



Sun Cluster 3.x With Sun StorEdge 3310 Array Manual

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

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Preface

The *Sun Cluster 3.x with Sun StorEdge 3310 Array Manual* provides procedures specific to Sun StorEdge™ 3310 SCSI storage devices that are placed in a Sun™ Cluster environment.

Use this manual with any version of Sun Cluster 3.x software. Unless otherwise noted, procedures are the same for all Sun Cluster 3.x versions. See the “Revision History” on page 6 for a list of changes to this manual.

Two versions of the StorEdge 3310 SCSI array exist, and this book provides the specialized Sun Cluster procedures for both RAID and JBOD versions of the storage device.

Who Should Use This Book

This book is for Sun representatives who are performing the initial installation of a Sun Cluster configuration and for system administrators who are responsible for maintaining the system.

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

How This Book Is Organized

The following chapters contain information about hardware used in a Sun Cluster environment.

Chapter 1 discusses how to install, configure, and maintain the RAID version of the StorEdge 3310 storage array.

Chapter 2 discusses how to install and maintain the JBOD version of the StorEdge 3310 storage array.

Revision History

The following table lists the information that has been revised or added since the initial release of this documentation. The table also lists the revision date for these changes.

TABLE P-1 Sun Cluster 3.x with Sun StorEdge 3310 Array Manual

Revision Date	New Information
July 2003	Updated illustrations.

Related Documentation

The following books provide conceptual information or procedures to administer hardware and applications. If you plan to use this documentation in a hard-copy format, ensure that you have the following books available for your reference.

The following Sun Cluster books support the Sun Cluster 3.1 release. If you are maintaining a different version of Sun Cluster software, refer to the appropriate documentation. All Sun Cluster documentation is available on <http://docs.sun.com>.

Documentation that is not available on <http://docs.sun.com> is listed with the appropriate URL.

TABLE P-2 Hardware Documentation

Title	Part Number
<i>Sun StorEdge PCI Dual Ultra 3 SCSI Host Adapter Release Notes</i>	816-2157
<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i>	816-7290
<i>Sun StorEdge 3310 SCSI Configuration Service User Guide</i>	816-7298

TABLE P-3 Sun Cluster Documentation

Application	Title	Part Number
Concepts	<i>Sun Cluster 3.1 Concepts Guide</i>	816-3383
Hardware	<i>Sun Cluster 3.x Hardware Administration Manual</i>	817-0168
	Sun Cluster 3.x Hardware Administration Collection at http://docs.sun.com/db/coll/1024.1/	
Software Installation	<i>Sun Cluster 3.1 Software Installation Guide</i>	816-3388
Data Services	<i>Sun Cluster 3.1 Data Service Planning and Administration Guide</i>	817-1526
	Sun Cluster 3.1 Data Service Collection at http://docs.sun.com/db/coll/573.10/	
API Development	<i>Sun Cluster 3.1 Data Services Developer's Guide</i>	816-3385
Administration	<i>Sun Cluster 3.1 System Administration Guide</i>	816-3384
Error Messages	<i>Sun Cluster 3.1 Error Messages Guide</i>	816-3382
Man Pages	<i>Sun Cluster 3.1 Man Page Reference Manual</i>	816-5251
Release Notes	<i>Sun Cluster 3.1 Release Notes</i>	816-5317
	<i>Sun Cluster 3.1 Release Notes Supplement</i>	816-3381

Using UNIX Commands

This document contains information on commands used to install, configure, or upgrade a Sun Cluster configuration. This document might not contain complete information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following sources for this information.

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

Getting Help

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

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

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

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

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

Accessing Sun Documentation Online

The docs.sun.comSM Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is `http://docs.sun.com`.

Typographic Conventions

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

TABLE P-4 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	<code>machine_name% su</code> Password:
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To delete a file, type rm <i>filename</i> .
<i>AaBbCc123</i>	Book titles, new words, or terms, or words to be emphasized.	Read Chapter 6 in <i>User's Guide</i> . These are called <i>class</i> options. You must be <i>root</i> to do this.

Shell Prompts in Command Examples

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

TABLE P-5 Shell Prompts

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

Installing and Maintaining Sun StorEdge 3310 SCSI RAID Array

This chapter describes the procedures about how to install, configure, and maintain Sun StorEdge™ 3310 RAID arrays in a Sun™ Cluster environment.

Read the entire procedure before you perform any steps within a procedure in this chapter. If you are not reading an online version of this document, ensure that you have the books listed in Preface available.

This chapter contains the following procedures.

- “How to Install a RAID Storage Array” on page 12
- “How to Create and Map a LUN” on page 14
- “How to Unmap and Delete a LUN” on page 15
- “How to Add a RAID Storage Array” on page 19
- “How to Remove a RAID Storage Array” on page 21
- “How to Replace a Controller” on page 23
- “How to Replace an I/O Module” on page 24
- “How to Replace a Terminator Module” on page 24

Installing RAID Storage Arrays

This section contains the procedure for an *initial installation* of storage arrays in a new cluster configuration. To add storage arrays to an operating cluster, use the procedure, “How to Add a RAID Storage Array” on page 19.

Note – The storage array must be mirrored with another storage array to ensure high availability.

▼ How to Install a RAID Storage Array

Use this procedure to install and configure RAID storage arrays *before* installing the Solaris operating environment and Sun Cluster software on your nodes.

This procedure assumes that the hardware is not connected.

Note – To attach a JBOD storage array to a RAID storage array as an expansion unit, attach the JBOD storage array before connecting the RAID storage array to the nodes. For more information, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

1. Install the host adapters in the nodes that connect to the RAID storage array.

For the procedure about how to install host adapters, see the documentation that shipped with your host adapters and nodes.

2. Cable the RAID storage array to the nodes.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure about how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

3. RAID storage arrays have redundant power inputs. Connect each power cord from the RAID storage array to a different power source.

Different RAID storage arrays can share power sources.

4. Install the Solaris operating environment, then apply any required Solaris patches.

For software installation procedures, see your Sun Cluster software installation documentation.

