

Oracle® Solaris Cluster Upgrade Guide

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Preface

The *Oracle Solaris Cluster Upgrade Guide* contains guidelines and procedures for upgrading the Oracle Solaris Cluster software on both SPARC based systems and x86 based systems.

Note – This Oracle Solaris Cluster release supports systems that use the SPARC and x86 families of processor architectures. In this document, “x86” refers to the larger family of x86 compatible products. Information in this document pertains to all platforms unless otherwise specified.

This document is intended for experienced system administrators with extensive knowledge of Oracle software and hardware. Do not use this document as a presales guide. You should have already determined your system requirements and purchased the appropriate equipment and software before reading this document.

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.

Note – Oracle Solaris 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.

Bash is the default shell for Oracle Solaris 11. Machine names shown with the Bash shell prompt are displayed for clarity.

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	Description	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% you have mail.</code>
AaBbCc123	What you type, contrasted with onscreen computer output	<code>machine_name% su</code> Password:
<i>aabbcc123</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 UNIX system prompts and superuser prompts for shells that are included in the Oracle Solaris OS. In command examples, the shell prompt indicates whether the command should be executed by a regular user or a user with privileges.

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://www.oracle.com/technetwork/indexes/documentation/index.html>.

Topic	Documentation
Hardware installation and administration	<i>Oracle Solaris Cluster 4.1 Hardware Administration Manual</i> Individual hardware administration guides
Concepts	<i>Oracle Solaris Cluster Concepts Guide</i>
Software installation	<i>Oracle Solaris Cluster Software Installation Guide</i>
Data service installation and administration	<i>Oracle Solaris Cluster Data Services Planning and Administration Guide</i> and individual data service guides
Data service development	<i>Oracle Solaris Cluster Data Services Developer's Guide</i>
System administration	<i>Oracle Solaris Cluster System Administration Guide</i> <i>Oracle Solaris Cluster Quick Reference</i>
Software upgrade	<i>Oracle Solaris Cluster Upgrade Guide</i>
Error messages	<i>Oracle Solaris Cluster Error Messages Guide</i>
Command and function references	<i>Oracle Solaris Cluster Reference Manual</i> <i>Oracle Solaris Cluster Data Services Reference Manual</i> <i>Oracle Solaris Cluster Geographic Edition Reference Manual</i> <i>Oracle Solaris Cluster Quorum Server Reference Manual</i>
Compatible software	Oracle Solaris Cluster Compatibility Guide available at the Oracle Solaris Cluster Technical Resources page

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

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 operating environment (for example, Oracle Solaris 11)
- The release number of Oracle Solaris Cluster (for example, Oracle Solaris Cluster 4.1)

Use the following commands to gather information about 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>pkg list</code>	Reports which packages are installed
<code>prtdiag -v</code>	Displays system diagnostic information
<code>/usr/cluster/bin/clnode show-rev -v</code>	Displays Oracle Solaris Cluster release and package version information for each node

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

Preparing to Upgrade Oracle Solaris Cluster Software

This chapter provides the following information and procedures to prepare to upgrade or update the Oracle Solaris Cluster 4.1 software:

- [“Upgrade Requirements and Software Support Guidelines” on page 9](#)
- [“Choosing an Oracle Solaris Cluster Upgrade Method” on page 11](#)

An upgrade moves the cluster to the latest major or minor Oracle Solaris Cluster release by updating all packages. By default, the upgrade also upgrades the Oracle Solaris OS and any other packages to the latest compatible version.

A software update changes a specific Oracle Solaris Cluster package to a newer Support Repository Update (SRU) level. For more information about using the `pkg` commands to update packages, see [“Overview of Updating Oracle Solaris Cluster Software” in *Oracle Solaris Cluster System Administration Guide*](#).

Note – Applying an Oracle Solaris Cluster 4.1 Core SRU does not provide the same result as upgrading the software to the Oracle Solaris Cluster 4.1 release.

Upgrade Requirements and Software Support Guidelines

Observe the following requirements and software-support guidelines when you upgrade to the Oracle Solaris Cluster 4.1 software:

- **Minimum Oracle Solaris OS** - Oracle Solaris 11.1 software is the minimum required to support Oracle Solaris Cluster 4.1 software.

Note – To upgrade directly to Oracle Solaris 11.1 software, an Oracle Solaris 11 system must be installed with at least SRU 10. Oracle Solaris software does not support direct upgrade to Oracle Solaris 11.1 software from an Oracle Solaris 11 system that is installed with less than SRU 10.

- **Minimum Oracle Solaris Cluster software version** - The cluster must run at least Oracle Solaris Cluster 4.0 software before upgrade.

Note – Oracle Solaris 11.2 software requires Oracle Solaris Cluster 4.1 SRU 8.

- **Supported hardware** - The cluster hardware must be a supported configuration for Oracle Solaris Cluster 4.1 software. Contact your Oracle representative for information about current supported Oracle Solaris Cluster configurations.
- **Architecture changes during upgrade** - Oracle Solaris Cluster 4.1 software does not support upgrade between architectures.
- **Software migration** - Do not migrate from one type of software product to another product during Oracle Solaris Cluster upgrade. Perform only software configuration changes that are specified by upgrade procedures of an installed software product.
- **Upgrading to compatible versions** - You must upgrade all software on the cluster nodes to a version that is supported by Oracle Solaris Cluster 4.1 software. For example, if an application version is supported on Oracle Solaris Cluster 4.0 software but is not supported on Oracle Solaris Cluster 4.1 software, you must upgrade to an application version that is supported on Oracle Solaris Cluster 4.1 software, if such a version exists. See [“Supported Products” in Oracle Solaris Cluster 4.1 Release Notes](#) for information about supported products.
- **Migration from Oracle Solaris 10** - You can alternatively migrate Oracle Solaris Cluster 3.3 software running on the Oracle Solaris 10 OS to a `solaris10` brand zone cluster. On a global cluster that already runs Oracle Solaris Cluster 4.1 software on Oracle Solaris 11.1 software, create a new `solaris10` brand zone cluster. Then migrate to the zone cluster your Oracle Solaris Cluster 3.3 configuration and applications. See [Chapter 6, “Creating Zone Clusters,” in Oracle Solaris Cluster Software Installation Guide](#) and [“Creating the Image for Directly Migrating Oracle Solaris 10 Systems Into Zones” in Oracle Solaris 11.1 Administration: Oracle Solaris Zones, Oracle Solaris 10 Zones, and Resource Management](#).
- **Downgrade** - Oracle Solaris Cluster 4.1 software does not support any downgrade of Oracle Solaris Cluster software.
- **Limitation of `scinstall` for data-service upgrades** - The `scinstall` upgrade utility only upgrades those data services that are provided with Oracle Solaris Cluster 4.1 software. You must manually upgrade any custom or third-party data services, unless they also have IPS packages and later versions are available in their publisher.

