6 in “How to Register and Configure Sun Cluster HA for WebSphere MQ in a Failover Resource Group” on page 28.

2 Register the failover zone in the failover resource group for WebSphere MQ.

Refer to *Sun Cluster Data Service for Solaris Containers Guide* for complete information about failover zones.

Edit the `sczbt_config` file and follow the comments within that file. Ensure that you specify the `websphere-mq-resource-group` for the `RG=` parameter within `sczbt_config`.

After you have edited `sczbt_config`, you must register the resource.

```
# cd /opt/SUNWsczone/sczbt/util
# vi sczbt_config
# ./sczbt_register
```

The following deployment example has been taken from [Step 7 in Appendix B](#) and shows `/opt/SUNWsczone/sczbt/util/sczbt_config` that has been edited to configure a failover zone resource.

```
Vigor5# cat > /var/tmp/sczbt_config <<-EOF
RS=wmq3-FOZ
RG=wmq3-rg
PARAMETERDIR=/FOZones
SC_NETWORK=true
SC_LH=wmq3-lh
FAILOVER=true
HAS_RS=wmq3-SVMhas,wmq3-ZFShas

Zonename=z3
Zonebootopt=
Milestone=multi-user-server
Mounts="/ZFSwmq3/Log /ZFSwmq3/qmgrs"
EOF
Vigor5#
Vigor5# /opt/SUNWsczone/sczbt/util/sczbt_register -f /var/tmp/sczbt_config
```

3 Enable the failover zone resource

```
# clresource enable websphere-mq-failover-zone-resource
```


4 Create a resource for the WebSphere MQ queue manager resource

Edit `/opt/SUNWscmq3/mgr/util/mgr_config` and follow the comments within that file. Ensure that the `RS_ZONE` variable specifies the cluster resource for the failover zone. After you have edited `mgr_config`, you must register the resource.

```
# cd /opt/SUNWscmq3/mgr/util
# vi mgr_config
# ./mgr_register
```

The following deployment example has been taken from [Step 1 in Appendix B](#) and shows `/opt/SUNWscmq3/mgr/util/mgr_config` that has been edited to configure a queue manager resource within a failover zone resource.

```
Vigor5# cat > /var/tmp/mgr3_config <<-EOF
# +++ Required parameters +++
RS=wmq3-qmgr
RG=wmq3-rg
QMGR=qmgr3
LH=wmq3-lh
HAS_RS=wmq3-ZFShas
LSR_RS=
CLEANUP=YES
SERVICES=NO
USERID=mqm

# +++ Optional parameters +++
DB2INSTANCE=
ORACLE_HOME=
ORACLE_SID=
START_CMD=
STOP_CMD=

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=wmq3-FOZ
PROJECT=default
TIMEOUT=300
EOF
Vigor5#
Vigor5# /opt/SUNWscmq3/mgr/util/mgr_register -f /var/tmp/mgr1_config
```

5 Enable the WebSphere MQ resource.

```
# clresource enable websphere-mq-resource
```

6 Create and register a resource for any other WebSphere MQ components.

Repeat this step for each WebSphere MQ component that is required.

Edit `/opt/SUNWscmq/xxx/util/xxx_config` and follow the comments within that file. Where `xxx` represents one of the following WebSphere MQ components:

```
chi      Channel Initiator
csv      Command Server
lsr      Listener
trm      Trigger Monitor
```

Ensure that the `RS_ZONE` variable specifies the cluster resource for the failover zone. After you have edited `xxx_config`, you must register the resource.

```
# cd /opt/SUNWscmq/xxx/util
# vi xxx_config
# ./xxx_register
```

The following deployment example has been taken from [Step 4 in Appendix A](#) and shows a *modified* `/opt/SUNWscmq/lsr/util/lsr_config` that has been edited to configure a listener resource in a failover zone resource.

```
Vigor5# cat > /var/tmp/lsr3_config <<-EOF
# +++ Required parameters +++
RS=wmq3-lsr
RG=wmq3-rg
QMGR=qmgr3
PORT=1420
IPADDR=
BACKLOG=100
LH=wmq3-lh
QMGR_RS=wmq3-qmgr3
USERID=mqm

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=wmq3-FOZ
PROJECT=default
EOF

Vigor5# /opt/SUNWscmq/lsr/util/lsr_register -f /var/tmp/lsr3_config
```

7 Enable the WebSphere MQ component resources.

```
# clresource enable websphere-mq-resource
```

Next Steps See “[Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration](#)” on page 35

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

- 1 On a cluster member, become superuser or assume a role that provides `solaris.cluster.modify` RBAC authorization.

- 2 Ensure all the WebSphere MQ resources are online.

```
# cluster status
```

Enable any WebSphere MQ resources that are not online.

```
# clresource enable websphere-mq-resource
```

- 3 Switch the WebSphere MQ resource group to another cluster node or node:zone.

```
# clresourcegroup switch -n node[:zone] websphere-mq-resource-group
```

Upgrading Sun Cluster HA for WebSphere MQ

Upgrade the Sun Cluster HA for WebSphere MQ data service if the following conditions apply:

- You are upgrading from an earlier version of the Sun Cluster HA for WebSphere MQ data service.
- You need to use the new features of this data service.

