



# Sun Cluster 3.x With Sun StorEdge T3 or T3+ Array Manual

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# Preface

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The *Sun Cluster 3.x With Sun StorEdge T3 or T3+ Array Partner-Group Configuration Manual* provides procedures specific to Sun StorEdge™ T3 or T3+ arrays in a partner-group configuration that is placed in a Sun™ Cluster environment.

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

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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

This book contains 2 chapters that consists of three major sections.

Chapter 1 discusses how to install, configure, and maintain the single-controller configuration of the StorEdge T3 and T3+ storage array.

Chapter 2 discusses how to install, configure, and maintain the partner-group configuration of the StorEdge T3 and T3+ storage array.

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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.x With Sun StorEdge T3 or T3+ Array Manual

| Revision Date | New Information                                                                                                                                                    |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| July 2003     | Updated illustrations.                                                                                                                                             |
|               | Updated documentation with editorial changes.                                                                                                                      |
|               | Provided a list of procedures that require no cluster-specific procedures.                                                                                         |
|               | Removed SAN section. For information on SAN solutions, see "SAN Solutions in a Sun Cluster Environment" in <i>Sun Cluster 3.x Hardware Administration Manual</i> . |

---

## Related Documentation

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

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

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

**TABLE P-2** Hardware Documentation

| <b>Title</b>                                                                                                                                                                                                               | <b>Part Number</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <i>Sun StorEdge Traffic Manager Installation and Configuration Guide</i><br>Available on <a href="http://www.sun.com/products-n-solutions/hardware/docs">http://www.sun.com/products-n-solutions/hardware/docs</a>         | 816-1420           |
| <i>Sun StorEdge T3 and T3+ Array Configuration Guide</i><br>Available on <a href="http://www.sun.com/products-n-solutions/hardware/docs">http://www.sun.com/products-n-solutions/hardware/docs</a>                         | 816-4771           |
| <i>Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual</i><br>Available on <a href="http://www.sun.com/products-n-solutions/hardware/docs">http://www.sun.com/products-n-solutions/hardware/docs</a> | 816-0773           |
| <i>Sun StorEdge T3 and T3+ Array Release Notes</i><br>Available on <a href="http://www.sun.com/products-n-solutions/hardware/docs">http://www.sun.com/products-n-solutions/hardware/docs</a>                               | 816-3652           |
| <i>Sun StorEdge T3 Array Controller Upgrade Manual</i><br>Available on <a href="http://www.sun.com/products-n-solutions/hardware/docs">http://www.sun.com/products-n-solutions/hardware/docs</a>                           | 816-0780           |

**TABLE P-3** Sun Cluster Documentation

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

**TABLE P-3** Sun Cluster Documentation (Continued)

| Application   | Title                                           | Part Number |
|---------------|-------------------------------------------------|-------------|
| Release Notes | <i>Sun Cluster 3.1 Release Notes</i>            | 816-5317    |
|               | <i>Sun Cluster 3.1 Release Notes Supplement</i> | 816-3381    |

---

## Using UNIX Commands

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

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

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

---

## Getting Help

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

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

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

| Command                 | Function                                                                                |
|-------------------------|-----------------------------------------------------------------------------------------|
| <code>prtconf -v</code> | Displays the size of the system memory and reports information about peripheral devices |
| <code>psrinfo -v</code> | Displays information about processors                                                   |

| Command                                     | Function                                                     |
|---------------------------------------------|--------------------------------------------------------------|
| <code>showrev -p</code>                     | Reports which patches are installed                          |
| <code>prtdiag -v</code>                     | Displays system diagnostic information                       |
| <code>/usr/cluster/bin/scinstall -pv</code> | Displays Sun Cluster release and package version information |

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

## Accessing Sun Documentation Online

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

## Typographic Conventions

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

**TABLE P-4** Typographic Conventions

| Typeface or Symbol | Meaning                                                                  | Example                                                                                                                       |
|--------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| AaBbCc123          | The names of commands, files, and directories; on-screen computer output | Edit your <code>.login</code> file.<br>Use <code>ls -a</code> to list all files.<br><code>machine_name%</code> you have mail. |
| <b>AaBbCc123</b>   | What you type, contrasted with on-screen computer output                 | <code>machine_name% su</code><br>Password:                                                                                    |
| <i>AaBbCc123</i>   | Command-line placeholder: replace with a real name or value              | To delete a file, type <b><i>rm</i></b> <i>filename</i> .                                                                     |

**TABLE P-4** Typographic Conventions (Continued)

| Typeface or Symbol | Meaning                                                      | Example                                                                                                                  |
|--------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <i>AaBbCc123</i>   | Book titles, new words, or terms, or words to be emphasized. | Read Chapter 6 in <i>User's Guide</i> .<br>These are called <i>class</i> options.<br>You must be <i>root</i> to do this. |

---

## Shell Prompts in Command Examples

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

**TABLE P-5** Shell Prompts

| Shell                                        | Prompt        |
|----------------------------------------------|---------------|
| C shell prompt                               | machine_name% |
| C shell superuser prompt                     | machine_name# |
| Bourne shell and Korn shell prompt           | \$            |
| Bourne shell and Korn shell superuser prompt | #             |

# Installing and Maintaining a Sun StorEdge T3 or T3+ Array Single-Controller Configuration

---

This chapter contains the procedures about how to install, configure, and maintain SunStorEdge™T3 and Sun StorEdge T3+ arrays in a single-controller (noninterconnected) configuration in a Sun™ Cluster environment.

This chapter contains the following procedures.

- “How to Install a Storage Array” on page 12
- “How to Create a Logical Volume” on page 15
- “How to Remove a Logical Volume” on page 16
- “How to Upgrade Storage Array Firmware” on page 20
- “How to Replace a Disk Drive” on page 21
- “How to Add a Storage Array” on page 21
- “How to Remove a Storage Array” on page 29
- “How to Replace a Host-to-Hub/Switch Component” on page 31
- “How to Replace a Hub/Switch or Hub/Switch-to-Array Component” on page 32
- “How to Replace a Storage Array Controller” on page 33
- “How to Replace a Chassis ” on page 34
- “How to Replace a Host Adapter” on page 34
- “How To Upgrade a StorEdge T3 Controller to a StorEdge T3+ Controller” on page 35

For information about how to use a storage array in a storage area network (SAN), see “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual*.

---

## Installing Storage Arrays

This section contains the procedure for an *initial installation* of new storage arrays.

## ▼ How to Install a Storage Array

Use this procedure to install and configure new storage arrays in a running cluster. Perform the steps in this procedure in conjunction with the procedures in the Sun Cluster software installation documentation and your server hardware manual.

**1. Install the host adapters in the nodes that are to be connected to the storage array.**

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

**2. Install the FC hubs/switches.**

For the procedure about how to install FC hubs/switches, see the documentation that shipped with your FC hub/switch hardware.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

**3. Set up a Reverse Address Resolution Protocol (RARP) server on the network on which the new storage arrays are to reside.**

This RARP server enables you to assign an IP address to the new storage array by using each storage array’s unique MAC address.

For the procedure about how to set up a RARP server, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**4. Are you installing a storage array?**

- If yes, proceed to Step 5.
- If no, install the media interface adapters (MIAs) in the storage array that you are installing, as shown in Figure 1–1.

For the procedure about how to install a media interface adapter (MIA), see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

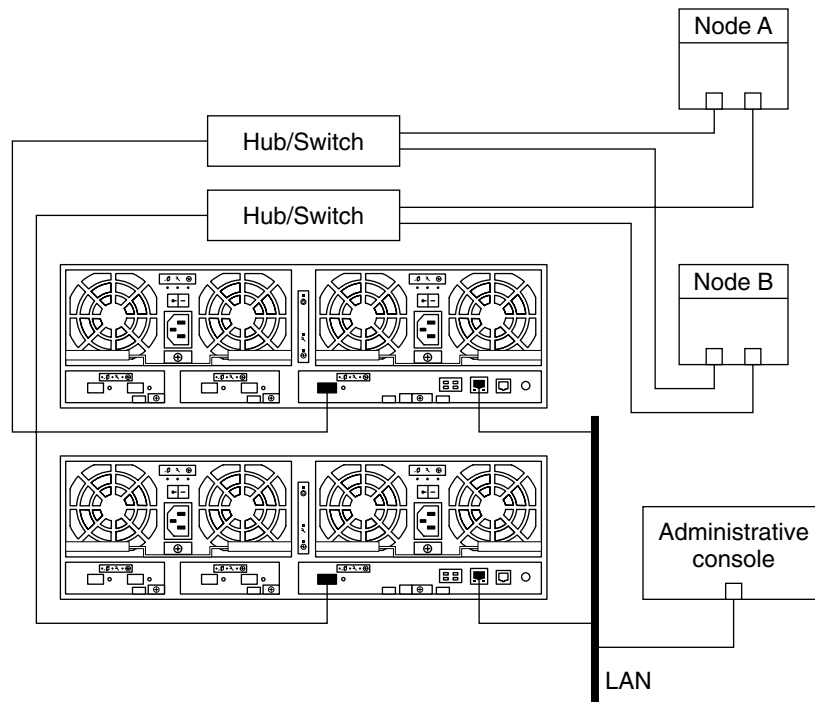
**5. If necessary, install gigabit interface converters (GBICs) or Small Form Factor Pluggables (SFPs) in the FC hubs/switches, as shown in Figure 1–1.**

The GBICs or SFPs let you connect the FC hubs/switches to the storage array that you are installing. For the procedure about how to install an FC hub/switch GBIC or an SFP, see the documentation that shipped with your FC hub/switch hardware.

**6. Install fiber-optic cables between the FC hubs/switches and the storage array, as shown in Figure 1–1.**

For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

7. Install fiber-optic cables between the FC hubs/switches and the nodes, as shown in Figure 1–1.
8. Install the Ethernet cables between the storage array and the Local Area Network (LAN), as shown in Figure 1–1.



**FIGURE 1–1** Installing a Single-Controller Configuration

---

**Note** – Figure 1–1 shows how to cable two storage arrays to enable data sharing and host-based mirroring. This configuration prevents a single-point of failure.

---

9. Install power cords to each storage array that you are installing.
10. Power on the storage array and confirm that all components are powered on and functional.