Note – For the current list of patches that are required for the Solaris operating environment, refer to SunSolve. SunSolve is available online to Sun service providers and to customers with SunSolve service contracts at the SunSolve site: <http://sunsolve.sun.com>.

5. If necessary, install the qus driver and appropriate driver patches.

For driver installation procedures, see the *Sun StorEdge PCI Dual Ultra 3 SCSI Host Adapter Release Notes*.

6. If necessary, upgrade the controller firmware.

7. Set up and configure the RAID storage arrays with logical units (LUNs).

For the procedure about how to set up the storage array with LUNs, see “How to Create and Map a LUN” on page 14.

Note – If you want to use the Configuration Service Console, perform this step after Step 8.

8. (Optional) Install the Configuration Service.

For the procedure about how to install the Configuration Service, see the *Sun StorEdge 3310 SCSI Configuration Service User Guide*.

9. Install the Sun Cluster software and volume management software.

For software installation procedures, see the your Sun Cluster software installation documentation.

Where to Go From Here

To continue with Sun Cluster software and data services installation tasks, see your Sun Cluster software installation documentation and your Sun Cluster data services collection.

Configuring RAID Storage Arrays

This product supports the use of hardware RAID and host-based software RAID. For host-based software RAID, this product supports RAID levels 0+1 and 1+0.

Note – When you use host-based software RAID with hardware RAID, the hardware RAID levels you use affect the hardware maintenance procedures due to volume management administration.

If you use hardware RAID level 1, 3, or 5, you can perform most maintenance procedures in “Maintaining RAID Storage Arrays” on page 17 without volume management disruptions. If you use hardware RAID level 0, some maintenance procedures in “Maintaining RAID Storage Arrays” on page 17 require additional volume management administration because the availability of the LUNs is impacted.

Note – When you upgrade firmware on a storage device or on an enclosure, redefine the stripe size of a LUN, or perform other LUN operations, a device ID (DID) might change unexpectedly. When you perform a check of the DID configuration by running the `scdidadm -c` command, the following error message appears on your console if the DID changed unexpectedly.

```
device id for nodename:/dev/rdisk/cXtYdZsN does not match physical
device's id for ddecimalnumber, device may have been replaced.
```

To fix DIDs that report this error, run the `scdidadm -R` command for each affected device.

This section describes the procedures about how to configure a RAID storage array *after* installing Sun Cluster software. Table 1–1 lists these procedures.

To configure a RAID storage array *before* you install Sun Cluster software, follow the same procedure that you use in a noncluster environment. For procedures about how to configure RAID storage arrays before you install Sun Cluster, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

TABLE 1–1 Task Map: Configuring Disk Drives

Task	Information
Create a logical unit (LUN).	"How to Create and Map a LUN" on page 14
Remove a LUN.	"How to Unmap and Delete a LUN" on page 15

▼ How to Create and Map a LUN

Use this procedure to create a logical unit (LUN) from unassigned disk drives or remaining capacity. See the *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide* for the latest information about LUN administration.

- 1. Create and partition the logical device(s).**
For more information on creating a LUN, see the *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide*.
- 2. Map the LUNs to the host channels that are cabled to the nodes.**
For more information on mapping LUNs to host channels, see *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide*.

Note – You can have a maximum of 64 shared LUNs.

3. **Ensure that each LUN has an associated entry in the `/kernel/drv/sd.conf` file.**

For more information, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

4. **To make the changes to the `/kernel/drv/sd.conf` file active, perform one of the following options.**

- On systems that run Solaris 8 Update 7 or below, perform a reconfiguration boot.
- For Solaris 9 and above, run the `update_drv -f sd` command and then the `devfsadm` command.

5. **If necessary, label the LUNs.**

6. **If the cluster is online and active, update the global device namespace.**

```
# scgdevs
```

7. **If you want a volume manager to manage the new LUN, run the appropriate Solstice DiskSuite/Solaris Volume Manager commands or VERITAS Volume Manager commands. Use these commands to incorporate the new LUN into a diskset or disk group.**

For information on administering LUNs, see your Sun Cluster system administration documentation.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

8. **If you want the new LUN to be a quorum device, add the quorum device.**

For the procedure about how to add a quorum device, see your Sun Cluster system administration documentation.

▼ How to Unmap and Delete a LUN

Use this procedure to delete a LUN(s). See the *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide* for the latest information about LUN administration.

This procedure assumes that the cluster is online. A cluster is online if the RAID storage array is connected to the nodes and all nodes are powered on. This procedure also assumes that you plan to telnet to the RAID storage array perform this procedure.



Caution – When you delete the LUN, you remove all data on that LUN.

1. Identify the LUNs that you need to remove.

```
# cfgadm -al
```

2. Is the LUN a quorum device? This LUN is the LUN that you are removing.

```
# scstat -q
```

- If no, proceed to Step 3.
- If yes, relocate that quorum device to another suitable RAID storage array.
For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

3. Remove the LUN from disksets or disk groups.

Run the appropriate Solstice DiskSuite/Solaris Volume Manager commands or VERITAS Volume Manager commands to remove the LUN from any diskset or disk group. For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation. See the following paragraph for additional VERITAS Volume Manager commands that are required.

Note – LUNs that were managed by VERITAS Volume Manager must be completely removed from VERITAS Volume Manager control before you can delete the LUNs from the Sun Cluster environment. After you delete the LUN from any disk group, use the following commands **on both nodes** to remove the LUN from VERITAS Volume Manager control.

```
# vxdisk offline cNtXdY  
# vxdisk rm cNtXdY
```

4. On both nodes, unconfigure the device that is associated with the LUN.

```
# cfgadm -c unconfigure cx::dsk/cxydz
```

5. Unmap the LUN from both host channels.

For the procedure about how to unmap a LUN, see the *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide*.

6. Delete the logical drive.

For more information, see the *Sun StorEdge 3310 SCSI RAID Firmware Version 3.25 Guide*.

