



# **Sun Cluster 3.1 - 3.2 With Sun StorEdge 3310 or 3320 SCSI RAID Array Manual for Solaris OS**



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# Contents

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<b>Preface</b> .....	5
<b>1 Installing and Configuring a Sun StorEdge 3310 or 3320 SCSI RAID Array</b> .....	11
Installing RAID Storage Arrays .....	11
▼ How to Install a RAID Storage Array in a New Cluster .....	12
▼ How to Add a RAID Storage Array to an Existing Cluster .....	13
Configuring RAID Storage Arrays .....	19
▼ How to Create and Map a LUN .....	20
▼ How to Unmap and Delete a LUN .....	21
<b>2 Maintaining Sun StorEdge 3310 or 3320 SCSI RAID Array</b> .....	25
Maintaining RAID Storage Arrays .....	25
Sun StorEdge 3310 and 3320 SCSI RAID FRUs .....	27
▼ How to Remove a RAID Storage Array .....	27
▼ How to Replace a Controller .....	30
▼ How to Replace an I/O Module .....	30
▼ How to Replace a Terminator Module .....	31
▼ How to Replace a Host Adapter .....	32
<b>Index</b> .....	35



# Preface

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The *Sun Cluster 3.1 - 3.2 With Sun StorEdge 3310 or 3320 SCSI RAID Array Manual for Solaris OS* provides procedures specific to Sun StorEdge™ 3310 and 3320 SCSI RAID storage devices that are placed in a Sun® Cluster environment. Use this manual with any version of Sun Cluster 3.1 or 3.2 software on SPARC based systems and with any support version of Sun Cluster 3.1 or 3.2 software on x86 based systems.

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

---

Unless otherwise noted, procedures are the same for all Sun Cluster 3.1 or 3.2 versions on SPARC™ based systems and for all supported Sun Cluster 3.1 or 3.2 versions on x86 based systems.

## 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 a pre-sales 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, “Installing and Configuring a Sun StorEdge 3310 or 3320 SCSI RAID Array,”](#) discusses how to install and configure the StorEdge 3310 RAID storage array.

[Chapter 2, “Maintaining Sun StorEdge 3310 or 3320 SCSI RAID Array,”](#) discusses how to maintain the StorEdge 3310 RAID 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 3.1 - 3.2 With Sun StorEdge 3310 or 3320 SCSI RAID Array Manual for Solaris OS

Revision Date	New Information
January 2009	Updated links to different versions of Sun Cluster documentation in Preface.

## Related Documentation

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

The following Sun Cluster books support the Sun Cluster 3.1 and 3.2 releases. If you are maintaining a different version of Sun Cluster software, refer to the appropriate documentation. All Sun Cluster documentation is available at <http://docs.sun.com>. Documentation that is not available at <http://docs.sun.com> is listed with the appropriate URL.

TABLE P-2 Sun StorEdge 3310 and 3320 RAID Storage Array Documentation

Title	Part Number
<i>OpenBoot 2.x Command Reference Manual</i>	806-2906
<i>Sun StorEdge PCI Dual Ultra3 SCSI Host Adapter Release Notes</i>	816-2157
<i>Sun StorEdge 3310 SCSI Array Release Notes</i>	816-7292
<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual, 3310 SCSI Array</i>	816-7290
<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual, 3320 SCSI Array</i>	819-1274
<i>Sun StorEdge 3000 Family CLI 2.0 User's Guide</i>	817-4951
<i>Sun StorEdge 3000 Family FRU Installation Guide</i>	816-7326
<i>Sun StorEdge 3000 Family RAID Firmware 4.1x User's Guide</i>	817-3711
<i>Sun StorEdge 3320 SCSI Array Release Notes</i>	817-7660
Available at <a href="http://docs.sun.com/db/doc/817-7660-10">http://docs.sun.com/db/doc/817-7660-10</a>	

TABLE P-3 Sun Cluster Documentation

Documentation
<a href="#">Solaris Cluster 3.2</a>
<a href="#">Sun Cluster 3.1</a>

## Using UNIX Commands

This document contains information about commands that are used to install, configure, or upgrade a Sun Cluster configuration. This document might not contain complete information about 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™ Operating System (Solaris OS)
- Other software documentation that you received with your system
- Solaris Operating System 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 10)
- The release number of Sun Cluster (for example, Sun Cluster 3.2)

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>showrev -p</code>	Reports which patches are installed
<code>prtdiag -v</code>	Displays system diagnostic information

Command	Function
<code>/usr/cluster/bin/clnode show-rev</code>	Displays Sun Cluster release and package version information
<code>/usr/cluster/bin/scinstall -pv</code>	

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

## Documentation, Support, and Training

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

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

## Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. To share your comments, go to <http://docs.sun.com> and click Feedback.