Choosing an Oracle Solaris Cluster Upgrade Method

The following matrix summarizes the supported upgrade methods for each Oracle Solaris OS version and platform, *provided that all other requirements for any supported method are met*. Check the documentation of other products in the cluster, such as volume management software and other applications, for any additional upgrade requirements or restrictions.

TABLE 1-1 Upgrade an Oracle Solaris Cluster Configuration to the 4.1 Release

Method	Oracle Solaris 11 SPARC	Oracle Solaris 11 x86
Standard upgrade	X	X
Rolling upgrade	X	X

Choose from the following methods to upgrade your Oracle Solaris Cluster 4.1 cluster software:

- [“Standard Upgrade” on page 11](#)
- [“Rolling Upgrade” on page 12](#)

For overview information about planning your Oracle Solaris Cluster 4.1 configuration, see [Chapter 1, “Planning the Oracle Solaris Cluster Configuration,”](#) in *Oracle Solaris Cluster Software Installation Guide*.

Standard Upgrade

A standard upgrade upgrades a cluster to a new release and upgrades the Oracle Solaris OS to the latest compatible version. You do not need to place the cluster in noncluster mode before performing this upgrade because the upgrade always occurs in the new boot environment and the existing boot environment remains unchanged. You can specify a name for the new boot environment or you can use the auto-generated name.

Any time you upgrade the Oracle Solaris Cluster software, by default you also upgrade the data services and Geographic Edition software. However, if you want to upgrade the data services separately, see [“Overview of the Installation and Configuration Process”](#) in *Oracle Solaris Cluster Data Services Planning and Administration Guide*. If you want to upgrade Oracle Solaris Cluster Geographic Edition separately, see the *Oracle Solaris Cluster Geographic Edition Installation Guide*.

Note – If you want to update individual packages, use the `pkg` command. See [“Updating a Specific Package”](#) in *Oracle Solaris Cluster System Administration Guide*.

For complete instructions on performing a standard upgrade, see [Chapter 3, “Performing a Standard Upgrade.”](#)

The cluster outage is limited to the amount of time that is needed to upgrade the software and reboot the cluster nodes into the upgraded boot environment. Resource groups are in the unmanaged state during the course of the upgrade.

Rolling Upgrade

In a rolling upgrade, you upgrade software to an update release, such as from Oracle Solaris Cluster 4.0 to 4.1, or to a new SRU on one node at a time. Services continue on the other nodes except for the time it takes to switch services from a node to be upgraded to a node that will remain in service.

Observe the following additional restrictions and requirements for the rolling upgrade method:

- **Minimum Oracle Solaris Cluster version** - The cluster must run at least Oracle Solaris Cluster 4.0 software before upgrade to Oracle Solaris Cluster 4.1 software.
- **Oracle Solaris upgrade paths** - You can upgrade the Oracle Solaris OS only to a new SRU or an update version of the same release. For example, you can perform a rolling upgrade from Oracle Solaris 11 to Oracle Solaris 11.1. But you cannot perform a rolling upgrade from a version of Oracle Solaris 10 to a version of Oracle Solaris 11.
- **Hardware configuration changes** - Do *not* change the cluster configuration during a rolling upgrade. For example, do not add to or change the cluster interconnect or quorum devices. If you need to make such a change, do so before you start the rolling upgrade procedure or wait until after all nodes are upgraded and the cluster is committed to the new software version.
- **Duration of the upgrade** - Limit the amount of time that you take to complete a rolling upgrade of all cluster nodes. After a node is upgraded, begin the upgrade of the next cluster node as soon as possible. You can experience performance penalties and other penalties when you run a mixed-version cluster for an extended period of time.
- **Software configuration changes** - Avoid installing new data services or issuing any administrative configuration commands during the upgrade.
- **New-feature availability** - Until all nodes of the cluster are successfully upgraded and the upgrade is committed, new features that are introduced by the new release might not be available.

Upgrading Zones Managed by Oracle Solaris Cluster Software

This chapter provides the following information to upgrade Oracle Solaris non-global zones of `solaris` and `solaris10` brand types that are managed by the Oracle Solaris Cluster software. For more information about making a non-global zone highly available, see *Oracle Solaris Cluster Data Service for Oracle Solaris Zones Guide*.

- “Upgrading a `solaris10` Brand Zone in a Zone Cluster” on page 13
- “Upgrading Failover Zones” on page 15

Upgrading a `solaris10` Brand Zone in a Zone Cluster

Use the `clzonecluster show - rev` subcommand to check the cluster release information for each node of the zone cluster. For more information, see the `clzonecluster(1CL)` man page.

▼ How to Upgrade a `solaris10` Brand Zone in a Zone Cluster

There are four ways to upgrade a configured `solaris10` brand zone in a zone cluster. The procedure below describes how to perform each method, but you should choose only one method.

1 Bring the zone cluster into an offline-running state.

```
phys-schost# clzonecluster reboot -o zoneclustername
```

2 Choose only one of the following upgrade methods to upgrade the `solaris10` brand zone.

- To use the `clzonecluster install-cluster` command, issue the following command from the command line of *one* configured node of the global zone:

```
phys-schost#clzonecluster install-cluster -p patchdir=patchdir \  
[,patchlistfile=filename] zoneclustername
```

Use the new release patches for the `patchlistfile` property. For more information about the `clzonecluster install-cluster` subcommand, see the [clzonecluster\(1CL\)](#) man page.

- To use the `patchadd` command, perform the following steps from inside the zone cluster for each configured zone-cluster node.

- a. Log in to the zone cluster.

```
phys-schost# zlogin zoneclustername
```

- b. From the command line, type `patchadd`.

```
zchost# patchadd
```

- c. Install the patches that correspond to the new release.

- To use the `scinstall -u update` command, perform the following steps from inside the zone cluster for each configured zone-cluster node:

- a. Log in to the zone cluster.

```
phys-schost# zlogin zoneclustername
```

- b. From the command line, type the following command.

```
zchost# new-release-dvd-path/Solaris_arch/Product/sun_cluster/Solaris_10/Tools/scinstall -u update
```

In the path, *arch* is `sparc` or `x86`. For example:

```
zchost# /net/my-machine/export/dvd/Solaris_arch/Product/sun_cluster/Solaris_10/Tools/scinstall -u update
```

- To use the interactive `scinstall` utility, perform the following steps from inside the zone cluster for each configured zone-cluster node:

- a. Log in to the zone cluster.

```
phys-schost# zlogin zoneclustername
```

- b. Change to the DVD image directory inside the zone.

You must run the `scinstall` utility from the latest DVD directory. For example:

```
zchost# cd /net/my-machine/export/dvd/Solaris_arch/Product/sun_cluster/Solaris_10/Tools/
```

In the path, *arch* is `sparc` or `x86`.