7. On both nodes, remove the paths to the LUN that you are deleting.

```
# devfsadm -C
```

8. On both nodes, remove all obsolete device IDs (DID)s.

```
# sddidadm -C
```

9. If no other LUN is assigned to the target and LUN ID, remove the LUN entries from `/kernel/drv/sd.conf` file.

Perform this step on both nodes to prevent extended boot time caused by unassigned LUN entries.

Note – Do not remove default `t0d0` entries.

Maintaining RAID Storage Arrays

This section contains the procedures about how to maintain a RAID storage array in a Sun Cluster environment. Maintenance tasks in Table 1–2 contain cluster-specific tasks. Tasks that are not cluster-specific are referenced in a list following the table.

Note – When you upgrade firmware on a storage device or on an enclosure, redefine the stripe size of a LUN, or perform other LUN operations, a device ID (DID) might change unexpectedly. When you perform a check of the DID configuration by running the `sddidadm -c` command, the following error message appears on your console if the DID changed unexpectedly.

```
device id for nodename:/dev/rdisk/cXtYdZsN does not match physical
device's id for ddecimalnumber, device may have been replaced.
```

To fix DIDs that report this error, run the `sddidadm -R` command for each affected device.

TABLE 1–2 Tasks: Maintaining a RAID Storage Array

Task	Information
Add a RAID storage array.	"How to Add a RAID Storage Array" on page 19
Remove a RAID storage array.	"How to Remove a RAID Storage Array" on page 21

TABLE 1–2 Tasks: Maintaining a RAID Storage Array *(Continued)*

Task	Information
Replace a RAID storage array. To replace a RAID storage array, remove the RAID storage array. Add a new RAID storage array to the configuration.	“How to Remove a RAID Storage Array” on page 21 “How to Add a RAID Storage Array” on page 19
Add a JBOD as an expansion unit. Follow the same procedure that you use in a noncluster environment. If you plan to use the disk drives in the expansion unit to create a new LUN, see “How to Create and Map a LUN” on page 14	<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i> “How to Create and Map a LUN” on page 14
Remove a JBOD expansion unit. Follow the same procedure that you use in a noncluster environment. If you plan to remove a LUN in conjunction with the disk drive, see “How to Unmap and Delete a LUN” on page 15.	<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i> “How to Unmap and Delete a LUN” on page 15
Add a disk drive. Follow the same procedure that you use in a noncluster environment. If you plan to create a new LUN with the disk drive, see “How to Create and Map a LUN” on page 14.	<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i> “How to Create and Map a LUN” on page 14
Remove a disk drive. Follow the same procedure that you use in a noncluster environment. If you plan to remove a LUN in conjunction with the disk drive, see “How to Unmap and Delete a LUN” on page 15. If your configuration is running in RAID level 0, take appropriate action to prepare the volume manager for the impacted disk to be inaccessible.	<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i> “How to Unmap and Delete a LUN” on page 15
Replace a failed controller or restore an offline controller.	“How to Replace a Controller” on page 23
Replace a host-to-storage array SCSI cable. Switch the device group over to the other node before performing this procedure. Then follow the same procedure that you use in a noncluster environment.	<i>Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual</i>

TABLE 1–2 Tasks: Maintaining a RAID Storage Array (Continued)

Task	Information
Replace the I/O module.	"How to Replace an I/O Module" on page 24
Replace the Terminator Module.	"How to Replace a Terminator Module" on page 24

The following is a list of administrative tasks which require no cluster-specific procedures. See the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual* for the following procedures.

- Replace a disk drive
- Replace the battery unit
- Replace a JBOD-to-RAID unit SCSI cable
- Replace a power and fan module
- Replace a power cord to a RAID storage array.

▼ How to Add a RAID Storage Array

Use this procedure to add RAID storage arrays to a running cluster.

Note – This procedure assumes that your nodes are not configured with dynamic reconfiguration functionality.

If your nodes are configured for dynamic reconfiguration, see your *Sun Cluster 3.x Hardware Administration Manual*.

1. Install any RAID storage array packages and patches on nodes.

Note – For the most current list of software, firmware, and patches that are required for the RAID storage array, refer to SunSolve. SunSolve is available online to Sun service providers and to customers with SunSolve service contracts at the SunSolve site: <http://sunsolve.sun.com>.

2. Power on the RAID storage array.

For procedures about how to power on the storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

3. Configure the RAID storage array.

For the procedure about how to create LUNs, see “How to Create and Map a LUN” on page 14.

4. **On each node that is connected to the RAID storage array, ensure that each LUN has an associated entry in the `/kernel/drv/sd.conf` file.**

For more information, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

5. **Shut down the first node.**

For the procedure about how to shut down and power off a node, see your Sun Cluster system administration documentation.

6. **If you are installing new host adapters, power off the first node.**

For the procedure about how to power off a node, see *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

7. **Install the host adapters in the first node.**

For the procedure about how to install host adapters, see the documentation that shipped with your host adapters and nodes.

8. **Cable the RAID storage array to the first node.**

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure about how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

9. **Boot the first node.**

For the procedure about how to boot nodes, see your Sun Cluster system administration documentation.

10. **Verify that the first node recognizes the new host adapters and disk drives.**

If the node does not recognize the new hardware, check all hardware connections and repeat installation steps you performed in Step 7.

```
{0} ok show-disks
a) /pci@1f,4000/pci@2/scsi@5/sd
b) /pci@1f,4000/pci@2/scsi@4/sd
...
```

11. **If necessary, perform a reconfiguration boot on the first node to create the new Solaris device files and links.**

12. **Shut down the second node.**

For the procedure about how to shut down a node, see your Sun Cluster system administration documentation.

13. **If you are installing new host adapters, power off the second node.**

For the procedure about how to shut down and power off a node, see your Sun Cluster system administration documentation.

14. Install the host adapters in the second node.

For the procedure about how to install host adapters, see the documentation that shipped with your nodes.

