Oracle® Solaris Cluster Data Service for WebSphere Message Broker Guide

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Contents

Preface

Oracle Solaris Cluster Data Service for WebSphere Message Broker Guide explains how to install and configure Oracle Solaris Cluster HA for WebSphere Message Broker.

Note – This Oracle Solaris Cluster release supports systems that use the SPARC and x86 families of processor architectures: UltraSPARC, SPARC64, AMD64, and Intel 64. In this document, x86 refers to the larger family of 64-bit x86 compatible products. Information in this document pertains to all platforms unless otherwise specified.

This document is intended for system administrators with extensive knowledge of Oracle 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 Oracle Solaris Operating System and expertise with the volume-manager software that is used with Oracle Solaris Cluster software.

Using UNIX Commands

This document contains information about commands that are specific to installing and configuring Oracle Solaris 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 Oracle Solaris Operating System
- Oracle 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 .login file.
		Use ls -a to list all files.
		machine_name% you have mail.
AaBbCc123	What you type, contrasted with onscreen computer output	machine_name% **su**
		Password:
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is rm *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*.
		A *cache* is a copy that is stored locally.
		Do *not* 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 shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P–2 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	$
Bash shell, Korn shell, and Bourne shell for superuser	#
C shell	machine_name%
C shell for superuser	machine_name#

Related Documentation

Information about related Oracle Solaris Cluster topics is available in the documentation that is listed in the following table. All Oracle Solaris Cluster documentation is available at `http://docs.sun.com`.

Topic	Documentation
Data service administration	*Oracle Solaris Cluster Data Services Planning and Administration Guide*
	Individual data service guides
Concepts	*Oracle Solaris Cluster Concepts Guide*
Overview	*Oracle Solaris Cluster Overview*
Software installation	*Oracle Solaris Cluster Software Installation Guide*
System administration	*Oracle Solaris Cluster System Administration Guide*
Hardware administration	*Oracle Solaris Cluster 3.3 Hardware Administration Manual*
	Individual hardware administration guides
Data service development	*Oracle Solaris Cluster Data Services Developer's Guide*
Error messages	*Oracle Solaris Cluster Error Messages Guide*
Command and function reference	*Oracle Solaris Cluster Reference Manual*

For a complete list of Oracle Solaris Cluster documentation, see the release notes for your release of Oracle Solaris 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 – Oracle is not responsible for the availability of third-party web sites mentioned in this document. Oracle 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. Oracle 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

See the following web sites for additional resources:

- Documentation (http://docs.sun.com)
- Support (http://www.oracle.com/us/support/systems/index.html)
- Training (http://education.oracle.com) – Click the Sun link in the left navigation bar.

Oracle Welcomes Your Comments

Oracle welcomes your comments and suggestions on the quality and usefulness of its documentation. If you find any errors or have any other suggestions for improvement, go to http://docs.sun.com and click Feedback. Indicate the title and part number of the documentation along with the chapter, section, and page number, if available. Please let us know if you want a reply.

Oracle Technology Network (http://www.oracle.com/technetwork/index.html) offers a range of resources related to Oracle software:

- Discuss technical problems and solutions on the Discussion Forums (http://forums.oracle.com).
- Get hands-on step-by-step tutorials with Oracle By Example (http://www.oracle.com/technology/obe/start/index.html).
- Download Sample Code (http://www.oracle.com/technology/sample_code/index.html).

Getting Help

If you have problems installing or using Oracle Solaris 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 Oracle Solaris Operating System (for example, Oracle Solaris 10)
- The release number of Oracle Solaris Cluster (for example, Oracle Solaris Cluster 3.3)

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

Command	Function
prtconf -v	Displays the size of the system memory and reports information about peripheral devices
psrinfo -v	Displays information about processors
showrev –p	Reports which patches are installed
prtdiag -v	Displays system diagnostic information
/usr/cluster/bin/clnode show-rev	Displays Oracle Solaris Cluster release and package version information

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

1

Installing and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker

This chapter explains how to install and configure Oracle Solaris Cluster HA for WebSphere Message Broker.

This chapter contains the following sections.

Oracle Solaris Cluster HA for WebSphere Message Broker Overview

> **Note –** Throughout this document the term zone reflects a non-global Solaris zone. The term global zone will remain.

The Oracle Solaris Cluster HA for WebSphere Message Broker data service provides a mechanism for the orderly startup and shutdown, fault monitoring, and automatic failover of the WebSphere Message Broker service.

The following components can be protected by the Oracle Solaris Cluster HA for WebSphere Message Broker data service within the global zone or whole root zone.

```
Broker
Configuration Manager
UserNameServer
```

Overview of Installing and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker

The following table summarizes the tasks for installing and configuring Oracle Solaris Cluster HA for WebSphere Message Broker 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 1–1 Tasks for Installing and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker

Task	Instructions
Plan the installation	"Planning the Oracle Solaris Cluster HA for WebSphere Message Broker Installation and Configuration" on page 13
Install and configure the WebSphere Message Broker software	"How to Install and Configure WebSphere Message Broker" on page 18
Verify the installation and configuration	"How to Verify the Installation and Configuration of WebSphere Message Broker" on page 22
Install Oracle Solaris Cluster HA for WebSphere Message Broker packages	"How to Install the Oracle Solaris Cluster HA for WebSphere Message Broker Packages" on page 25
Register and configure Oracle Solaris Cluster HA for WebSphere Message Broker resources	"How to Register and Configure Oracle Solaris Cluster HA for WebSphere Message Broker" on page 28

TABLE 1–1 Tasks for Installing and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker *(Continued)*

Task	Instructions
Verify the Oracle Solaris Cluster HA for WebSphere Message Broker installation and configuration	"How to Verify the Oracle Solaris Cluster HA for WebSphere Message Broker Installation and Configuration" on page 32
Upgrade the Oracle Solaris Cluster HA for WebSphere Message Broker data service	"How to Upgrade to the New Version of Oracle Solaris Cluster HA for WebSphere Message Broker" on page 32
Tune the Oracle Solaris Cluster HA for WebSphere Message Broker fault monitor	"Understanding the Oracle Solaris Cluster HA for WebSphere Message Broker Fault Monitor" on page 33
Debug Oracle Solaris Cluster HA for WebSphere Message Broker	"How to turn on debug for Oracle Solaris Cluster HA for WebSphere Message Broker" on page 35

Planning the Oracle Solaris Cluster HA for WebSphere Message Broker Installation and Configuration

This section contains the information you need to plan your Oracle Solaris Cluster HA for WebSphere Message Broker installation and configuration.

Configuration Restrictions

The configuration restrictions in the subsections that follow apply only to Oracle Solaris Cluster HA for WebSphere Message Broker.