- c. Start the `scinstall` utility.

```
zchost# pwd
/net/my-machine/export/dvd/Solaris_arch/Product/sun_cluster/Solaris_10/Tools/
zchost# ./scinstall
```

d. Choose the Upgrade This Cluster Node menu item.

The Upgrading Oracle Solaris Cluster on This Node menu is displayed.

e. Follow the menu prompts to upgrade the solaris10 brand zone on this zone cluster node.

This action upgrades the Oracle Solaris Cluster framework and data service agents on this node.

f. Quit the scinstall utility.

Troubleshooting If the `scinstall -u update` command fails with a message that the `pkg (5)` command is out of date, follow the instructions in the message.

Upgrading Failover Zones

A failover zone is a non-global zone that is configured with the HA for Oracle Solaris Zones data service so that it can be managed by the Oracle Solaris Cluster software. If you have failover zones of brand type `solaris` configured on the cluster, perform this procedure in conjunction with the procedures for the cluster upgrade method that you use.

▼ How to Upgrade a Failover Zone

Note – This task is not needed for `solaris10` brand failover zones.

- 1 Determine the nodes where the resource group that manages the failover zone of brand type `solaris` is offline.**

```
# clresourcegroup status resourcegroup
```
- 2 Suspend the resource group that manages the failover zone of brand type `solaris`.**

```
# clresourcegroup suspend resourcegroup
```
- 3 Perform the standard or rolling upgrade on the nodes where the resource group that manages the failover zones is offline.**

Perform all steps, including booting into the new boot environment, in [“How to Upgrade the Software \(Standard Upgrade\)” on page 24](#) or [“How to Upgrade the Software \(Rolling Upgrade\)” on page 31](#). Then return to this procedure.

- 4 **Perform the standard or rolling upgrade on the nodes where the resource group that manages the failover zones of brand type `solaris` is online.**

Perform [Step 1](#) through [Step 5](#) in “How to Upgrade the Software (Standard Upgrade)” on [page 24](#) or [Step 1](#) through [Step 5](#) in “How to Upgrade the Software (Rolling Upgrade)” on [page 31](#). Do *not* perform the final step in those procedures to boot the machine into the new boot environment. Instead, return to this procedure after you complete this task.

- 5 **Synchronize the universally unique IDs (UUID) of the updated boot environments.**
 - a. **Determine the UUID of the updated boot-environment root dataset of the node where the resource group that manages the failover zone of brand type `solaris` is online.**

You will see output similar to the following:

```
phys-schost-1# beadm list -H
...
b175b-SC;8fe53702-16c3-eb21-ed85-d19af92c6bbd;R;/;756
...
```

In this example, the UUID is `8fe53702-16c3-eb21-ed85-d19af92c6bbd` and the updated boot environment is `b175b-SC`.

- b. **Set the same UUID on the updated boot environment for the other nodes where the resource group that manages the failover zone of brand type `solaris` is offline.**

```
phys-schost-2# zfs set org.opensolaris.libbe:uuid=uuid rpool/ROOT/BE
```

For example:

```
phys-schost-2# zfs set org.opensolaris.libbe:uuid=8fe53702-16c3-eb21-ed85-d19af92c6bbd rpool/ROOT/b175b-SC
```

- c. **If a cluster node that was upgraded in [Step 3](#) contains other kinds of `solaris` brand zones that are configured and running, update the UUID.**

Perform this step on each node where a resource group that manages a `solaris` brand failover zone is offline. On the `solaris` brand zone's updated boot environment, set the same UUID that you identified in [Step a](#).

```
phys-schost-2# zfs set org.opensolaris.libbe:parentbe=uuid poolname/zonepath/rpool/ROOT/bename
```

For example:

```
phys-schost-2# zoneadm list -cv
...
  1 myzone1      running    /zones/myzone1  solaris  shared
...
```

```
phys-schost-2# zlogin myzone1 beadm list -H
solaris;4391e8aa-b8d2-6da9-a5aa-d8b3e6ed6d9b;NR;/;606941184;static;1342165571
```

```
phys-schost-2# zfs set org.opensolaris.libbe:parentbe=8fe53702-16c3-eb21-ed85-d19af92c6bbd \
rpool/zones/myzone1/rpool/ROOT/solaris
```

- 6 Resume the resource group that manages the failover zone of brand type `solaris`.
`# clresourcegroup resume resourcegroup`
- 7 Switch the resource group that manages the failover zone of brand type `solaris` to a node that was already booted into the updated boot environment and verify that the zone started correctly.
`# clresourcegroup switch -n phys-schost-2 resourcegroup`
- 8 Boot the node from [Step 4](#), where the resource group that manages the failover zone of brand type `solaris` had initially been online, into its updated boot environment.

Next Steps Go to [Chapter 5](#), “Completing the Upgrade.”

Performing a Standard Upgrade

This chapter provides the following information to upgrade to Oracle Solaris Cluster 4.1 software or to a Software Repository Update (SRU) by using the standard nonrolling upgrade method:

- [“How to Upgrade Quorum Server Software” on page 20](#)
- [“How to Prepare the Cluster for Upgrade \(Standard Upgrade\)” on page 21](#)
- [“How to Upgrade the Software \(Standard Upgrade\)” on page 24](#)

Upgrading to Oracle Solaris Cluster 4.1 software also upgrades the Oracle Solaris Operating System to the latest compatible version.

Note – Oracle Solaris 11.2 software requires Oracle Solaris Cluster 4.1 SRU 8.

Performing a Standard Upgrade of a Cluster

The following table lists the tasks to upgrade to Oracle Solaris Cluster 4.1 software or to a 4.1 SRU. By default, all Oracle Solaris packages are automatically upgraded.

TABLE 3-1 Task Map: Performing a Standard Upgrade for Oracle Solaris Cluster 4.1 Software

Task	Instructions
1. Read the upgrade requirements and restrictions. Determine the proper upgrade method for your configuration and needs.	“Upgrade Requirements and Software Support Guidelines” on page 9 “Choosing an Oracle Solaris Cluster Upgrade Method” on page 11
2. If failover zones of brand type solaris are configured in the cluster, upgrade the failover zones.	“Upgrading Failover Zones” on page 15

TABLE 3-1 Task Map: Performing a Standard Upgrade for Oracle Solaris Cluster 4.1 Software (Continued)

Task	Instructions
3. If a quorum server is used, upgrade the Quorum Server software.	“How to Upgrade Quorum Server Software” on page 20
4. Remove the cluster from production and back up shared data.	“How to Prepare the Cluster for Upgrade (Standard Upgrade)” on page 21
5. Upgrade to Oracle Solaris Cluster 4.1 framework, data-service, and Geographic Edition software. If necessary, upgrade applications that support alternate boot environments.	“How to Upgrade the Software (Standard Upgrade)” on page 24
6. Use the <code>scversions</code> command to commit the cluster to the upgrade.	“How to Commit the Upgraded Cluster” on page 35
7. Verify successful completion of upgrade to Oracle Solaris Cluster 4.1 software.	“How to Verify the Upgrade” on page 36
8. Enable resources and bring resource groups online. Migrate existing resources to new resource types. If necessary, boot into noncluster mode and upgrade applications that do not support alternate boot environments.	“How to Finish the Upgrade” on page 37

▼ How to Upgrade Quorum Server Software

If the cluster uses a quorum server, upgrade the Quorum Server software on the quorum server *before* you upgrade the cluster.