15. Cable the RAID storage array to the second node.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure about how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

16. Boot the second node.

For the procedure about how to boot nodes, see your Sun Cluster system administration documentation

17. Verify that the second node recognizes the new host adapters and disk drives.

If the node does not recognize the new hardware, check all hardware connections and repeat installation steps you performed in Step 14.

```
{0} ok show-disks
a) /pci@1f,4000/pci@2/scsi@5/sd
b) /pci@1f,4000/pci@2/scsi@4/sd
...
```

18. If necessary, perform a reconfiguration boot on the second node to create the new Solaris device files and links.

19. For all nodes that are attached to the RAID storage array, verify that the DIDs have been assigned to the LUNs.

```
# scdidadm -L
```

▼ How to Remove a RAID Storage Array

Use this procedure to remove a RAID storage array from a running cluster.

This procedure assumes that your nodes are not configured with dynamic reconfiguration functionality. If your nodes are configured for dynamic reconfiguration, see your *Sun Cluster 3.x Hardware Administration Manual*.



Caution – This procedure removes all data that is on the RAID storage array that you remove.

1. **Is one of the disks in the RAID storage array a quorum device? This RAID storage array is the storage array that you are removing.**

```
# scstat -q
```

- If no, proceed to Step 2.
- If yes, relocate that quorum device to another suitable RAID storage array.
For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

2. **If necessary, back up the metadvice or volume.**

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

3. **Perform volume management administration to remove the RAID storage array from the configuration.**

If a volume manager does manage the LUN, run the appropriate Solstice DiskSuite/Solaris Volume Manager commands or VERITAS Volume Manager commands to remove the LUN from any diskset or disk group. For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation. See the following paragraph for additional VERITAS Volume Manager commands that are required.

Note – LUNs that were managed by VERITAS Volume Manager must be completely removed from VERITAS Volume Manager control before you can delete the LUNs from the Sun Cluster environment. After you delete the LUN from any disk group, use the following commands *on both nodes* to remove the LUN from VERITAS Volume Manager control.

```
# vxdisk offline cNtXdY
# vxdisk rm cNtXdY
```

4. **Identify the LUNs that you need to remove.**

```
# cfgadm -al
```

5. **On all nodes, remove references to the LUNs in the RAID storage array that you removed.**

```
# cfgadm -c unconfigure cN::dsk/cNtXdY
```

6. **Disconnect the SCSI cables from the RAID storage array.**

7. **On both nodes, remove the paths to the LUN that you are deleting.**

```
# devfsadm -C
```

8. **On both nodes, remove all obsolete device IDs (DIDs).**

```
# scdidadm -C
```

9. **If no other LUN is assigned to the target and LUN ID, remove the LUN entries from `/kernel/drv/sd.conf` file.**

Perform this step on both nodes to prevent extended boot time caused by unassigned LUN entries.

Note – Do not remove default `t0d0` entries.

10. **Power off the RAID storage array. Disconnect the RAID storage array from the AC power source.**

For the procedure about how to power off a storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

11. **Remove the RAID storage array.**

For the procedure about how to remove a storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

12. **If necessary, remove any unused host adapters from the nodes.**

For the procedure about how to remove a host adapter, see your Sun Cluster system administration documentation and the documentation that shipped with your host adapter and node.

13. **From any node, verify that the configuration is correct.**

```
# scdidadm -L
```

▼ How to Replace a Controller

If the RAID storage array is configured with dual controllers, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual* for controller replacement procedures. If the RAID storage array is configured with a single controller, perform the procedure below to ensure high availability.

1. **Detach the submirrors on the RAID storage array that are connected to the controller. This controller is the controller that you are replacing. Detach the submirrors to stop all I/O activity to the RAID storage array.**

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

2. **Replace the controller.**

For the procedure about how to replace a controller, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

3. **Reattach the submirrors to resynchronize the submirrors.**

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

How to Replace an I/O Module

Use this procedure to replace a RAID storage array I/O module.

Note – If your configuration is running in RAID level 0, take appropriate action to prepare the volume manager for the impacted disk to be inaccessible.

1. **Detach the submirrors on the RAID storage array that are connected to the I/O module that you are replacing. Detach the submirrors to stop all I/O activity to the RAID storage array.**

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

2. **Disconnect the SCSI cables from the hosts.**
3. **Disconnect the SCSI cables from the I/O module.**
4. **Replace the I/O module.**
5. **Reconnect the SCSI cables to the I/O module.**
6. **Reconnect the SCSI cables to the host.**
7. **Reattach the submirrors to resynchronize submirrors.**

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

How to Replace a Terminator Module

Use this procedure to replace a RAID storage array terminator module.

Note – If your configuration is running in RAID level 0, take appropriate action to prepare the volume manager for the impacted disk to be inaccessible.

1. **Detach the submirrors on the RAID storage array that are connected to the terminator module that you are replacing. Detach the submirrors to stop all I/O activity to the RAID storage array.**

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

2. Replace the terminator module.

For the procedure about how to replace the terminator module, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

3. Reattach the submirrors to resynchronize submirrors.

For more information, see your VERITAS Volume Manager or Solstice DiskSuite/Solaris Volume Manager documentation.

Installing and Maintaining Sun StorEdge 3310 SCSI JBOD Arrays

This chapter describes the procedures about how to install, configure, and maintain Sun StorEdge™ 3310 SCSI JBOD arrays in a Sun™ Cluster environment.

Read the entire procedure before you perform any steps within a procedure in this chapter. If you are not reading an online version of this document, ensure that you have the books listed in Preface available.

This chapter contains the following procedures.

- “How to Install a JBOD Storage Array” on page 28
- “How to Add a JBOD Storage Array” on page 31
- “How to Remove a JBOD Storage Array” on page 36
- “How to Replace a Chassis” on page 38
- “How to Add a Disk Drive” on page 40
- “How to Remove a Disk Drive” on page 41
- “How to Replace a Disk Drive” on page 42

Installing JBOD Storage Arrays

This section contains the procedure for an initial installation of the JBOD storage array in a new cluster configuration.

You can install the JBOD storage array as an expansion unit to a JBOD storage array or as a standalone storage platform.

To install the JBOD storage array as an expansion unit, follow the same procedure that is used in a noncluster environment. If you plan to use the disk drives in the expansion unit to create a new LUN, see “How to Create and Map a LUN” on page 14.