▼ How to Migrate Existing Resources to a New Version of Sun Cluster HA for WebSphere MQ

Perform steps 1, 2, 3 and 6 if you have an existing Sun Cluster HA for WebSphere MQ deployment and wish to upgrade to the new version. Complete all steps if you need to use the new features of this data service.

- 1 On a cluster member, become superuser or assume a role that provides `solaris.cluster.modify` RBAC authorization.

2 Disable the WebSphere MQ resources.

```
# clresource disable websphere-mq-resource
```

3 Install the new version of Sun Cluster HA for WebSphere MQ to each cluster

Refer to “[How to Install the Sun Cluster HA for WebSphere MQ Packages](#)” on page 26 for more information.

4 Delete the WebSphere MQ resources, if you want to use new features that have been introduced in the new version of Sun Cluster HA for WebSphere MQ.

```
# clresource delete websphere-mq-resource
```

5 Reregister the WebSphere MQ resources, if you want to use new features that have been introduced in the new version of Sun Cluster HA for WebSphere MQ.

Refer to “[How to Register and Configure Sun Cluster HA for WebSphere MQ](#)” on page 28 for more information.

6 Enable the WebSphere MQ resources

If you have only performed steps 1, 2 and 3 you will need to re-enable the WebSphere MQ resources.

```
# clresource enable websphere-mq-resource
```

Understanding the Sun Cluster HA for WebSphere MQ Fault Monitor

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

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

Resource Properties

The 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

The Sun Cluster HA for WebSphere MQ fault monitor is controlled by the extension properties that control the probing frequency. The default values of these properties determine the preset behavior of the fault monitor. The preset behavior should be suitable for most Sun Cluster installations.

Therefore, you should tune the Sun Cluster HA for WebSphere MQ fault monitor *only* if you need to modify this preset behavior.

- Setting the interval between fault monitor probes (`Thorough_probe_interval`)
- Setting the time-out for fault monitor probes (`Probe_timeout`)
- Setting the number of times the fault monitor attempts to restart the resource (`Retry_count`)

The Sun Cluster HA for WebSphere MQ fault monitor checks the queue manager and other components within an infinite loop. During each cycle the fault monitor will check the relevant component and report either a failure or success.

If the fault monitor is successful it returns to its infinite loop and continues the next cycle of probing and sleeping.

If the fault monitor reports a failure a request is made to the cluster to restart the resource. If the fault monitor reports another failure another request is made to the cluster to restart the resource. This behavior will continue whenever the fault monitor reports a failure.

If successive restarts exceed the `Retry_count` within the `Thorough_probe_interval` a request to failover the resource group onto a different node or zone is made.

Operations of the queue manager probe

The WebSphere MQ queue manager probe checks the queue manager by using a program named `create_tdq` which is included in the Sun Cluster HA for WebSphere MQ data service.

The `create_tdq` program connects to the queue manager, creates a temporary dynamic queue, puts a message to the queue and then disconnects from the queue manager.

Operations of the channel initiator, command server, listener and trigger monitor probes

The WebSphere MQ probe for the channel initiator, command server, listener and trigger monitor all operate in a similar manner and will simply restart any component that has failed.

The process monitor facility will request a restart of the resource as soon as any component has failed.

The channel initiator, command server and trigger monitor are all dependent on the queue manager being available. The listener has an optional dependency on the queue manager that is set when the listener resource is configured and registered. Therefore if the queue manager fails the channel initiator, command server, trigger monitor and optional dependent listener will be restarted when the queue manager is available again.

Debug Sun Cluster HA for WebSphere MQ

▼ 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. It is possible to turn debug on for all WebSphere MQ instances or a particular WebSphere MQ instance.

A config file exists under `/opt/SUNWscmq/xxx/etc`, where `xxx` can be `mgr` (Queue Manager), `chi` (Channel Initiator), `csv` (Command Server), `lstr` (Listener) and `trm` (Trigger Monitor).

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

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`. Note that the output below, from `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
```

Restart the `syslog` daemon.

a. If running Solaris 9

```
# kill -1 syslogd
```

b. If running Solaris 10

```
# svcadm disable system-log
# svcadm enable system-log
```

2 Edit `/opt/SUNWscmq/xxx/etc/config`.

Perform this step for each component that requires debug output, on each node of Sun Cluster as required.

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