Note – If more than one cluster uses the quorum server, perform on each cluster the steps to remove the quorum server and later the steps to add back the quorum server.

Perform all steps as the root role on the cluster and on the quorum server.

- 1 If the cluster has two nodes and the quorum server is the cluster's only quorum device, temporarily add a second quorum device.**

See “Adding a Quorum Device” in *Oracle Solaris Cluster System Administration Guide*.

If you add another quorum server as a temporary quorum device, the quorum server can run the same software version as the quorum server that you are upgrading, or it can run the 4.1 version of Quorum Server software.

- 2 Unconfigure the quorum server from each cluster that uses the quorum server.**

```
phys-schost# clquorum remove quorumserver
```

- 3 From the quorum server to upgrade, verify that the quorum server no longer serves any cluster.**

```
quorumserver# clquorumserver show +
```

If the output shows any cluster is still served by the quorum server, unconfigure the quorum server from that cluster. Then repeat this step to confirm that the quorum server is no longer configured with any cluster.

Note – If you have unconfigured the quorum server from a cluster but the `clquorumserver show` command still reports that the quorum server is serving that cluster, the command might be reporting stale configuration information. See [“Cleaning Up Stale Quorum Server Cluster Information”](#) in *Oracle Solaris Cluster System Administration Guide*.

4 From the quorum server to upgrade, halt all quorum server instances.

```
quorumserver# clquorumserver stop +
```

5 Uninstall the Quorum Server software from the quorum server to upgrade.

```
quorumserver# pkg uninstall ha-cluster/*
```

6 (Optional) Clean up or remove the quorum server directories.

By default, this directory is `/var/scqsd`.

7 Install the Oracle Solaris Cluster 4.1 Quorum Server software, reconfigure the quorum server, and start the quorum server daemon.

Follow the steps in [“How to Install and Configure Oracle Solaris Cluster Quorum Server Software”](#) in *Oracle Solaris Cluster Software Installation Guide* for installing the Quorum Server software.

8 From a cluster node, configure the upgraded quorum server as a quorum device.

Follow the steps in [“How to Configure Quorum Devices”](#) in *Oracle Solaris Cluster Software Installation Guide*.

9 If you configured a temporary quorum device, unconfigure it.

```
phys-schost# clquorum remove tempquorum
```

▼ How to Prepare the Cluster for Upgrade (Standard Upgrade)

Perform this procedure to remove the cluster from production before you perform a standard upgrade. Performing a standard upgrade also upgrades the Oracle Solaris OS to the latest compatible version. Perform all steps from the global zone only.

Before You Begin Perform the following tasks:

- Ensure that the configuration meets the requirements for upgrade. See [“Upgrade Requirements and Software Support Guidelines”](#) on page 9.

- Have available the installation media, documentation, and software updates for all software products that you are upgrading, including the following software:
 - Oracle Solaris OS
 - Oracle Solaris Cluster
 - Applications that are managed by Oracle Solaris Cluster data services
 - Any other third-party applications to upgrade

For instructions on updating single or multiple packages, see [Chapter 11, “Updating Your Software,”](#) in *Oracle Solaris Cluster System Administration Guide*.

- If you use role-based access control (RBAC) instead of the root role to access the cluster nodes, ensure that you can assume an RBAC role that provides authorization for all Oracle Solaris Cluster commands. This series of upgrade procedures requires the following Oracle Solaris Cluster RBAC authorizations if the user is not the root role:
 - `solaris.cluster.modify`
 - `solaris.cluster.admin`
 - `solaris.cluster.read`

See [“Role-Based Access Control \(Overview\)”](#) in *Oracle Solaris 11.1 Administration: Security Services* for more information about using RBAC roles. See the Oracle Solaris Cluster man pages for the RBAC authorization that each Oracle Solaris Cluster subcommand requires.

1 Ensure that the cluster is functioning normally.

- a. View the current status of the cluster by running the following command from any node.**

```
phys-schost% cluster status
```

See the `cluster(1CL)` man page for more information.

- b. Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.**

- c. Check the volume-manager status.**

2 Assume the root role on a node of the cluster.

3 If the cluster is configured with zone clusters, take offline each resource group and disable all resources in each zone cluster.

```
# clresourcegroup offline -Z zonecluster resource-group
# clresource disable -Z zonecluster resource
# clresourcegroup unmanage -Z zonecluster resource-group
```

4 In the global zone, take offline each resource group and disable all resources.

Take offline all resource groups in the cluster, including those that are in non-global zones. Then disable all resources, to prevent the cluster from bringing the resources online automatically if a node is mistakenly rebooted into cluster mode.

- To use the `clsetup` utility, perform the following steps:

- a. Start the utility.

```
phys-schost# clsetup
```

The Main Menu is displayed.

- b. Choose the menu item, Resource Groups.

The Resource Group Menu is displayed.

- c. Choose the menu item, Online/Offline or Switchover a Resource Group.

- d. Follow the prompts to take offline all resource groups and to put them in the unmanaged state.

- e. When all resource groups are offline, type `q` to return to the Resource Group Menu.

- f. Exit the `clsetup` utility.

Type `q` to back out of each submenu or press `Ctrl-C`.

- To use the command line, perform the following steps:

- a. Take each resource group offline.

```
phys-schost# clresourcegroup offline resource-group
```

- b. From any node, list all enabled resources in the cluster.

```
phys-schost# clresource show -p Enabled
```

```
=== Resources ===
```

```
Resource:                                     resource
  Enabled{nodename1}:                          True
  Enabled{nodename2}:                          True
  ...
```

- c. Identify those resources that depend on other resources.

```
phys-schost# clresource show -p resource_dependencies
```

```
=== Resources ===
```

```
Resource:                                     node
  Resource_dependencies:                       node
  ...
```

You must disable dependent resources first before you disable the resources that they depend on.

d. Disable each enabled resource in the cluster.

```
phys-schost# clresource disable resource
```

See the [clresource\(1CL\)](#) man page for more information.

e. Verify that all resources are disabled.

```
phys-schost# clresource show -p Enabled
=== Resources ===
```

```
Resource:                                     resource
  Enabled{nodename1}:                          False
  Enabled{nodename2}:                          False
  ...
```

f. Move each resource group to the unmanaged state.

```
phys-schost# clresourcegroup unmanage resource-group
```

5 Verify that all resources on all nodes are OffLine and that all resource groups are in the Unmanaged state.

```
phys-schost# cluster status -t resource,resourcegroup
```

6 Stop all applications that are running on each node of the cluster.

7 Ensure that all shared data is backed up.

8 Ensure that each system disk is backed up.

Next Steps Upgrade the cluster and OS software. Go to [“How to Upgrade the Software \(Standard Upgrade\)”](#) on page 24.