## Typographic Conventions

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

TABLE P-4 Typographic Conventions

Typeface	Meaning	Example
AaBbCc123	The names of commands, files, and directories, and onscreen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name% you have mail.</code>
<b>AaBbCc123</b>	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 <code>rm filename.</code>



TABLE P-4 Typographic Conventions (Continued)

Typeface	Meaning	Example
<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.  <b>Note:</b> Some emphasized items appear bold online.

## Shell Prompts in Command Examples

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

TABLE P-5 Shell Prompts

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



# Installing and Configuring a Sun StorEdge 3310 or 3320 SCSI RAID Array

---

This chapter describes the procedures about how to install and configure Sun StorEdge™ 3310 and 3320 SCSI 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 major topics:

- “Installing RAID Storage Arrays” on page 11
- “Configuring RAID Storage Arrays” on page 19

## Installing RAID Storage Arrays

This section contains instructions on installing storage arrays both in new clusters and in existing clusters.

TABLE 1-1 Task Map: Installing Storage Arrays

Task	Information
Install a storage array in a new cluster, before the OS and Sun Cluster software are installed.	“How to Install a RAID Storage Array in a New Cluster” on page 12
Add a storage array to an operational cluster.	“How to Add a RAID Storage Array to an Existing Cluster” on page 13

## ▼ How to Install a RAID Storage Array in a New Cluster

Use this procedure to install and configure RAID storage arrays *before* installing the Solaris operating environment and Sun Cluster software on your nodes. To add storage arrays to an operating cluster, use the procedure, “[How to Add a RAID Storage Array to an Existing Cluster](#)” on page 13.

---

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

---

**Before You Begin** This procedure assumes that the hardware is not connected.

---

**SPARC only** – 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 3000 Family 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 3000 Family 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 20](#).

---

**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 3000 Family Configuration Service 1.5 User's Guide for the Sun StorEdge 3310 SCSI Array and the Sun StorEdge 3510 FC Array*.
- 9 **Install the Sun Cluster software and volume management software.**  
For software installation procedures, see the your Sun Cluster software installation documentation.

**See Also** 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.

## ▼ How to Add a RAID Storage Array to an Existing Cluster

Use this procedure to add RAID storage arrays to a running cluster. If you need to install a storage array in a new cluster, use the procedure in [“How to Install a RAID Storage Array in a New Cluster” on page 12](#).

**Before You Begin** 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 Hardware Administration Manual for Solaris OS*.

This procedure provides the long forms of the Sun Cluster commands. Most commands also have short forms. Except for the forms of the command names, the commands are identical. For a list of the commands and their short forms, see [Appendix A, “Sun Cluster Object-Oriented Commands,”](#) in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

To perform this procedure, become superuser or assume a role that provides `solaris.cluster.read` RBAC (role-based access control) authorization.

- 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 3000 Family 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 20.

**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 3000 Family 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 the *Sun StorEdge 3000 Family 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 3000 Family Installation, Operation, and Service Manual*.

**9 Boot the first node.**

For the procedure about how to boot cluster nodes, see [Chapter 3, “Shutting Down and Booting a Cluster,”](#) in *Sun Cluster System Administration Guide for Solaris OS*.