```
# cat /opt/SUNWscmq/mgr/etc/config
#
```

```
# Copyright 2006 Sun Microsystems, Inc. All rights reserved.  
# Use is subject to license terms.  
#  
##ident "@(#)config 1.2 06/03/08 SMI"  
#  
# Usage:  
#     DEBUG=<RESOURCE_NAME> or ALL  
#  
DEBUG=ALL
```

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

Deployment Example: Installing a WebSphere MQ Queue Manager in Non-Global Zones

This appendix presents a complete example of how to install and configure multiple WebSphere MQ queue managers in non-global zones. It presents a simple node cluster configuration. If you need to install the application in any other configuration, refer to the general-purpose procedures presented elsewhere in this manual.

Target Cluster Configuration

This example uses a single-node cluster with the following node and zone names:

- Vigor5 The physical node, which owns the file system.
- Vigor5:z1 A whole root non-global zone named z1.
- Vigor5:z2 A whole root non-global zone named z2.

Software Configuration

This deployment example uses the following software products and versions:

- Solaris 10 06/06 software for SPARC or x86 platforms
- Sun Cluster 3.2 core software
- Sun Cluster HA for WebSphere MQ data service
- WebSphere MQ v6 Solaris x86-64

This example assumes that you have already installed and established your cluster. It illustrates installation and configuration of the data service application only.

Assumptions

The instructions in this example were developed with the following assumptions:

- **Shell environment:** All commands and the environment setup in this example are for the Korn shell environment. If you use a different shell, replace any Korn shell-specific information or instructions with the appropriate information for your preferred shell environment.
- **User login:** Unless otherwise specified, perform all procedures as superuser or assume a role that provides `solaris.cluster.admin`, `solaris.cluster.modify`, and `solaris.cluster.read` RBAC authorization.

Installing and Configuring WebSphere MQ

Note – This deployment example is designed for a single-node cluster. It is provided simply as a concise guide to help you if you need to refer to an installation and configuration of WebSphere MQ.

This deployment example is *not* meant to be a precise guide to install and configure WebSphere MQ.

If you need to install WebSphere MQ in any other configuration, refer to the general purpose procedures elsewhere in this manual.

The instructions with this deployment example assumes that you are using the WebSphere MQ v6 Solaris x86–64 platform and will configure WebSphere MQ on a ZFS highly available local file system.

The cluster resource group will be configured to failover between two non-global zones on a single node cluster.

The tasks you must perform to install and configure WebSphere MQ in the non-global zones are as follows:

- “[Example: Prepare the Cluster for WebSphere MQ](#)” on page 42
- “[Example: Configure two Non-Global Zones](#)” on page 43
- “[Example: Install WebSphere MQ in the Non-Global Zones](#)” on page 45
- “[Example: Verify WebSphere MQ](#)” on page 46
- “[Example: Configure Cluster Resources for WebSphere MQ](#)” on page 47
- “[Example: Enable the WebSphere MQ Software to Run in the Cluster](#)” on page 48
- “[Example: Verify the Sun Cluster HA for WebSphere MQ Resource Group](#)” on page 49
- “[Example: Creating Multiple Instances](#)” on page 50

▼ Example: Prepare the Cluster for WebSphere MQ

Perform all steps within this example in the global zone.

- 1 **Install and configure the cluster as instructed in *Sun Cluster Software Installation Guide for Solaris OS*.**

Install the following cluster software components on node Vigor5.

- Sun Cluster core software
- Sun Cluster data service for WebSphere MQ

- 2 **Add the logical host name to `/etc/hosts` and `/etc/inet/ipnodes` in the global zone.**

The following output shows logical host name entries for `qmgr1`.

```
Vigor5# grep qmgr1 /etc/hosts /etc/inet/ipnodes
/etc/hosts:192.168.1.150 qmgr1
/etc/inet/ipnodes:192.168.1.150 qmgr1
```

- 3 **Install and configure a Zettabyte file system.**

Create two ZFS pools.

Note – The following `zpool` definitions represent a very basic configuration for deployment on a single-node cluster.

You should *not* consider this example for use within a productive deployment, instead it is a very basic configuration for testing or development purposes only.

```
Vigor5# zpool create -m /ZFSwmq1/Log HAZpool1 c1t1d0
Vigor5# zpool create -m /ZFSwmq1/qmgrs HAZpool2 c1t4d0
```

▼ Example: Configure two Non-Global Zones

Perform all steps within this example in the global zone.

- 1 **On local storage create a directory for the non-global zones root path.**

```
Vigor5# mkdir /zones
```

- 2 **Create a temporary file for the whole root zones, for example `/tmp/z1` and `/tmp/z2`, and include the following entries:**

```
Vigor5# cat > /tmp/z1 <<-EOF
create -b
set zonepath=/zones/z1
EOF
Vigor5# cat > /tmp/z2 <<-EOF
create -b
set zonepath=/zones/z2
EOF
```

3 Configure the non-global zones, using the files you created.

```
Vigor5# zonecfg -z z1 -f /tmp/z1
Vigor5# zonecfg -z z2 -f /tmp/z2
```

4 Install the zones.

Open two windows and issue the following command in each window.

```
Vigor5# zoneadm -z z1 install
Vigor5# zoneadm -z z2 install
```

5 Boot the zones.

Perform this step after the installation of the zones are complete.

```
Vigor5# zoneadm -z z1 boot
Vigor5# zoneadm -z z2 boot
```

6 Log in to the zones and complete the zone system identification.

```
Vigor5# zlogin -C z1
Vigor5# zlogin -C z2
```

7 Close the terminal window and disconnect from the zone consoles.

After you have completed the zone system identification, disconnect from the window your previously opened.

```
Vigo5# ~.
```

8 Create the appropriate mount points and symlinks for the queue manager in the zone.

```
Vigor5# zlogin z1 mkdir -p /var/mqm/log /var/mqm/qmgrs
Vigor5# zlogin z1 ln -s /ZFSwmq1/log /var/mqm/log/qmgr1
Vigor5# zlogin z1 ln -s /ZFSwmq1/qmgrs /var/mqm/qmgrs/qmgr1
Vigor5#
Vigor5# zlogin z2 mkdir -p /var/mqm/log /var/mqm/qmgrs
Vigor5# zlogin z2 ln -s /ZFSwmq1/log /var/mqm/log/qmgr1
Vigor5# zlogin z2 ln -s /ZFSwmq1/qmgrs /var/mqm/qmgrs/qmgr1
```

9 Create the WebSphere MQ userid in the zones.