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

Restriction for the supported configurations of Oracle Solaris Cluster HA for WebSphere Message Broker

The Oracle Solaris Cluster HA for WebSphere Message Broker data service can only be configured as a failover service.

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

WebSphere Message Broker can be deployed in the global zone or a whole root zone. The See "Restriction for multiple WebSphere Message Broker instances" on page 15 for more information about deploying in a zone.

The Oracle Solaris Cluster HA for WebSphere Message Broker data service supports different versions of WebSphere Message Broker. Before proceeding with the installation of WebSphere

Message Broker you must check that the Oracle Solaris Cluster HA for WebSphere Message Broker data service has been verified against that version.

Restriction for the location of WebSphere Message Broker files

The WebSphere Message Broker files are the data files used by the broker in `/var/mqsi`. Within this document references will be made to the WebSphere Message Broker files which implies all of the contents of `/var/mqsi`, unless specified otherwise.

These WebSphere Message Broker files needs to be placed on shared storage as either a cluster file system or a highly available local file system. However, this placement will depend on how WebSphere Message Broker is being deployed, if a single or multiple instances are being deployed, and if that deployment will be in the global zone or zones.

Refer to Step 5 and Step 6 in "How to Install and Configure WebSphere Message Broker" on page 18 for a more information.

Restriction for the WebSphere Message Broker additional software

WebSphere Message Broker requires WebSphere MQ and a database.

If you are installing WebSphere Business Integration Message Broker v5, the Oracle Solaris Cluster HA for WebSphere Message Broker requires that the broker, queue manager and database are all registered within the same resource group. This implies that a remote database cannot be used for WebSphere Business Integration Message Broker v5.

This restriction is required because WebSphere Business Integration Message Broker v5 has very specific restart dependencies if the queue manager or database fails. More specifically, it is not possible for the cluster to manage the restart of a remote database that is outside of the cluster.

Table 1–2 describes the restart dependencies that the WebSphere Business Integration Message Broker v5 software has on additional software.

TABLE 1–2   WebSphere Business Integration Message Broker v5 restart dependencies

Failure	Intended Action	Actual Action
Broker	Broker Start	Solaris Cluster Broker resource restarted
Broker Queue Manager	Broker Stop	Solaris Cluster Queue Manager resource restarted
	Broker Queue Manager Start	Solaris Cluster Broker resource restarted
	Broker Start	

TABLE 1–2 WebSphere Business Integration Message Broker v5 restart dependencies   *(Continued)*

Failure	Intended Action	Actual Action
Broker Database	Broker Stop	Solaris Cluster Database resource restarted
	Broker Queue Manager Stop	Solaris Cluster Queue Manager resource restarted
	Broker Database Start	Solaris Cluster Broker resource restarted
	Broker Queue Manager Start	
	Broker Start	

If you are installing WebSphere Message Broker v6, the restart dependency for the broker database listed in Table 1–2 is no longer required. This implies that a remote database can be used for WebSphere Message Broker v6. WebSphere Message Broker and WebSphere MQ are still required to be registered within the same resource group.

Note – The broker database needs to be available for WebSphere Message Broker v6 to fully initialize. Therefore if you are deploying a remote broker database you must consider the availability of the broker database and the impact that can have on the broker if the broker database is not available.

Restriction for multiple WebSphere Message Broker instances

The Oracle Solaris Cluster HA for WebSphere Message Broker data service can support multiple WebSphere Message Broker instances, potentially with different versions.

If you intend to deploy multiple WebSphere Message Broker instances you will need to consider how you deploy WebSphere Message Broker in the global zone or whole root zones.

The purpose of the following discussion is to help you decide how to use the global zone or whole root zones to deploy multiple WebSphere Message Broker instances and then to determine what Nodelist entries are required.

The Nodelist entry is used when the resource group is defined using the clresourcegroup command. The Oracle Solaris Cluster HA for WebSphere Message Broker *must* use the same resource group that is used for the WebSphere MQ and database resources.

You must therefore determine how the WebSphere Message Broker will be deployed in the cluster *before* the WebSphere MQ resource group is created so that you can specify the appropriate Nodelist entry.

Within these examples:

- There are two nodes within the cluster, node1 and node2.
- Both nodes have two zones named z1 and z2.

- Each example listed simply shows the required `Nodelist` property value, via the `-n` parameter, which is used when creating a failover resource group.

- Benefits and drawbacks are listed within each example as `+` and `-`.

EXAMPLE 1–1　Run multiple WebSphere Message Broker instances in the global zone in one resource group.

Create a single failover resource group that will contain all the WebSphere Message Broker instances that will run in the global zones across `node1` and `node2`.

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

- `+` Only the global zone per node is required.

- `-` Multiple WebSphere Message Broker instances do not have independent failover as they are all within the same failover resource group.

- `-` Under normal operation, only one node of the cluster at any time is actively processing the WebSphere Message Broker workload.

EXAMPLE 1–2　Run multiple WebSphere Message Broker instances in the global zone in separate resource groups.

Create multiple failover resource groups that will each contain one WebSphere Message Broker instance that will run in the global zones across `node1` and `node2`.

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

- `+` Only the global zone per node is required.

- `+` Multiple WebSphere Message Broker instances have independent failover in separate failover resource groups.

- `+` Under normal operation, each node of the cluster is actively processing a WebSphere Message Broker workload, thereby utilizing each node of the cluster.

EXAMPLE 1–3　Run multiple WebSphere Message Broker instances in zones in one resource group.

Create a single failover resource group that will contain all the WebSphere Message Broker instances that will run in the same zones across `node1` and `node2`.

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

- `+` Only one zone per node is required.

- `-` Although all zones are booted, only one zone at any time is actively processing the WebSphere Message Broker workload.

- `-` Multiple WebSphere Message Broker instances do not have independent failover as they are all within the same failover resource group.

- `-` Multiple WebSphere Message Broker instances are not isolated within their own separate zones.

EXAMPLE 1–4   Run multiple WebSphere Message Broker instances in zones in separate resource groups.

Create multiple zones, where each zone pair will contain just one WebSphere Message Broker instance that will run in the same zones across node1 and node2.

```
# clresourcegroup create -n node1:z1,node2:z1 RG1
# clresourcegroup create -n node2:z2,node1:z2 RG2
```

- + Multiple WebSphere Message Broker instances have independent failover in separate failover resource groups and separate zones.
- + All WebSphere Message Broker instances are isolated within their own separate zones.
- - Each resource group requires a unique zone per node.

Configuration Requirements

The configuration requirements in this section apply only to Oracle Solaris Cluster HA for WebSphere Message Broker.

> ⚠ **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 Message Broker 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: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones*.

You must determine which Solaris zone WebSphere Message Broker will run in. WebSphere Message Broker can run within a global zone or zone configuration. Table 1–3 provides some reasons to help you decide which zone is appropriate.