---

**Note** – The storage array might require a few minutes to boot.

---

For the procedure about how to power on a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**11. (Optional) Configure the storage array with logical volumes.**

For the procedure about how to configure the storage array with logical volumes, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**12. Access each storage array that you are adding. Install the required controller firmware for the storage array.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**13. Ensure that this new storage array has a unique target address.**

For the procedure on how to verify and assign a target address, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**14. Reset the storage array.**

For the procedure about how to reboot or reset a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**15. Install to the nodes the Solaris operating environment. Apply any required Solaris patches for Sun Cluster software and storage array support.**

For the procedure about how to install the Solaris operating environment, see your Sun Cluster software installation documentation. For the location of required Solaris patches and installation instructions for Sun Cluster software support, see your Sun Cluster release notes documentation. For a list of required Solaris patches for storage array support, see the *Sun StorEdge T3 and T3+ Array Release Notes*.

## Where to Go From Here

To continue with Sun Cluster software installation tasks, see your Sun Cluster software installation documentation.

---

## Configuring Storage Arrays

This section contains the procedures about how to configure a storage array in a running cluster. The following table lists these procedures.

---

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

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

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

---

**TABLE 1-1** Task Map: Configuring a Storage Array

| Task                     | Information                                 |
|--------------------------|---------------------------------------------|
| Create a logical volume. | "How to Create a Logical Volume" on page 15 |
| Remove a logical volume. | "How to Remove a Logical Volume" on page 16 |

## ▼ How to Create a Logical Volume

Use this procedure to create a logical volume. This procedure assumes all nodes are booted and are attached to the storage array. This storage array is to host the logical volume that you are creating.

**1. Access the storage array that is to host the logical volume that you are creating.**

**2. Create the logical volume.**

The creation of a logical volume involves adding, mounting, and initializing the logical volume.

For the procedure about how to create and initialize a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*. For the procedure about how to mount a logical volume, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

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

```
# devfsadm
```

**4. On one node that is connected to the partner-group, verify that the new logical volume is visible to the system.**

```
# format
```

**5. Are you running VERITAS Volume Manager?**

- If no, proceed to Step 6
- If yes, update the list of devices on all nodes. These nodes are attached to the logical volume that you created in Step 2.

For more information, see your VERITAS Volume Manager documentation.

**6. If necessary, partition the logical volume.**

**7. 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.

---

## Where to Go From Here

To create a new resource or reconfigure a running resource to use the new logical volume, see your Sun Cluster data services collection.

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

## ▼ How to Remove a Logical Volume

Use this procedure to remove a logical volume. This procedure assumes all nodes are booted and are attached to the storage array. This storage array hosts the logical volume that you are removing.

This procedure defines Node A as the node with which you begin working. Node B is the remaining node.




---

**Caution** – This procedure destroys all data on the logical volume that you are removing.

---

1. If necessary, migrate all data and volumes off the logical volume that you are removing. Otherwise, proceed to Step 2.
2. Is the logical volume that you are removing a quorum device?

```
# scstat -q
```

- If no, proceed to Step 3.
- If yes, choose and configure another device to be the new quorum device. Then remove the old quorum device.

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

### 3. Are you running VERITAS Volume Manager?

- If no, proceed to Step 4.
- If yes, update the list of devices on all nodes that are attached to the logical volume that you are removing.

For more information, see your VERITAS Volume Manager documentation.

### 4. Remove the reference to the logical unit number (LUN) from any diskset or disk group.

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

### 5. Access the storage array. Remove the logical volume.

For the procedure about how to delete a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

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

Record this information because you use this information in Step 11 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

### 7. Shut down and reboot Node A.

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

### 8. On Node A, remove the obsolete device IDs (DIDs).

```
# devfsadm -C
# sddidadm -C
```

### 9. Shut down and reboot Node B.

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

### 10. On Node B, remove the obsolete DIDs.

```
# devfsadm -C
# sddidadm -C
```

### 11. Return the resource groups and device groups that you identified in Step 6 to Node A and Node B.

```
# 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.

## Where to Go From Here

To create a logical volume, see “How to Create a Logical Volume” on page 15.

---

# Maintaining Storage Arrays

This section contains the procedures about how to maintain a storage array. The following table lists these procedures. This section does not include a procedure about how to add a disk drive and a procedure about how to remove a disk drive. This section does not include these procedures because a storage array only operates when fully configured.



---

**Caution** – If you remove any field-replaceable unit (FRU) for an extended period of time, thermal complications might result. To prevent this complication, the storage array is designed so that an orderly shutdown occurs. This shutdown occurs when you remove a component for longer than 30 minutes. Therefore, a replacement part must be immediately available before you start an FRU replacement procedure. You must replace an FRU within 30 minutes. If you do not replace the FRU within this time, the storage array, and all attached storage array, shut down and power off.

---

---

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

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

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

---

**TABLE 1–2** Task Map: Maintaining a Storage Array

| Task                                                                                                            | Information                                                               |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Upgrade storage array firmware.                                                                                 | "How to Upgrade Storage Array Firmware" on page 20                        |
| Replace a disk drive.                                                                                           | "How to Replace a Disk Drive" on page 21                                  |
| Add a storage array.                                                                                            | "How to Add a Storage Array" on page 21                                   |
| Remove a storage array.                                                                                         | "How to Remove a Storage Array" on page 29                                |
| Replace a host-to-hub/switch fiber-optic cable.                                                                 | "How to Replace a Host-to-Hub/Switch Component" on page 31                |
| Replace an FC host adapter GBIC or an SFP.                                                                      | "How to Replace a Host-to-Hub/Switch Component" on page 31                |
| Replace an FC hub/switch GBIC or an SFP that connects an FC hub/switch to a host.                               | "How to Replace a Host-to-Hub/Switch Component" on page 31                |
| Replace a hub/switch-to-storage array fiber-optic cable.                                                        | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace an FC hub/switch GBIC or an SFP that connects the FC hub/switch to a storage array.                     | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace an FC hub/switch.                                                                                       | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace an FC switch.<br>This procedure applies to SAN-configured clusters only.                                | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace an FC hub/switch power cord.                                                                            | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace a media interface adapter (MIA) on a storage array.<br>This procedure does not apply to storage arrays. | "How to Replace a Hub/Switch or Hub/Switch-to-Array Component" on page 32 |
| Replace a storage array controller.                                                                             | "How to Replace a Storage Array Controller" on page 33                    |

**TABLE 1–2** Task Map: Maintaining a Storage Array (Continued)

| Task                                                                       | Information                                                                       |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Replace a chassis.                                                         | "How to Replace a Chassis " on page 34                                            |
| Replace a host adapter.                                                    | "How to Replace a Host Adapter" on page 34                                        |
| Upgrade a StorEdge T3 array controller to a StorEdge T3+ array controller. | "How To Upgrade a StorEdge T3 Controller to a StorEdge T3+ Controller" on page 35 |

The following is a list of administrative tasks that require no cluster-specific procedures. See the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual* for the following procedures.

- Replacing an Ethernet cable.
- Replacing a power cable on the storage array.
- Replacing a Power and Cooling Unit (PCU).
- Replacing a unit interconnect card (UIC).
- Adding a disk drive.
- Removing a disk drive.

## ▼ How to Upgrade Storage Array Firmware

Use this procedure to upgrade storage array firmware in a running cluster. Storage array firmware includes controller firmware, unit interconnect card (UIC) firmware, and disk drive firmware.



**Caution** – Perform this procedure on one storage array at a time. This procedure requires that you reset the storage arrays that you are upgrading. If you reset more than one storage array at a time, your cluster loses access to data.

**Note** – For all firmware installations, always read any README files that accompany the firmware patch for the latest information and special notes.

1. **On one node that is attached to the storage array, detach the submirrors. This storage array is the storage array that you are upgrading.**

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

2. **Apply the controller, disk drive, and UIC firmware patches.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**3. Reset the storage array, if you have not already done so.**

For the procedure about how to reboot a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**4. 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 a Disk Drive

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



---

**Caution** – If you remove any field-replaceable unit (FRU) for an extended period of time, thermal complications might result. To prevent this complication, the storage array is designed so that an orderly shutdown occurs. This shutdown occurs when you remove a component for longer than 30 minutes. Therefore, a replacement part must be immediately available before you start an FRU replacement procedure. You must replace an FRU within 30 minutes. If you do not replace the FRU within this time, the storage array, and all attached storage array, shut down and power off.

---

**1. If the failed disk drive impacted the logical volume's availability, remove the logical volume from volume management control. Otherwise, proceed to Step 2.**

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

**2. Replace the disk drive.**

For the procedure about how to replace a disk drive, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**3. If you removed a LUN from volume management control in Step 1, return the LUN(s) to volume management control. Otherwise, Step 2 completes this procedure.**

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

## ▼ How to Add a Storage Array

Use this procedure to add a new storage array to a running cluster.

This procedure defines Node A as the node with which you begin working. Node B is the remaining node.

1. **Set up a Reverse Address Resolution Protocol (RARP) server on the network you want the new storage arrays to reside on. Afterward, assign an IP address to the new storage arrays.**

This RARP server enables you to assign an IP address to the new storage array by using the storage array's unique MAC address.

For the procedure about how to set up a RARP server, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

2. **Are you adding a StorEdge T3+ array?**

- If yes, proceed to Step 3.
- If no, skip to Step 4.

3. **Install the media interface adapter (MIA) in storage array that you are adding, as shown in Figure 1–2.**

For the procedure about how to install a media interface adapter (MIA), see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

4. **If necessary, install gigabit interface converters (GBICs) or Small Form Factor Pluggables (SFPs) in the FC hub/switch, as shown in Figure 1–2.**

The GBICs or SFPs enables you to connect the FC hubs/switches to the storage array that you are adding.

For the procedure about how to install an FC hub/switch GBIC or an SFP, see the documentation that shipped with your FC hub/switch hardware.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

5. **Install the Ethernet cable between the storage array and the Local Area Network (LAN), as shown in Figure 1–2.**

6. **Power on the storage array array.**

---

**Note** – The storage array might require a few minutes to boot.

---

For the procedure about how to power on a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

7. **Aaccess the storage array that you are adding. If necessary, install the required controller firmware for the storage array.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

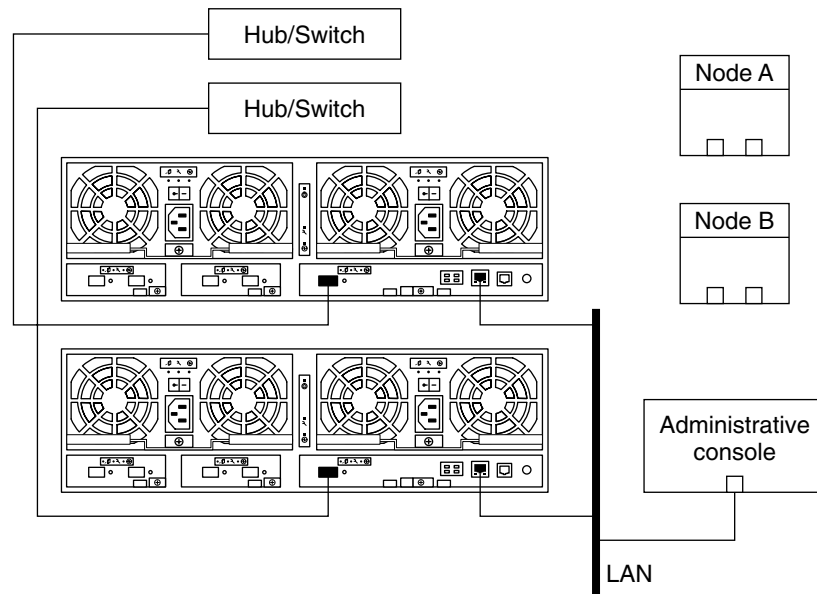
**8. Does this new storage array have a unique target address?**

- If yes, proceed to Step 9.
- If no, change the target address for this new storage array.

For the procedure about how to verify and assign a target address, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**9. Install a fiber-optic cable between the FC hub/switch and the storage array, as shown in Figure 1-2.**

For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.



**FIGURE 1-2** Adding a Single-Controller Configuration: Part I

---

**Note** – Figure 1-2 shows how to cable two storage arrays to enable data sharing and host-based mirroring. This configuration prevents a single-point of failure.

---

**10. Configure the new storage array.**

For the procedure about how to create a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

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

Record this information because you use this information in Step 42 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

**12. Move all resource groups and device groups off Node A.**