```
Vigor5# zlogin z1 groupadd -g 1000 mqm
Vigor5# zlogin z1 useradd -u 1000 -g 1000 -d /var/mqm mqm
Vigor5#
Vigor5# zlogin z2 groupadd -g 1000 mqm
Vigor5# zlogin z2 useradd -u 1000 -g 1000 -d /var/mqm mqm
```

10 Add the logical host name to /etc/hosts and /etc/inet/ipnodes in the zones.

The following output shows the logical host name entry for qmgr1 in zones z1 and z2.

```
Vigor5# zlogin z1 grep qmgr1 /etc/hosts /etc/inet/ipnodes
192.168.1.150      qmgr1
```

```
Vigor5# zlogin z2 grep qmgr1 /etc/hosts /etc/inet/ipnodes
/etc/hosts:192.168.1.150    qmgr1
/etc/inet/ipnodes:192.168.1.150    qmgr1
```

▼ Example: Install WebSphere MQ in the Non-Global Zones

1 Mount the WebSphere MQ software in the zones.

Perform this step in the global zone.

In this example, the WebSphere MQ software has been copied to node Vigor5 in directory /export/software/ibm/wmqsv6 on .

```
Vigor5# zlogin z1 mkdir -p /var/tmp/software
Vigor5# zlogin z2 mkdir -p /var/tmp/software
Vigor5#
Vigor5# mount -F lofs /export/software /zones/z1/root/var/tmp/software
Vigor5# mount -F lofs /export/software /zones/z2/root/var/tmp/software
```

2 Mount the ZFS pools in the non-global zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool1
Vigor5# zpool export -f HAZpool2
Vigor5# zpool import -R /zones/z1/root HAZpool1
Vigor5# zpool import -R /zones/z1/root HAZpool2
```

3 Setup the ZFS file systems for user and group mqm

```
Vigor5# zlogin z1 chown -R mqm:mqm /ZFSwmq1
```

4 Login to each zone in two separate windows.

Perform this step from the global zone.

```
Vigor5# zlogin z1
Vigor5# zlogin z2
```

5 Install the WebSphere MQ software in each zone.

Perform this step within each new window you used to login to the zone.

```
# cd /var/tmp/software/ibm/wmqsv6
# ./mqlicense.sh
# pkgadd -d .
# exit
```

▼ Example: Verify WebSphere MQ

1 Create and start the queue manager.

Perform this step from the global zone.

```
Vigor5# zlogin z1
# su - mqm
$ crtmqm qmgr1
$ strmqm qmgr1
```

2 Create a persistent queue in each queue manager and put a message to the queue .

Perform this step in zone z1.

```
$ runmqsc qmgr1
def ql(sc3test) defpsist(yes)
end
$ /opt/mqm/samp/bin/amqsput SC3TEST qmgr1
test test test test test
^C
```

3 Stop the queue manager.

Perform this step in zone z1.

```
$ endmqm -i qmgr1
$ exit
# exit
```

4 Copy the mq.s.ini file between the two zones.

Perform this step in the global zone.

```
Vigor5# cp /zones/z1/root/var/mqm/mqs.ini /zones/z2/root/var/mqm/mqs.ini
```

5 Unmount and mount the ZFS file systems in the other zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool1
Vigor5# zpool export -f HAZpool2
Vigor5# zpool import -R /zones/z2/root HAZpool1
Vigor5# zpool import -R /zones/z2/root HAZpool2
```

6 Start the queue manager.

Perform this step from the global zone.

```
Vigor5# zlogin z2
# su - mqm
$ strmqm qmgr1
```

7 Get the messages from the persistent queue and delete the queue.

Perform this step in zone z2.

```
$ /opt/mqm/samp/bin/amqsget SC3TEST qmgr1
^C
$ runmqsc qmgr1
delete ql(sc3test)
end
```

8 Stop the queue manager.

Perform this step in zone z2.

```
$ endmqm -i qmgr1
$ exit
# exit
```

9 Unmount the ZFS file systems from the zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool1
Vigor5# zpool export -f HAZpool2
```

▼ Example: Configure Cluster Resources for WebSphere MQ

Perform all steps within this example in the global zone.

1 Register the required resource types.

```
Vigor5# clresourcetype register SUNW.HAStoragePlus
Vigor5# clresourcetype register SUNW.gds
```

2 Create the resource group.

```
Vigor5# clresourcegroup create -n Vigor5:z1,Vigor5:z2 wmq1-rg
```

3 Create the logical hosts.

```
Vigor5# clreslogicalhostname create -g wmq1-rg -h qmgr1 wmq1-lh
```

4 Create the HAStoragePlus resource in the wmq1-rg resource group.

```
Vigor5# clresource create -g wmq1-rg -t SUNW.HAStoragePlus \
> -p Zpools=HAZpool1,HAZpool2 wmq1-ZFShas
```

5 Enable the resource group.

```
Vigor5# clresourcegroup onLine -M wmq1-rg
```

▼ Example: Enable the WebSphere MQ Software to Run in the Cluster

Perform all steps within this example in the global zone.