TABLE 1–3   Choosing the appropriate Solaris zone for WebSphere Message Broker

Zone type	Reasons for choosing the appropriate Solaris Zone for WebSphere Message Broker
Global Zone	Only one instance of WebSphere Message Broker will be installed.
	You are upgrading your cluster where previously a single or multiple WebSphere Message Broker instances were deployed on the cluster nodes.
	Zones are not required.

TABLE 1–3   Choosing the appropriate Solaris zone for WebSphere Message Broker   *(Continued)*

Zone type	Reasons for choosing the appropriate Solaris Zone for WebSphere Message Broker
Non-global Zone	Multiple WebSphere Message Broker instances need to be consolidated and isolated from each other.
	Different versions of WebSphere Message Broker will be installed.
	Failover testing of WebSphere Message Broker between zones on a single node cluster is required.

Installing and Configuring WebSphere Message Broker

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

▼ How to Install and Configure WebSphere Message Broker

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

1   Determine how many WebSphere Message Broker instances will be used.

Refer to "Restriction for multiple WebSphere Message Broker instances" on page 15 for more information.

2   Determine which Solaris zone to use.

Refer to "Determine which Solaris zone WebSphere Message Broker will use" on page 17 for more information.

3   If a zone will be used, create the whole root zone.

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

Note – When creating a zone for use by the cluster, autoboot=true must be used.

---

4   If a zone is being used, ensure the zone is booted.

Repeat this step on all nodes of the cluster if a zone is being used.

Boot the zone if it is not running.

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

5   Determine how WebSphere Message Broker should be deployed in the cluster.

The WebSphere Message Broker files can be deployed onto a cluster file system or highly available file system in 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 Message Broker will be considered within a global zone or zone.

In each scenario, file system options for the WebSphere Message Broker files (`/var/mqsi`) will be listed together with a recommendation where appropriate.

a.   Single Instance of WebSphere Message Broker

i.   Global zone deployment

`/var/mqsi`   Can be deployed on a cluster file system, however you are recommend to deploy on a highly available local file system.

ii.   Zone deployment

`/var/mqsi`   Must be deployed on a highly available local file system.

b.   Multiple Instances of WebSphere Message Broker

i.   Global zone deployment

`/var/mqsi`   Must be deployed on a cluster file system.

ii.   Zone deployment

`/var/mqsi`   Must be deployed on a highly available local file system.

Note – Refer to Appendix A, "Deployment Example: Installing WebSphere Message Broker in Zones," for Deployment Example: Installing a WebSphere Message Broker in zones for an example on how to set up the WebSphere Message Broker files.

---

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

Within this step you will create a file system for the WebSphere Message Broker files (`/var/mqsi`). Once you have determined how WebSphere Message Broker should be deployed in the cluster, you can choose one of the sub steps below.

- Create the WebSphere Message Broker files on a cluster file system by using Step a.

- Create the WebSphere Message Broker files on a highly available local file systems by using Step b.

a.   WebSphere Message Broker files on a cluster file system.

Within this deployment:

- The WebSphere Message Broker files (`/var/mqsi`) are deployed on a cluster file system.

- However, `/var/mqsi/local` or `/var/mqsi/common/local` requires a symbolic link to a local file system. This is required as WebSphere Message Broker generates specific locks that require the locks directory to be located on local storage within each node.

   If WebSphere Business Integration Message Broker v5 is being deployed you must create a symbolic link for `/var/mqsi/locks` to a local file system, e.g. `/local/mqsi/locks` on each node in the cluster.

   If WebSphere Message Broker v6 is being deployed you must create a symbolic link for `/var/mqsi/common/locks` to a local file system, e.g. `/local/mqsi/locks` on each node in the cluster.

b. WebSphere Message Broker files on a highly available local file system.

Within this deployment:

- The WebSphere Message Broker files (`/var/mqsi`) are deployed on a highly available local file system.

- Highly available local file systems can include the Zettabyte File System (ZFS).

- A symbolic link for the `locks` directory is *not* required, regardless if you are deploying WebSphere Business Integration Message Broker v5 or WebSphere Message Broker v6.

7 Mount the highly available local file system

Perform this step on one node of the cluster.

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

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 Message Broker.

```
# mount websphere-message-broker-highly-available-local-file-system
```

ii. If a zone is being used for WebSphere Message Broker.

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

zlogin *zonename* **mkdir** *websphere-message-broker-highly-available-local-file-system*

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

```
# mount -F lofs websphere-message-broker-highly-available-local-file-system \
> /zonepath/root/websphere-message-broker-highly-available-local-file-system
```

b. If a ZFS highly available local file system is being used for WebSphere Message Broker.

i. If the global zone is being used for WebSphere Message Broker.

zpool import -R / *HAZpool*

ii. If a zone is being used for WebSphere Message Broker.

zpool import -R */zonepath/***root** *HAZpool*

Note – If you are repeating this step to mount the ZFS highly available local file system on another node or zone *before* installing the WebSphere Message Broker software, you must first export the ZFS pool from the node that currently has the ZFS pool imported.

To export the ZFS pool, issue the following,

zpool export -f *HAZpool*

---

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

After you have created and mounted the appropriate file system for the WebSphere Message Broker files, you must install WebSphere Message Broker on *each* node of the cluster, either in the global zone or zone as required.

For compatibility reasons, the Oracle Solaris Cluster HA for WebSphere Message Broker data service requires that /opt/mqsi exists on all nodes or zones in the cluster, even if WebSphere Message Broker v6 is being deployed. Therefore you *must* create the directory /opt/mqsi.

Follow *IBM's WebSphere Message Broker Installation Guide* to install WebSphere Message Broker.

Note – If the WebSphere Message Broker files will use a highly available local file system, you will need to mount the highly available local file system on each node or zone *before* installing the WebSphere Message Broker software.

Repeat as required.

---

9   **Ensure that WebSphere MQ and the appropriate database are running.**

WebSphere Message Broker requires that a queue manager and appropriate database are running when creating a Broker, Configuration Manager or UserNameServer. You must ensure that the queue manger and database are running on the node where you will create a Broker, Configuration Manager or UserNameServer.

10   **Create the WebSphere Message Broker, Configuration Manager or UserNameServer as required.**

Follow *IBM's WebSphere Message Broker Installation Guide* to create a WebSphere Message Broker.

Verifying the Installation and Configuration of WebSphere Message Broker

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

▼ How to Verify the Installation and Configuration of WebSphere Message Broker

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 step indicates otherwise.

1   **Ensure the zone is booted, if a zone is being used.**

Repeat this step on all nodes on the cluster if a 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 zone is being used.**
```
# zlogin zonename
```

3   **Start the WebSphere Message Broker, Configuration Manager or UserNameServer.**
```
# su - message-broker-userid
$ mqsistart message-broker
```

4   List all WebSphere Message Brokers that are running.

Perform this step as the *message-broker-userid*.