▼ How to Install a JBOD Storage Array

Perform this procedure in conjunction with the procedures in your Sun Cluster software installation documentation and your server hardware manual.

This procedure assumes that all nodes are powered off, the hardware is disconnected, and the operating system and clustering software are not installed.

1. If necessary, install the host adapters in the node that you plan to connect to the JBOD storage array.

For the procedure about how to install host adapters, see the documentation that shipped with your host adapters and node.

2. Cable the JBOD storage arrays to the nodes.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure on how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual* and the *Sun StorEdge 3310 SCSI Array Release Notes*.

3. The JBOD storage arrays have redundant power inputs. Connect each power cord from the JBOD storage array to a different power source.

Different JBOD storage arrays can share power sources.

4. Ensure that each device in the SCSI chain has a unique SCSI address.

This procedure ensures that each device in the SCSI chain has a unique SCSI address.

a. If necessary, power on the storage devices.

For the procedure on powering on a storage device, see the service manual that shipped with your storage device.

b. If necessary, power on the *first* node, but do not allow it to boot. If necessary, halt the system to continue with OBP Monitor tasks.

c. Set the `scsi-initiator-id` for one node to 6.

```
{1} ok setenv scsi-initiator-id 6
scsi-initiator-id = 6
```

d. Find the paths to the host adapters that connect to the local disk drives.

```
{0} ok show-disks
```

Use this information to change the SCSI addresses in the `nvrामrc` script. Do not include the `/sd` directories in the device paths.

e. Edit the `nvrामrc` script to set the `scsi-initiator-id` for the local devices on the first node to 7.

For a full list of commands, see the *OpenBoot 2.x Command Reference Manual*.



Caution – Insert exactly one space after the first double quote and before `scsi-initiator-id`.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok nvedit
0: probe-all
1: cd /pci@1f,4000/scsi@2
2: 7 " scsi-initiator-id" integer-property
3: device-end
4: cd /pci@1f,4000/scsi@3
5: 7 " scsi-initiator-id" integer-property
6: device-end
7: install-console
8: banner[Control C]
{0} ok
```

f. Store the changes.

The changes you make through the `nvedit` command are recorded on a temporary copy of the `nvrarc` script. You can continue to edit this copy without risk. After you complete your edits, save the changes. If you are not sure about the changes, discard them.

- To store the changes, type:

```
{0} ok nvstore
{1} ok
```

- To discard the changes, type:

```
{0} ok nvquit
{1} ok
```

g. Verify the contents of the `nvrarc` script that you created, as shown in the following example.

If the contents of the `nvrarc` script are incorrect, use the `nvedit` command to make corrections.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok printenv nvrarc
nvrarc =
        probe-all
        cd /pci@1f,4000/scsi@2
        7 " scsi-initiator-id" integer-property
        device-end
        cd /pci@1f,4000/scsi@3
        7 " scsi-initiator-id" integer-property
        device-end
        install-console
        banner
```

```
{1} ok
```

- h. Instruct the OpenBoot PROM (OBP) Monitor to use the nvramrc script, as shown in the following example.**

```
{0} ok setenv use-nvramrc? true
use-nvramrc? = true
{1} ok
```

- 5. Verify that the `scsi-initiator-id` is set correctly on the second node.**

- a. If necessary, power on the second node, but do not allow it to boot. If necessary, halt the system to continue with OBP Monitor tasks.**
- b. Verify that the `scsi-initiator-id` for each host adapter on the second node is set to 7**

Use the `show-disks` command to find the paths to the host adapters that are connected to these enclosures. Select each host adapter's device tree node, and display the node's properties to confirm that the `scsi-initiator-id` for each host adapter is set to 7.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok cd /pci@6,4000/pci@3/scsi@5
{0} ok .properties
scsi-initiator-id      00000007
...
```

- 6. Install the Solaris operating environment, then apply any required Solaris patches.**

For software installation procedures, see your Sun Cluster software installation documentation.

Note – For the current list of patches that are required for the Solaris operating environment, refer to SunSolve. SunSolve is available online to Sun service providers and to customers with SunSolve service contracts at the SunSolve site: <http://sunsolve.sun.com>.

- 7. If necessary, install the `qus` driver and appropriate driver patches.**

For driver installation procedures, see the *Sun StorEdge PCI Dual Ultra 3 SCSI Host Adapter Release Notes*.

- 8. Install the Sun Cluster software and volume management software.**

For software installation procedures, see your Sun Cluster software installation documentation.

Maintaining JBOD Storage Arrays

This section provides cluster-specific procedures about how to maintain a JBOD storage array. See the documentation that shipped with your JBOD storage array for general maintenance procedures.

TABLE 2-1 Task Map: Maintaining a JBOD Storage Array

Task	Information
Add a JBOD storage array	"How to Add a JBOD Storage Array" on page 31
Remove a JBOD storage array	"How to Remove a JBOD Storage Array" on page 36
Replace a JBOD storage array	"How to Remove a JBOD Storage Array" on page 36
To replace a JBOD storage array, remove the JBOD storage array. Add a new JBOD storage array to the configuration.	"How to Add a JBOD Storage Array" on page 31
Replace a chassis	"How to Replace a Chassis" on page 38
Add a disk drive	"How to Add a Disk Drive" on page 40
Remove a disk drive	"How to Remove a Disk Drive" on page 41
Replace a disk drive	"How to Replace a Disk Drive" on page 42
Replace a SCSI cable	<i>Sun Cluster 3.x Hardware Administration Manual</i>

▼ How to Add a JBOD Storage Array

Use this procedure to install a JBOD storage array in a running cluster. Perform the steps in this procedure in conjunction with the procedures in your Sun Cluster system administration documentation and your server hardware manual.

This procedure uses an updated method for setting the `scsi-initiator-id`. This new method must be used with the StorEdge PCI Dual Ultra3 SCSI host adapter. If you are adding this storage array to a cluster configuration that uses the previous method of setting the `scsi-initiator-id`, you will need to update the `nvrarc` script and set the `scsi-initiator-id` by using this procedure. The previous method relied on setting each node's `scsi-initiator-id` for shared storage in the `nvrarc` script.

Note – To determine if the cluster configuration uses the previous method of setting the `scsi-initiator-id`, run the following command on the two nodes that you plan to connect to this storage device.