**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](#).

- SPARC:

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

- x86:

```
Adaptec AIC-7899 SCSI BIOS v2.57S4
(c) 2000 Adaptec, Inc. All Rights Reserved.
Press <Ctrl><A> for SCSISelect(TM) Utility!
```

```
Ch B, SCSI ID: 0 SEAGATE ST336605LC 160
      SCSI ID: 1 SEAGATE ST336605LC 160
      SCSI ID: 6 ESG-SHV SCA HSBP M18 ASYN
Ch A, SCSI ID: 2 SUN StorEdge 3310 160
      SCSI ID: 3 SUN StorEdge 3310 160
```

```
AMIBIOS (C)1985-2002 American Megatrends Inc.,
Copyright 1996-2002 Intel Corporation
SCB20.86B.1064.P18.0208191106
SCB2 Production BIOS Version 2.08
BIOS Build 1064
```

```
2 X Intel(R) Pentium(R) III CPU family 1400MHz
Testing system memory, memory size=2048MB
2048MB Extended Memory Passed
512K L2 Cache SRAM Passed
ATAPI CD-ROM SAMSUNG CD-ROM SN-124
```

```
SunOS - Intel Platform Edition Primary Boot Subsystem, vsn 2.0
```

Current Disk Partition Information

Part#	Status	Type	Start	Length
1	Active	X86 BOOT	2428	21852
2		SOLARIS	24280	71662420
3		<unused>		
4		<unused>		

Please select the partition you wish to boot: \* \*

Solaris DCB

```

loading /solaris/boot.bin

SunOS Secondary Boot version 3.00

Solaris Intel Platform Edition Booting System

Autobooting from bootpath: /pci@1,0/pci8086,340f@7,1/sd@0,0:a

If the system hardware has changed, or to boot from a different
device, interrupt the autoboot process by pressing ESC.
Press ESCape to interrupt autoboot in 2 seconds.
Initializing system
Please wait...
Warning: Resource Conflict - both devices are added

NON-ACPI device: ISY0050
Port: 3F0-3F5, 3F7; IRQ: 6; DMA: 2
ACPI device: ISY0050
Port: 3F2-3F3, 3F4-3F5, 3F7; IRQ: 6; DMA: 2

<<< Current Boot Parameters >>>
Boot path: /pci@1,0/pci8086,340f@7,1/sd@0,0:a
Boot args:

Type    b [file-name] [boot-flags] <ENTER> to boot with options
or      i <ENTER>                        to enter boot interpreter
or      <ENTER>                          to boot with defaults

<<< timeout in 5 seconds >>>

Select (b)oot or (i)nterpreter:

```

**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 3000 Family Installation, Operation, and Service Manual*.

**16 Boot the second node.**

For the procedure about how to boot cluster nodes, see [Chapter 3, “Shutting Down and Booting a Cluster,”](#) in *Sun Cluster System Administration Guide for Solaris OS*.

**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](#).

- SPARC:

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

- x86:

```
Adaptec AIC-7899 SCSI BIOS v2.5754
(c) 2000 Adaptec, Inc. All Rights Reserved.
    Press <Ctrl><A> for SCSISelect(TM) Utility!

Ch B,  SCSI ID: 0 SEAGATE  ST336605LC      160
        SCSI ID: 1 SEAGATE  ST336605LC      160
        SCSI ID: 6 ESG-SHV  SCA HSBP M18   ASYN
Ch A,  SCSI ID: 2 SUN      StorEdge 3310   160
        SCSI ID: 3 SUN      StorEdge 3310   160
```

```
AMIBIOS (C)1985-2002 American Megatrends Inc.,
Copyright 1996-2002 Intel Corporation
SCB20.86B.1064.P18.0208191106
SCB2 Production BIOS Version 2.08
BIOS Build 1064
```

```
2 X Intel(R) Pentium(R) III CPU family    1400MHz
Testing system memory, memory size=2048MB
2048MB Extended Memory Passed
512K L2 Cache SRAM Passed
ATAPI CD-ROM SAMSUNG CD-ROM SN-124
```

```
SunOS - Intel Platform Edition    Primary Boot Subsystem, vsn 2.0
```

## Current Disk Partition Information

Part#	Status	Type	Start	Length
1	Active	X86 BOOT	2428	21852
2		SOLARIS	24280	71662420
3		<unused>		
4		<unused>		

Please select the partition you wish to boot: \* \*

Solaris DCB

loading /solaris/boot.bin

SunOS Secondary Boot version 3.00

Solaris Intel Platform Edition Booting System

Autobooting from bootpath: /pci@1,0/pci8086,340f@7,1/sd@0,0:a

If the system hardware has changed, or to boot from a different device, interrupt the autoboot process by pressing ESC.

