



# Sun Cluster 3.0-3.1 With Sun StorEdge 3510 or 3511 FC RAID Array Manual

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For Solaris OS

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# Preface

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The *Sun Cluster 3.0-3.1 With Sun StorEdge 3510 or 3511 FC RAID Array Manual* provides procedures specific to Sun StorEdge™ 3510 and 3511 FC RAID storage arrays placed in a Sun™ Cluster environment.

Use this manual with any version of Sun Cluster 3.0 or 3.1 software on SPARC™ based clusters and with any supported version of Sun Cluster 3.1 on x86 based clusters. Unless otherwise noted, procedures are the same for all Sun Cluster 3.0 or 3.1 versions. Unless otherwise noted, procedures are the same for all Sun Cluster 3.1 versions on both SPARC and x86 based systems. See the [“Revision History”](#) on page 6 for a list of changes to this manual.

See the *Sun Cluster 3.0-3.1 Release Notes Supplement* for current information on bugs or restrictions.

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## 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.

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## How This Book Is Organized

[Chapter 1](#) discusses how to install, configure, and maintain the RAID version of the StorEdge 3510 and 3511 storage arrays.

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## 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 3.0-3.1 With Sun StorEdge 3510 or 3511 FC RAID Array Manual

Revision Date	New Information
January 2006	Added information about single, dual-port HBA configurations.
November 2005	Qualified support on x86 based clusters.

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## 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, 2004, and 2005 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** Hardware Documentation

<b>Title</b>	<b>Part Number</b>
<i>Sun StorEdge 3000 Family Installation, Operation, and Service Manual, Sun StorEdge 3510 FC Array</i>	816-7300
<i>Sun StorEdge 3000 Family RAID Firmware 4.1x User's Guide</i>	817-3711
<i>Sun StorEdge 3000 Family Best Practices Manual</i>	816-7325
<i>Sun StorEdge 3510 FC Array Release Notes</i>	816-7301
<i>Sun StorEdge 3511 FC Array with SATA Release Notes</i>	817-6597
<i>Sun StorEdge 3000 Family FRU Installation Guide</i>	816-7326
<i>Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays</i>	817-3629

**TABLE P-3** Sun Cluster Documentation

<b>Application</b>	<b>Title</b>
Concepts	<i>Sun Cluster Concepts Guide for Solaris OS</i>
Overview	<i>Sun Cluster Overview for Solaris OS</i>
Hardware administration	<i>Sun Cluster 3.0-3.1 Hardware Administration Manual for Solaris OS</i> Individual hardware administration guides
Software installation	<i>Sun Cluster Software Installation Guide for Solaris OS</i>
Data service administration	<i>Sun Cluster Data Services Planning and Administration Guide for Solaris OS</i> Individual data service guides
Data service development	<i>Sun Cluster Data Services Developer's Guide for Solaris OS</i>
System administration	<i>Sun Cluster System Administration Guide for Solaris OS</i>
Error messages	<i>Sun Cluster Error Messages Guide for Solaris OS</i>
Command and function reference	<i>Sun Cluster Reference Manual for Solaris OS</i>
Release Notes	<i>Sun Cluster 3.1 8/05 Release Notes for Solaris OS</i> <i>Sun Cluster 3.0-3.1 Release Notes Supplement</i>

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## 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

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## 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 9)
- The release number of Sun Cluster (for example, Sun Cluster 3.1 8/05)

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
<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.



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## Documentation, Support, and Training

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

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

## 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% <b>su</b></code> <code>password:</code>
<i>aabbcc123</i>	Placeholder: replace with a real name or value	The command to remove a file is <code>rm filename</code> .
<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<sup>®</sup> 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	#

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## Product Training

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# Installing and Maintaining Sun StorEdge 3510 and 3511 Fibre Channel RAID Arrays

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This chapter describes the procedures for installing, configuring, and maintaining the Sun™ StorEdge™ 3510 FC RAID array and the Sun StorEdge 3511 FC RAID array with SATA in a Sun™ Cluster environment. This chapter contains the following main topics:

- “Installing Storage Arrays” on page 11
- “Configuring Storage Arrays in a Running Cluster” on page 21
- “Maintaining Storage Arrays” on page 24

Before you perform any of the tasks in this chapter, read the entire procedure. If you are not reading an online version of this document, have the books listed in the [Preface](#) available.

For conceptual information on multihost disks, see the Sun Cluster concepts documentation.