```
# eeprom scsi-initiator-id
```

If `scsi-initiator-id` equals 7 on both nodes, you must update the `nvrarc` script and set the `scsi-initiator-id` for each node that connects to this storage device.

For conceptual information on multi-initiator SCSI and device IDs, see your Sun Cluster concepts documentation.

1. Shut down the *first* node.

For the procedure on shutting down and powering off a node, see your Sun Cluster system administration documentation.

2. If necessary, install the host adapters in the first node.

For the procedure about how to install host adapters, see the documentation that shipped with your host adapters and nodes.

3. Connect the SCSI cable between the first node and the JBOD storage array.

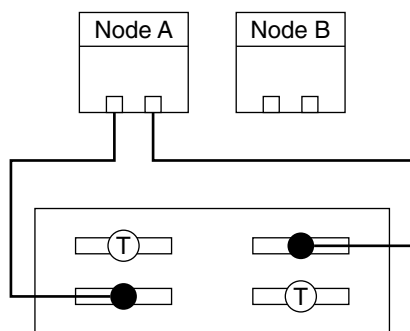
If the JBOD storage array is in dual bus, multi-initiator mode, see Figure 2–1 for a diagram about how to cable and terminate the JBOD storage arrays.



Caution – Do not power on the JBOD storage array until the JBOD storage array is cabled to the first node.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure on how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.



Ⓣ Terminator

FIGURE 2-1 Cabling a Dual-Bus, Multi-Initiator Storage Array: Part 1

4. **Ensure that each device in the SCSI chain has a unique SCSI address.**

This procedure ensures that each device in the SCSI chain has a unique SCSI address.

a. **If necessary, power on the storage devices.**

For the procedure on powering on a storage device, see the service manual that shipped with your storage device.

b. **If necessary, power on the *first* node, but do not allow it to boot. If necessary, halt the system to continue with OBP Monitor tasks.**

c. **Set the `scsi-initiator-id` for one node to 6.**

```
{1} ok setenv scsi-initiator-id 6
scsi-initiator-id = 6
```

d. **Find the paths to the host adapters that connect to the local disk drives.**

```
{0} ok show-disks
```

Use this information to change the SCSI addresses in the `nvrामrc` script. Do not include the `/sd` directories in the device paths.

e. **Edit the `nvrामrc` script to set the `scsi-initiator-id` for the local devices on the first node to 7.**

For a full list of commands, see the *OpenBoot 2.x Command Reference Manual*.



Caution – Insert exactly one space after the first double quote and before `scsi-initiator-id`.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok nvedit
0: probe-all
1: cd /pci@1f,4000/scsi@2
2: 7 " scsi-initiator-id" integer-property
3: device-end
4: cd /pci@1f,4000/scsi@3
5: 7 " scsi-initiator-id" integer-property
6: device-end
7: install-console
8: banner[Control C]
{0} ok
```

f. Store the changes.

The changes you make through the `nvedit` command are recorded on a temporary copy of the `nvrsrc` script. You can continue to edit this copy without risk. After you complete your edits, save the changes. If you are not sure about the changes, discard them.

- To store the changes, type:

```
{0} ok nvstore
{1} ok
```

- To discard the changes, type:

```
{0} ok nvquit
{1} ok
```

g. Verify the contents of the `nvrsrc` script that you created, as shown in the following example.

If the contents of the `nvrsrc` script are incorrect, use the `nvedit` command to make corrections.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok printenv nvrsrc
nvrsrc =
        probe-all
        cd /pci@1f,4000/scsi@2
        7 " scsi-initiator-id" integer-property
        device-end
        cd /pci@1f,4000/scsi@3
        7 " scsi-initiator-id" integer-property
        device-end
        install-console
        banner
{1} ok
```

h. Instruct the OpenBoot PROM (OBP) Monitor to use the `nvrsrc` script, as shown in the following example.

```
{0} ok setenv use-nvramrc? true
use-nvramrc? = true
{1} ok
```

5. Perform a reconfiguration boot on the first node to create the new Solaris device files and links.

6. If necessary, format and label the disks.

7. On the first node, verify that the DIDs have been assigned to the disk drives in the JBOD storage array.

```
# scdidadm -l
```

8. Shut down the *second* node.

For the procedure about how to shut down and power off a node, see your Sun Cluster system administration documentation.

9. If necessary, install the host adapters in the second node.

For the procedure about how to install a host adapter, see the documentation that shipped with your host adapter and node.

10. Connect the JBOD storage array to the host adapters.

If the JBOD storage array is in dual bus, multi-initiator mode, remove the terminators and connect the JBOD storage array to the second node. See Figure 2–2 for a diagram about how the JBOD storage array will look cabled to both nodes.

For the procedure on how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual* and the *Sun StorEdge 3310 SCSI Array Release Notes*.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

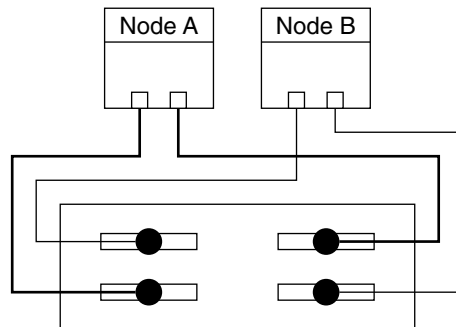


FIGURE 2–2 Cabling a Dual-Bus, Multi-Initiator Storage Array: Part 2

11. Verify that the `scsi-initiator-id` is set correctly on the second node.

- a. If necessary, power on the second node, but do not allow it to boot. If necessary, halt the system to continue with OBP Monitor tasks.
- b. Verify that the `scsi-initiator-id` for each host adapter on the second node is set to 7

Use the `show-disks` command to find the paths to the host adapters that are connected to these enclosures. Select each host adapter's device tree node, and display the node's properties to confirm that the `scsi-initiator-id` for each host adapter is set to 7.

The following screen shot is an example and might not reflect the hardware that you plan to configure. Do not input this text verbatim.