```
# scswitch -S -h from-node
```

**13. Do you need to install a host adapter in Node A?**

- If yes, proceed to Step 14.
- If no, skip to Step 21.

**14. Is the host adapter that you are installing the first FC host adapter on Node A?**

- If no, skip to Step 16.
- If yes, determine whether the Fibre Channel support packages are already installed on these nodes. This product requires the following packages.

```
# pkginfo | egrep Wlux
system    SUNWluxd      Sun Enterprise Network Array sf Device Driver
system    SUNWluxdx      Sun Enterprise Network Array sf Device Driver
                        (64-bit)
system    SUNWluxl      Sun Enterprise Network Array socal Device Driver
system    SUNWluxlx      Sun Enterprise Network Array socal Device Driver
                        (64-bit)
system    SUNWluxop      Sun Enterprise Network Array firmware and utilities
```

**15. Are the Fibre Channel support packages installed?**

- If yes, proceed to Step 16.
- If no, install the required support packages that are missing.

The storage array packages are located in the Product directory of the Solaris CD-ROM. Add any necessary packages.

**16. Shut down Node A.**

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

**17. Power off Node A.**

**18. Install the host adapter in Node A.**

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

**19. If necessary, power on and boot Node A into noncluster mode.**

For the procedure about how to boot a node in noncluster mode, see your Sun Cluster system administration documentation.

**20. If necessary, upgrade the host adapter firmware on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**21. If necessary, install a GBIC or an SFP in the FC hub/switch, as shown in Figure 1-3.**

For the procedure about how to install an FC hub/switch GBIC or an SFP, see the documentation that shipped with your FC hub/switch hardware.

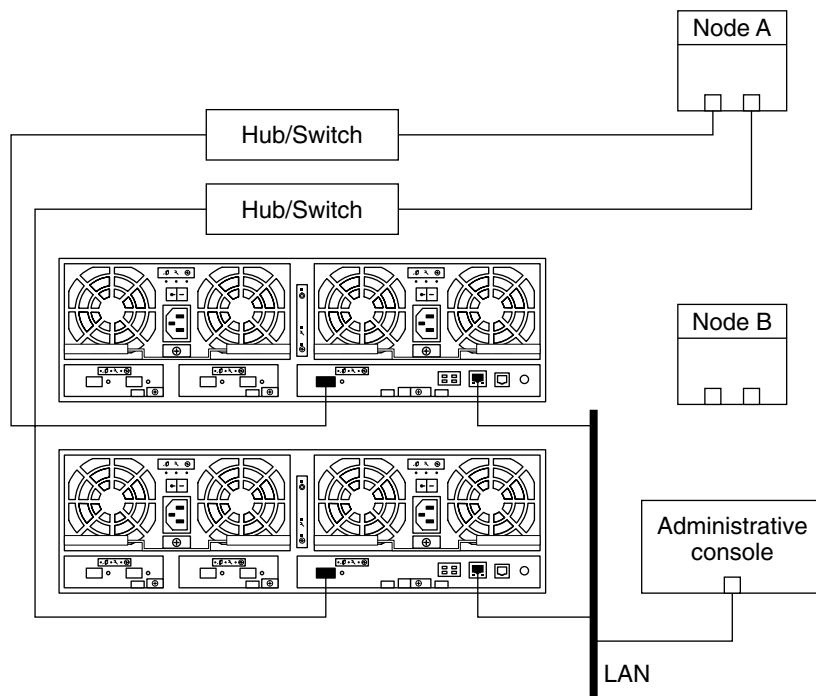
---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

**22. If necessary, connect a fiber-optic cable between the FC hub/switch and Node A, as shown in Figure 1-3.**

For the procedure about how to install an FC host adapter GBIC or an SFP, see your host adapter documentation. For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.



**FIGURE 1-3** Adding a Single-Controller Configuration: Part II

**23. If necessary, install the required Solaris patches for array support on Node A.**

For a list of required Solaris patches for storage array support, see the *Sun StorEdge T3 and T3+ Array Release Notes*.

**24. Shut down Node A.**

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

**25. Perform a reconfiguration boot to create the new Solaris device files and links on Node A.**

**26. Label the new logical volume.**

For the procedure about how to label a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**27. (Optional) On Node A, verify that the device IDs (DIDs) are assigned to the new storage array.**

```
# scdidadm -l
```

**28. Do you need to install a host adapter in Node B?**

- If yes, proceed to Step 29.

- If no, skip to Step 36.

## 29. Is the host adapter that you are installing the first FC host adapter on Node B?

- If no, skip to Step 31.
- If yes, determine whether the Fibre Channel support packages are already installed on these nodes. This product requires the following packages.

```
# pkginfo | egrep Wlux
system      SUNWluxd      Sun Enterprise Network Array sf Device Driver
system      SUNWluxdx      Sun Enterprise Network Array sf Device Driver
               (64-bit)
system      SUNWluxl      Sun Enterprise Network Array socal Device Driver
system      SUNWluxlx     Sun Enterprise Network Array socal Device Driver
               (64-bit)
system      SUNWluxop    Sun Enterprise Network Array firmware and utilities
```

## 30. Are the Fibre Channel support packages installed?

- If yes, proceed to Step 31.
- If no, install the required support packages that are missing.

The storage array packages are located in the Product directory of the Solaris CD-ROM. Add any necessary packages.

## 31. Shut down Node B.

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

## 32. Power off Node B.

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

## 33. Install the host adapter in Node B.

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

## 34. If necessary, power on and boot Node B into noncluster mode.

For the procedure about how to boot a node in noncluster mode, see your Sun Cluster system administration documentation.

## 35. If necessary, upgrade the host adapter firmware on Node B.

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

## 36. If necessary, install a GBIC or an SFP, as shown in Figure 1-4.

For the procedure about how to install an FC hub/switch GBIC or an SFP, see the documentation that shipped with your FC hub/switch hardware.

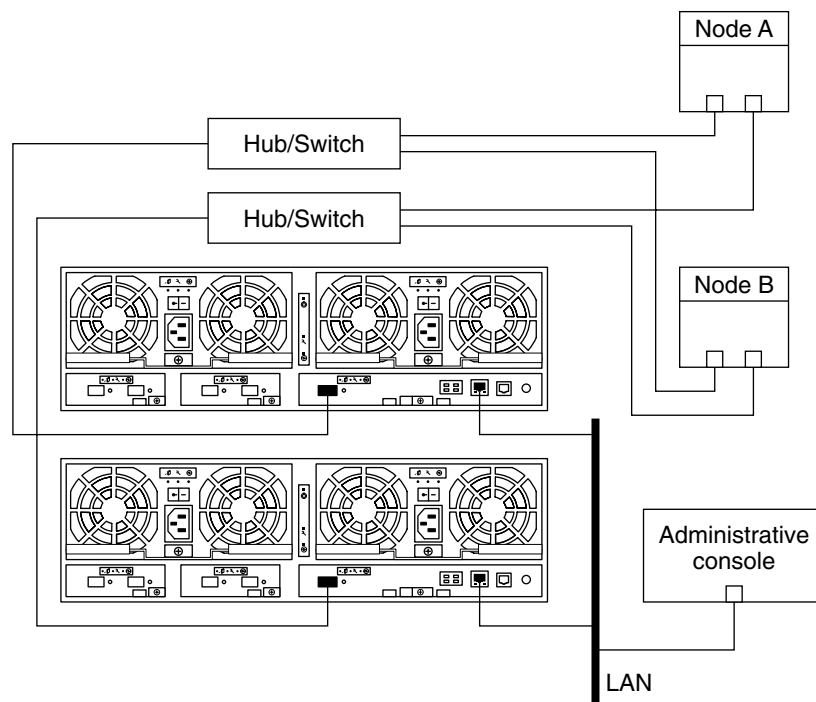
---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

**37. If necessary, connect a fiber-optic cable between the FC hub/switch and Node B, as shown in Figure 1–4.**

For the procedure about how to install an FC host adapter GBIC or an SFP, see your host adapter documentation. For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.



**FIGURE 1–4** Adding a Single-Controller Configuration: Part III

**38. If necessary, install the required Solaris patches for storage array support on Node B.**

For a list of required Solaris patches for storage array support, see the *Sun StorEdge T3 and T3+ Array Release Notes*.

**39. Shut down Node B.**

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

40. Perform a reconfiguration boot to create the new Solaris device files and links on Node B.

41. (Optional) On Node B, verify that the device IDs (DIDs) are assigned to the new storage array.

```
# sddidadm -l
```

42. Return the resource groups and device groups that you identified in Step 11 to Node A and Node B.

```
# 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.

43. Perform volume management administration to incorporate the new logical volumes into the cluster.

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

## ▼ How to Remove a Storage Array

Use this procedure to remove a storage array and its submirrors from a running cluster. This procedure provides the flexibility to remove the host adapters from the nodes for the storage array that you are removing.

This procedure defines Node A as the node with which you begin working. Node B is the remaining node.