Press ESCape to interrupt autoboot in 2 seconds.

Initializing system

Please wait...

Warning: Resource Conflict - both devices are added

NON-ACPI device: ISY0050

Port: 3F0-3F5, 3F7; IRQ: 6; DMA: 2

ACPI device: ISY0050

Port: 3F2-3F3, 3F4-3F5, 3F7; IRQ: 6; DMA: 2

<<< Current Boot Parameters >>>

Boot path: /pci@1,0/pci8086,340f@7,1/sd@0,0:a

Boot args:

Type    b [file-name] [boot-flags] <ENTER>    to boot with options  
 or      i <ENTER>                            to enter boot interpreter  
 or      <ENTER>                              to boot with defaults

<<< timeout in 5 seconds >>>

Select (b)oot or (i)nterpreter:

## 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.
  - If you are using Sun Cluster 3.2, use the following command:

```
# cldevice list -v
```
  - If you are using Sun Cluster 3.1, use the following command:

```
# scdidadm -l
```

## 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 25 without volume management disruptions. If you use hardware RAID level 0, some maintenance procedures in “[Maintaining RAID Storage Arrays](#)” on page 25 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 might change unexpectedly. When you perform a check of the device ID configuration by running the `cldevice check` or `scdidadm -c` command, the following error message appears on your console if the device ID 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 device IDs that report this error, run the `cldevice repair` or `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 1–2](#) 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 3000 Family Installation, Operation, and Service Manual*.

TABLE 1-2 Task Map: Configuring Disk Drives

Task	Information
Create a logical unit (LUN).	<a href="#">“How to Create and Map a LUN” on page 20</a>
Remove a LUN.	<a href="#">“How to Unmap and Delete a LUN” on page 21</a>

## ▼ 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.

This procedure provides the long forms of the Sun Cluster commands. Most commands also have short forms. Except for the forms of the command names, the commands are identical. For a list of the commands and their short forms, see [Appendix A, “Sun Cluster Object-Oriented Commands,”](#) in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

**Before You Begin** To perform this procedure, become superuser or assume a role that provides `solaris.cluster.modify` RBAC authorization.

### 1 Create and partition the logical device(s).

For more information on creating a LUN, see the *Sun StorEdge 3000 Family RAID Firmware 4.1x User’s 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 the *Sun StorEdge 3000 Family RAID Firmware 4.1x User’s 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 3000 Family Installation, Operation, and Service Manual, 3310 SCSI Array*.

- 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.**
  - **If you are using Sun Cluster 3.2, use the following command:**  

```
# cldevice populate
```
  - **If you are using Sun Cluster 3.1, use the following command:**  

```
# 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 3000 Family RAID Firmware 4.1x User's Guide* for the latest information about LUN administration.




---

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

---

This procedure provides the long forms of the Sun Cluster commands. Most commands also have short forms. Except for the forms of the command names, the commands are identical. For a list of the commands and their short forms, see [Appendix A, “Sun Cluster Object-Oriented Commands,”](#) in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

**Before You Begin** 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.

To perform this procedure, become superuser or assume a role that provides `solaris.cluster.read` and `solaris.cluster.modify` RBAC authorization.

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

```
# cfgadm -aL
```

**2 If the LUN is configured as a quorum device, relocate that quorum device to another suitable RAID storage array.**

To determine whether the LUN is configured as a quorum device, use one of the following commands.

- **If you are using Sun Cluster 3.2, use the following command:**

```
# clquorum show +
```

- **If you are using Sun Cluster 3.1, use the following command:**

```
# scstat -q
```

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::disk/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 (DIDs).**

- If you are using Sun Cluster 3.2, use the following command:

```
# cldevice clear
```

- If you are using Sun Cluster 3.1, use the following command:

```
# 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.

---





# Maintaining Sun StorEdge 3310 or 3320 SCSI RAID Array

---

This chapter describes the procedures about how to maintain Sun™ StorEdge™ 3310 and 3320 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 Remove a RAID Storage Array” on page 27
- “How to Replace a Controller” on page 30
- “How to Replace an I/O Module” on page 30
- “How to Replace a Terminator Module” on page 31

## 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 2–1](#) 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 might change unexpectedly. When you perform a check of the device ID configuration by running the `cldevice check` or `scdidadm -c` command, the following error message appears on your console if the device ID 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 device IDs that report this error, run the `cldevice repair` or `scdidadm -R` command for each affected device.