```
{0} ok cd /pci@6,4000/pci@3/scsi@5
{0} ok .properties
scsi-initiator-id      00000007
...
```

12. Perform a reconfiguration boot to create the new Solaris device files and links.

13. On the second node, verify that the DIDs have been assigned to the disk drives in the JBOD storage array.

```
# sddidadm -L
```

14. Perform volume management administration to add the disk drives in the JBOD storage array to the volume management configuration.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

▼ How to Remove a JBOD Storage Array

Use this procedure to remove a JBOD storage array from a cluster. This procedure assumes that you are removing the references to the disk drives in the enclosure. This procedure assumes that your nodes are not configured with dynamic reconfiguration functionality. If your nodes are configured for dynamic reconfiguration, see your *Sun Cluster 3.x Hardware Administration Manual*.

1. Is one of the disks in the JBOD storage array a quorum device? This JBOD storage array is the JBOD storage array that you are removing.

```
# scstat -q
```

- If no, proceed to Step 2.
- If yes, relocate that quorum device to another suitable JBOD storage array.

For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

2. If necessary, back up the metadvice or volume.

For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.

3. On both nodes, perform volume management administration to remove the JBOD storage array from the configuration.

If a volume manager does manage the LUN, run the appropriate Solstice DiskSuite/Solaris Volume Manager commands or VERITAS Volume Manager commands to remove the LUN from any diskset or disk group. For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation. See the following paragraph for additional VERITAS Volume Manager commands that are required.

Note – LUNs that were managed by VERITAS Volume Manager must be completely removed from VERITAS Volume Manager control before you can delete the LUNs from the Sun Cluster environment. After you delete the LUN from any disk group, use the following commands *on both nodes* to remove the LUN from VERITAS Volume Manager control.

```
# vxdisk offline cNtXdY
# vxdisk rm cNtXdY
```

4. Identify the disk drives that you are removing.

```
# cfgadm -al
```

5. On all nodes, remove references to the disk drives in the JBOD storage array that you removed.

```
# cfgadm -c unconfigure cN::dsk/cNtXdY
```

6. Disconnect the SCSI cables from the JBOD storage array.

7. On both nodes, remove the paths to the LUN that you are deleting.

```
# devfsadm -C
```

8. On both nodes, remove all obsolete device IDs (DIDs).

```
# scdidadm -C
```

9. Power off the JBOD storage array. Disconnect the JBOD storage array from the AC power source.

For the procedure about how to power off an storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

10. Remove the JBOD storage array.

For the procedure about how to remove an storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

11. If necessary, remove any unused host adapters from the nodes.

For the procedure about how to remove a host adapter, see your *Sun Cluster 3.x Hardware Administration Manual* and the documentation that shipped with your host adapter and node.

12. From any node, verify that the configuration is correct.

```
# scdidadm -L
```

▼ How to Replace a Chassis

Use this procedure to replace the chassis of a JBOD storage array in a running cluster. This procedure assumes that you are retaining the disk drives in the JBOD storage array you are replacing. This procedure also assumes that you are retaining the references to those disk drives.

1. Is one of the disks in the chassis a quorum device? This chassis is the chassis that you are replacing.

```
# scstat -q
```

- If no, go to Step 2.
- If yes, relocate that quorum device to another suitable JBOD storage array.
For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

2. If possible, back up the metadevices or volumes that reside in the JBOD storage array.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

3. Perform volume management administration to remove the JBOD storage array from the configuration.

If a volume manager does manage the LUN, run the appropriate Solstice DiskSuite/Solaris Volume Manager commands or VERITAS Volume Manager commands to remove the LUN from any diskset or disk group. For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation. See the following paragraph for additional VERITAS Volume Manager commands that are required.

Note – LUNs that were managed by VERITAS Volume Manager must be completely removed from VERITAS Volume Manager control before you can delete the LUNs from the Sun Cluster environment. After you delete the LUN from any disk group, use the following commands *on both nodes* to remove the LUN from VERITAS Volume Manager control.

```
# vxdisk offline cNtXdY
# vxdisk rm cNtXdY
```

4. Disconnect the SCSI cables from the JBOD storage array.

5. Power off the JBOD storage array. Disconnect the JBOD storage array from the AC power sources.

For the procedure about how to power off an storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

6. Connect the new JBOD storage array to the AC power sources.

7. Connect the SCSI cables to the new JBOD storage array.

Ensure the cable does not exceed bus length limitations. For more information on bus length limitations, see the documentation that shipped with your hardware.

For the procedure on how to cable the storage arrays, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual* and *Sun StorEdge 3310 SCSI Array Release Notes*.

8. Move the disk drives one disk drive at a time from the old JBOD storage array. Insert the disk drives into the same slots in the new JBOD storage array.

Move your other components to the new chassis as well. For the procedures about how to replace your storage array's components, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

9. Power on the JBOD storage array.

For the procedure to power on the storage array, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

10. On all nodes that are attached to the JBOD storage array, run the `devfsadm(1M)` command.

```
# devfsadm
```

11. From one node, attach the new JBOD storage array to the global device namespace.