$ **mqsilist**

5   Stop the WebSphere Message Broker, Configuration Manager or UserNameServer.

Perform this step as the *message-broker-userid*.

$ **mqsistop -i** *message-broker*
$ **exit**

6   Logout from the zone, if a zone is being used.

exit

7   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 Message Broker" on page 18

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

i.   If the global zone is being used for WebSphere Message Broker.

umount *websphere-message-broker-highly-available-local-file-system*

ii.   If a zone is being used for WebSphere Message Broker.

Unmount the highly available local file system from the zone.

umount /zonepath**/root/**websphere-message-broker-highly-available-local-file-system

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

zpool export -f *HAZpool*

8   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 Message Broker 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 Message Broker.**

```
# mount websphere-message-broker-highly-available-local-file-system
```

ii. **If a zone is being used for WebSphere Message Broker.**

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

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

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

b. **If a ZFS highly available file system is being used for WebSphere Message Broker.**

i. **If the global zone is being used for WebSphere Message Broker.**

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

ii. **If a zone is being used for WebSphere Message Broker.**

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

9 **Login to the zone, if a zone is being used.**

Perform this step on the other node of the cluster.

```
# zlogin zonename
```

10 **Start the WebSphere Message Broker, Configuration Manager or UserNameServer.**

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

```
# su - message-broker-userid
$ mqsistart message-broker
```

11 **List all WebSphere Message Brokers that are running.**

Perform this step as the *message-broker-userid*.

```
$ mqsilist
```

12 **Stop the WebSphere Message Broker, Configuration Manager or UserNameServer.**

Perform this step as the *message-broker-userid*.

```
$ mqsistop -i message-broker
$ exit
```

13   Logout from the zone, if a zone is being used.

```
# exit
```

14   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 Message Broker" on page 18

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

i.   If the global zone is being used for WebSphere Message Broker.

```
# umount websphere-message-broker-highly-available-local-file-system
```

ii.   If a zone is being used for WebSphere Message Broker.

Unmount the highly available local file system from the zone.

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

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

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

Installing the Oracle Solaris Cluster HA for WebSphere Message Broker Packages

If you did not install the Oracle Solaris Cluster HA for WebSphere Message Broker packages during your initial Oracle Solaris Cluster installation, perform this procedure to install the packages. To install the packages, use the installer program.

Note – You need to install the Oracle Solaris Cluster HA for WebSphere Message Broker packages in the global cluster and not in the zone cluster.

▼ How to Install the Oracle Solaris Cluster HA for WebSphere Message Broker Packages

Perform this procedure on each cluster node where you are installing the Oracle Solaris Cluster HA for WebSphere Message Broker packages.

You can run the installer program with a command-line interface (CLI) or with a graphical user interface (GUI). The content and sequence of instructions in the CLI and the GUI are similar.

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 Oracle Solaris Cluster installation media.

If you intend to run the installer program 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 Oracle Solaris Cluster installation media 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 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 installation wizard.**
   ```
   # ./installer
   ```

5. **When you are prompted, accept the license agreement.**

6. **From the list of Oracle Solaris Cluster agents under Availability Services, select the data service for WebSphere Message Broker.**

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 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 installation wizard with the CLI, omit this step.

11 **Exit the installation wizard.**

12 **Unload the installation media from the DVD-ROM drive.**

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

b. **Eject the DVD-ROM.**

```
# eject cdrom
```

Next Steps   See "Registering and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker" on page 27 to register Oracle Solaris Cluster HA for WebSphere Message Broker and to configure the cluster for the data service.

Registering and Configuring Oracle Solaris Cluster HA for WebSphere Message Broker

This section contains the procedures you need to configure Oracle Solaris Cluster HA for WebSphere Message Broker.

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

The Oracle Solaris Cluster HA for WebSphere Message Broker data service

▼ How to Register and Configure Oracle Solaris Cluster HA for WebSphere Message Broker

Perform this procedure on one node of the cluster only.

This procedure assumes that you installed the data service packages during your initial Oracle Solaris Cluster installation.

If you did not install the Oracle Solaris Cluster HA for WebSphere Message Broker packages as part of your initial Oracle Solaris Cluster installation, go to "How to Install the Oracle Solaris Cluster HA for WebSphere Message Broker Packages" on page 25.

Note – This procedure requires that WebSphere MQ and a broker database have been installed and that the Oracle Solaris Cluster HA for WebSphere MQ data service and database data service have been registered and configured.

The registration and configuration of Oracle Solaris Cluster HA for WebSphere Message Broker must use the same resource group that WebSphere MQ and the broker database use.

You must therefore have completed the installation of the Oracle Solaris Cluster Data Service for WebSphere MQ data service and the database data service before continuing with this procedure.

---

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

2   **Create a resource for the WebSphere Message Broker Disk Storage.**

    a. **If a ZFS highly available local file system is being used.**

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

    Alternatively, you can simply add the *websphere-message-broker-zspool* to the existing *websphere-mq-hastorage-resource*.

```
# clresource set \
> -p Zpools=websphere-mq-zspools,websphere-message-broker-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.HAStoragePlus \
> -p FilesystemMountPoints=websphere-message-broker-filesystem-mountpoint \
> websphere-message-broker-hastorage-resource
```

Alternatively, you can simply add the *websphere-message-broker-filesystem-mountpoint* to the existing *websphere-mq-hastorage-resource*.

```
# clresource set \
> -p FilesystemMountPoints=mq-filesystem-mountpoints,message-broker-filesystem-mountpoint \
> websphere-mq-hastorage-resource
```

3   Enable the Disk Storage resource.

```
# clresource enable websphere-message-broker-hastorage-resource
```

4   Create and register a resource for the Broker.

Edit /opt/SUNWscmqi/sib/util/sib_config and follow the comments within that file. After you have edited sib_config, you must register the resource.

If you require the broker probe to perform a simple message flow test, you must create a message flow and specify the *inbound* queue in the SC3_IN variable and the *outbound* queue in the SC3_OUT variable.

Refer to IBM's *WebSphere Message Broker Message Flows* to create a simple message flow.

Alternatively, the default values for SC3_IN and SC3_OUT are set to NONE which will cause the broker probe to not perform a simple message flow and just check that the bipservice program is running.