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## Installing Storage Arrays

This section contains the procedures listed in [Table 1-1](#)

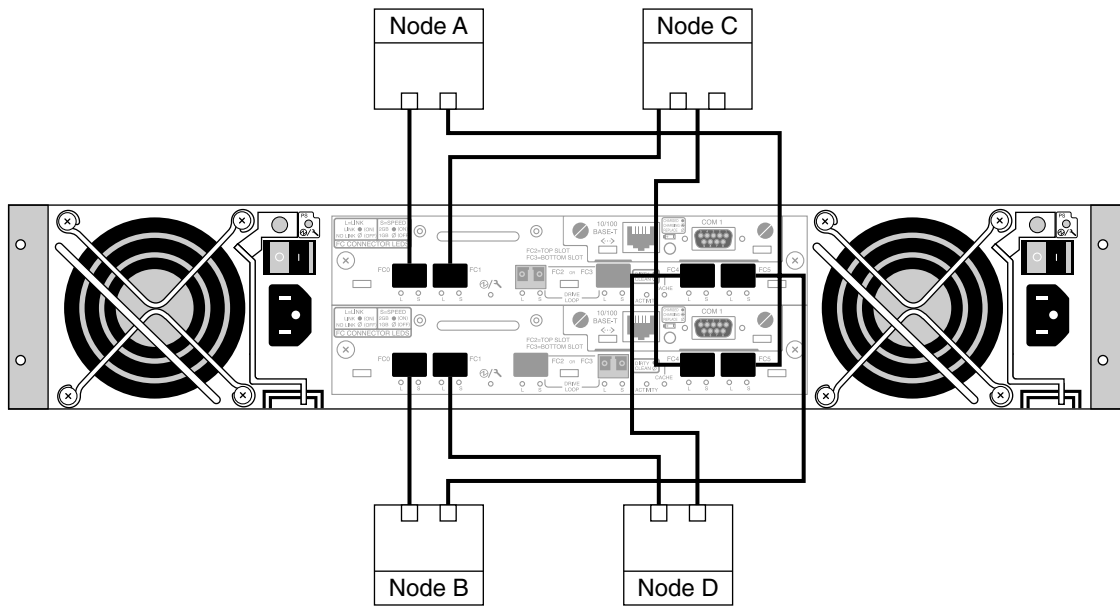
**TABLE 1-1** Task Map: Installing Storage Arrays

Task	Information
Install a storage array in a new cluster, before the OS and Sun Cluster software are installed.	“How to Install a Storage Array” on page 15
Add a storage array to an existing cluster.	“Adding a Storage Array to a Running Cluster” on page 17

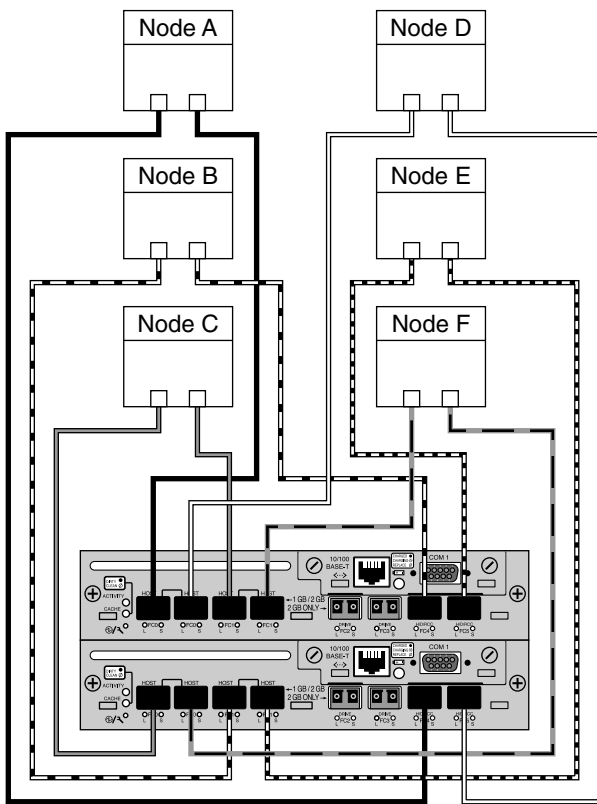
## Storage Array Cabling Configurations

You can install the StorEdge 3510 and 3511 FC RAID arrays in several different configurations. Use the *Sun StorEdge 3000 Family Best Practices Manual* to help evaluate your needs and determine which configuration is best for your situation. See your Sun service provider for currently supported Sun Cluster configurations.

The following figures provide examples of configurations with multipathing solutions. With direct attach storage (DAS) configurations with multipathing, you map each LUN to each host channel. All nodes can see all 256 LUNs.