TABLE 2-1 Tasks: Maintaining a RAID Storage Array

Task	Information
Remove a RAID storage array.	<a href="#">“How to Remove a RAID Storage Array” on page 27</a>
Replace a RAID storage array.	<a href="#">“How to Remove a RAID Storage Array” on page 27</a>
To replace a RAID storage array, remove the RAID storage array. Add a new RAID storage array to the configuration.	<a href="#">“How to Add a RAID Storage Array to an Existing Cluster” on page 13</a>
Add a JBOD as an expansion unit.	<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual</i>
Follow the same procedure that you use in a noncluster environment.	<a href="#">“How to Create and Map a LUN” on page 20</a>
If you plan to use the disk drives in the expansion unit to create a new LUN, see <a href="#">“How to Create and Map a LUN” on page 20</a>	
Remove a JBOD expansion unit.	<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual</i>
Follow the same procedure that you use in a noncluster environment.	<a href="#">“How to Unmap and Delete a LUN” on page 21</a>
If you plan to remove a LUN in conjunction with the disk drive, see <a href="#">“How to Unmap and Delete a LUN” on page 21</a> .	
Add a disk drive.	<i>Sun StorEdge Family FRU Installation Guide for the Sun StorEdge 3310 SCSI Array and the Sun StorEdge 3510 FC Array</i>
Follow the same procedure that you use in a noncluster environment.	<a href="#">“How to Create and Map a LUN” on page 20</a>
If you plan to create a new LUN with the disk drive, see <a href="#">“How to Create and Map a LUN” on page 20</a> .	

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

Task	Information
Remove a disk drive.	<i>Sun StorEdge Family FRU Installation Guide for the Sun StorEdge 3310 SCSI Array and the Sun StorEdge 3510 FC Array</i>
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 21.	“How to Unmap and Delete a LUN” on page 21
If your configuration is running in RAID level 0, take appropriate action to prepare the volume manager for the impacted disk to be inaccessible.	
Replace a failed controller or restore an offline controller.	“How to Replace a Controller” on page 30
Replace a host-to-storage array SCSI cable.	<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual</i>
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.	
Replace the I/O module.	“How to Replace an I/O Module” on page 30
Replace the terminator module.	“How to Replace a Terminator Module” on page 31

## Sun StorEdge 3310 and 3320 SCSI RAID FRUs

The following is a list of administrative tasks that require no cluster-specific procedures. See the *Sun StorEdge 3000 Family FRU Installation Guide* for instructions on replacing the following FRUs.

- 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
- Replace an EMU module

### ▼ How to Remove a RAID Storage Array

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



---

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

---

This procedure provides the long forms of the Sun Cluster commands. Most commands also have short forms. Except for the forms of the command names, the commands are identical. For a list of the commands and their short forms, see [Appendix A, “Sun Cluster Object-Oriented Commands,”](#) in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

**Before You Begin** 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 Hardware Administration Manual for Solaris OS*.

To perform this procedure, become superuser or assume a role that provides `solaris.cluster.read` and `solaris.cluster.modify` RBAC (role-based access control) authorization.

**1 If one of the disks in the RAID storage array is configured as a quorum device, relocate that quorum device to another suitable RAID storage array.**

To determine whether any of the disks is configured as a quorum device, use one of the following commands.

- **If you are using Sun Cluster 3.2, use the following command:**

```
# clquorum show +
```

- **If you are using Sun Cluster 3.1, use the following command:**

```
# scstat -q
```

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).**

- If you are using Sun Cluster 3.2, use the following command:

```
# cldevice clear
```

- If you are using Sun Cluster 3.1, use the following command:

```
# 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 3000 Family Installation, Operation, and Service Manual, 3310 SCSI Array*.

**11 Remove the RAID storage array.**

For the procedure about how to remove a storage array, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual, 3310 SCSI Array*.

**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.**

- **If you are using Sun Cluster 3.2, use the following command:**

```
# cldevice list -v
```

- **If you are using Sun Cluster 3.1, use the following command:**