▼ How to Upgrade the Software (Standard Upgrade)

A standard upgrade upgrades a cluster to a new release, including installed data service software, and upgrades the Oracle Solaris OS to the latest compatible version. You do not need to place the cluster in noncluster mode before performing this upgrade because the upgrade always occurs in the new boot environment and the existing boot environment remains unchanged. You can specify a name for the new boot environment or you can use the auto-generated name.

If you do not want to upgrade all of your software to the latest available version, you can prevent certain components from being upgraded. You can do this by freezing individual packages or

incorporations, or by disabling the appropriate publisher. For instructions, see [Chapter 5, “Configuring Installed Images,” in *Adding and Updating Oracle Solaris 11.1 Software Packages*](#) or the `pkg(1)` man page.

Any time you upgrade the Oracle Solaris Cluster software, by default you also upgrade the data services and Geographic Edition software.

Note – If you want to install any individual Oracle Solaris Cluster SRUs, instead see [“How to Update a Specific Package” in *Oracle Solaris Cluster System Administration Guide*](#).

Oracle Solaris 11.2 software requires Oracle Solaris Cluster 4.1 SRU 8.

Before You Begin If you have failover zones of brand type `solaris` configured on the cluster, you must perform additional steps. Follow the instructions in [“How to Upgrade a Failover Zone” on page 15](#) before you begin this procedure. If you have a `solaris10` brand zone in a zone cluster, follow the instructions in [“Upgrading a `solaris10` Brand Zone in a Zone Cluster” on page 13](#).

1 Assume the root role or assume a role that provides `solaris.cluster.admin` RBAC authorization.

2 Subscribe to the `ha-cluster` publisher that contains the software you want to upgrade to.

```
# pkg set-publisher -G '*' -g URL_for_ha-cluster_publisher ha-cluster
```

3 Ensure that the `solaris` publisher is valid.

```
# pkg publisher
PUBLISHER          TYPE      STATUS  URI
solaris             origin   online  solaris-repository
```

For information about setting the `solaris` publisher, see [Adding and Updating Oracle Solaris 11.1 Software Packages](#).

4 Run the upgrade.

If you are upgrading a failover zone, follow the instructions in [“How to Upgrade a Failover Zone” on page 15](#).

- **To use the command line, perform the following:**

```
# scinstall -u update [-b bename]
```

You can choose to specify a name for the new boot environment with the `-b bename` option.

- **To use the interactive `scinstall` utility, perform the following:**

Note – The cluster nodes must be installed with at least 4.0 SRU 2.

a. Start the `scinstall` utility.

```
phys-schost# scinstall
```

The `scinstall` Main Menu is displayed.

b. Choose the menu item, Upgrade This Cluster Node.

```
*** Main Menu ***
```

```
Please select from one of the following (*) options:
```

- 1) Create a new cluster or add a cluster node
- * 2) Upgrade this cluster node
- * 3) Print release information for this cluster node

- * ?) Help with menu options
- * q) Quit

```
Option: 2
```

The Upgrade Menu is displayed.

c. Choose the menu item, Upgrade This Cluster Node.

d. Follow the menu prompts to upgrade the cluster framework, data service agents, and underlying OS.

Upgrade processing is finished when the system displays the message `Completed Oracle Solaris Cluster framework upgrade` and prompts you to press `Enter` to continue.

e. Quit the `scinstall` utility.

5 As needed, upgrade other applications that support alternate boot environments.

6 Boot the machine into the new boot environment.

- **If you need to upgrade any applications that do not support alternate boot environments, boot into the new boot environment in noncluster mode.**

Add the `-x` option to the boot command to boot into noncluster mode.

- **Otherwise, follow the prompts to boot the machine into the new boot environment.**

Next Steps Go to [Chapter 5, “Completing the Upgrade.”](#)

Performing a Rolling Upgrade

This chapter provides procedures to perform a rolling upgrade of an Oracle Solaris Cluster 4.0 release to the Oracle Solaris Cluster 4.1 release, from the Oracle Solaris Cluster 4.1 release to a newer Oracle Solaris Cluster 4.1 SRU, or from a compatible Oracle Solaris 11 release to a newer Oracle Solaris 11 SRU.

Note – Oracle Solaris 11.2 software requires Oracle Solaris Cluster 4.1 SRU 8.

In a rolling upgrade, you upgrade one cluster node at a time, while the other cluster nodes remain in production. After all nodes are upgraded and have rejoined the cluster, you must commit the cluster to the new software version before you can use any new features.

Note – Oracle Solaris Cluster software does not support rolling upgrade to Oracle Solaris 11 software from a previous marketing release such as Oracle Solaris 10 software, or to Oracle Solaris Cluster 4.1 software from a previous marketing release such as Oracle Solaris Cluster 3.3 software. You can only perform an Oracle Solaris Cluster rolling upgrade of Oracle Solaris Cluster or Oracle Solaris software to an update of the same marketing release, such as from the Oracle Solaris Cluster 4.0 release to the Oracle Solaris Cluster 4.1 release.

This chapter provides the following information to upgrade an Oracle Solaris Cluster 4.0 configuration to the Oracle Solaris Cluster 4.1 release, to an Oracle Solaris Cluster 4.1 SRU, or to an SRU of the Oracle Solaris OS by using the rolling upgrade method:

- [“Performing a Rolling Upgrade of a Cluster” on page 28](#)

Performing a Rolling Upgrade of a Cluster

The following table lists the tasks to upgrade to Oracle Solaris Cluster 4.1 software or to a 4.1 SRU. By default, all Oracle Solaris packages are automatically upgraded.

TABLE 4-1 Task Map: Performing a Rolling Upgrade to Oracle Solaris Cluster 4.1 Software

Task	Instructions
1. Read the upgrade requirements and restrictions.	“Upgrade Requirements and Software Support Guidelines” on page 9
2. If failover zones of brand type <code>solaris</code> are configured in the cluster, upgrade the failover zones.	“Upgrading Failover Zones” on page 15
3. If a quorum server is used, upgrade the Quorum Server software.	“How to Upgrade Quorum Server Software” on page 28
4. On one node of the cluster, move resource groups and device groups to another cluster node, and ensure that shared data and system disks are backed up.	“How to Prepare a Cluster Node for Upgrade (Rolling Upgrade)” on page 30
5. Upgrade the cluster node Oracle Solaris Cluster 4.1 framework, data service, and Geographic Edition software. If necessary, upgrade applications that support alternate boot environments.	“How to Upgrade the Software (Rolling Upgrade)” on page 31
6. Repeat Tasks 3 through 4 on each remaining node to upgrade.	
7. Use the <code>scversions</code> command to commit the cluster to the upgrade.	“How to Commit the Upgraded Cluster” on page 35
8. Verify successful completion of upgrade to Oracle Solaris Cluster 4.1 software.	“How to Verify the Upgrade” on page 36
9. Enable resources and bring resource groups online. Migrate existing resources to new resource types. If necessary, upgrade applications that do not support alternate boot environments.	“How to Finish the Upgrade” on page 37

▼ How to Upgrade Quorum Server Software

If the cluster uses a quorum server, upgrade the Quorum Server software on the quorum server *before* you upgrade the cluster.