1 Create the Sun Cluster HA for WebSphere MQ queue manager configuration file.

Either cat the following into `/var/tmp/mgr1_config` or edit `/opt/SUNWscmq/mgr/util/mgr_config` and execute `/opt/SUNWscmq/mgr/util/mgr_register`.

```
Vigor5# cat > /var/tmp/mgr1_config <<-EOF
# +++ Required parameters +++
RS=wmq1-qmgr
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-haZFS
LSR_RS=
CLEANUP=YES
SERVICES=NO
USERID=mqm

# +++ Optional parameters +++
DB2INSTANCE=
ORACLE_HOME=
ORACLE_SID=
START_CMD=
STOP_CMD=

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=
PROJECT=default
TIMEOUT=300
EOF
```

2 Register the Sun Cluster HA for WebSphere MQ queue manager resource.

```
Vigor5# /opt/SUNWscmq/mgr/util/mgr_register -f /var/tmp/mgr1_config
```

3 Enable the Sun Cluster HA for WebSphere MQ queue manager resource.

```
Vigor5# clresource enable wmq1-qmgr
```


4 Create the Sun Cluster HA for WebSphere MQ listener configuration file.

Either cat the following into `/var/tmp/lsr1_config` or edit `/opt/SUNWscmq/lsr/util/lsr_config` and execute `/opt/SUNWscmq/lsr/util/lsr_register`.

```
Vigor5# cat > /var/tmp/lsr1_config <<-EOF
# +++ Required parameters +++
RS=wmq1-lsr
RG=wmq1-rg
QMGR=qmgr1
PORT=1414
IPADDR=
BACKLOG=100
LH=wmq1-lh
QMGR_RS=wmq1-qmgr
USERID=mqm

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=
PROJECT=default
EOF
```

5 Register the Sun Cluster HA for WebSphere MQ listener resource.

```
Vigor5# /opt/SUNWscmq/lsr/util/lsr_register -f /var/tmp/lsr1_config
```

6 Enable the Sun Cluster HA for WebSphere MQ listener resource.

```
Vigor5# clresource enable wmq1-lsr
```

▼ Example: Verify the Sun Cluster HA for WebSphere MQ Resource Group

Perform this step in the global zone.

► Switch the WebSphere MQ resource group between the two non-global zones.

```
Vigor5# for node in Vigor5:z2 Vigor5:z1
do
    clrg switch -n $node wmq1-rg
    clrs status wmq1-qmgr
    clrs status wmq1-lsr
    clrg status wmq1-rg
done
```

▼ Example: Creating Multiple Instances

If another queue manager is required you can repeat the following tasks. However you must change the entries within that task to reflect your new queue manager.

- 1 Repeat the following steps from “Example: Prepare the Cluster for WebSphere MQ” on page 42.**
Step 2 and Step 3.
- 2 Repeat the following steps from “Example: Configure two Non-Global Zones” on page 43.**
Step 8 and Step 10.
- 3 Repeat the following steps from “Example: Install WebSphere MQ in the Non-Global Zones” on page 45.**
Step 2.
- 4 Repeat the following steps from “Example: Verify WebSphere MQ” on page 46.**
Step 1, Step 3, Step 4 and Step 9.
- 5 Repeat the following steps from “Example: Configure Cluster Resources for WebSphere MQ” on page 47.**
Step 2, Step 3, Step 4 and Step 5.
- 6 Repeat the following steps from “Example: Enable the WebSphere MQ Software to Run in the Cluster” on page 48.**
Step 1, Step 2 and Step 3.
Repeat as required for any WebSphere MQ component.

Deployment Example: Installing a WebSphere MQ Queue Manager in a Failover Zone

This appendix presents a complete example of how to install and configure a WebSphere MQ queue manager in a failover zone. It presents a simple node cluster configuration. If you need to install the application in any other configuration, refer to the general-purpose procedures presented elsewhere in this manual.

Target Cluster Configuration

This example uses a single-node cluster with the following node and zone names:

vigor5 The physical node, which owns the file system.

vigor5:z3 A whole root non-global zone named z3.

Software Configuration

This deployment example uses the following software products and versions:

- Solaris 10 06/06 software for SPARC or x86 platforms
- Sun Cluster 3.2 core software
- Sun Cluster HA for WebSphere MQ data service
- Sun Cluster HA for Solaris Containers data service
- WebSphere MQ v6 Solaris x86-64

This example assumes that you have already installed and established your cluster. It illustrates installation and configuration of the data service application only.

Assumptions

The instructions in this example were developed with the following assumptions:

- **Shell environment:** All commands and the environment setup in this example are for the Korn shell environment. If you use a different shell, replace any Korn shell-specific information or instructions with the appropriate information for your preferred shell environment.
- **User login:** Unless otherwise specified, perform all procedures as superuser or assume a role that provides `solaris.cluster.admin`, `solaris.cluster.modify`, and `solaris.cluster.read` RBAC authorization.

Installing and Configuring WebSphere MQ in a Failover Zone

Note – This deployment example is designed for a single-node cluster. It is provided simply as a concise guide to help you if you need to refer to an installation and configuration of WebSphere MQ.

