



Sun StorEdge™ SAN 4.0 Release Installation Guide

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Preface

The *Sun StorEdge SAN 4.0 Release Installation Guide* describes how to set up the Sun StorEdge™ SAN 4.0 Release software and configure it to the network. It provides information and pointers to additional documentation you may need for configuring, troubleshooting, and using the switch. The book is intended for technical users who have experience with storage systems.

Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1

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

Shell Prompts

TABLE P-2

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

Related Documentation

Application	Title	Part Number
Configuration	<i>Sun StorEdge SAN 4.0 Release Configuration Guide</i>	806-5513-10
Safety & Compliance	<i>Sun StorEdge SAN 4.0 Release Safety and Compliance Manual</i>	816-5246-10
Latest Information	<i>Sun StorEdge SAN 4.0 Release Notes</i>	816-4472-10
Sun StorEdge T3+ Array/Switch	<i>Sun StorEdge T3+ Array 2.1 Firmware Release Notes</i>	816-4771-10
Installation	<i>Sun StorEdge T3+ Array Start Here</i>	816-4768-10
Installation	<i>Sun StorEdge T3+ Array Installation and Configuration Manual</i>	816-4769-10
User's Information	<i>Sun StorEdge T3+ Array Administrator's Guide</i>	816-4770-10
Upgrade Information	<i>Sun StorEdge T3+Array Disk Tray Installation Task Map</i>	816-4775-10
Installer/User's information—1Gb switch	<i>SANbox-16STD Fibre Channel Switch Installer's/User's Manual</i>	875-3141-10
Installer/User's Information—2Gb switch	<i>SANbox2 Switch Management User's Manual</i>	875-3264-01
Installer/User's Information—2 Gb switch	<i>SANbox2-16 Installer's/User's Manual</i>	875-3263-01
Installer/User's Information—1Gb switch	<i>SANbox 8/16 Switch Management User's Manual</i>	875-3143-10

Application	Title	Part Number
Information on past releases—1Gb switch	<i>Sun StorEdge Network FC Switch-8 and Switch-16 Release Notes¹</i>	816-0842-10
Latest Information	<i>Brocade Fabric OS v 3.0 Release Notes</i>	
Reference Information	<i>Brocade Fabric OS Reference Manual Version 3.0</i>	53-0000127-03
Reference Information	<i>Brocade SilkWork®3800 Hardware Reference Guide</i>	53-0001576-03
User's Information	<i>Brocade ZONING User's Guide Version 3.0</i>	53-0000135-03
User's Information	<i>Brocade WEB TOOLS User's Guide Version 3.0</i>	53-0000130-03
Installation Information	<i>Sun StorEdge PCI Single Fibre Channel Network Adapter Installation Guide</i>	806-7532-10
Installation Information	<i>Sun StorEdge PCI Dual Fibre Channel Network Adapter Installation Guide</i>	806-4199-10
Installation Information	<i>Sun StorEdge CPCI Dual Fibre Channel Network Adapter Installation Guide</i>	806-6991-10
Installation Information	<i>Sun StorEdge SBus Dual Fibre Channel Host Bus Adapter</i>	816-2490-10
Installation Information	<i>Sun StorEdge 2G FC PCI Single Channel Network Adapter Installation Guide</i>	816-4999-10
Installation Information	<i>Sun StorEdge 2G FC PCI Dual Channel Network Adapter Installation Guide</i>	806-5001-10
Traffic Management	<i>Sun StorEdge Traffic Manager Installation and Configuration Guide</i>	816-1420-10
Rackmount information Online	<i>Rackmount Placement Matrix</i>	805-4748-xx
Sun Cluster 3.0	<i>Sun Cluster 3.0 Installation Guide</i>	806-1419-10

Application	Title	Part Number
Volume management	<i>VERITAS Volume Manager 3.2 Installation Guide (Solaris)</i>	875-3165-11
cfgadm utility	<i>cfgadm_fp (1M)</i>	
luxadm utility	<i>luxadm (1M)</i>	

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Introduction

This guide provides instructions for installing Sun StorEdge SAN 4.0 Release software components. Hardware components include Fibre Channel switches, Fibre Channel host adapters, and storage devices and enclosures. The software components include drivers bundled with the operating system, firmware for the switches, management tools for the switches and storage devices, volume managers, if needed, and other administration tools.

Before installing or configuring any SAN components, you need to plan how your site will use the SAN and identify your goals in implementing the SAN. There are numerous options at various steps in the installation and configuration process, and understanding the purpose of the SAN clarifies appropriate decisions for your site.

Hardware activation of new switches is covered in this guide. Hardware installation of switches, host adapters and storage devices and enclosures is described in the documentation delivered with those products.

This guide also describes software installation, starting from an installation or upgrade of Solaris, and including firmware upgrades for any SAN component required.

New Features

- 2 Gb Switches
- 2 Gb Host Bus Adapters
- Heterogeneous Switches
- Large Configuration Support

Features, Benefits, and Products

This version of the Sun StorEdge SAN product delivers a large high-performing SAN, with native fabric host connectivity, improved manageability, an integrated multipathing solution (Sun StorEdge Traffic Management software), and support for a variety of new hardware and software products.

SAN 4.0 Device Names

Longer, device names in this release require additional planning. SANs and multipath storage devices require the devices to be addressed by device-specific static global identifiers, and not by physical port IDs, which are dynamic in nature and are different across different host's systems.