Note – If more than one cluster uses the quorum server, perform these steps for each of those clusters.

Perform all steps as the `root` role on the cluster and on the quorum server.

- 1 **If the cluster has two nodes and the quorum server is the cluster's only quorum device, temporarily add a second quorum device.**

See “Adding a Quorum Device” in *Oracle Solaris Cluster System Administration Guide*.

If you add another quorum server as a temporary quorum device, the quorum server can run the same software version as the quorum server that you are upgrading, or it can run the 4.1 version of Quorum Server software.

- 2 **Unconfigure the quorum server from each cluster that uses the quorum server.**

```
phys-schost# clquorum remove quorumserver
```

- 3 **From the quorum server to upgrade, verify that the quorum server no longer serves any cluster.**

```
quorumserver# clquorumserver show +
```

If the output shows any cluster is still served by the quorum server, unconfigure the quorum server from that cluster. Then repeat this step to confirm that the quorum server is no longer configured with any cluster.

Note – If you have unconfigured the quorum server from a cluster but the `clquorumserver show` command still reports that the quorum server is serving that cluster, the command might be reporting stale configuration information. See “Cleaning Up Stale Quorum Server Cluster Information” in *Oracle Solaris Cluster System Administration Guide*.

- 4 **From the quorum server to upgrade, halt all quorum server instances.**

```
quorumserver# clquorumserver stop +
```

- 5 **Uninstall the Quorum Server software from the quorum server to upgrade.**

```
quorumserver# pkg uninstall ha-cluster/*
```

- 6 **(Optional) Clean up or remove the quorum server directories.**

By default, this directory is `/var/scqsd`.

- 7 **Install the Oracle Solaris Cluster 4.1 Quorum Server software, reconfigure the quorum server, and start the quorum server daemon.**

Follow the steps in “How to Install and Configure Oracle Solaris Cluster Quorum Server Software” in *Oracle Solaris Cluster Software Installation Guide* for installing the Quorum Server software.

- 8 **From a cluster node, configure the upgraded quorum server as a quorum device.**

Follow the steps in “How to Configure Quorum Devices” in *Oracle Solaris Cluster Software Installation Guide*.

9 If you configured a temporary quorum device, unconfigure it.

```
phys-schost# clquorum remove tempquorum
```

▼ How to Prepare a Cluster Node for Upgrade (Rolling Upgrade)

Perform this procedure on one node at a time. You will take the upgraded node out of the cluster while the remaining nodes continue to function as active cluster members.

Before You Begin Perform the following tasks:

- Ensure that the configuration meets requirements for upgrade. See [“Upgrade Requirements and Software Support Guidelines” on page 9](#).
- Have available the installation media, documentation, and upgrades for all the software products that you are upgrading, including the following software:
 - Oracle Solaris OS
 - Oracle Solaris Cluster
 - Applications that are managed by Oracle Solaris Cluster 4.1 data service agents
 - Any other third-party applications to upgrade

For instructions on updating single or multiple packages, see [Chapter 11, “Updating Your Software,” in *Oracle Solaris Cluster System Administration Guide*](#).

1 Ensure that the cluster is functioning normally.

- a. View the current status of the cluster by running the following command from any node.**

```
phys-schost% cluster status
```

See the [cluster\(1CL\)](#) man page for more information.

- b. Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.**

- c. Check the volume-manager status.**

2 If necessary, notify users that cluster services might be temporarily interrupted during the upgrade.

Service interruption will be approximately the amount of time that your cluster normally takes to switch services to another node.

3 Assume the root role on a node of the cluster.

4 Move all resource groups and device groups that are running on the node to upgrade.

```
phys-schost# clnode evacuate node-to-evacuate
```

See the `clnode(1CL)` man page for more information.

5 Move any resource groups that are running in a zone-cluster node that is on the node to upgrade.

```
phys-schost# clresourcegroup evacuate -n zone-cluster-node \
-Z zone-cluster-name resource-group
```

6 Verify that the move was completed successfully.

```
phys-schost# cluster status -t devicegroup,resourcegroup
```

7 Ensure that the system disk, applications, and all data are backed up.

Next Steps Go to [“How to Upgrade the Software \(Rolling Upgrade\)”](#) on page 31.

▼ How to Upgrade the Software (Rolling Upgrade)

Perform this procedure to upgrade to Oracle Solaris Cluster 4.1 software or to an Oracle Solaris Cluster 4.1 SRU while the remaining cluster nodes are in cluster mode.

Note – Oracle Solaris 11.2 software requires Oracle Solaris Cluster 4.1 SRU 8.

Note – Until all nodes of the cluster are upgraded and the upgrade is committed, new features that are introduced by the new release might not be available.

Before You Begin If you have failover zones of brand type `solaris` configured on the cluster, you must perform additional steps. Follow the instructions in [“How to Upgrade a Failover Zone”](#) on page 15 before you begin this procedure. If you have a `solaris10` brand zone in a zone cluster, follow the instructions in [“Upgrading a solaris10 Brand Zone in a Zone Cluster”](#) on page 13.

1 Assume the root role or assume a role that provides `solaris.cluster.admin` RBAC authorization on the node of the cluster you want to upgrade.**2 Subscribe to the `ha-cluster` publisher that contains the software you want to upgrade to.**

```
# pkg set-publisher -G '*' -g URL_for_ha-cluster_publisher ha-cluster
```

3 Ensure that the `solaris` publisher is valid.

```
# pkg publisher
PUBLISHER          TYPE    STATUS  URI
solaris            origin online  solaris-repository
```

For information about setting the `solaris` publisher, see [Adding and Updating Oracle Solaris 11.1 Software Packages](#).

4 Run the upgrade on the node you want to upgrade.

If you are upgrading a failover zone, follow the instructions in “How to Upgrade a Failover Zone” on page 15.

▪ **To use the command line, perform the following:**

```
# scinstall -u update [-b bename]
```

You can choose to specify a name for the new boot environment with the `-b bename` option.

▪ **To use the interactive `scinstall` utility, perform the following:**

Note – The cluster nodes must be installed with at least 4.0 SRU 2.

a. Start the `scinstall` utility.

```
phys-schost# scinstall
```

The `scinstall` Main Menu is displayed.

b. Choose the Upgrade This Cluster menu item.