This deployment example is *not* meant to be a precise guide to install and configure WebSphere MQ.

If you need to install WebSphere MQ in any other configuration, refer to the general purpose procedures elsewhere in this manual.

The instructions with this deployment example assumes that you are using the WebSphere MQ V6 Solaris x86-64 and will configure WebSphere MQ on a ZFS highly available local file system .

The failover zonepath cannot use a ZFS highly available local file system, instead the zonepath will use a SVM highly available local system.

The cluster resource group is simply brought online and is *not* failed over to another node as this deployment example is on a single node cluster.

The tasks you must perform to install and configure WebSphere MQ in the failover zone are as follows:

- [“Example: Prepare the Cluster for WebSphere MQ” on page 53](#)
- [“Example: Configure the Failover Zone” on page 54](#)
- [“Example: Install WebSphere MQ in the failover zone” on page 55](#)
- [“Example: Verify WebSphere MQ” on page 56](#)
- [“Example: Configure Cluster Resources for WebSphere MQ” on page 58](#)
- [“Example: Enable the WebSphere MQ Software to Run in the Cluster” on page 59](#)
- [“Example: Verify the Sun Cluster HA for WebSphere MQ resource group” on page 60](#)
- [“Example: Creating Multiple Instances” on page 60](#)

▼ Example: Prepare the Cluster for WebSphere MQ

- 1 **Install and configure the cluster as instructed in *Sun Cluster Software Installation Guide for Solaris OS*.**

Install the following cluster software components on node Vigor5.

- Sun Cluster core software
- Sun Cluster data service for WebSphere MQ
- Sun Cluster data service for Solaris Containers

- 2 **Add the logical host name to `/etc/hosts` and `/etc/inet/ipnodes` in the global zone and failover zone.**

The following output shows the logical host name entry for `qmgr3` in the global zone.

```
Vigor5# grep qmgr1 /etc/hosts /etc/inet/ipnodes
/etc/hosts:192.168.1.150    qmgr1
/etc/inet/ipnodes:192.168.1.150    qmgr1
```

- 3 **Install and configure a Zettabyte File System**

Note – The following `zpool` definition represents a very basic configuration for deployment on a single-node cluster.

You should *not* consider this example for use within a productive deployment, instead it is a very basic configuration for testing or development purposes only.

Create a ZFS pool

```
Vigor5# zpool create -m /ZFSwmq3/log HAZpool1 c1t1d0
Vigor5# zpool create -m /ZFSwmq3/qmgr HAZpool2 c1t4d0
```

- 4 **Install and Configure a Solaris Volume Manager File System**

Note – The following `metaset` definitions represent a very basic configuration for deployment on a single-node cluster.

You should *not* consider this example for use within a productive deployment, instead it is a very basic configuration for testing or development purposes only.

- a. **Create a SVM Disk Set.**

```
Vigor5# metaset -s dg_d1 -a -h Vigor5
```

- b. **Add a Disk to the SVM Disk Set**

```
Vigor5# metaset -s dg_d1 -a /dev/did/rdisk/d2
```

c. Add the Disk Information to the metainit utility input file

```
Vigor5# cat >> /etc/lvm/md.tab <<-EOF
dg_d1/d100      -m      dg_d1/d110
dg_d1/d110     1 1     /dev/did/rdisk/d2s0
EOF
```

d. Configure the metadevices

```
Vigor5# metainit -s dg_d1 -a
```

e. Create a Mount Point for the SVM Highly Available Local File System

```
Vigor5# mkdir /FOZones
```

f. Add the SVM highly available local file system to /etc/vfstab

```
Vigor5# cat >> /etc/vfstab <<-EOF
/dev/md/dg_d1/dsk/d100 /dev/md/dg_d1/rdisk/d100 /FOZones ufs 3 no logging
EOF
```

g. Create the File System

```
Vigor5# newfs /dev/md/dg_d1/rdisk/d100
```

h. Mount the File System

```
Vigor5# mount /FOZones
```

▼ Example: Configure the Failover Zone

In this task you will create a whole root failover non-global zone on node Vigor5.

1 Create a non-global zone to be used as the failover zone

```
Vigor5# cat > /tmp/z3 <<-EOF
create -b
set zonepath=/FOZones/z3
set autoboot=false
add inherit-pkg-dir
set dir=/opt/SUNWscmq
end
EOF
```

2 Configure the non-global failover zone, using the file you created.

```
Vigor5# zonecfg -z z3 -f /tmp/z3
```

3 Install the zones.

```
Vigor5# zoneadm -z z3 install
```

4 Boot the zone.

Perform this step after the installation of the zones are complete.

```
Vigor5# zoneadm -z z3 boot
```

5 Log in to the zone and complete the zone system identification.

Open another window and issue the following command.

```
Vigor5# zlogin -C z3
```

6 Disconnect from the zone console and close the terminal window.

After you have completed the zone system identification, disconnect from the zone and close the window you previously opened.

```
Vigo5# ~.
```

```
Vigo5# exit
```