A value for the RDBMS_RS parameter is not required if WebSphere Message Broker v6 is being deployed. This implies that a remote database can be used for WebSphere Message Broker v6 and that the broker does not need to be restarted if the broker database is restarted.

```
# cd /opt/SUNWscmqi/sib/util
# vi sib_config
# ./sib_register
```

The following listing has been taken from the deployment example, Step 2, which can be found in Appendix A, "Deployment Example: Installing WebSphere Message Broker in Zones," and shows /opt/SUNWscmqi/sib/util/sib_config that has been edited to configure a broker resource.

```
Vigor5# cat > /var/tmp/brk_config <<-EOF
RS=wmq1-brk
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
SC3_IN=NONE
SC3_OUT=NONE
MQSI_ID=mqsiuser
BROKER=brk
QMGR_RS=wmq1-qmgr
RDBMS_RS=
START_CMD=
```

```
STOP_CMD=
EOF

Vigor5# /opt/SUNWscmqi/sib/util/sib_register -f /var/tmp/brk_config
```

5   Enable the Broker resource.

Note – Before you enable the Broker resource, ensure that /opt/mqsi exists.

For compatibility reasons, the Oracle Solaris Cluster HA for WebSphere Message Broker data service requires that /opt/mqsi exists on all nodes or zones in the cluster.

```
# clresource enable webspheremessagebrokerresource
```

6   (Optional) Create and register a resource for the Configuration Manager.

Edit /opt/SUNWscmqi/sib/util/sib_config and follow the comments within that file. After you have edited sib_config, you must register the resource.

The configuration manager resource *must* specify NONE for the SC3_IN and SC3_OUT variables.

A value for the RDBMS_RS parameter is not required if WebSphere Message Broker v6 Configuration Manager is being deployed.

```
# cd /opt/SUNWscmqi/sib/util
# vi sib_config
# ./sib_register
```

The following listing has been taken from the deployment example, Step 4, which can be found in Appendix A, "Deployment Example: Installing WebSphere Message Broker in Zones," and shows /opt/SUNWscmqi/sib/util/sib_config that has been edited to configure a configuration manager resource.

```
Vigor5# cat > /var/tmp/cmg_config <<-EOF
RS=wmq1-cmg
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
SC3_IN=NONE
SC3_OUT=NONE
MQSI_ID=mqsiuser
BROKER=cmg
QMGR_RS=wmq1-qmgr
RDBMS_RS=
START_CMD=
STOP_CMD=
EOF

Vigor5# /opt/SUNWscmqi/sib/util/sib_register -f /var/tmp/cmg_config
```

7   (Optional) Enable the Configuration Manager resource.

```
# clresource enable websphere-message-broker-configuration-manager-resource
```

8   (Optional) Create and register a resource for the UserNameServer.

Edit /opt/SUNWscmqi/siu/util/siu_config and follow the comments within that file. After you have edited siu_config, you must register the resource.

```
# cd /opt/SUNWscmqi/siu/util
# vi siu_config
# ./siu_register
```

The following listing has been taken from the deployment example, Step 6, which can found in Appendix A, "Deployment Example: Installing WebSphere Message Broker in Zones," and shows /opt/SUNWscmqi/siu/util/siu_config that has been edited to configure a UserNameServer resource.

```
Vigor5# cat > /var/tmp/cmg_config <<-EOF
RS=wmq1-uns
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
MQSI_ID=mqsiuser
QMGR_RS=wmq1-qmgr
START_CMD=
STOP_CMD=
EOF

Vigor5# /opt/SUNWscmqi/siu/util/siu_register -f /var/tmp/uns_config
```

9   (Optional) Enable the UserNameServer resource.

```
# clresource enable websphere-message-broker-usernameserver-resource
```

Verifying the Oracle Solaris Cluster HA for WebSphere Message Broker 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 Oracle Solaris Cluster HA for WebSphere Message Broker 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 Message Broker resources are online.

```
# cluster status
```

Enable any WebSphere Message Broker resources that are not online.

```
# clresource enable websphere-message-broker-resource
```

3   Switch the WebSphere Message Broker resource group to another cluster node or node:zone.

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

Upgrading Oracle Solaris Cluster HA for WebSphere Message Broker

Upgrade the Oracle Solaris Cluster HA for WebSphere Message Broker data service if the following conditions apply:

■ You are upgrading from an earlier version of the Oracle Solaris Cluster HA for WebSphere Message Broker data service, that was previously known as Oracle Solaris Cluster HA for WebSphere MQ Integrator.

■ You need to use the new features of this data service.

▼ How to Upgrade to the New Version of Oracle Solaris Cluster HA for WebSphere Message Broker

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

Note – If you intend to run all steps, you should consider if your current WebSphere Message Broker resources have been modified to have specific timeout values that suit your deployment. If timeout values were previously adjusted you should reapply those timeout values to your new WebSphere Message Broker resources.

---

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

2. **Disable the WebSphere Message Broker resources.**

   ```
   # clresource disable  websphere-messabge-broker-resource
   ```

3. **Install the new version of Oracle Solaris Cluster HA for WebSphere Message Broker to each cluster**

   Refer to "How to Install the Oracle Solaris Cluster HA for WebSphere Message Broker Packages" on page 25 for more information.

4. **Delete the WebSphere Message Broker resources, if you want to use new features that have been introduced in the new version of Oracle Solaris Cluster HA for WebSphere Message Broker.**

   ```
   # clresource delete  websphere-message-broker-resource
   ```

5. **Reregister the WebSphere Message Broker resources, if you want to use new features that have been introduced in the new version of Oracle Solaris Cluster HA for WebSphere Message Broker.**

   Refer to "How to Register and Configure Oracle Solaris Cluster HA for WebSphere Message Broker" on page 28 for more information.

6. **Enable the WebSphere Message Broker resources**

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

   ```
   # clresource enable  websphere-message-broker-resource
   ```

Understanding the Oracle Solaris Cluster HA for WebSphere Message Broker Fault Monitor

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

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

Resource Properties

The Oracle Solaris Cluster HA for WebSphere Message Broker 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 Oracle Solaris Cluster HA for WebSphere Message Broker 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 Oracle Solaris Cluster installations. Therefore, you should tune the Oracle Solaris Cluster HA for WebSphere Message Broker fault monitor *only* if you need to modify this preset behavior.

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

The Oracle Solaris Cluster HA for WebSphere Message Broker fault monitor checks the broker 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 Broker probe

The broker probe can check the broker by using a simple message flow test, if `SC3_IN` and `SC3_OUT` are set to the *inbound* and *outbound* queues.

If set, the broker probe puts a message to the *inbound* queue referenced by the `SC3_IN` variable. After waiting two seconds, the broker probe checks that the message has arrived at the *outbound* queue referenced by the `SC3_OUT` variable.

If SC3_IN and SC3_OUT are set to NONE the simple message flow is not performed. Instead the broker probe checks that the bipservice process is still running.

SC3_IN and SC3_OUT are set when the broker resource was configured and registered within /opt/SUNWscmqi/sib/util/sib_config.

Operations of the Configuration Manager probe

The broker probe checks the configuration manager to see if the bipservice process is still running.

The configuration manager resource must set SC3_IN and SC3_OUT to NONE. This ensures that the simple message flow test is not performed.