The Upgrade Menu is displayed.

c. If you are upgrading a global-cluster node, follow the menu prompts to upgrade the cluster framework, data service agents, or underlying OS.

If you are upgrading a zone cluster node, follow the menu prompts to upgrade the cluster framework, data service agents, or Oracle RAC for this node.

Upgrade processing is finished when the system displays the message `Completed Oracle Solaris Cluster framework upgrade` and prompts you to press `Enter` to continue.

d. Quit the `scinstall` utility.

5 As needed, upgrade other applications that support alternate boot environments.

6 Boot the node into the new boot environment.

▪ **If you need to upgrade any applications that do not support alternate boot environments, boot into the new boot environment in noncluster mode.**

Add the `-x` option to the boot command to boot into noncluster mode.

▪ **Otherwise, follow the prompts to boot the node into the new boot environment.**

7 Repeat these steps on each remaining node, one at a time, that you want to upgrade.

Next Steps When all nodes in the cluster are upgraded, go to [Chapter 5, “Completing the Upgrade.”](#)

Completing the Upgrade

This chapter provides the following information to complete all Oracle Solaris Cluster 4.1 software upgrade methods:

- “How to Commit the Upgraded Cluster” on page 35
- “How to Verify the Upgrade” on page 36
- “How to Finish the Upgrade” on page 37

Completing a Cluster Upgrade

▼ How to Commit the Upgraded Cluster

Before You Begin Ensure that all upgrade procedures are completed for all cluster nodes that you are upgrading.

- 1 **From one node, check the upgrade status of the cluster.**

```
phys-schost# scversions
```

- 2 **From the following table, perform the action that is listed for the output message from [Step 1](#).**

Output Message	Action
Upgrade commit is needed.	Proceed to Step 3 .
Upgrade commit is NOT needed. All versions match.	Go to “ How to Verify the Upgrade ” on page 36.
Upgrade commit cannot be performed until all cluster nodes are upgraded. Please run <code>scinstall(1m)</code> on cluster nodes to identify older versions.	Return to the Oracle Solaris Cluster upgrade procedures that you used and upgrade the remaining cluster nodes.

Output Message	Action
Check upgrade cannot be performed until all cluster nodes are upgraded. Please run <code>scinstall(1m)</code> on cluster nodes to identify older versions.	Return to the Oracle Solaris Cluster upgrade procedures that you used and upgrade the remaining cluster nodes.

3 After all nodes have rejoined the cluster, from one node commit the cluster to the upgrade.

```
phys-schost# scversions -c
```

Committing the upgrade enables the cluster to utilize all features in the newer software. New features are available only after you perform the upgrade commitment.

4 From one node, verify that the cluster upgrade commitment has succeeded.

```
phys-schost# scversions
```

Upgrade commit is NOT needed. All versions match.

Next Steps Go to [“How to Verify the Upgrade”](#) on page 36.

▼ How to Verify the Upgrade

Perform this procedure to verify that the cluster is successfully upgraded to Oracle Solaris Cluster 4.1 software. Perform all steps from the global zone only.

- Before You Begin**
- Ensure that all upgrade procedures are completed for all cluster nodes that you are upgrading.
 - Ensure that all steps in [“How to Commit the Upgraded Cluster”](#) on page 35 are completed successfully.

1 On each node, assume the root role.

2 On each upgraded node, view the installed levels of Oracle Solaris Cluster software.

```
phys-schost# clnode show-rev -v
```

The first line of output states which version of Oracle Solaris Cluster software the node is running. This version should match the version that you just upgraded to.

3 From any node, verify that all upgraded cluster nodes are running in cluster mode (OnLine).

```
phys-schost# clnode status
```

See the `clnode(1CL)` man page for more information about displaying cluster status.

4 From any node, view the boot environment (BE) created by the upgrade.

```
# beadm list
```

Record the name of the upgraded BE and any other BEs that you might want to boot back into if needed.

Example 5-1 Verifying Upgrade to Oracle Solaris Cluster 4.1 Software

The following example shows the commands used to verify upgrade of a two-node cluster to Oracle Solaris Cluster 4.1 software. The cluster node names are `phys-schost-1` and `phys-schost-2`.

```
phys-schost# clnode show-rev -v
4.1
...
phys-schost# clnode status
=== Cluster Nodes ===

--- Node Status ---

Node Name                               Status
-----
phys-schost-1                           Online
phys-schost-2                           Online
```

Next Steps Go to [“How to Finish the Upgrade”](#) on page 37.

▼ How to Finish the Upgrade

Perform this procedure to finish Oracle Solaris Cluster upgrade. Perform all steps from the global zone only.

Before You Begin Ensure that all steps in [“How to Verify the Upgrade”](#) on page 36 are completed.

- 1 If you upgraded any data services that are not supplied on the product media, register the new resource types for those data services.**

Follow the documentation that accompanies the data services.

- 2 If necessary, reset the `resource_security` property.**

After upgrade, the `resource_security` property for the cluster is reset to `COMPATIBLE`. To use a different security policy for RGM resources, run the following command from one node of the cluster:

```
phys-schost# cluster set -p resource_security=policy clustername
```

You can alternatively use the `clsetup` utility from the Other Cluster Tasks menu option. For more information about the `resource_security` property, see the `cluster(1CL)` man page.

- 3 Migrate resources to new resource type versions.**

You must migrate all resources to the Oracle Solaris Cluster 4.1 resource-type version to use the new features and bug fixes that are provided in this release.

See “Upgrading a Resource Type” in *Oracle Solaris Cluster Data Services Planning and Administration Guide*, which contains procedures which use the command line. Alternatively, you can perform the same tasks by using the Resource Group menu of the `clsetup` utility. The process involves performing the following tasks:

- Registering the new resource type.
- Migrating the eligible resource to the new version of its resource type.
- Modifying the extension properties of the resource type.

Note – The Oracle Solaris Cluster 4.1 release might introduce new default values for some extension properties. These changes affect the behavior of any existing resource that uses the default values of such properties. If you require the previous default value for a resource, modify the migrated resource to set the property to the previous default value.

4 In the global zone, re-enable all disabled resources and bring online all resource groups.

- **To use the `clsetup` utility, perform the following steps:**
 - a. **From any node, start the `clsetup` utility.**
`phys-schost# clsetup`
 The `clsetup` Main Menu is displayed.
 - b. **Choose the menu item, Resource Groups.**
 The Resource Group Menu is displayed.
 - c. **Choose the menu item, Enable/Disable a Resource.**
 - d. **Choose a resource to enable and follow the prompts.**
 - e. **Repeat [Step d](#) for each disabled resource.**
 - f. **When all resources are re-enabled, type `q` to return to the Resource Group Menu.**
 - g. **Choose the menu item, Online/Offline or Switchover a Resource Group.**
 - h. **Follow the prompts to put each resource group into the managed state and then bring the resource group online.**
 - i. **When all resource groups are back online, exit the `clsetup` utility.**
 Type `q` to back out of each submenu, or press `Ctrl-C`.