```
# scdidadm -l
```

## ▼ How to Replace a Controller

If the RAID storage array is configured with dual controllers, see the *Sun StorEdge 3000 Family FRU Installation Guide* 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 Solstice DiskSuite/Solaris Volume Manager or Veritas Volume Manager documentation.

- 2 Replace the controller.**

For the procedure about how to replace a controller, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual, 3310 SCSI Array*.

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

For more information, see your Solstice DiskSuite/Solaris Volume Manager or Veritas 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 Solstice DiskSuite/Solaris Volume Manager or Veritas 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.**  
For the procedure about how to replace the I/O module, see the *Sun StorEdge 3000 Family FRU Installation Guide*.
- 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 Solstice DiskSuite/Solaris Volume Manager or Veritas 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 Solstice DiskSuite/Solaris Volume Manager or Veritas Volume Manager documentation.
- 2 Replace the terminator module.**  
For the procedure about how to replace the terminator module, see the *Sun StorEdge 3000 Family FRU Installation Guide*.
- 3 Reattach the submirrors to resynchronize submirrors.**  
For more information, see your Solstice DiskSuite/Solaris Volume Manager or Veritas Volume Manager documentation.

## ▼ How to Replace a Host Adapter

Use this procedure to replace a failed host adapter in a running cluster. This procedure defines Node A as the node with the failed host adapter that you are replacing.

This procedure provides the long forms of the Sun Cluster commands. Most commands also have short forms. Except for the forms of the command names, the commands are identical. For a list of the commands and their short forms, see [Appendix A, “Sun Cluster Object-Oriented Commands,”](#) in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

**Before You Begin** This procedure relies on the following prerequisites and assumptions.

- Except for the failed host adapter, your cluster is operational and all nodes are powered on.
- Your nodes are not configured with dynamic reconfiguration functionality.

If your nodes are configured for dynamic reconfiguration **and** you are using two entirely separate hardware paths to your shared data, see the *Sun Cluster Hardware Administration Manual for Solaris OS* and skip steps that instruct you to shut down the cluster.

If you are using a single, dual-port HBA to provide the connections to your shared data, you cannot use dynamic reconfiguration for this procedure. Follow all steps in the procedure. For the details on the risks and limitations of this configuration, see “[Configuring Cluster Nodes With a Single, Dual-Port HBA](#)” in *Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS*.

To perform this procedure, become superuser or assume a role that provides `solaris.cluster.read` and `solaris.cluster.modify` RBAC (role-based access control) authorization.

### 1 Determine the resource groups and device groups that are running on Node A.

Record this information because you use this information in [Step 12](#) and [Step 13](#) of this procedure to return resource groups and device groups to Node A.

- **If you are using Sun Cluster 3.2, use the following commands:**

```
# clresourcegroup status -n nodename
# cldevicegroup status -n nodename
```

- **If you are using Sun Cluster 3.1, use the following command:**

```
# scstat
```

### 2 Record the details of any metadevices that are affected by the failed host adapter.

Record this information because you use it in [Step 11](#) of this procedure to repair any affected metadevices.



### 3 Move all resource groups and device groups off Node A.

- If you are using Sun Cluster 3.2, use the following command:

```
# clnode evacuate NodeA
```

- If you are using Sun Cluster 3.1, use the following command:

```
# scswitch -S -h NodeA
```

### 4 Shut down Node A.

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

### 5 Power off Node A.

### 6 Replace the failed host adapter.

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

### 7 If you need to upgrade the node's host adapter firmware, boot Node A into noncluster mode by adding -x to your boot instruction. Proceed to [Step 9](#).

For more information about how to boot nodes, see your Sun Cluster system administration documentation.

### 8 If you do not need to upgrade the node's host adapter firmware, proceed to [Step 10](#).

### 9 Upgrade the host adapter firmware on Node A.

If you use the Solaris 8, Solaris 9, or Solaris 10 Operating System, [Sun Connection Update Manager](#) keeps you informed of the latest versions of patches and features. Using notifications and intelligent needs-based updating, [Sun Connection](#) helps improve operational efficiency and ensures that you have the latest software patches for your Sun software.

You can download the Sun Connection Update Manager product for free by going to <http://www.sun.com/download/products.xml?id=4457d96d>.

Additional information for using the Sun patch management tools is provided in *Solaris Administration Guide: Basic Administration* at <http://docs.sun.com> (<http://docs.sun.com>). Refer to the version of this manual for the Solaris OS release that you have installed.

If you must apply a patch when a node is in noncluster mode, you can apply it in a rolling fashion, one node at a time, unless instructions for a patch require that you shut down the entire cluster. Follow the procedures in “[How to Apply a Rebooting Patch \(Node\)](#)” in *Sun Cluster System Administration Guide for Solaris OS* to prepare the node and to boot it in noncluster mode. For ease of installation, consider applying all patches at the same time. That is, apply all patches to the node that you place in noncluster mode.

For a list of patches that affect Sun Cluster, see the [Sun Cluster Wiki Patch Klatch](#).

For required firmware, see the *Sun System Handbook*.

**10 Boot Node A into cluster mode.**

For more information about how to boot nodes, see [Chapter 3, “Shutting Down and Booting a Cluster,”](#) in *Sun Cluster System Administration Guide for Solaris OS*.

**11 Perform any volume management procedures that are necessary to fix any metadevices affected by this procedure, as you identified in [Step 2](#).**

For more information, see your volume manager software documentation.

**12 (Optional) Restore the device groups to Node A.**

Perform the following step for each device group you want to return to the original node.

■ **If you are using Sun Cluster 3.2, use the following command:**

```
# cldevicegroup switch -n NodeA devicegroup1[ devicegroup2 ...]
```

*-n NodeA*

The node to which you are restoring device groups.

*devicegroup1[ devicegroup2 ...]*

The device group or groups that you are restoring to the node.

■ **If you are using Sun Cluster 3.1, use the following command:**

```
# scswitch -z -D devicegroup -h NodeA
```

**13 (Optional) Restore the resource groups to Node A.**

Perform the following step for each resource group you want to return to the original node.

■ **If you are using Sun Cluster 3.2, use the following command:**

```
# clresourcegroup switch -n NodeA resourcegroup1[ resourcegroup2 ...]
```

*NodeA*

For failover resource groups, the node to which the groups are returned. For scalable resource groups, the node list to which the groups are returned.

*resourcegroup1[ resourcegroup2 ...]*

The resource group or groups that you are returning to the node or nodes.

■ **If you are using Sun Cluster 3.1, use the following command:**

```
# scswitch -z -g resourcegroup -h NodeA
```

# Index

---

## A

adding, RAID storage arrays, 13-19  
arrays, *See* RAID storage arrays

## B

battery units, replacing, 27

## C

configuring, RAID storage arrays, 19-23  
controllers  
    replacing, 30  
    restoring, 30  
creating, LUNs, 20-21

## D

deleting, LUNs, 21-23  
disk drive, replacing, 27

## E

EMU modules, replacing, 27

## F

fan modules, replacing, 27

FRUs, 27

## H

HBAs, replacing, 32-34  
help, 7-8  
host adapters, replacing, 32-34

## I

I/O modules, replacing, 30-31  
installing  
    *See also* adding  
    RAID storage arrays, 11-19

## L

logical unit, *See* LUN  
logical unit number, *See* LUN  
LUNs  
    creating, 20-21  
    deleting, 21-23  
LVD cables, replacing, 27

## M

maintaining, RAID storage arrays, 25-34

## **P**

power cords, replacing storage array cords, 27  
power modules, replacing, 27

## **R**

RAID level 0 considerations, 19  
RAID levels supported, 19-23  
RAID storage arrays  
    adding, 13-19  
    configuring, 19-23  
    installing, 11-19  
    maintaining, 25-34  
    removing, 27-30  
related storage array documents, 6-7  
removing, RAID storage arrays, 27-30  
replacing  
    battery units, 27  
    controllers, 30  
    disk drives, 27  
    EMU modules, 27  
    fan modules, 27  
    host adapters, 32-34  
    I/O modules, 30-31  
    LVD cables, 27  
    power cords, 27  
    power modules, 27  
    terminator modules, 31  
restoring, controllers, 30

## **S**

SE 3310 RAID, related documents, 6-7  
SE 3320 RAID, related documents, 6-7  
storage array, *See* RAID storage array

## **T**

technical support, 7-8  
terminator modules, replacing, 31