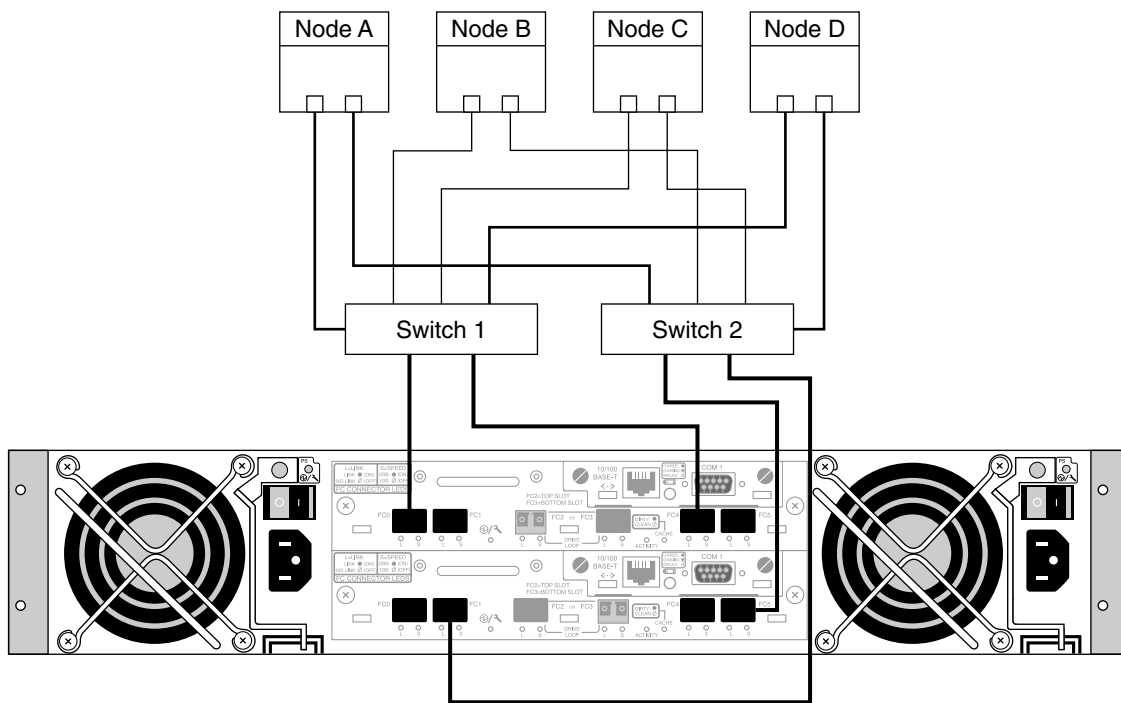


**FIGURE 1-1** Sun StorEdge 3510 Direct Attach Storage (DAS) Configuration With Multipathing and Two Controllers



**FIGURE 1-2** Sun StorEdge 3511 Direct Attach Storage (DAS) Configuration With Multipathing and Two Controllers

The two-controller SAN configurations allow 32 LUNs to be mapped to each pair of host channels. Since these configurations use multipathing, each node sees a total of 64 LUNs.



**FIGURE 1-3** Sun StorEdge 3510 SAN Configuration With Multipathing and Two Controllers

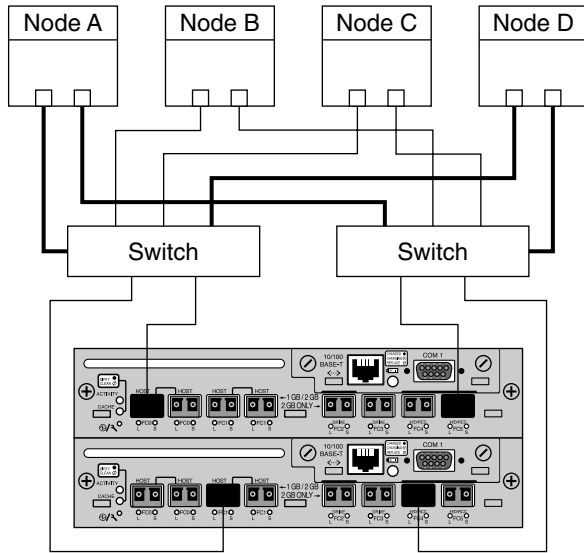


FIGURE 1-4 Sun StorEdge 3511 SAN Configuration With Multipathing and Two Controllers

## ▼ How to Install a Storage Array

Before installing or configuring your cluster, see “Known Problems” in the *Sun Cluster 3.0-3.1 Release Notes Supplement* for important information about the StorEdge 3510 and 3511 FC storage arrays.

Use this procedure to install and configure storage arrays *before* installing the Solaris Operating System and Sun Cluster software on your cluster nodes. If you need to add a storage array to an existing cluster, use the procedure in “Adding a Storage Array to a Running Cluster” on page 17

### Before You Begin

This procedure assumes that the hardware is not connected.

---

**Note** – If you plan to attach a StorEdge 3510 or 3511 FC expansion storage array to a StorEdge 3510 or 3511 FC RAID storage array, attach the expansion storage array before connecting the RAID storage array to the cluster nodes. See the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* for more information.