```
# scgdevs
```

12. Perform volume management administration to add the JBOD storage array back into the configuration.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

▼ How to Add a Disk Drive

Use this procedure to add a disk drive to a running cluster. Perform the steps in this procedure in conjunction with the procedures in your Sun Cluster system administration documentation and your server hardware manual.

For conceptual information on quorum, quorum devices, global devices, and device IDs, see your Sun Cluster concepts documentation.

1. **Note the target number of the empty disk slot that you plan to add the disk drive to.**

Identify the disk slot in the JBOD storage array for the disk drive that you are adding and note the target number. Refer to the documentation that shipped with your storage array.

2. **Install the disk drive.**

For the procedure about how to install a disk drive, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

3. **On all nodes attached to the JBOD storage array, configure the disk drive into the cluster.**

```
# cfgadm -c configure cN
# devfsadm
```

4. **If necessary, use the `format(1M)` command or the `fmthard(1M)` command to partition and label the disk drive.**

5. **From any node, update the global device namespace.**

```
# scgdevs
```

If a volume management daemon such as `vold` is running on your node, and you have a CD-ROM drive that is connected to the node, a `device busy` error might be returned even if no disk is in the drive. This error is an expected behavior.

6. **On one node, verify that a device ID (DID) has been assigned to the disk drive.**

```
# scdidadm -L
```

7. **Perform volume management administration to add the new disk drive to the configuration.**

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

8. **If you want this new disk drive to be a quorum device, add the quorum device.**

For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

▼ How to Remove a Disk Drive

Use this procedure to remove a disk drive from a JBOD storage array in a running cluster. Perform the steps in this procedure in conjunction with the procedures in your Sun Cluster system administration documentation and the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

For conceptual information on quorum, quorum devices, global devices, and device IDs, see your Sun Cluster concepts documentation.

1. Identify the disk drive that you are removing. Identify the slot that the disk drive needs to be removed from.

If the disk error message reports the drive problem by DID, use the `sddidadm -l` command to determine the Solaris device name. To list all configurable hardware information, use the `cfgadm -al` command.

```
# sddidadm -l deviceID
# cfgadm -al
```

2. Is the disk drive a quorum device? This disk drive is the disk drive that you are removing.

```
# scstat -q
```

- If no, proceed to Step 3.
- If yes, relocate that quorum device to another suitable JBOD storage array.
For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

3. If possible, back up the metadvice or volume.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

4. Perform volume management administration to remove the disk drive from the configuration.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

5. On all nodes, unconfigure the disk drive. Remove references to the disk drive from the operating system and clustering environment.

```
# cfgadm -c unconfigure cN::dsk/cNtXdY
```

6. Remove the disk drive.

For the procedure about how to remove a disk drive, see the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

7. On both nodes, remove the paths to the LUN that you are deleting.

```
# devfsadm -C
```

8. On both nodes, remove all obsolete device IDs (DIDs).

```
# scdidadm -C
```

▼ How to Replace a Disk Drive

Use this procedure to replace a disk drive in a JBOD storage array. Perform the steps in this procedure in conjunction with the procedures in your Sun Cluster system administration documentation and the *Sun StorEdge 3310 SCSI Array Installation, Operation, and Service Manual*.

For conceptual information on quorum, quorum devices, global devices, and device IDs, see your Sun Cluster concepts documentation.

1. Identify the failed disk drive.

```
# scdidadm -o diskid -l cNtXdY
```

2. Determine if the disk drive you want to replace is a quorum device.

```
# scstat -q
```

- If the disk is not a quorum device, skip this step.
- If the disk drive you want to replace is a quorum device, add a new quorum device on a different storage device and remove the old quorum device.

For the procedure on how to add and remove a quorum device, see your Sun Cluster system administration documentation.

3. If possible, back up the metadvice or volume.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

4. If you are using Solstice DiskSuite/Solaris Volume Manager as your volume manager, save the disk partitioning for use when you partition the new disk drive.

```
# prtvtoc /dev/rdisk/cNtXdYsZ > filename
```

Note – Do not save this file under /tmp because you will lose this file when you reboot. Instead, save this file under /usr/tmp.

5. Replace the failed disk.

- a. Determine which node owns the device group.

```
# scstat -D
```

- b. If you are using VERITAS Volume Manager, remove the LUNs from the VERITAS Volume Manager control on a node that does not have ownership of the device group.

```
# vxdisk offline cNtXdY
# vxdisk rm cNtXdY
```

- c. On a node that does not have ownership of the device group, suspend activity on the SCSI bus.

```
# cfgadm -x replace_device cX::disk/cXtYdZ
```

When prompted, enter **y** to suspend activity on the SCSI bus.

- d. After SCSI bus activity stops, replace the disk and enter **y** at the prompt.

After replacing the disk, warning messages might display. These messages can be ignored.

- e. Switch the primary for the device group.

```
# scswitch -z -D disk-device-group -h node
```

- f. If you are using VERITAS Volume Manager, remove the LUNs from the VERITAS Volume Manager control on a node that does not have ownership of the device group.

```
# vxdisk offline cNtXdY
# vxdisk rm cNtXdY
```

- g. Suspend activity on the device group's original primary.

```
# cfgadm -x replace_device cX::disk/cXtYdZ
```

When prompted, enter **y** to suspend activity on the SCSI bus.

- h. When prompted to proceed with the disk replacement, enter **y** to proceed.

Warning messages might display. These messages can be ignored.

6. On all nodes that are attached to the storage device, run the **devfsadm(1M)** command to probe all devices and to write the new disk drive to the **/dev/rdisk** directory.

Depending on the number of devices connected to the node, the **devfsadm** command can require at least five minutes to complete.

```
# devfsadm
```

7. Label the new disk drive by using the **format** command.

8. If you are using Solstice DiskSuite/Solaris Volume Manager as your volume manager, from any node that is connected to the storage device, partition the new disk drive by using the partitioning you saved.

If you are using VERITAS Volume Manager, skip this step.

```
# fmthard -s filename /dev/rdisk/cNtXdYsZ
```

9. From all nodes that are connected to the disk drive, update the DID database and driver.

```
# sddidadm -R deviceID
```

Note – After running `sddidadm -R` on the first node, each subsequent node that you run the command on might display a warning. This warning can be ignored.

10. From any node, confirm that the failed disk drive has been replaced by comparing the new physical DID to the physical DID that was identified at the beginning of this procedure.

If the new physical DID is different, you successfully replaced the failed disk drive with a new disk drive.

```
# sddidadm -o diskid -l cNtXdY
```

11. Perform volume management administration to add the disk drive back to its diskset or disk group.

For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

12. If you want this new disk drive to be a quorum device, add the quorum device.

For procedures on how to add quorum devices, see your Sun Cluster system administration documentation.

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