7 Create the appropriate mount points and symlinks for WebSphere MQ in the zone.

```
Vigor5# zlogin z3 mkdir -p /var/mqm/log /var/mqm/qmgrs
```

```
Vigor5# zlogin z3 ln -s /ZFSwmq3/log /var/mqm/log/qmgr3
```

```
Vigor5# zlogin z3 ln -s /ZFSwmq3/qmgrs /var/mqm/qmgrs/qmgr3
```

8 Create the WebSphere MQ userid in the zone.

```
Vigor5# zlogin z3 groupadd -g 1000 mqm
```

```
Vigor5# zlogin z3 useradd -u 1000 -g 1000 -d /var/mqm mqm
```

9 Add the logical host name to /etc/hosts and /etc/inet/ipnodes in the zone

The following output shows logical host name entry for qmgr3 in zone z3 .

```
Vigor5# zlogin z3 grep qmgr3 /etc/hosts /etc/inet/ipnodes
```

```
/etc/hosts:192.168.1.152 qmgr3
```

```
/etc/inet/ipnodes:192.168.1.152 qmgr3
```

▼ Example: Install WebSphere MQ in the failover zone**1 Mount the WebSphere MQ software in the zones.**

In this example, the WebSphere MQ software has been copied to node Vigor5 in directory /export/software/ibm/wmqsv6.

```
Vigor5# zlogin z3 mkdir -p /var/tmp/software
```

```
Vigor5#
```

```
Vigor5# mount -F lofs /export/software /FOZzones/z3/root/var/tmp/software
```

2 Mount the ZFS pools in the zone.

```
Vigor5# zpool export -f HAZpool1
```

```
Vigor5# zpool export -f HAZpool2
```

```
Vigor5# zpool import -R /FOZones/z3/root HAZpool1
Vigor5# zpool import -R /FOZones/z3/root HAZpool2
```

3 Setup the ZFS file systems for user and group `mqm`

```
Vigor5# zlogin z3 chown -R mqm:mqm /ZFSwmq3
```

4 Login to the failover zone in a separate window.

```
Vigor5# zlogin z3
```

5 Install the WebSphere MQ software in the failover zone.

Perform this step within each new window you used to login to the zone.

```
# cd /var/tmp/softwareibm/wmqsv6
# ./mqlicense.sh
# pkgadd -d .
# exit
```

▼ Example: Verify WebSphere MQ

1 Create and start a queue manager.

Perform this step from the global zone.

```
Vigor5# zlogin z3
# su - mqm
$ crtmqm qmgr3
$ strmqm qmgr3
```

2 Create a persistent queue in the queue manager and put a message to the queue.

Perform this step in zone z3.

```
$ runmqsc qmgr3
def ql(sc3test) defpsist(yes)
end
$ /opt/mqm/samp/bin/amqspout SC3TEST qmgr3
test test test test test
^C
```

3 Stop the queue manager.

Perform this step in zone z3.

```
$ endmqm -i qmgr3
$ exit
# exit
```


4 Unmount and mount the ZFS file systems in the zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool1
Vigor5# zpool export -f HAZpool2
Vigor5# zpool import -R /FOZones/z3/root HAZpool1
Vigor5# zpool import -R /FOZones/z3/root HAZpool2
```

5 Start the queue manager.

Perform this step from the global zone.

```
Vigor5# zlogin z3
# su - mqm
$ strmqm qmgr3
```

6 Get the messages from the persistent queues in the queue manager and delete the queue.

Perform this step in zone z3.

```
$ /opt/mqm/samp/bin/amqsget SC3TEST qmgr3
^C
$ runmqsc qmgr3
delete ql(sc3test)
end
```

7 Stop the queue manager.

Perform this step in zone z3.

```
$ endmqm -i qmgr3
$ exit
# exit
```

8 Unmount the ZFS file systems from the other zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool1
Vigor5# zpool export -f HAZpool2
```

9 Halt the failover zone.

Perform this step in the global zone.

```
Vigor5# zoneadm -z z3 halt
```

10 Unmount the SVM zonepath.

Perform this step in the global zone.

```
Vigor5# umount -f /FOZones
```

▼ Example: Configure Cluster Resources for WebSphere MQ

1 Register the necessary data types on the single node cluster

```
Vigor5# clresourcetype register SUNW.HASStoragePlus
Vigor5# clresourcetype register SUNW.gds
```

2 Create the resource group.

```
Vigor5# clresourcegroup create -n Vigor5 wmq3-rg
```

3 Create the logical host.

```
Vigor5# clreslogicalhostname create -g wmq3-rg -h qmgr3 wmq3-lh
```

4 Create the SVM HASStoragePlus resource in the wmq3-rg resource group.

```
Vigor5# clresource create -g wmq3-rg -t SUNW.HASStoragePlus \
> -p FilesystemMountPoints=/FOZones wmq3-SVMhas
```

5 Create the ZFS HASStoragePlus resource in the wmq3-rg resource group.

```
Vigor5# clresource create -g wmq3-rg -t SUNW.HASStoragePlus \
> -p Zpools=HAZpool1,HAZpool2 wmq3-ZFSHas
```