---

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

---

1. **Back up all database tables, data services, and volumes that are associated with the storage array. This storage array is the storage array you are removing.**

2. **Detach the submirrors from the storage array that you are removing. Detach the submirrors to stop all I/O activity to the storage array.**

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

3. **Remove the references to the LUN(s) from any diskset or disk group.**

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

4. **Determine the resource groups and device groups that are running on Node B.**

```
# scstat
```

**5. Shut down Node A.**

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

**6. Is the storage array that you are removing the last storage array that is connected to Node A?**

- If yes, disconnect the fiber-optic cable between Node A and the FC hub/switch that is connected to this storage array. Afterward, disconnect the fiber-optic cable between the FC hub/switch and this storage array.
- If no, proceed to Step 7.

For the procedure about how to remove a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

---

**Note** – If you are use your storage array in a SAN-configured cluster, you must keep two FC switches configured in parallel. This configuration maintains cluster availability. See “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

**7. Do you want to remove the host adapter from Node A?**

- If yes, power off Node A.
- If no, skip to Step 10.

**8. Remove the host adapter from Node A.**

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

**9. Without enabling the node to boot, power on Node A.**

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

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

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

**11. Shut down Node B.**

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

**12. Is the storage array that you are removing the last storage array that is connected to the FC hub/switch.**

- If yes, disconnect the fiber-optic cable that connects this FC hub/switch and Node B.

- If no, proceed to Step 13.

For the procedure about how to remove a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

---

**Note** – If you use your storage array in a SAN-configured cluster, you must keep two FC switches configured in parallel. This configuration maintains cluster availability. See “SAN Solutions in a Sun Cluster Environment” in *Sun Cluster 3.x Hardware Administration Manual* for more information.

---

### 13. Do you want to remove the host adapter from Node B?

- If yes, power off Node B.
- If no, skip to Step 16.

### 14. Remove the host adapter from Node B.

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

### 15. Without enabling the node to boot, power on Node B.

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

### 16. Boot Node B into cluster mode.

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

### 17. On all nodes, update the `/devices` and `/dev` entries.

```
# devfsadm -C
# sddidadm -C
```

### 18. Return the resource groups and device groups that you identified in Step 4 to Node A and Node B.

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

## ▼ How to Replace a Host-to-Hub/Switch Component

Use this procedure to replace the following host-to-hub/switch components. You can use storage array in single-controller configuration with FC switches when you create a SAN.

- Host-to-hub/switch fiber-optic cable
- FC host adapter GBIC or an SFP
- FC hub/switch GBIC or an SFP that connects a hub/switch to a node

1. On the node that is connected to the host-to-hub/switch component, determine the resource groups and device groups that are running on this node. This host-to-hub/switch component is the component you are replacing.

```
# scstat
```

2. Move all resource groups and device groups to off the node.

```
# scswitch -S -h from-node
```

3. Replace the host-to-hub/switch component.

- For the procedure about how to replace a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.
- For the procedure about how to replace an FC hub/switch GBIC or an SFP, see the documentation that shipped with your FC hub/switch hardware.
- For the procedure about how to replace an FC host adapter GBIC or an SFP, see your host adapter documentation.

4. Return the resource groups and device groups that you identified in Step 1 to the node. This node is connected to the host-to-hub/switch connection that you replaced.

```
# scswitch -z -g resource-group -h nodename
```

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

## ▼ How to Replace a Hub/Switch or Hub/Switch-to-Array Component

Use this procedure to replace a hub/switch or the following hub/switch-to-array components. You can use storage array in single-controller configuration with FC switches when you create a SAN.

- Fiber-optic cable that connects a hub/switch to a storage array
  - FC hub/switch GBIC or an SFP that connects a hub/switch to a storage array
  - FC hub/switch
  - FC hub/switch power cord
  - Media interface adapter (MIA) on a StorEdge T3 array
- This component does not apply to StorEdge T3+ arrays.

1. Detach the submirrors on the storage array. This array is connected to the hub/switch-to-array fiber-optic cable that you are replacing. Detach the submirrors to stop all I/O activity to this storage array.

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

2. Replace the hub/switch or hub/switch-to-array component.

- For the procedure about how to replace a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.
- For the procedure about how to replace an FC hub/switch GBIC or an SFP, an FC hub/switch, or an FC hub/switch power cord, see the documentation that shipped with your FC hub/switch hardware.
- For the procedure about how to replace an MIA, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.
- If you are replacing FC switches in a SAN, follow the hardware installation and SAN configuration instructions in the documentation that shipped with your switch hardware.

---

**Note** – If you are replacing an FC switch and you intend to save the switch configuration for restoration to the replacement switch, do not connect the cables to the replacement switch until *after* you recall the Fabric configuration to the replacement switch. For more information about how to save and recall switch configurations, see the documentation that shipped with your switch hardware.

---



---

**Note** – Before you replace an FC switch, be sure that the `probe_timeout` parameter of your data service software is set to more than 90 seconds. If you increase the value of the `probe_timeout` parameter to more than 90 seconds, you avoid unnecessary resource group restarts. Resource group restarts occur when one of the FC switches is powered off.

---

### 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 a Storage Array Controller

Use this procedure to replace a storage array controller.

1. **Detach the submirrors on the storage array. This array is connected to the controller that you are replacing. Detach the submirrors to stop all I/O activity to this 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 storage array controller, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**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 a Chassis

Use this procedure to replace a storage array chassis. This procedure assumes that you are retaining all FRUs other than the chassis and the midplane. To replace the chassis, you must replace both the chassis and the midplane because these components are manufactured as one part.



---

**Caution** – You must be a Sun service provider to perform this procedure. If you need to replace a chassis, contact your Sun service provider.

---

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

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

**2. Replace the chassis and the midplane.**

For the procedure about how to replace a storage array chassis, see the *Sun StorEdge T3 and T3+ Array Field Service Manual*.

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



---

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

---

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. Node A in this procedure refers to the node with the failed host adapter that you are replacing. Node B is a backup node.

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

Record this information because you use this information in Step 9 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

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

```
# scswitch -S -h from-node
```

3. **Shut down Node A.**

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

4. **Power off Node A.**

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

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. **Power on Node A.**

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

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

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

8. **If necessary, upgrade the host adapter firmware on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

9. **Return the resource groups and device groups that you identified in Step 1 to Node A and Node B.**

```
# 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.

## ▼ How To Upgrade a StorEdge T3 Controller to a StorEdge T3+ Controller

Use the following procedure to upgrade a StorEdge T3 storage array controller to a StorEdge T3+ storage array controller in a running cluster.



---

**Caution** – Perform this procedure on one storage array at a time. This procedure requires you to reset the storage arrays that you are upgrading. If you reset more than one storage array at a time, your cluster loses access to data.

---

1. **On one node that is attached to the StorEdge T3 storage array in which you are upgrading the controller, detach that storage array's submirrors.**  
For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.
2. **Upgrade the StorEdge T3 storage array controller to a StorEdge T3+ storage array controller.**  
For instructions, see the *Sun StorEdge T3 Array Controller Upgrade Manual* .
3. **Reattach the submirrors to resynchronize the submirrors.**  
For more information, see your Solstice DiskSuite/Solaris Volume Manager or VERITAS Volume Manager documentation.

# Installing and Maintaining a Sun StorEdge T3 Array or Sun StorEdge T3+ Array Partner-Group

---

## Configuration

This chapter contains the procedures about how to install, configure, and maintain Sun StorEdge™ T3 and Sun StorEdge T3+ arrays in a partner-group (interconnected) configuration.

This chapter contains the following procedures.

- “How to Install a Partner Group” on page 38
- “How to Create a Logical Volume” on page 43
- “How to Remove a Logical Volume” on page 44
- “How to Upgrade Storage Array Firmware” on page 49
- “How to Add Partner Groups” on page 51
- “How to Remove Partner Groups” on page 59
- “How to Replace a Disk Drive” on page 62
- “How to Replace a Node-to-Switch Component in a Running Cluster” on page 63
- “How to Replace an FC Switch or Storage Array-to-Switch Component” on page 63
- “How to Replace a Chassis ” on page 65
- “How to Replace a Node’s Host Adapter” on page 66
- “How to Migrate From a Single-Controller Configuration to a Partner-Group Configuration” on page 67

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

For information about how to use a storage arrays in a storage area network (SAN), see “SAN Considerations” on page 70.

---

## Installing Partner Groups

This section contains the procedure for an *initial installation* of storage array partner groups in a cluster.

### ▼ How to Install a Partner Group

Use this procedure to install and configure storage array partner groups in a running cluster. To add storage array partner groups to an existing cluster, use the procedure in “How to Add Partner Groups” on page 51. Perform the steps in this procedure in conjunction with the procedures in the Sun Cluster software installation documentation and your server hardware manual.

#### **1. Install the host adapters in the nodes to be connected to the storage arrays.**

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

## 2. Install the Fibre Channel (FC) switches.

For the procedure about how to install an FC switch, see the documentation that shipped with your switch hardware.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Considerations” on page 70 for more information.

---

## 3. Are you installing Sun StorEdge T3+ arrays?

- If no, proceed to Step 4
- If yes, install the media interface adapters (MIAs) in the Sun StorEdge T3 arrays that you are installing, as shown in Figure 2–1.

For the procedure about how to install a media interface adapter (MIA), see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

## 4. If necessary, install GBICs or SFPs in the FC switches, as shown in Figure 2–1.

For the procedure about how to install a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.

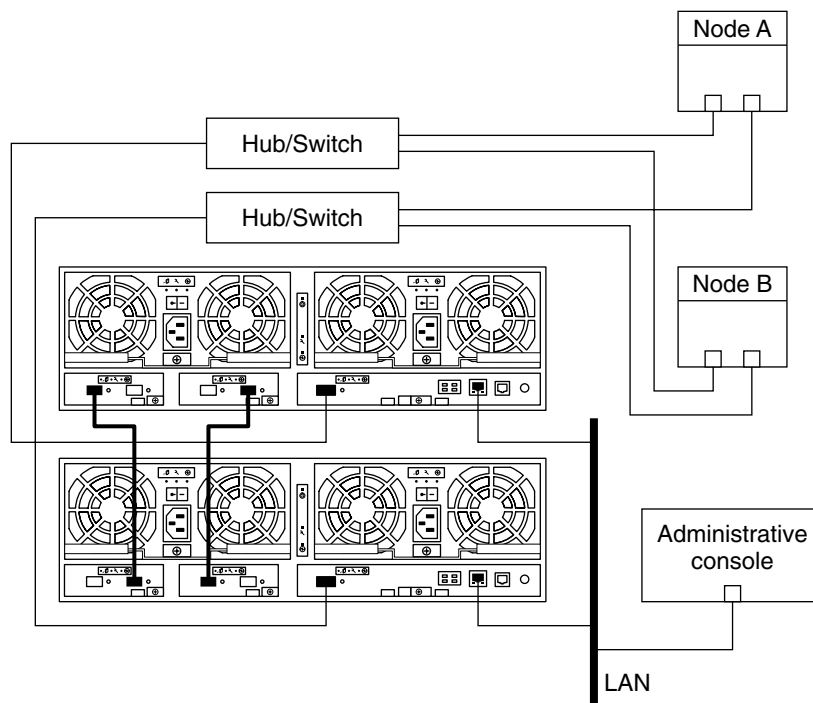
## 5. Set up a Reverse Address Resolution Protocol (RARP) server on the network on which the new storage arrays are to reside.

This RARP server enables you to assign an IP address to the new storage arrays. Assign an IP address by using the storage array’s unique MAC address. For the procedure about how to set up a RARP server, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

## 6. Cable the storage arrays, as shown in Figure 2–1.

- a. Connect the storage arrays to the FC switches by using fiber-optic cables.
- b. Connect the Ethernet cables from each storage array to the LAN.
- c. Connect interconnect cables between the two storage arrays of each partner group.
- d. Connect power cords to each storage array.

For the procedure about how to install fiber-optic, Ethernet, and interconnect cables, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.



**FIGURE 2-1** Installing a Partner-Group Configuration

**7. Power on the storage arrays. Verify that all components are powered on and functional.**

For the procedure about how to power on the storage arrays and verify the hardware configuration, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**8. Administer the storage arrays' network settings.**

Use the `telnet` command to access the *master* controller unit and administer the storage arrays. For the procedure on how to administer the storage array network addresses and settings, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

The master controller unit is the storage array that has the interconnect cables attached to the second port of each interconnect card, when viewed from the rear of the storage arrays. For example, Figure 2-1 shows the master controller unit of the partner group as the lower storage array. In this diagram, the interconnect cables are connected to the second port of each interconnect card on the master controller unit.

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

For partner-group configurations, use the `telnet` command to access the *master* controller unit. Install the required controller firmware.

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**10. Ensure that each storage array has a unique target address.**

For the procedure about how to verify and assign a target address to a storage array, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**11. Ensure that the `cache` and `mirror` settings for each storage array are set to `auto`.**

For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**12. Ensure that the `mp_support` parameter for each storage array is set to `mpxio`.**

For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**13. Ensure that both storage array controllers are online.**

For more information about how to correct the situation if both controllers are not online, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**14. (Optional) Configure the storage arrays with the desired logical volumes.**

For the procedure about how to create and initialize a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*. For the procedure about how to mount a logical volume, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**15. Reset the storage arrays.**

For the procedure about how to reboot or reset a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**16. On all nodes, install the Solaris operating environment. 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 your Sun Cluster software installation documentation.

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**17. Install any required patches or software for Sun StorEdge Traffic Manager software support to nodes.**

For the procedure on how to install the Sun StorEdge Traffic Manager software, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide* at <http://www.sun.com/products-n-solutions/hardware/docs/>. For a list of required patches for Sun StorEdge Traffic Manager software, see the *Sun StorEdge*

*Traffic Manager Software Release Notes* on <http://www.sun.com/storage/san>.

18. Edit the `/kernel/drv/scsi_vhci.conf` file to activate the Sun StorEdge Traffic Manager software functionality. Set the `mpxio-disable` parameter to `no`.