---

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

For the procedure on installing host adapters, see the documentation that shipped with your host adapters and nodes.

**2. If necessary, install the Fibre Channel (FC) switches.**

For the procedure on installing an FC switch, see the documentation that shipped with your switch hardware.

**3. If necessary, install gigabit interface converters (GBICs) or Small Form-Factor Pluggables (SFPs) in the FC switches.**

For the procedures on installing a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.

**4. Cable the storage array.**

For the procedures on connecting your FC storage array, see *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

- If you plan to create a storage area network (SAN), connect the storage array to the FC switches using fiber-optic cables.
- If you plan to have a direct connect configuration (DAS), connect the storage array to the nodes.

**5. Power on the storage arrays.**

Verify that all components are powered on and functional.

For the procedure on powering up the storage arrays and checking LEDs, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

**6. Set up and configure the storage array.**

For procedures on setting up logical drives and LUNs, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* or the *Sun StorEdge 3000 Family RAID Firmware 3.27 User's Guide*.

For the procedure on configuring the storage array, see *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

**7. On all nodes, install the Solaris operating system and apply the required Solaris patches for Sun Cluster software and storage array support.**

For the procedure about how to install the Solaris operating environment, see "How to Install Solaris Software" in *Sun Cluster Software Installation Guide for Solaris OS*.

**8. Install any required storage array controller firmware.**

Sun Cluster software requires patch version 113723-03 or later for each Sun StorEdge 3510 array in the cluster.

See the Sun Cluster release notes documentation for information about accessing Sun's EarlyNotifier web pages. The EarlyNotifier web pages list information about any required patches or firmware levels that are available for download.



9. **Install any required patches or software for Sun StorEdge Traffic Manager software support to nodes and enable multipathing.**

When using these arrays, Sun Cluster software requires Sun StorEdge SAN Foundation software:

- **SPARC: For the Sun StorEdge 3510 storage array, at least Sun StorEdge SAN Foundation software version 4.2.**
- **SPARC: For the Sun StorEdge 3511 storage array, at least Sun StorEdge SAN Foundation software version 4.4.**
- **x86: For x86 based clusters, at least the Sun StorEdge SAN Foundation software that is bundled with Solaris 10.**

For the procedure about how to install the Sun StorEdge Traffic Manager software, see “How to Install Sun Multipathing Software” in *Sun Cluster Software Installation Guide for Solaris OS*.

10. **On all nodes, update the `/devices` and `/dev` entries.**

```
# devfsadm -C
```

11. **On all nodes, confirm that the storage arrays that you installed are visible.**

```
# luxadm probe
```

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

```
# format
```

13. **Install the Sun Cluster software and volume management software.**

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

**See Also** To continue with Sun Cluster software installation tasks, see the Sun Cluster software installation documentation.

## Adding a Storage Array to a Running Cluster

Use this procedure to add new storage array to a running cluster. To install to a new Sun Cluster that is not running, use the procedure in [“How to Install a Storage Array” on page 15](#).

If you need to add a storage array to more than two nodes, repeat the steps for each additional node that connects to the storage array.

---

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

If your nodes are configured for dynamic reconfiguration, see the Sun Cluster system administration documentation and skip steps that instruct you to shut down the node.

---

## ▼ How to Perform Initial Configuration Tasks on the Storage Array

### **Steps** 1. **Power on the storage array.**

#### 2. **Set up and configure the storage array.**

For the procedures on configuring the storage array, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

#### 3. **If necessary, upgrade the storage array's controller firmware.**

Sun Cluster software requires patch version 113723-03 or later for each Sun StorEdge 3510 array in the cluster.

See the Sun Cluster release notes documentation for information about accessing Sun's EarlyNotifier web pages. The EarlyNotifier web pages list information about any required patches or firmware levels that are available for download. For the procedure on applying any host adapter's firmware patch, see the firmware patch README file.

#### 4. **Configure the new storage array. Map the LUNs to the host channels.**

For the procedures on setting up logical drives and LUNs, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* or *Sun StorEdge 3000 Family RAID Firmware 3.27 User's Guide*.

#### 5. **To continue adding the storage array, proceed to "How to Connect the Storage Array to FC Switches" on page 18.**

## ▼ How to Connect the Storage Array to FC Switches

Use this procedure if you plan to add a storage array to a SAN environment. If you do not plan to add the storage array to a SAN environment, go to ["How to Connect the Node to the FC Switches or the Storage Array"](#) on page 19.