Operations of the UserNameServer probe

The broker probe checks the UserNameServer to see if the bipservice process is still running.

Debug Oracle Solaris Cluster HA for WebSphere Message Broker

▼ How to turn on debug for Oracle Solaris Cluster HA for WebSphere Message Broker

Oracle Solaris Cluster HA for WebSphere Message Broker can be used by multiple WebSphere Message Broker instances. It is possible to turn debug on for all WebSphere Message Broker instances or a particular WebSphere Message Broker instance.

A config file exists under /opt/SUNWscmqi/*xxx*/etc, where *xxx* can be sib (Broker or Configuration Manager) or siu (UserNameServer).

These files allow you to turn on debug for all WebSphere Message Broker instances or for a specific WebSphere Message Broker instance on a particular node or zone within the cluster. If you require debug to be turned on for Oracle Solaris Cluster HA for WebSphere Message Broker 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.

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

2   Edit /opt/SUNWscmqi/*xxx*/etc/config.

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

Edit /opt/SUNWscmqi/*xxx*/etc/config and change DEBUG= to DEBUG=ALL or DEBUG=*resource*.

```
# cat /opt/SUNWscmqi/sib/etc/config
#
# Copyright 2006 Sun Microsystems, Inc.  All rights reserved.
# Use is subject to license terms.
#
##ident   "@(#)config 1.2     06/03/21 SMI"
#
# Usage:
#        DEBUG=<RESOURCE_NAME> or ALL
#
DEBUG=ALL
```

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

A

Deployment Example: Installing WebSphere Message Broker in Zones

This appendix presents a complete example of how to install and configure a WebSphere Message Broker in zones. It presents a single 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 zone named z1.

Vigor5:z2   A whole root 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
- Oracle Solaris Cluster 3.3 core software
- Oracle Solaris Cluster HA for WebSphere MQ data service
- Oracle Solaris Cluster HA for WebSphere Message Broker data service
- WebSphere Message Broker v6 Solaris x86–64
- WebSphere MQ v6 Solaris x86–64
- DB2 v8 Solaris x86–64

This example assumes that you have already installed and established your cluster. It illustrates the 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 you 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 Message Broker

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 Message Broker.

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

If you need to install WebSphere Message Broker 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 Message Broker v6 Solaris x86–64 platform and will configure WebSphere Message Broker on a ZFS highly available local file system.

The cluster resource group has already be configured to failover between two zones on a single node cluster.

This deployment examples assumes that you have completed the `Deployment Example: Installing WebSphere MQ in Zones` from the Oracle Solaris Cluster Data Service for WebSphere MQ Guide.

The tasks you must perform to install and configure WebSphere Message Broker in the zones are as follows:

▼ Example: Prepare the Cluster for WebSphere Message Broker

Perform all steps within this example in the global zone.

1 Install and configure the cluster as instructed in *Oracle Solaris Cluster Software Installation Guide***.**

Install the following cluster software components.

- Oracle Solaris Cluster core software
- Oracle Solaris Cluster HA for WebSphere Message Broker data service

---

Note – This deployment example assumes that WebSphere MQ has been installed into zones z1 and z2 and that the Oracle Solaris Cluster for WebSphere MQ data service has been installed and configured.

This deployment example further assumes that the Deployment Example: Installing WebSphere MQ in Zones, from the Oracle Solaris Cluster Data Service for WebSphere MQ Guide, was used to create the resource group wmq1-rg and zones z1 and z2.

Within this deployment example a GDS resource is used to create and register a DB2 resource.

---

2 Install and configure a Zettabyte file system.

Create a ZFS pool.

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 /ZFSwmb1 HAZpool3 c1t5d0
```

▼ Example: Configure zones `z1` and `z2` for WebSphere Message Broker

1 Import the ZFS pool into zone `z1`.

Perform this step in the global zone only.

```
Vigor5# zpool export -f HAZpool3
Vigor5# zpool import -R /zones/z1/root HAZpool3
```

2 Create some directories and a symbolic link for the WebSphere Message Broker and DB2 software.

Perform this step in the global zone only.

```
Vigor5# zlogin z1 mkdir /ZFSwmb1/mqsiuser /ZFSwmb1/db2user /ZFSwmb1/mqsi
Vig0r5# zlogin z1 touch /ZFSwmb1/mqsiuser/.profile
Vig0r5# zlogin z1 touch /ZFSwmb1/db2user/.profile
Vigor5# zlogin z1 mkdir /opt/mqsi
Vigor5# zlogin z2 mkdir /opt/mqsi
Vigor5# zlogin z1 ln -s /ZFSwmb1/mqsi /var/mqsi
Vigor5# zlogin z2 ln -s /ZFSwmb1/mqsi /var/mqsi
```

3 Create the WebSphere Message Broker and DB2 userid in the zones.

Perform this step from the global zone and repeat for zone z2.

```
Vigor5# zlogin z1
# groupadd -g 2000 mqbrkrs
# useradd -u 2000 -G mqm,mqbrkrs -d /ZFSwmb1/mqsiuser -s /usr/bin/ksh mqsiuser
# groupadd -g 3000 dba
# useradd -u 3000 -G dba -d /ZFSwmb1/db2user -s /usr/bin/ksh db2user
# passwd mqsiuser
New Password: mqsiuser
Re-enter new Password: mqsiuser
# passwd db2user
New Password: db2user
Re-enter new Password: db2user
# exit
```

4 Setup file permissions in the ZFS pool.

Perform this step in zone z1 only.

```
Vigor5# zlogin z1
# cd /ZFSwmb1
# chown db2user:dba db2user
# chown mqm:mqbrkrs mqsi
# chown mqsiuser:mqbrkrs mqsiuser
# exit
```

▼ Example: Install WebSphere Message Broker in the zones

Caution – The steps within this procedure are *not* precise steps to install WebSphere Message Broker or DB2. Refer to the relevant IBM documentation for complete information.

1   Mount the WebSphere Message Broker software in the zones.

Perform this step in the global zone only.

In this example, the WebSphere Message Broker software and DB2 software has been copied to node Vigor5 in directories /export/software/ibm/wmbv6 and /export/software/ibm/db2v8.

```
Vigor5# zlogin z1 mkdir -p /var/tmp/software
Vigor5# zlogin z2 mkdir -p /var/tmp/software
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   Install the DB2 software in zone z1.