```
mpxio-disable="no"
```

19. Perform a reconfiguration boot on all nodes to create the new Solaris device files and links.

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

```
# devfsadm -C
```

21. On all nodes, confirm that all storage arrays that you installed are visible.

```
# luxadm display
```

## Where to Go From Here

To continue with Sun Cluster software installation tasks, see your Sun Cluster software installation documentation.

---

# Configuring Storage Arrays

This section contains the procedures about how to configure a storage array in a running cluster. Table 2-1 lists these procedures.

---

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

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

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

---

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

| Task                    | Information                                 |
|-------------------------|---------------------------------------------|
| Create a logical volume | "How to Create a Logical Volume" on page 43 |
| Remove a logical volume | "How to Remove a Logical Volume" on page 44 |

## ▼ How to Create a Logical Volume

Use this procedure to create a storage array logical volume. This procedure assumes all nodes are booted and are attached to the storage array. This storage array is to host the logical volume that you are creating.

**1. Access the storage array. This storage array is the master controller unit of your partner group.**

The master controller unit is the storage array that has the interconnect cables attached to the second port of each interconnect card, when viewed from the rear of the storage arrays. For example, Figure 2-1 shows the master controller unit of the partner group as the lower storage array. In this diagram, the interconnect cables are connected to the second port of each interconnect card on the master controller unit.

**2. Create the logical volume.**

To create a logical volume, add, initialize, and mount the logical volume.

For the procedure about how to create and initialize a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*. For the procedure about how to mount a logical volume, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

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

```
# devfsadm
```

**4. On one node that is connected to the partner group, verify that the new logical volume is visible to the system.**

```
# format
```

**5. Are you running VERITAS Volume Manager?**

- If no, proceed to Step 6
- If yes, update the list of devices on all nodes that are attached to the logical volume you created in Step 2.

For more information, see your VERITAS Volume Manager documentation.

**6. If needed, partition the logical volume.**

7. 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.

---

## Where to Go From Here

To create a new resource or reconfigure a running resource to use the new logical volume, see your Sun Cluster data services collection.

To configure a logical volume as a quorum device, see your Sun Cluster system administration documentation

## ▼ How to Remove a Logical Volume

Use this procedure to remove a logical volume. This procedure assumes all nodes are booted and are attached to the storage array. This storage array is to host the logical volume that you are removing.

This procedure defines Node A as the node that you begin working with. Node B as the other node.



---

**Caution** – This procedure destroys all data from the logical volume that you are removing.

---

1. If necessary, migrate all data and volumes off the logical volume that you are removing.

2. Is the logical volume that you are removing a quorum device?

```
# scstat -q
```

- If no, proceed to Step 3.
- If yes, choose and configure another device to be the new quorum device. Afterward, remove the old quorum device.

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

3. Are you running VERITAS Volume Manager?

- If no, proceed to Step 4.
- If yes, update the list of devices on all nodes that are attached to the logical volume that you are removing.

For more information, see your VERITAS Volume Manager documentation.

**4. Remove the reference to the logical unit number (LUN) from any diskset or disk group.**

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

**5. Access the storage array. This storage array is the master controller unit of your partner group.**

The master controller unit is the storage array that has the interconnect cables attached to the second port of each interconnect card, when viewed from the rear of the storage arrays. For example, Figure 2-1 shows the master controller unit of the partner group as the lower storage array. In this diagram, the interconnect cables are connected to the second port of each interconnect card on the master controller unit.

**6. Remove the logical volume.**

For the procedure about how to remove a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**7. Identify the resource groups and device groups that are running on all nodes.**

Record this information because you use this information in Step 14 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

**8. Shut down Node A.**

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

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

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

**10. On Node A, remove the obsolete device IDs (DIDs).**

```
# devfsadm -C
# scdidadm -C
```

**11. Shut down Node B.**

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

**12. Boot Node B into cluster mode.**

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

**13. On Node B, remove the obsolete DIDs.**

```
# devfsadm -C
# scdidadm -C
```

**14. Return the resource groups and device groups that you identified in Step 7 to Node A and Node B.**

```
# 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.

## Where to Go From Here

To create a logical volume, see “How to Create a Logical Volume” on page 43.

---

# Maintaining Storage Arrays

This section contains the procedures about how to maintain storage arrays. Table 2–2 lists these procedures. This section does not include a procedure about how to add a disk drive or a procedure about how to remove a disk drive. This section does not include these procedures because a storage array operates only when fully configured.



---

**Caution** – If you remove any field-replaceable unit (FRU) for an extended period of time, thermal complications might result. To prevent this complication, the storage array is designed so that an orderly shutdown occurs. This shutdown occurs when you remove a component for longer than 30 minutes. Therefore, a replacement part must be immediately available before you start an FRU replacement procedure. You must replace an FRU within 30 minutes. If you do not replace the FRU within this time, the storage array, and all attached storage arrays, shut down and power off.

---

---

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

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

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

---

**TABLE 2-2** Task Map: Maintaining a Storage Array

| Task                                                                                                        | Information                                                                   |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Upgrade storage array firmware.                                                                             | "How to Upgrade Storage Array Firmware" on page 49                            |
| Add a storage array.                                                                                        | "How to Add Partner Groups" on page 51                                        |
| Remove a storage array.                                                                                     | "How to Remove Partner Groups" on page 59                                     |
| Replace a disk drive in a storage array.                                                                    | "How to Replace a Disk Drive" on page 62                                      |
| Replace a node-to-switch fiber optic cable.                                                                 | "How to Replace a Node-to-Switch Component in a Running Cluster" on page 63   |
| Replace a gigabit interface converter (GBIC) or Small Form Factor Pluggable (SFP) on a node's host adapter. | "How to Replace a Node-to-Switch Component in a Running Cluster" on page 63   |
| Replace a GBIC or an SFP on an FC switch, connecting to a node.                                             | "How to Replace a Node-to-Switch Component in a Running Cluster" on page 63   |
| Replace a storage array-to-switch fiber-optic cable.                                                        | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63 |
| Replace a GBIC or an SFP on an FC switch, connecting to a storage array.                                    | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63 |
| Replace an FC switch.                                                                                       | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63 |

**TABLE 2-2** Task Map: Maintaining a Storage Array (Continued)

| Task                                                                                                                         | Information                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Replace an FC switch power cord.                                                                                             | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63                       |
| Replace a media interface adapter (MIA) on a storage array.<br><br>This procedure does not apply to Sun StorEdge T3+ arrays. | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63                       |
| Replace interconnect cables.                                                                                                 | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63                       |
| Replace a storage array controller.                                                                                          | "How to Replace an FC Switch or Storage Array-to-Switch Component" on page 63                       |
| Replace a chassis.                                                                                                           | "How to Replace a Chassis " on page 65                                                              |
| Replace a node's host adapter.                                                                                               | "How to Replace a Node's Host Adapter" on page 66                                                   |
| Migrate from a single-controller configuration to a partner-group configuration.                                             | "How to Migrate From a Single-Controller Configuration to a Partner-Group Configuration" on page 67 |
| Add a node to the storage device.                                                                                            | Sun Cluster system administration documentation                                                     |
| Remove a node from the storage device.                                                                                       | Sun Cluster system administration documentation                                                     |

The following is a list of administrative tasks that require no cluster-specific procedures. See the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual* for the following procedures.