### **Steps** 1. **Install the SFPs in the storage array that you plan to add.**

For the procedure on installing an SFP, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

2. **If necessary, install GBICs or SFPs in the FC switches.**  
For the procedure on installing a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.
3. **Install a fiber-optic cable between the new storage array and each FC switch.**  
For the procedure on installing a fiber-optic cable, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.
4. **To finish adding your storage array, see “How to Connect the Node to the FC Switches or the Storage Array” on page 19.**

## ▼ How to Connect the Node to the FC Switches or the Storage Array

Use this procedure when you add a storage array to a SAN or DAS configuration. In SAN configurations, you connect the node to the FC switches. In DAS configurations, you connect the node directly to the storage array.

- Steps**
1. **Determine the resource groups and device groups that are running on all nodes.**  
Record this information because you will use it in [Step 12](#) of this procedure to return resource groups and device groups to these nodes.  

```
# scstat
```
  2. **Move all resource groups and device groups off the node that you plan to connect.**  

```
# scswitch -s -h from-node
```
  3. **Determine if you need to install host adapters in the node.**
    - If no, skip to [Step 4](#).
    - If yes, see the documentation that shipped with your host adapters.
  4. **If necessary, install GBICs or SFPs to the FC switches or the storage array.**  
For the procedure on installing a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.  
  
For the procedure on installing a GBIC or an SFP to a storage array, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.
  5. **Connect fiber-optic cables between the node and the FC switches or the storage array.**  
For the procedure on installing a fiber-optic cable, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

6. If necessary, install the required Solaris patches for storage array support on the node.

See the Sun Cluster release notes documentation for information about accessing Sun's EarlyNotifier web pages. The EarlyNotifier web pages list information about any required patches or firmware levels that are available for download. For the procedure on applying any host adapter's firmware patch, see the firmware patch README file.

7. On the node, update the `/devices` and `/dev` entries.

```
# devfsadm -C
```

8. On the node, update the paths to the device ID instances.

```
# scgdevs
```

9. If necessary, label the LUNs on the new storage array.

```
# format
```

10. (Optional) On the node, verify that the device IDs are assigned to the new LUNs.

```
# scdidadm -C  
# scdidadm -l
```

11. Repeat [Step 2](#) to [Step 10](#) for each remaining node that you plan to connect to the storage array.

12. Return the resource groups and device groups that you identified in [Step 1](#) to the original nodes.

```
# scswitch -z -g resource-group -h nodename  
# scswitch -z -D device-group-name -h nodename
```

For more information, see the Sun Cluster system administration documentation.

13. Perform volume management administration to incorporate the new logical drives into the cluster.

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

**Next Steps** The best way to enable multipathing for a cluster is to install the multipathing software and enable multipathing before installing the Sun Cluster software and establishing the cluster. For this procedure, see "How to Install Sun Multipathing Software" in *Sun Cluster Software Installation Guide for Solaris OS*. If you need to add multipathing software to an established cluster, see "How to Install Sun Multipathing Software" in *Sun Cluster Software Installation Guide for Solaris OS* and follow the troubleshooting steps to clean up the device IDs.

---

# Configuring Storage Arrays in a Running Cluster

This section contains the procedures for configuring a storage array in a running cluster. [Table 1–2](#) lists these procedures.

Before installing or configuring your cluster, see “Known Problems” in the *Sun Cluster 3.0-3.1 Release Notes Supplement* for important information about the StorEdge 3510 and 3511 FC storage array.

---

**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 `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 `scdidadm -R` command for each affected device.

---

---

**Note** – Logical volumes are not supported in a Sun Cluster environment. Use logical drives as an alternative.

---

**TABLE 1–2** Task Map: Configuring a Fibre-Channel Storage Array

Task	Information
Create a LUN	“How to Create and Map a LUN” on page 22
Remove a LUN	“How to Unmap and Remove a LUN” on page 23

---

## ▼ How to Create and Map a LUN

Use this procedure to create a LUN from unassigned storage capacity.

### Before You Begin

This procedure relies on the following prerequisites and assumptions.

- All nodes are booted in cluster mode and attached to the storage device.
- The storage device is installed and configured. If you are using multipathing, it is configured as described in the installation procedure.
- If you are using Sun StorEdge Traffic Manager, it is installed and configured and the path between Traffic Manager and the storage device is functioning.

### Steps

1. **Follow the instructions in your storage device's documentation to create and map the LUN.**

To allow multiple clusters and nonclustered systems to access the storage device, create initiator groups by using LUN filtering or masking.

2. **Are you using multipathing?**

- If yes, proceed to [Step 3](#).
- If no, skip to [Step 4](#).

3. **Are any devices that are associated with the LUN you created at an unconfigured state?**

```
# cfgadm -al | grep disk
```

- If no, proceed to [Step 4](#).
- If yes, configure the STMS paths on each node that is connected to the storage device.

```
cfgadm -o force_update -c configure controllerinstance
```

For the procedure about how to configure STMS paths, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide*.