Perform this step from the global zone for zone z1.

```
Vigor5# zlogin z1
# cat > /var/tmp/db2_response <<-EOF
PROD          = ENTERPRISE_SERVER_EDITION
INSTALL_TYPE  = TYPICAL
LIC_AGREEMENT = ACCEPT
EOF
# cd /var/tmp/software/ibm/db2v8
# ./db2setup -r /var/tmp/db2_response
```

Comment out chk_kernel_conf in /opt/IBM/db2/V8.1/instance/db2iutil as indicated by
->.

```
    # Check that kernel parameters are updated
 -> # chk_kernel_conf
    # Set the value of vars INSTHOME and INSTPGRP
    # and check their validity


# vi /opt/IBM/db2/V8.1/instance/db2iutil
# exit
```

3   Install the WebSphere Message Broker software in zone z1.

Perform this step from the global zone for zone z1 which can be performed at the same time you are installing the DB2 software.

```
Vigor5# zlogin z1
# cat > /var/tmp/install.opt <<-EOF
-W setupTypes.selectedSetupTypeId=typical
-P installLocation=/opt/IBM/mqsi/6.0
-P brokerFeature.active=true
-P transformationServicesFeature.active=true
```

```
-p unsFeature.active=true
-P configManagerFeature.active=true
EOF
# cd /var/tmp/software/ibm/wmbv6/messagebroker_runtime1
# ./setupsolarisx86 -options /var/tmp/install.opt -silent
# exit
```

4   Relocate the ZFS pool to zone z2.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool3
Vigor5# zpool import -R /zones/z2/root HAZpool3
```

5   Install the DB2 software in zone z2.

Perform this step from the global zone for zone z2.

```
Vigor5# zlogin z2
# cat > /var/tmp/db2_response <<-EOF
PROD            = ENTERPRISE_SERVER_EDITION
INSTALL_TYPE    = TYPICAL
LIC_AGREEMENT   = ACCEPT
EOF
# cd /var/tmp/software/ibm/db2v8
# ./db2setup -r /var/tmp/db2_response
```

Comment out chk_kernel_conf in /opt/IBM/db2/V8.1/instance/db2iutil as indicated by
->.

```
    # Check that kernel parameters are updated
 -> # chk_kernel_conf
    # Set the value of vars INSTHOME and INSTPGRP
    # and check their validity


# vi /opt/IBM/db2/V8.1/instance/db2iutil
# exit
```

6   Install the WebSphere Message Broker software in zone z2.

Perform this step from the global zone for zone z2 which can be performed at the same time you are installing the DB2 software.

```
Vigor5# zlogin z2
# cat > /var/tmp/install.opt <<-EOF
-W setupTypes.selectedSetupTypeId=typical
-P installLocation=/opt/IBM/mqsi/6.0
-P brokerFeature.active=true
-P transformationServicesFeature.active=true
-p unsFeature.active=true
-P configManagerFeature.active=true
EOF
# cd /var/tmp/software/ibm/wmbv6/messagebroker_runtime1
# ./setupsolarisx86 -options /var/tmp/install.opt -silent
# exit
```

7   Relocate the ZFS pool back to zone z1.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool3
Vigor5# zpool import -R /zones/z1/root HAZpool3
```

▼ Example: Verify WebSphere Message Broker

1   Create the Broker database.

Perform this step in the global zone for zone z1.

```
Vigor5# zlogin z1
# cd /opt/IBM/db2/V8.1/instance
# ./db2icrt -u db2user db2user
# su - db2user
$ db2start
$ db2 create database BROKERDB
$ db2 connect to BROKERDB
$ db2 bind ./sqllib/bnd/@db2cli.lst grant public CLIPKG 5
$ db2 update database configuration for BROKERDB using dbheap 900
$ chmod 644 /ZFSwmb1/db2user/sqllib/db2nodes.cfg
$ cat > /ZFSwmb1/db2user/sqllib/db2nodes.cfg <<-EOF
0 db2user 0
EOF
$ chmod 444 /ZFSwmb1/db2user/sqllib/db2nodes.cfg
$ exit
```

2   Update /etc/hosts with db2user on both zones.

Perform this step in zones z1 and z2.

```
# vi /etc/hosts
```

The following listing shows db2user that has been added to /etc/hosts on z1.

```
127.0.0.1        localhost    loghost    z1    db2user
```

3   Create the Broker, Configuration Manager and UserNameServer.

Perform this step in zone z1 only.

Note – The broker queue manager and broker database must be running *before* you perform this step.

Ensure that DB2 is started and resource group wmq1-rg is online on Vigor5:z1.

Deployment Example: Installing WebSphere MQ in Zones, from the Oracle Solaris Cluster Data Service for WebSphere MQ Guide, was used to create the resource group wmq1-rg.

```
# cat > /ZFSwmb1/mqsiuser/.profile <<-EOF
. /ZFSwmb1/db2user/sqllib/db2profile
. /opt/IBM/mqsi/6.0/bin/mqsiprofile
EOF
# su - mqsiuser
$ mqsicreatebroker brk \
> -i mqsiuser -a mqsiuser -q qmgr1 -n BROKERDB -u db2user -p db2user
$ mqsicreateconfigmgr cmg \
> -i mqsiuser -a mqsiuser -q qmgr1
$ mqsicreateusernameserver \
> -i mqsiuser -a mqsiuser -q qmgr1
$ exit
```

4   Start the Broker, Configuration Manager and UserNameServer.

Perform this step in zone z1.

```
# su - mqsiuser
$ mqsistart brk
$ mqsistart cmg
$ mqsistart UserNameServer
```

5   Verify that the Broker, Configuration Manager and UserNameServer have been created and are running.

Perform this step in zone z1.

```
# su - mqsiuser
$ mqsilist
BIP8099I: ConfigMgr: cmg  -  qmgr1
BIP8099I: UserNameServer: UserNameServer  -  qmgr1
BIP8099I: Broker: brk  -  qmgr1

BIP8071I: Successful command completion.
$ exit
# ptree mqsiuser
2608  zsched
  15573 bipservice brk
    15574 bipbroker brk
      15590 biphttplistener brk
  15594 bipservice cmg
    15595 bipconfigmgr cmg
  15665 bipservice UserNameServer
    15666 bipuns UserNameServer
```

6   Stop the Broker, Configuration Manager and UserNameServer.

Perform this step in zone z1.

```
# su - mqsiuser
$ mqsistop -i brk
$ mqsistop -i cmg
$ mqsistop -i UserNameServer
$ exit
```

7   Stop the Broker database.

Perform this step in zone z1.

```
# su - db2user
$ db2stop force
$ exit
# exit
```

8   Failover the WebSphere MQ resource group to the other zone.

Perform this step in the global zone.

```
Vigor5# clrg switch -n Vigor5:z2 wmq1-rg
```

9   Relocate the ZFS pool to the other zone.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool3
Vigor5# zpool import -R /zones/z2/root HAZpool3
```

10   Setup /etc/services and start the Broker database.

Perform this step in zone z2.

Note – The port list entries for db2user should be the same as those on zone z1.