6 Enable the resource group.

```
Vigor5# clresourcegroup online -M wmq3-rg
```

7 Create the Sun Cluster HA for Solaris Container Configuration file.

```
Vigor5# cat > /var/tmp/sczbt_config <<-EOF
RS=wmq3-FOZ
RG=wmq3-rg
PARAMETERDIR=/FOZones
SC_NETWORK=true
SC_LH=wmq3-lh
FAILOVER=true
HAS_RS=wmq3-SVMhas,wmq3-ZFSHas
```

```
Zonename=z3
Zonebootopt=
Milestone=multi-user-server
Mounts="/ZFSwmq3/Log /ZFSwmq3/qmgrs"
EOF
```

8 Register the Sun Cluster HA for Solaris Container data service.

```
Vigor5# /opt/SUNWsczone/sczbt/util/sczbt_register -f /var/tmp/sczbt_config
```

9 Enable the failover zone resource

```
Vigor5# clresource enable wmq3-FOZ
```

▼ Example: Enable the WebSphere MQ Software to Run in the Cluster

1 Create the Sun Cluster HA for WebSphere MQ queue manager configuration file.

```
Vigor5# cat > /var/tmp/mgr3_config <<-EOF
# +++ Required parameters +++
RS=wmq3-qmgr
RG=wmq3-rg
QMGR=qmgr3
LH=wmq3-lh
HAS_RS=wmq3-ZFShas
LSR_RS=
CLEANUP=YES
SERVICES=NO
USERID=mqm

# +++ Optional parameters +++
DB2INSTANCE=
ORACLE_HOME=
ORACLE_SID=
START_CMD=
STOP_CMD=

# +++ Failover zone parameters +++
# These parameters are only required when WebSphere MQ should run
# within a failover zone managed by the Sun Cluster Data Service
# for Solaris Containers.
RS_ZONE=wmq3-FOZ
PROJECT=default
TIMEOUT=300
EOF
```

2 Register the Sun Cluster HA for WebSphere MQ data service.

```
Vigor5# /opt/SUNWscmqsmgr/util/mgr_register -f /var/tmp/mgr3_config
```

3 Enable the resource.

```
Vigor5# clresource enable wmq3-qmgr
```

▼ Example: Verify the Sun Cluster HA for WebSphere MQ resource group

- ▶ Check the status of the WebSphere MQ resources.

```
Vigor5# clrs status wmq3-F0Z
Vigor5# clrs status wmq3-qmgr
Vigor5# clrg status wmq3-rg
```

▼ Example: Creating Multiple Instances

If another queue manager is required you can repeat the following tasks. However you must change the entries within that task to reflect your new queue manager.

- 1 Repeat the following steps from [“Example: Prepare the Cluster for WebSphere MQ” on page 53](#).
[Step 2](#) and [Step 3](#).
- 2 Repeat the following steps from [“Example: Configure the Failover Zone” on page 54](#).
[Step 7](#) and [Step 9](#).
- 3 Repeat the following steps from [“Example: Install WebSphere MQ in the failover zone” on page 55](#).
[Step 2](#).
- 4 Repeat the following steps from [“Example: Verify WebSphere MQ” on page 56](#).
[Step 1](#), [Step 3](#) and [Step 8](#).
- 5 Repeat the following steps from [“Example: Configure Cluster Resources for WebSphere MQ” on page 58](#).
[Step 3](#) and [Step 5](#).

After creating these resources you must enable them using `cl resource enable resource` before continuing with the next step.

- 6 Repeat the following steps from [“Example: Enable the WebSphere MQ Software to Run in the Cluster” on page 59](#).
[Step 1](#), [Step 2](#) and [Step 3](#).

Also repeat as required for any WebSphere MQ component.

Index

C

- clnode command, 8
- Command
 - clresourcetype command, 29
 - cluster command, 35
- commands
 - clreslogicalhostname, 16-23
 - clresource, 16-23
 - clresourcegroup, 16-23
 - clresourcetype, 16-23
 - node information, 8
- Configuration
 - Verifying the Installation and Configuration of WebSphere MQ, 23-26
 - WebSphere MQ files requirements, 14-15
- configuration requirements, 13-15
- configuration restrictions, 11-13

D

- deployment examples
 - WebSphere MQ in a failover zone, 51
 - WebSphere MQ packaged with Solaris 10, 41

E

- error messages, cluster, 8
- examples
 - WebSphere MQ in a failover zone, 51
 - WebSphere MQ packaged with Solaris 10, 41

F

- Fault Monitoring
 - Probing Algorithm and Functionality, 36-37
 - Resource Properties, 36
 - Understanding the Sun Cluster HA for WebSphere MQ
 - Fault Monitor, 36-37

G

- global zone, 26

H

- help, 8

I

- Installation, Verifying the Sun Cluster HA for WebSphere MQ Installation and Configuration, 35
- installing
 - Sun Cluster HA for WebSphere MQ, 26-27
 - WebSphere MQ, 16-23

L

- local zones, *See* non-global zones

M

messages file, 8

N

non-global zones, 26

O

overview

 installation, 10

 product, 9

P

packages, 26-27

prtconf -v command, 8

prtdiag -v command, 8

psrinfo -v command, 8

R

Resource Types, 29

restrictions, zones, 26

S

show-rev subcommand, 8

showrev -p command, 8

software packages, 26-27

Solaris zone Type, 13-14

Sun Cluster HA for WebSphere MQ

 installing, 26-27

 software packages

 installing, 26-27

T

technical support, 8

V

/var/adm/messages file, 8

Z

zones, 26