4. **On one node that is connected to the storage device, use the `format` command to label the new LUN.**

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

```
# scgdevs
```

---

**Note** – You might have a volume management daemon such as `vold` running on your node, and have a CD-ROM drive connected to the node. Under these conditions, a `device busy` error might be returned even if no disk is in the drive. This error is expected behavior. You can safely ignore this error message.

---

6. **If you will manage this LUN with volume management software, use the appropriate Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager commands to update the list of devices on all nodes that are attached to the new volume that you created.**

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

- See Also**
- To configure a LUN as a quorum device, see Chapter 5, “Administering Quorum,” in *Sun Cluster System Administration Guide for Solaris OS*.
  - To create a new resource or configure a running resource to use the new LUN, see Chapter 2, “Administering Data Service Resources,” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

## ▼ How to Unmap and Remove a LUN

Use this procedure to remove one or more LUNs. See the *Sun StorEdge 3000 Family RAID Firmware 3.25 and 3.27 User’s Guide* for the latest information about LUN administration.

This procedure assumes that all nodes are booted in cluster mode and attached to the storage device.



---

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

---

### **Steps** 1. **Identify the LUN or LUNs that you will remove.**

Refer to your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation for the appropriate commands. For example:

```
# luxadm probe
# scdidadm -L pathname
```

### 2. **Is the LUN that you will remove a quorum device?**

```
# scstat -q
```

- **If no, proceed to Step 3.**

- **If yes, choose and configure another device as the quorum device. Then remove the old quorum device.**

For procedures about how to add and remove quorum devices, see Chapter 5, “Administering Quorum,” in *Sun Cluster System Administration Guide for Solaris OS*.

**3. Remove the LUN from disksets or disk groups.**

Run the appropriate Solstice DiskSuite/Solaris Volume Manager 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 for more information. See the following note 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 them 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. Unmap the LUN from both host channels.**

For the procedure on unmapping a LUN, see the *Sun StorEdge 3000 Family RAID Firmware 3.25 and 3.27 User's Guide*.

**5. (Optional) Delete the logical drive.**

For more information, see *Sun StorEdge 3000 Family RAID Firmware 3.25 and 3.27 User's Guide*.

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

```
# devfsadm -C
```

**7. On both nodes, remove all obsolete device IDs.**

```
# scdidadm -C
```

---

## Maintaining Storage Arrays

This section contains the procedures for maintaining a storage array in a Sun Cluster environment. Maintenance tasks are listed in [Table 1–3](#) 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 `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 `scdidadm -R` command for each affected device.

---

**TABLE 1-3** Task Map: Maintaining a Storage Array

Task	Information
Remove a storage array from a running cluster.	"How to Remove a Storage Array From a Running Cluster" on page 26
Upgrade array firmware.	"How to Upgrade Storage Array Firmware" on page 28
Replace a disk drive in an storage array.	"How to Replace a Disk Drive" on page 29
Replace a host adapter.	"How to Replace a Host Adapter" on page 30
Replace a node-to-switch fiber optic cable.	"Replacing a Node-to-Switch Component" on page 31
Replace a gigabit interface converter (GBIC) or Small Form-Factor Pluggable (SFP) on a node's host adapter.	"Replacing a Node-to-Switch Component" on page 31
Replace a GBIC or an SFP on an FC switch, connecting to a node.	"Replacing a Node-to-Switch Component" on page 31
Replace a storage array-to-switch fiber-optic cable.	"Replacing a Node-to-Switch Component" on page 31
Replace a GBIC or an SFP on an FC switch, connecting to a storage array.	"Replacing a Node-to-Switch Component" on page 31
Replace an FC switch.	"Replacing a Node-to-Switch Component" on page 31
Replace the power cord of an FC switch.	"Replacing a Node-to-Switch Component" on page 31
Replace the controller.	"Replacing a Node-to-Switch Component" on page 31

---

**TABLE 1-3** Task Map: Maintaining a Storage Array (Continued)

Task	Information
Replace the chassis.	"How to Replace a Chassis in a Running Cluster" on page 33
Add a node to the storage array.	Sun Cluster system administration documentation
Remove a node from the storage array.	Sun Cluster system administration documentation

## StorEdge 3510 and 3511 FC RAID Array FRUs

The following is a list of administrative tasks that require no cluster-specific procedures. See the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* for the following procedures.

- Replacing an Ethernet cable.
- Replacing the power cable on the storage array.
- Replacing a Power and Cooling Unit (PCU).
- Replacing the expansion unit-to-RAID storage array interconnect components such as SFPs and fiber-optic cables.

### ▼ How to Remove a Storage Array From a Running Cluster

Use this procedure to permanently remove storage arrays and their submirrors from a running cluster.

If you need to remove a storage array from more than two nodes, repeat [Step 6](#) to [Step 11](#) for each additional node that connects to the storage array.