- To use the command line, perform the following steps:

- a. Enable each disabled resource.

```
# clresource enable resource
```

- b. Verify that each resource is enabled.

```
# clresource status
```

- c. Bring online each resource group.

```
# clresourcegroup online -emM resourcegroup
```

- d. Verify that each resource group is online.

```
# clresourcegroup status
```

5 If zone clusters are configured in the cluster, in each zone cluster re-enable all disabled resources and bring online all resource groups.

```
# clresourcegroup online -Z zonecluster resource-group
# clresource enable -Z zonecluster resource
# clresourcegroup online -eM -Z zonecluster resource-group
```

6 If, before upgrade, you enabled automatic node reboot if all monitored shared-disk paths fail, ensure that the feature is still enabled.

Also perform this task if you want to configure automatic reboot for the first time.

- a. Determine whether the automatic reboot feature is enabled or disabled.

```
phys-schost# clnode show
```

- If the `reboot_on_path_failure` property is set to `enabled`, no further action is necessary.
- If `reboot_on_path_failure` property is set to `disabled`, proceed to the next step to re-enable the property.

- b. Enable the automatic reboot feature.

```
phys-schost# clnode set -p reboot_on_path_failure=enabled node
```

```
-p Specifies the property to set
```

```
reboot_on_path_failure=enable Specifies that the node will reboot if all monitored
disk paths fail, provided that at least one of the disks
is accessible from a different node in the cluster.
```

- c. Verify that automatic reboot on disk-path failure is enabled.

```
phys-schost# clnode show
=== Cluster Nodes ===
```

```

Node Name:                               node
...
reboot_on_path_failure:                   enabled
...

```

7 Revalidate the upgraded cluster configuration.

See “How to Validate the Cluster” in *Oracle Solaris Cluster Software Installation Guide*.

8 (Optional) Capture the ZFS root pool property information for future reference.

```
phys-schost# zpool get all rootpool > filename
```

Store the file in a location outside the cluster. If you make any root pool configuration changes, run this command again to capture the changed configuration. If necessary, you can use this information to restore the root pool partition configuration. For more information, see the [zpool\(1M\)](#) man page.

9 (Optional) Make a backup of your cluster configuration.

An archived backup of your cluster configuration facilitates easier recovery of your cluster configuration.

For more information, see “How to Back Up the Cluster Configuration” in *Oracle Solaris Cluster System Administration Guide*.

Troubleshooting

Resource-type migration failure - Normally, you migrate resources to a new resource type while the resource is offline. However, some resources need to be online for a resource-type migration to succeed. If resource-type migration fails for this reason, error messages similar to the following are displayed:

```

phys-schost - Resource depends on a SUNW.HASStoragePlus type resource that is not
online anywhere.
(C189917) VALIDATE on resource nfsrs, resource group rg, exited with
non-zero exit status.
(C720144) Validation of resource nfsrs in resource group rg on node
phys-schost failed.

```

If resource-type migration fails because the resource is offline, use the `clsetup` utility to re-enable the resource and then bring its related resource group online. Then repeat migration procedures for the resource.

Java binaries location change - If the location of the Java binaries changed during the upgrade of Oracle Solaris software, you might see error messages similar to the following when you attempt to run the `cacaoadm start` command:

```

phys-schost# /usr/sbin/cacaoadm start
No suitable Java runtime found. Java 1.7 or higher is required.

```

```
Jan 3 17:10:26 ppups3 cacao: No suitable Java runtime found. Java 1.7 or higher  
is required.
```

```
Cannot locate all the dependencies
```

This error is generated because the start command cannot locate the current location of the Java binaries. The `JAVA_HOME` property still points to the directory where the previous version of Java was located, but that previous version was removed during upgrade.

To correct this problem, change the setting of `JAVA_HOME` in the following configuration file to use the current Java directory:

```
/etc/opt/SUNWcacao/cacao.properties
```

Next Steps The cluster upgrade is complete.

Recovering From an Incomplete Upgrade

This chapter provides the following information to recover from certain kinds of incomplete upgrades:

- [“Recovering From Storage Configuration Changes During Upgrade” on page 43](#)

Recovering From Storage Configuration Changes During Upgrade

This section provides the following repair procedures to follow if changes were inadvertently made to the storage configuration during upgrade:

- [“How to Handle Storage Reconfiguration During an Upgrade” on page 43](#)
- [“How to Resolve Mistaken Storage Changes During an Upgrade” on page 44](#)

▼ How to Handle Storage Reconfiguration During an Upgrade

Any changes to the storage topology, including running Oracle Solaris Cluster commands, should be completed before you upgrade the Oracle Solaris software. If, however, changes were made to the storage topology during the upgrade, perform the following procedure. This procedure ensures that the new storage configuration is correct and that existing storage that was not reconfigured is not mistakenly altered.

Before You Begin Ensure that the storage topology is correct. Check whether the devices that were flagged as possibly being replaced map to devices that actually were replaced. If the devices were not replaced, check for and correct possible accidental configuration changes, such as incorrect cabling.

- 1 **On a node that is attached to the unverified device, assume the root role.**

2 Manually update the unverified device for the node list.

```
phys-schost# cldevice repair -n node[,...] device
```

See the `cldevice(1CL)` man page for more information.

3 Update the DID driver for the node list.

```
phys-schost# cldevice refresh -n node[,...]
```

4 Repeat Step 2 through Step 3 on all other nodes that are attached to the unverified device.

Next Steps Return to the remaining upgrade tasks. Go to “[How to Upgrade the Software \(Standard Upgrade\)](#)” on page 24.

▼ How to Resolve Mistaken Storage Changes During an Upgrade

If accidental changes are made to the storage cabling during the upgrade, perform the following procedure to return the storage configuration to the correct state.

Note – This procedure assumes that no physical storage was actually changed. If physical or logical storage devices were changed or replaced, instead follow the procedures in “[How to Handle Storage Reconfiguration During an Upgrade](#)” on page 43.

Before You Begin Return the storage topology to its original configuration. Check the configuration of the devices that were flagged as possibly being replaced, including the cabling.

1 On each node of the cluster, assume the root role.**2 Update the DID driver on each node of the cluster.**

```
phys-schost# cldevice refresh -n node[,...]
```

See the `cldevice(1CL)` man page for more information.

3 If the `cldevice` command returned any error messages in Step 2, make further modifications as needed to correct the storage configuration, then repeat Step 2.

Next Steps Return to the remaining upgrade tasks. Go to “[How to Upgrade the Software \(Standard Upgrade\)](#)” on page 24.

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