- Replacing an Ethernet cable.
- Replacing a power cable on the storage array.
- Replacing a Power and Cooling Unit (PCU).
- Replacing a unit interconnect card (UIC).
- Adding a disk drive.
- Removing a disk drive.

The following is a list of administrative tasks that require no cluster-specific procedures. See the *Sun StorEdge T3 Array Controller Upgrade Manual* for the following procedures.

- Upgrading a Sun StorEdge T3 array controller to a Sun StorEdge T3+ array controller.

## ▼ How to Upgrade Storage Array Firmware

Use one of the following procedures to upgrade storage array firmware. The procedure that you choose depends on whether you configured your partner-group configuration to support submirrors of a cluster node's volumes. Storage array firmware includes controller firmware, unit interconnect card (UIC) firmware, EPROM firmware, and disk drive firmware.

- "Upgrading Firmware on Storage Arrays That Support Submirrored Data" on page 49
- "Upgrading Firmware on Storage Arrays That Do Not Support Submirrored Data" on page 50

---

**Note** – For all firmware installations, always read any README files that accompany the firmware patch for the latest information and special notes.

---

### Upgrading Firmware on Storage Arrays That Support Submirrored Data



---

**Caution** – Perform this procedure on one storage array at a time. This procedure requires that you reset the storage arrays that you are upgrading. If you reset more than one storage array at a time, your cluster loses access to data.

---

1. **On the node that currently owns the disk group or diskset to which the submirror belongs, detach the storage array's submirrors. This storage array is the storage array on which you are upgrading firmware.**

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

2. **Disconnect both storage array-to-switch fiber-optic cables from the two storage arrays of the partner group.**

3. **Apply the controller, disk drive, and UIC firmware patches.**

For the list of required storage array patches, see the *Sun StorEdge T3 Disk Tray Release Notes*. For the procedure about how to apply firmware patches, see the firmware patch README file. For the procedure about how to verify the firmware level, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

4. **Reset the storage arrays.**

For the procedure about how to reset a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

5. **Disable the storage array controller that is attached to Node B. Disable the controller so that all logical volumes are managed by the remaining controller.**  
For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

6. **Reconnect both storage array-to-switch fiber-optic cables to the two storage arrays of the partner group.**

7. **On one node that is connected to the partner group, verify that the storage array controllers are visible to the node.**

# format

8. **Enable the storage array controller that you disabled in Step 5.**

9. **Reattach the submirrors that you detached in Step 1 to resynchronize the submirrors.**

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

## Upgrading Firmware on Storage Arrays That Do Not Support Submirrored Data

In a partner-group configuration, you can have nonmirrored data. However, you must shut down the cluster when upgrading firmware.



---

**Caution** – Perform this procedure on one storage array at a time. This procedure requires that you reset the storage arrays that you are upgrading. If you reset more than one storage array at a time, your cluster loses access to data.

---

1. **Shut down the entire cluster.**

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

2. **Apply the controller, disk drive, and UIC firmware patches.**

For the list of required storage array patches, see the *Sun StorEdge T3 Disk Tray Release Notes*. For the procedure about how to apply firmware patches, see the firmware patch README file. For the procedure about how to verify the firmware level, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

3. **Reset the storage arrays.**

For the procedure about how to reset a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

4. **Boot all nodes back into the cluster.**

For the procedure about how to boot a cluster, Sun Cluster system administration documentation

5. **On one node that is connected to the partner group, verify that the storage array controllers are visible to the node.**

# format

## ▼ How to Add Partner Groups

---

**Note** – Use this procedure to add new storage array partner groups to a running cluster. To install partner groups to a new Sun Cluster that is not running, use the procedure in “How to Install a Partner Group” on page 38.

---

This procedure defines Node A as the node that you begin working with. Node B is the second node.

1. **Set up a Reverse Address Resolution Protocol (RARP) server on the network you want the new storage arrays to reside on. Afterward, assign an IP address to the new storage arrays.**

---

**Note** – Assign an IP address to the *master* controller unit only. The master controller unit is the storage array that has the interconnect cables attached to the to the second port of each interconnect card, as shown in Figure 2–2.

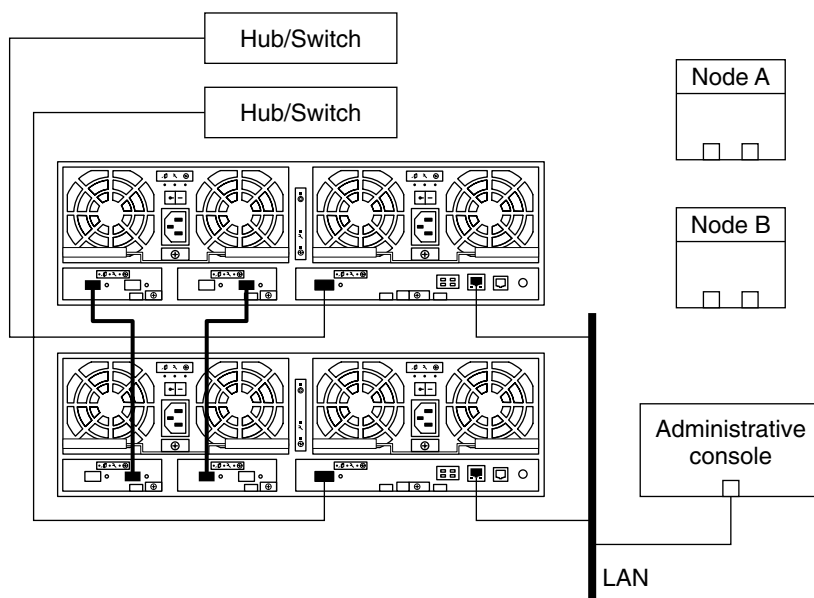
---

This RARP server enables you to assign an IP address to the new storage arrays. Assign an IP address by using the storage array’s unique MAC address. For the procedure about how to set up a RARP server, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

2. **Install the Ethernet cable between the storage arrays and the local area network (LAN), as shown in Figure 2–2.**

3. **If not already installed, install interconnect cables between the two storage arrays of each partner group, as shown in Figure 2–2.**

For the procedure about how to install interconnect cables, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.



**FIGURE 2-2** Adding a Partner-Group Configuration: Part I

**4. Power on the storage arrays.**

---

**Note** – The storage arrays might require several minutes to boot.

---

For the procedure about how to power on storage arrays, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**5. Administer the storage arrays' network addresses and settings.**

Use the `telnet` command to access the *master* controller unit and administer the storage arrays.

For the procedure about how to administer the network address and the settings of a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**6. Install any required storage array controller firmware upgrades.**

For partner-group configurations, use the `telnet` command to the *master* controller unit. If necessary, install the required controller firmware for the storage array.

For the required revision number of the storage array controller firmware, see the *Sun StorEdge T3 Disk Tray Release Notes*.

**7. Ensure that each storage array has a unique target address.**

For the procedure about how to verify and assign a target address to a storage array, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**8. Ensure that the `cache` and `mirror` settings for each storage array are set to `auto`.**

For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**9. Ensure that the `mp_support` parameter for each storage array is set to `mpxio`.**

For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**10. Configure the new storage arrays with the desired logical volumes.**

For the procedure about how to create and initialize a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*. For the procedure about how to mount a logical volume, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**11. Reset the storage arrays.**

For the procedure about how to reboot or reset a storage array, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

**12. Are you adding Sun StorEdge T3+ arrays?**

- If no, proceed to Step 13.
- If yes, install the media interface adapter (MIA) in the Sun StorEdge T3 arrays that you are adding, as shown in Figure 2-2.

For the procedure about how to install an MIA, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**13. If necessary, install GBICs or SFPs in the FC switches, as shown in Figure 2-2.**

For the procedure about how to install a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.

**14. Install a fiber-optic cable between each FC switch and both new storage arrays of the partner group, as shown in Figure 2-2.**

For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Considerations” on page 70 for more information.

---

**15. Determine the resource groups and device groups that are running on all nodes.**

Record this information because you use this information in Step 53 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

**16. Move all resource groups and device groups off Node A.**

```
# scswitch -S -h from-node
```

**17. Do you need to install host adapters in Node A?**

- If no, skip to Step 24.
- If yes, proceed to Step 18.

**18. Is the host adapter that you are installing the first host adapter on Node A?**

- If no, skip to Step 20.
- If yes, determine whether the required support packages are already installed on this node. The following packages are required.

```
# pkginfo | egrep Wlux
system      SUNWluxd      Sun Enterprise Network Array sf Device Driver
system      SUNWluxdx     Sun Enterprise Network Array sf Device Driver
              (64-bit)
system      SUNWluxl      Sun Enterprise Network Array socal Device Driver
system      SUNWluxlx     Sun Enterprise Network Array socal Device Driver
              (64-bit)
system      SUNWluxop     Sun Enterprise Network Array firmware and utilities
system      SUNWluxox     Sun Enterprise Network Array libraries (64-bit)
```

**19. Are the required support packages already installed?**

- If yes, proceed to Step 20.
- If no, install the required support packages that are missing.

The support packages are located in the `Product` directory of the Solaris CD-ROM. Add any missing packages.

**20. Shut down and power off Node A.**

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

**21. Install the host adapters in Node A.**

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

**22. Power on and boot Node A into noncluster mode.**

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

**23. If necessary, upgrade the host adapter firmware on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**24. If necessary, install GBICs or SFPs to the FC switches, as shown in Figure 2-3.**

For the procedure about how to install a GBIC or an SFP to an FC switch, see the documentation that shipped with your FC switch hardware.