---

**Caution** – During this procedure, you lose access to the data that resides on each storage array that you are removing.

---

**Steps** 1. Does the storage array you are removing contain any quorum devices?

```
# scstat -q
```

- If no, proceed to [Step 2](#).

- **If yes, choose another disk drive to configure as the quorum device. Then remove the old quorum device.**  
For procedures on adding and removing quorum devices, see the Sun Cluster system administration documentation.
2. **If necessary, back up all database tables, data services, and drives associated with each storage array that you are removing.**
  3. **Determine the resource groups and device groups that are running on all nodes.**  
Record this information because you will use it in [Step 15](#) of this procedure to return resource groups and device groups to these nodes.  

```
# scstat
```
  4. **If necessary, run the appropriate Solstice DiskSuite or VERITAS Volume Manager commands to detach the submirrors from each storage array that you are removing to stop all I/O activity to the storage array.**  
For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.
  5. **Run the appropriate volume manager commands to remove references to each LUN that belongs to the storage array that you are removing.**  
For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.
  6. **Shut down the node.**  
For the full procedure on shutting down and powering off a node, see the Sun Cluster system administration documentation.
  7. **If necessary, disconnect the storage arrays from the nodes or the FC switches.**
  8. **Is the storage array that you are removing the last storage array connected to the node?**
    - **If no, skip to [Step 11](#).**
    - **If yes, disconnect the fiber-optic cable between the node and the FC switch that was connected to this storage array.**
  9. **Do you want to remove the host adapters from the node?**
    - **If no, skip to [Step 11](#).**
    - **If yes, power off the node.**
  10. **Remove the host adapters from the node.**  
For the procedure on removing host adapters, see the documentation that shipped with your host adapter and nodes.

**11. Boot the node into cluster mode.**

For more information on booting nodes, see the Sun Cluster system administration documentation.

**12. Repeat steps [Step 6](#) to [Step 11](#) on each additional node that you need to disconnect from the storage array.**

**13. On all cluster nodes, remove the paths to the devices that you are deleting.**

```
# devfsadm -C
```

**14. On all cluster nodes, remove all obsolete device IDs.**

```
# scdidadm -C
```

**15. Return the resource groups and device groups that you identified in [Step 3](#) to the original nodes.**

```
# scswitch -z -g resource-group -h nodename  
# scswitch -z -D device-group-name -h nodename
```

**See Also** To prepare the storage array for later use, unmap and delete all LUNs and logical drives. See [“How to Unmap and Remove a LUN”](#) on [page 23](#) for information about LUN removal. For more information about removing logical drives, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

## ▼ How to Upgrade Storage Array Firmware

Use this procedure to upgrade storage array firmware in a running cluster.

---

**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 `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 `scdidadm -R` command for each affected device.

---

**Steps** **1. Stop all I/O to the storage arrays you are upgrading.**

**2. Download the firmware to the storage arrays.**

Refer to the *Sun StorEdge 3000 Family RAID Firmware 3.25 and 3.27 User's Guide* and to any patch readme files for more information.

3. Confirm that all storage arrays that you upgraded are visible to all nodes.

```
# luxadm probe
```

4. Restart all I/O to the storage arrays.

You stopped I/O to these storage arrays in [Step 1](#).

## ▼ How to Replace a Disk Drive

Use this procedure to replace a failed disk drive in a storage array in a running cluster.

- Steps**
1. Did the failed disk drive affect the storage array LUN's availability?

- If no, proceed to [Step 3](#).
- If yes, use volume manager commands to detach the submirror or plex.  
For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

2. Is the LUN (in [Step 1](#)) a quorum device?

```
# scstat -q
```

- If no, proceed to [Step 3](#).
- If yes, choose and configure another device to be the new quorum device. Remove the old quorum device.  
For procedures about how to add and remove quorum devices, see your Sun Cluster system administration documentation.

3. Replace the failed disk drive.

For instructions, refer to the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

4. (Optional) If you reconfigured a quorum device in [Step 1](#), restore the original quorum configuration.

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

5. Did you detach a submirror or plex in [Step 1](#)?

- If no, you are finished with this procedure.
- If yes, use volume manager commands to reattach the submirror or plex.  
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.

### 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.

You cannot replace a single, dual-port HBA that has quorum configured on that storage path by using DR. 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 3.0-3.1 Hardware Administration Manual for Solaris OS*.

Exceptions to this restriction include three-node or larger cluster configurations where no storage device has a quorum device configured.

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

Record this information because you use this information in [Step 9](#) of this procedure to return resource groups and device groups to Node A.

```
# scstat
```

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

```
# scswitch -S -h nodename
```

### 3. 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.

### 4. Power off Node A.

### 5. Replace the failed host adapter.

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

### 6. Do you need to upgrade the node’s host adapter firmware?

- **If yes, boot Node A into noncluster mode. Proceed to [Step 7](#).**

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

- If no, proceed to [Step 8](#).