```
Vigor5# z2
# cat >> /etc/services <<-EOF
DB2_db2user      60000/tcp
DB2_db2user_1    60001/tcp
DB2_db2user_2    60002/tcp
DB2_db2user_END 60003/tcp
EOF
# su - db2user
$ db2start
$ exit
```

11   Start the Broker, Configuration Manager and UserNameServer.

Perform this step in zone z2.

```
# su - mqsiuser
$ mqsistart brk
$ mqsistart cmg
$ mqsistart UserNameServer
$ exit
```

12   Verify that the Broker, Configuration Manager and UserNameServer are running.

Perform this step in zone z2.

```
# su - mqsiuser
$ mqsilist
BIP8099I: ConfigMgr: cmg  -  qmgr1
BIP8099I: UserNameServer: UserNameServer  -  qmgr1
```

```
BIP8099I: Broker: brk  -  qmgr1

BIP8071I: Successful command completion.
$ exit
# ptree mqsiuser
2614  zsched
  6658 bipservice brk
    6659 bipbroker brk
      6681 biphttplistener brk
  6674 bipservice cmg
    6675 bipconfigmgr cmg
  6691 bipservice UserNameServer
    6692 bipuns UserNameServer
```

13 Stop the Broker, Configuration Manager and UserNameServer.

Perform this step in zone z2.

```
# su - mqsiuser
$ mqsistop -i brk
$ mqsistop -i cmg
$ mqsistop -i UserNameServer
$ exit
```

14 Stop the Broker database.

Perform this step in zone z2.

```
# su - db2user
$ db2stop force
$ exit
# exit
```

15 Export the ZFS pool.

Perform this step in the global zone.

```
Vigor5# zpool export -f HAZpool3
```

▼ Example: Configure Cluster Resources for WebSphere Message Broker

Perform all steps within this example in the global zone.

1 Create the `HAStoragePlus` resource in the `wmq1-rg` resource group.

```
Vigor5# clresource create -g wmq1-rg -t SUNW.HAStoragePlus \
> -p Zpools=HAZpool3 wmq1-ZFSbrokerhas
```

Alternatively, you can simply add HAZpool3 to the existing wmq1-ZFShas resource.

Deployment Example: Installing WebSphere MQ in Zones, from the Oracle Solaris Cluster Data Service for WebSphere MQ Guide, was used to create the wmq1-ZFShas resource..

```
Vigor5# clresource set -p Zpools=HAZpool1,HAZpool2,HAZpool3 wmq1-ZFShas
```

2   **Enable the resource.**

This step is only required is you created the wmq1-ZFSbrokerhas resource.

```
Vigor5# clresource enable wmq1-ZFSbrokerhas
```

▼ Example: Enable the WebSphere Message Broker Software to Run in the Cluster

Perform all steps within this example in the global zone.

1   **Create and enable the DB2 cluster resource.**

Note – At the time of writing this deployment example, an IBM DB2 agent for Oracle Solaris Cluster 3.2 was not available. Instead to provide high availability for DB2 the following GDS resource was used.

```
Vigor5# z2
# cat > /ZFSwmb1/db2user/ha-db2probe <<-EOF
if su - db2user -c "db2gcf -s -i db2user -p 0" > /dev/null
then
   rc=0
else
   su - db2user -c "ipclean -a"
   rc=100
fi
return ${rc}
EOF
# chmod 755 /ZFSwmb1/db2user/ha-db2probe
# exit
Vigor5# clresource create -g wmq1-rg -t SUNW.gds \
-p Start_command='/usr/bin/su - db2user -c "db2start"' \
-p Stop_command='/usr/bin/su - db2user -c "db2stop force"' \
-p Probe_command='/usr/bin/ksh /ZFSwmb1/db2user/ha-db2probe' \
-p Network_aware=false wmq1-db2
Vigor5# clresource enable wmq1-db2
```

2   **Create the Broker configuration file.**

Either cat the following into /var/tmp/brk_config or edit /opt/SUNWscmqi/sib/util/sib_config and execute /opt/SUNWscmqi/sib/util/sib_register.

Within this step HAS_RS=wmq1-ZFShas is specified, if you created resource wmq1-ZFSbrokerhas you must specify HAS_RS=wmq1-ZFSbrokerhas.

```
Vigor5# cat > /var/tmp/brk_config <<-EOF
RS=wmq1-brk
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
SC3_IN=NONE
SC3_OUT=NONE
MQSI_ID=mqsiuser
BROKER=brk
QMGR_RS=wmq1-qmgr
RDBMS_RS=
START_CMD=
STOP_CMD=
EOF
```

3   Register and enable the Broker resource.

```
Vigor5# /opt/SUNWscmqi/sib/util/sib_register -f /var/tmp/brk_config
Vigor5# clresource enable wmq1-brk
```

4   Create the Configuration Manager configuration file.

Either cat the following into /var/tmp/cmg_config or edit
/opt/SUNWscmqi/sib/util/sib_config and execute
/opt/SUNWscmqi/sib/util/sib_register.

Within this step HAS_RS=wmq1-ZFShas is specified, if you created resource wmq1-ZFSbrokerhas you must specify HAS_RS=wmq1-ZFSbrokerhas.

```
Vigor5# cat > /var/tmp/cmg_config <<-EOF
RS=wmq1-cmg
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
SC3_IN=NONE
SC3_OUT=NONE
MQSI_ID=mqsiuser
BROKER=cmg
QMGR_RS=wmq1-qmgr
RDBMS_RS=
START_CMD=
STOP_CMD=
EOF
```

5   Register and enable the Configuration Manager resource.

```
Vigor5# /opt/SUNWscmqi/sib/util/sib_register -f /var/tmp/cmg_config
Vigor5# clresource enable wmq1-cmg
```

6   Create the UserNameServer configuration file.

Either cat the following into /var/tmp/uns_config or edit
/opt/SUNWscmqi/siu/util/siu_config and execute
/opt/SUNWscmqi/siu/util/siu_register.

Within this step HAS_RS=wmq1-ZFShas is specified, if you created resource wmq1-ZFSbrokerhas
you must specify HAS_RS=wmq1-ZFSbrokerhas.

```
Vigor5# cat > /var/tmp/uns_config <<-EOF
RS=wmq1-uns
RG=wmq1-rg
QMGR=qmgr1
LH=wmq1-lh
HAS_RS=wmq1-ZFShas
MQSI_ID=mqsiuser
QMGR_RS=wmq1-qmgr
START_CMD=
STOP_CMD=
EOF
```

7   Register and enable the UserNameServer resource.

```
Vigor5# /opt/SUNWscmqi/siu/util/siu_register -f /var/tmp/uns_config
Vigor5# clresource enable wmq1-uns
```

▼ Example: Verify the Oracle Solaris Cluster HA for WebSphere Message Broker Resource Group

Perform this step in the global zone.

●   **Switch the WebSphere MQ resource group between the two zones.**

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

Index