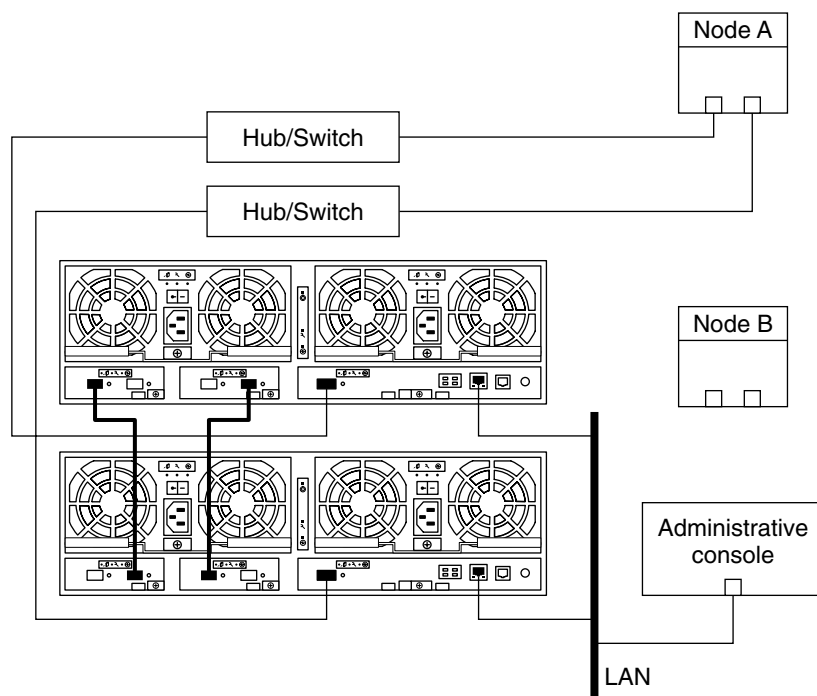
**25. Connect fiber-optic cables between Node A and the FC switches, as shown in Figure 2–3.**

For the procedure about how to install a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Considerations” on page 70 for more information.

---



**FIGURE 2–3** Adding a Partner-Group Configuration: Part II

**26. If necessary, install the required Solaris patches for storage array support on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun’s Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**27. Install any required patches or software for Sun StorEdge Traffic Manager software support on Node A.**

For the procedure on how to install the Sun StorEdge Traffic Manager software, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide* at <http://www.sun.com/products-n-solutions/hardware/docs/>. For a list of required patches for Sun StorEdge Traffic Manager software, see the *Sun StorEdge Traffic Manager Software Release Notes* on <http://www.sun.com/storage/san>.

**28. Edit the `/kernel/drv/scsi_vhci.conf` file to activate the Sun StorEdge Traffic Manager software functionality. Set the `mpxio-disable` parameter to `no`.**

```
mpxio-disable="no"
```

**29. Shut down Node A.**

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

**30. Perform a reconfiguration boot on Node A to create the new Solaris device files and links.**

**31. On Node A, update the `/devices` and `/dev` entries.**

```
# devfsadm -C
```

**32. On Node A, update the paths to the DID instances.**

```
# scdidadm -C
```

**33. Label the new storage array logical volume.**

For the procedure about how to label a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**34. (Optional) On Node A, verify that the device IDs (DIDs) are assigned to the new storage array.**

```
# scdidadm -l
```

**35. Do you need to install host adapters in Node B?**

- If no, skip to Step 42.
- If yes, proceed to Step 36.

**36. Is the host adapter that you are installing the first host adapter on Node B?**

- If no, skip to Step 38.
- If yes, determine whether the required support packages for host adapters are already installed on this node. The following packages are required.

```
# pkginfo | egrep Wlux
system    SUNWluxd      Sun Enterprise Network Array sf Device Driver
system    SUNWluxdx      Sun Enterprise Network Array sf Device Driver
              (64-bit)
system    SUNWluxl      Sun Enterprise Network Array social Device Driver
```

|        |           |                                                            |
|--------|-----------|------------------------------------------------------------|
| system | SUNWluxlx | Sun Enterprise Network Array social Device Driver (64-bit) |
| system | SUNWluxop | Sun Enterprise Network Array firmware and utilities        |
| system | SUNWluxox | Sun Enterprise Network Array libraries (64-bit)            |

### 37. Are the required support packages already installed?

- If yes, skip to Step 38.
- If no, install the missing support packages.

The support packages are located in the `Product` directory of the Solaris CD-ROM. Add any missing packages.

### 38. Shut down and power off Node B.

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

### 39. Install the host adapters in Node B.

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

### 40. Power on and boot Node B.

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

### 41. If necessary, upgrade the host adapter firmware on Node B.

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

### 42. If necessary, install GBICs or SFPs to the FC switches, as shown in Figure 2-4.

For the procedure about how to install GBICs or SFPs to an FC switch, see the documentation that shipped with your FC switch hardware.

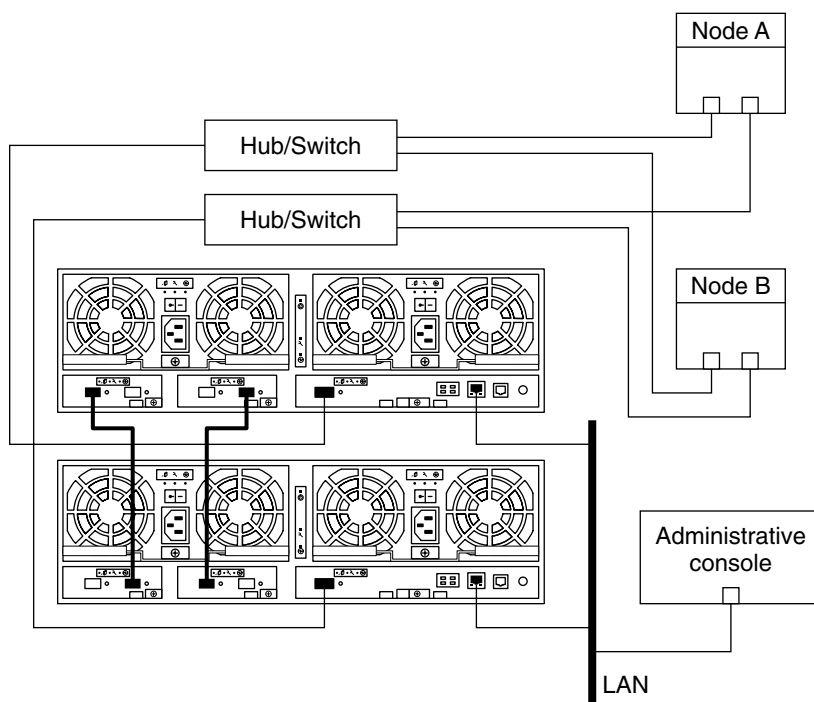
### 43. Connect fiber-optic cables between the FC switches and Node B, as shown in Figure 2-4.

For the procedure about how to install fiber-optic cables, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

---

**Note** – If you are using two FC switches and Sun SAN software to create a storage area network (SAN), see “SAN Considerations” on page 70 for more information.

---



**FIGURE 2-4** Adding a Partner-Group Configuration: Part III

44. If necessary, install the required Solaris patches for storage array support on Node B.  
For a list of required Solaris patches for storage array support, see the *Sun StorEdge T3 Disk Tray Release Notes*.
45. If you are installing a partner-group configuration, install any required patches or software for Sun StorEdge Traffic Manager software support on Node B.  
For the procedure about how to install the software, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide* at <http://www.sun.com/products-n-solutions/hardware/docs/>.
46. Edit the `/kernel/drv/scsi_vhci.conf` file to activate the Sun StorEdge Traffic Manager software functionality. Set the `mpxio-disable` parameter to `no`.  
`mpxio-disable="no"`
47. Shut down Node B.  
For the procedure about how to shut down and power off a node, see your Sun Cluster system administration documentation.

48. Perform a reconfiguration boot to create the new Solaris device files and links on Node B.

49. On Node B, update the `/devices` and `/dev` entries.

```
# devfsadm -C
```

50. On Node B, update the paths to the DID instances.

```
# scdidadm -C
```

51. (Optional) On Node B, verify that the DIDs are assigned to the new storage arrays.

```
# scdidadm -l
```

52. On one node that is attached to the new storage arrays, reset the SCSI reservation state.

```
# scdidadm -R n
```

Where *n* is the DID instance of a storage array LUN that you are adding to the cluster.

---

**Note** – Repeat this command on the same node for each storage array LUN that you are adding to the cluster.

---

53. Return the resource groups and device groups that you identified in Step 15 to all nodes.

```
# 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.

54. Perform volume management administration to incorporate the new logical volumes into the cluster.

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

## ▼ How to Remove Partner Groups

Use this procedure to permanently remove storage array partner groups and their submirrors from a running cluster.

This procedure defines Node A as the cluster node that you begin working with. Node B is the other node.



---

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

---

1. If necessary, back up all database tables, data services, and volumes associated with each partner group that you are removing.
2. If necessary, detach the submirrors from each storage array or partner group that you are removing. Detach the submirrors to stop all I/O activity to the storage array or partner group.

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

3. Remove references to each LUN. Each LUN belongs to the storage array or partner group that you are removing.

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

4. Determine the resource groups and device groups that are running on all nodes.

Record this information because you use this information in Step 19 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

5. Shut down Node A.

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

6. Disconnect from both storage arrays the fiber-optic cables connecting to the FC switches, then the Ethernet cable(s).

7. Is any storage array that you are removing the last storage array connected to an FC switch that is on Node A?

- If no, skip to Step 11.
- If yes, disconnect the fiber-optic cable between Node A and the FC switch that was connected to this storage array.

For the procedure about how to remove a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

---

**Note** – If you are using your storage arrays in a SAN-configured cluster, you must keep two FC switches configured in parallel. This configuration maintains cluster availability. See “SAN Considerations” on page 70 for more information.

---

8. Do you want to remove the host adapters from Node A?

- If no, skip to Step 11.
- If yes, power off Node A.

**9. Remove the host adapters from Node A.**

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

**10. Without enabling the node to boot, power on Node A.**

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

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

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

**12. Shut down Node B.**

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

**13. Is any storage array that you are removing the last storage array connected to an FC switch that is on Node B?**

- If no, proceed to Step 14.
- If yes, disconnect the fiber-optic cable that connects this FC switch to Node B.

For the procedure about how to remove a fiber-optic cable, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

---

**Note** – If you are using your storage arrays in a SAN-configured cluster, you must keep two FC switches configured in parallel. This configuration maintains cluster availability. See “SAN Considerations” on page 70 for more information.

---

**14. Do you want to remove the host adapters from Node B?**

- If no, proceed to Step 17.
- If yes, power off Node B.

**15. Remove the host adapters from Node B.**

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

**16. Without enabling the node to boot, power on Node B.**

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

**17. Boot Node B into cluster mode.**

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

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