**7. Upgrade the host adapter firmware on Node A.**

PatchPro is a patch-management tool that eases the selection and download of patches required for installation or maintenance of Sun Cluster software. PatchPro provides an Interactive Mode tool especially for Sun Cluster. The Interactive Tool makes the installation of patches easier. PatchPro's Expert Mode tool helps you to maintain your configuration with the latest set of patches. Expert Mode is especially useful for obtaining all of the latest patches, not just the high availability and security patches.

To access the PatchPro tool for Sun Cluster software, go to <http://www.sun.com/PatchPro/>, click Sun Cluster, then choose either Interactive Mode or Expert Mode. Follow the instructions in the PatchPro tool to describe your cluster configuration and download the patches.

For third-party firmware patches, see the SunSolve<sup>SM</sup> Online site at <http://sunsolve.ebay.sun.com>.

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

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

**9. Return the resource groups and device groups you identified in [Step 1](#) to Node A.**

```
# scswitch -z -g resource-group -h nodename  
# scswitch -z -D device-group-name -h nodename
```

For more information, see your Sun Cluster system administration documentation.

## Replacing a Node-to-Switch Component

Use this procedure to replace a node-to-switch component that has failed or that you suspect might be contributing to a problem.

---

**Note** – Node-to-switch components that are covered by this procedure include the following components:

- Node-to-switch fiber-optic cables
- Gigabit interface converters (GBICs) or small form-factor pluggables (SFPs) on an FC switch
- FC switches

For the procedure about how to replace a host adapter, see [“How to Replace a Host Adapter” on page 30](#).

---

This procedure defines *Node A* as the node that is connected to the node-to-switch component that you are replacing. This procedure assumes that, except for the component you are replacing, your cluster is operational.

Ensure that you are following the appropriate instructions:

- If your cluster uses multipathing, see [“How to Replace a Node-to-Switch Component in a Cluster That Uses Multipathing” on page 32](#).
- If your cluster does *not* use multipathing, see [“How to Replace a Node-to-Switch Component in a Cluster Without Multipathing” on page 32](#).

## ▼ How to Replace a Node-to-Switch Component in a Cluster That Uses Multipathing

- Steps**
1. **Is your configuration active-passive?**  
If yes, and the active path is the path that needs a component replaced, make that path passive.
  2. **Replace the component.**  
Refer to your hardware documentation for any component-specific instructions.
  3. **(Optional) If your configuration is active-passive and you changed your configuration in [Step 1](#), switch your original data path back to active.**

## ▼ How to Replace a Node-to-Switch Component in a Cluster Without Multipathing

- Steps**
1. **Check if the physical data path failed.**  
If no, proceed to [Step 2](#).  
If yes:



- a. **Replace the component.**  
Refer to your hardware documentation for any component-specific instructions.
- b. **Fix the volume manager error that was caused by the failed data path.**
- c. **(Optional) If necessary, return resource groups and device groups to this node.**

You have completed this procedure.

2. **Determine the resource groups and device groups that are running on Node A.**

```
# scstat
```

3. **Move all resource groups and device groups to another node.**

```
# scswitch -s -h from-node
```

4. **Replace the node-to-switch component.**

Refer to your hardware documentation for any component-specific instructions.

5. **(Optional) If necessary, return the resource groups and device groups that you identified in Step 2 to Node A.**

```
# scswitch -z -g resource-group -h nodename
# swswitch -z -D device-group -h nodename
```

## ▼ How to Replace a Chassis in a Running Cluster

Use this procedure to replace a storage array chassis in a running cluster. This procedure assumes that you want to retain all FRUs other than the chassis and the backplane.

- Steps**
1. **To stop all I/O activity to this storage array, detach the submirrors that are connected to the chassis you are replacing.**  
For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.
  2. **Is this storage array made redundant by host-based mirroring?**
    - **If yes, proceed to Step 3.**
    - **If no, shut down the cluster.**  
For the full procedure on shutting down a cluster, see the Sun Cluster system administration documentation.
  3. **Replace the chassis and backplane.**  
For the procedure on replacing a chassis, see the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*.

4. Did you shut down the cluster in [Step 2](#)?

- If no, proceed to [Step 5](#).

- If yes, boot it back into cluster mode.

For the full procedure on booting a cluster, see the Sun Cluster system administration documentation.

5. Reattach the submirrors that you detached in [Step 1](#) to resynchronize them.



---

**Caution** – The world wide numbers (WWNs) might change as a result of this procedure. If the WWNs change, and you must reconfigure your volume manager software to recognize the new WWNs.

---

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

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