```
# devfsadm -C
# sddidadm -C
```

19. Return the resource groups and device groups that you identified in Step 4 to all nodes.

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

## ▼ How to Replace a Disk Drive

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



---

**Caution** – If you remove any field-replaceable unit (FRU) for an extended period of time, thermal complications might result. To prevent this complication, the storage array is designed so that an orderly shutdown occurs. This shutdown occurs when you remove a component for longer than 30 minutes. Therefore, a replacement part must be immediately available before you start an FRU replacement procedure. You must replace an FRU within 30 minutes. If you do not replace the FRU within this time, the storage array, and all attached storage arrays, shut down and power off.

---

1. Did the failed disk drive impact the storage array logical volume's availability?

- If no, proceed to Step 2.
- If yes, remove the logical volume from volume management control.  
For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.

2. Is the disk drive that you are replacing is 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 disk drive in the storage array.

For the procedure about how to replace a disk drive, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.

4. If you want this new disk drive 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.

**5. Did you remove a LUN from volume management control in Step 1?**

- If no, you are finished with this procedure.
- If yes, return the LUN to volume management control.

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

## ▼ How to Replace a Node-to-Switch Component in a Running Cluster

Use this procedure to replace the following node-to-switch components in a running cluster.

- Node-to-switch fiber-optic cable
- GBIC or an SFP on an FC switch, connecting to a node

**1. On the node connected to the component that you are replacing, determine the resource groups and device groups that are running on the node.**

Record this information because you use this information in Step 4 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.**

```
# scswitch -S -h from-node
```

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

- For the procedure about how to replace a fiber-optic cable between a node and an FC switch, see the documentation that shipped with your switch hardware.
- For the procedure about how to replace a GBIC or an SFP on an FC switch, see the documentation that shipped with your FC switch hardware.

**4. Return the resource groups and device groups that you identified in Step 1 to the node. This node is connected to the component you replaced.**

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

## ▼ How to Replace an FC Switch or Storage Array-to-Switch Component

Use this procedure to replace an FC switch, or the following storage array-to-switch components in a running cluster.

- fiber-optic cable that connects an FC switch to a storage array
  - GBIC or an SFP on an FC switch, connecting to a storage array
  - FC switch
  - Media Interface Adapter (MIA) on a Sun StorEdge T3 storage array. This component does not apply to Sun StorEdge T3+ storage arrays.
  - Interconnect cables between two interconnected storage arrays of a partner group
1. **Access the storage array. This storage array is connected to the FC switch or component that you are replacing.**
  2. **View the controller status for the two storage arrays in the partner group.**  
For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.
  3. **Are you replacing an FC switch or component that is attached to a storage array controller that is **ONLINE** or **DISABLED**?**
    - If the controller is already **DISABLED**, skip to Step 5.
    - If the controller is **ONLINE**, disable the controller.
For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.
  4. **Verify that the controller's state has been changed to **DISABLED**.**
  5. **Replace the component by using the following references.**
    - For the procedure about how to replace a fiber-optic cable between a storage array and an FC switch, see the documentation that shipped with your switch hardware.
    - For the procedure about how to replace a GBIC or an SFP on an FC switch, see the documentation that shipped with your FC switch hardware.
    - For the procedure about how to replace an FC switch, see the documentation that shipped with your switch hardware.

---

**Note** – If you are replacing an FC switch and you intend to save the switch IP configuration for restoration to the replacement switch, wait to connect the cables to the replacement switch. Connect the cables to the replacement switch *after* you recall the Fabric configuration to the replacement switch. For more information about how to save and recall switch configurations, see the documentation that shipped with your switch hardware.

---

---

**Note** – Before you replace an FC switch, be sure that the `probe_timeout` parameter of your data service software is set to more than 90 seconds. If you increase the value of the `probe_timeout` parameter to more than 90 seconds, you avoid unnecessary resource group restarts. Resource group restarts occur when one of the FC switches is powered off.

---

- For the procedure about how to replace an MIA, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.
  - For the procedure about how to replace interconnect cables, see the *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*.
6. **If necessary, access the storage array. This storage array is the storage array in the partner group that is still online.**
  7. **Enable the storage array that you disabled in Step 3.**  
For more information, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.
  8. **Verify that the controller's state has been changed to `ONLINE`.**

## ▼ How to Replace a Chassis

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 midplane. To replace the chassis, you must replace both the chassis and the midplane. These components are manufactured as one part.



---

**Caution** – You must be a Sun service provider to perform this procedure. If you need to replace a chassis, contact your Sun service provider.

---

1. **Detach the submirrors on the storage array that is connected to the chassis. Detach the submirrors to stop all I/O activity to this storage array.**  
For more information, see your Solstice DiskSuite or VERITAS Volume Manager documentation.
2. **Are the storage arrays in your partner-group configuration redundant as a result of host-based mirroring?**
  - If yes, proceed to Step 3.
  - If no, shut down the cluster.  
For the procedure about how to shut down a cluster, see your Sun Cluster system administration documentation.

**3. Replace the chassis and the midplane.**

For the procedure about how to replace a chassis and a midplane, see the *Sun StorEdge T3 and T3+ Array Field Service Manual*. This manual is available to trained Sun service providers only.

**4. Did you shut down the cluster in Step 2?**

- If no, proceed to Step 5.
- If yes, boot the cluster back into cluster mode.

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

**5. Reattach the submirrors that you detached in Step 1 to resynchronize the submirrors.**



---

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

---

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

## ▼ How to Replace a Node's 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. Node B is the other node.

**1. Determine the resource groups and device groups that are running on all nodes.**

Record this information because you use this information in Step 9 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

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

Record this information because you use this information in Step 9 of this procedure to return resource groups and device groups to these nodes.

```
# scstat
```

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

```
# scswitch -S -h from-node
```

**4. Shut down Node A.**

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

**5. Power off Node A.**

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

**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. Power on Node A.**

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

**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 that you identified in Step 1 to all nodes.**

```
# 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.

## ▼ How to Migrate From a Single-Controller Configuration to a Partner-Group Configuration

Use this procedure to migrate your storage arrays from a single-controller (noninterconnected) configuration to a partner-group (interconnected) configuration. This procedure assumes that the two storage arrays in the partner-group configuration are correctly isolated from each other on separate FC switches. Do not disconnect the cables from the FC switches or the nodes.



---

**Caution** – You must be a Sun service provider to perform this procedure. If you need to migrate from a single-controller configuration to a partner-group configuration, contact your Sun service provider.

---

**1. Back up all data on the storage arrays before you remove the storage arrays from the Sun Cluster configuration.**

**2. Remove the noninterconnected storage arrays to be in your partner group from the cluster configuration.**

Follow the procedure in “How to Remove Partner Groups” on page 59.

**3. Connect and configure the single storage arrays to form a partner group.**

Follow the procedure in the *Sun StorEdge T3 and T3+ Array Field Service Manual*.

**4. Add the new partner group to the cluster configuration.**

**a. Ensure that each storage array has a unique target address.**

For the procedure about how to verify and assign a target address to a storage array, see the *Sun StorEdge T3 and T3+ Array Configuration Guide*.

**b. Ensure that the cache and mirror settings for each storage array are set to auto.**

**c. Ensure that the `mp_support` parameter for each storage array is set to `mpxio`.**

**d. If necessary, upgrade the host adapter firmware on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**e. If necessary, install the required Solaris patches for storage array support on Node A.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**f. Install any required patches or software for Sun StorEdge Traffic Manager software support on Node A.**

For the procedure about how to install the software, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide* at <http://www.sun.com/products-n-solutions/hardware/docs/>.

**g. Edit the `/kernel/drv/scsi_vhci.conf` file to activate the Sun StorEdge Traffic Manager software functionality. Set the `mpxio-disable` parameter to `no`.**

```
mpxio-disable="no"
```

**h. Shut down Node A.**

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

**i. Perform a reconfiguration boot on Node A to create the new Solaris device files and links.**

**j. On Node A, update the `/devices` and `/dev` entries.**

```
# devfsadm -C
```

**k. On Node A, update the paths to the DID instances.**

```
# scdidadm -C
```

**l. Label the new storage array logical volume.**

For the procedure about how to label a logical volume, see the *Sun StorEdge T3 and T3+ Array Administrator's Guide*.

**m. If necessary, upgrade the host adapter firmware on Node B.**

See the *Sun Cluster release notes documentation* for information about accessing Sun's Info Docs on <http://sunsolve.sun.com>. The Info Docs list information about required patches and firmware that are available for download. For the procedure about how to apply host adapter firmware, see the firmware patch README file.

**n. If necessary, install the required Solaris patches for storage array support on Node B.**

For a list of required Solaris patches for storage array support, see the *Sun StorEdge T3 Disk Tray Release Notes*.

**o. Install any required patches or software for Sun StorEdge Traffic Manager software support on Node B.**

For the procedure on how to install the Sun StorEdge Traffic Manager software, see the *Sun StorEdge Traffic Manager Installation and Configuration Guide* at <http://www.sun.com/products-n-solutions/hardware/docs/>. For a list of required patches for Sun StorEdge Traffic Manager software, see the *Sun StorEdge Traffic Manager Software Release Notes* on <http://www.sun.com/storage/san>.

**p. Edit the `/kernel/drv/scsi_vhci.conf` file to activate the Sun StorEdge Traffic Manager software functionality. Set the `mpxio-disable` parameter to `no`.**

```
mpxio-disable="no"
```

**q. Shut down Node B.**

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

**r. Perform a reconfiguration boot to create the new Solaris device files and links on Node B.**

**s. On Node B, update the `/devices` and `/dev` entries.**

```
# devfsadm -C
```

**t. On Node B, update the paths to the DID instances.**

```
# scdidadm -C
```

**u. (Optional) On Node B, verify that the DIDs are assigned to the new storage arrays.**

```
# sddidadm -l
```

- v. **On one node that is attached to the new storage arrays, reset the SCSI reservation state.**

```
# sddidadm -R n
```

Where *n* is the DID instance of a storage array LUN that you are adding to the cluster.

---

**Note** – Repeat this command on the same node for each storage array LUN that you are adding to the cluster.

---

- w. **Perform volume management administration to incorporate the new logical volumes into the cluster.**

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

---

## SAN Considerations

This section contains information about how to use storage array in a SAN. This information is specific to a SAN in a Sun Cluster environment. Use the cluster-specific procedures in this chapter to install and maintain a storage array in your cluster.

For instructions about how to create and maintain a SAN, see the documentation that shipped with your switch hardware. For information on switch ports, zoning, and required software and firmware, also see the documentation that shipped with your switch hardware.

SAN hardware includes the following components.

- FC switches
- FC host adapters
- Storage devices
- Enclosures

SAN software includes the following components.

- Drivers that are packaged with the operating system
- Firmware for the switches
- Management tools for the switches and storage devices
- Volume management software
- Other administration tools

## SAN Clustering Considerations

If you are replacing an FC switch and you intend to save the switch IP configuration for restoration to the replacement switch, wait to connect the cables to the replacement switch. Connect the cables to the replacement switch *after* you recall the Fabric configuration to the replacement switch. For more information about how to save and recall switch configurations, see the documentation that shipped with your switch hardware.



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