Traditionally, Solaris has named storage devices based on the controller, target ID and logical unit number (LUN) of the device. When large SANs with multiple paths to large storage arrays are constructed, this naming convention could lead to thousands of targets per controller and storage identified more than once by different controllers and targets. The new method incorporates the World Wide Name of the device into the device name used by the host.

The longer names provide the benefit of uniquely identifying storage devices to the host. When using the Sun StorEdge Traffic Manager, a device with multiple connections to a host is known to that host by one name.

Examples

Old device path:

```
/devices/pci@f,4000/pci@4/SUNW,qlc@4/fp@0,0/ssd@3,0
```

Sun StorEdge Traffic Manager device path:

```
/devices/pci@f,4000/pci@4/SUNW,qlc@4/fp@0,0/ssd@w50020f200000225,0.
```

Old symbolic device name:

```
/dev/dsk/c4t3d0s2
```

New symbolic designation:

```
/dev/dsk/c18t50060E8000000000000004E78000000ABd0s2 is a link to  
/devices/scsi_vhci/ssd@g50060e8000000000000004e78000000ab:c
```

On-Demand Node Creation

The number of storage devices that can be attached to a host can grow to the thousands with the advent of SANs with native Fabric connectivity. Probing all these devices at boot time and creating device nodes can increase the boot time greatly. In addition, a host might not need access to all of the storage devices it can access.

The Sun StorEdge SAN 4.0 Release software no longer creates device nodes for every storage device attached. Instead, device nodes are created on demand by the administrator using the `cfgadm` utility. The device nodes, once created, are persistent across reboots. The `cfgadm` utility, which provides on-demand node creation, is described in greater detail in manpage `cfgadm_fp (1M)`.

Fabric Connection of Hosts

Hosts can connect to switches in a Fabric topology, using F_Ports, allowing construction of scalable, high performing SANs.

Cascading of Switches

Switches can be cascaded to increase the distance between ports available in a zone and across the entire SAN. Cascading of switches allows for distances of up to ten kilometers between ports, supporting highly available, disaster-tolerant configurations.

Higher Realized Bandwidth

Host connections to switch Fabric connections (F-Ports) and InterSwitch Links (ISLs) are full duplex connections. On a two gigabit Fibre Channel link, this can provide an aggregate four gigabits per second of bandwidth when I/Os are flowing in both directions.

Support of Multiple Protocols

The Sun StorEdge SAN 4.0 product supports both SCSI (FCP) and IP(FCIP) over Fibre Channel. This allows both storage and networking applications to work on the SAN and minimizes the need for multiple networks.

FCIP can be used in any supported topology and can be used for traditional IP applications and IP file access at the same time. Simultaneous SCSI and IP traffic in the same switch zone is not currently supported.

Support for More, Heterogeneous Storage Devices

Block, sequential, and file access protocols are supported with this product. A variety of SCSI devices can be attached to the SAN, such as block-storage disks, intelligent RAID controllers, sequential FC-tape devices, robotic tape libraries and SCSI enclosure services. File-access devices, such as Network Attached Storage (NAS) and NFS devices can be attached to the SAN, as well.

Support for New Hardware and Software

This version of the StorEdge Network provides support for new Fibre Channel host adapters, such as the Sun StorEdge PCI Dual Fibre Channel Network Adapter+ and CPCI Dual Fibre Channel Network Adapter. New software support includes Multiplexed I/O Sun StorEdge Traffic Manager, allowing management and load balancing across multiple paths between a host and storage device, the newest release of Sun's Solstice Disk Suite volume manager, SDS 4.2.1, and the StorEdge Network Data Replicator (SNDR).

Software and Hardware Upgrade

Upgrading from previous versions of the Sun StorEdge Area Network (SAN) product involves new hardware—2Gb switches. If you have 1Gb switches, and you install this software, your 1Gb functionality goes away.

Building Blocks for More Complex Topologies

This version of the StorEdge Area Network introduces configurations with interconnected switches. Cascaded switches allow more reliable, faster, and larger SANs.

Switch Activation

This chapter contains the procedures for bringing the new Sun StorEdge SAN 4.0 Release software onto the network. For more details about the switch, refer to the documentation delivered with your switch.

Overall Installation Order

Use this manual, the *Sun StorEdge SAN 4.0 Release Configuration Guide*, and the documentation that came with your switch.

1. Install the Solaris patch cluster on the host.
2. Install the SAN 4.0 packages and patches (including HBA drivers).
3. Install the HBAs, connect the hosts, switches and storage devices
4. Assign IP address to the switch ethernet ports.
5. Start the GUI for your switch.
6. Verify and load the switch firmware.
7. Verify and set the domain ID
8. Configure the switch ports.
9. Configure and activate zonesets and zones.
10. Configure the fabric devices
11. Enable multipathing (optional)
12. Mount the filesystems.

Configuring the Switch Ethernet Port

Note – The following RARP instructions apply to the Sun switch only. Brocade switch setup procedures can be found in the *Brocade SilkWork® 3800 Hardware Reference Guide*, 53-0001576-03, available on the CD that came with the switch.

Sun StorEdge Switch

The IP address of the switch is set to the default value of 10.0.0.1. You can change this default IP address using the Reverse Address Resolution Protocol (RARP), or the switch management GUI supplied with your switch. This guide provides the procedures for changing the IP address using RARP only.

Using RARP to Change the IP Address

You can use RARP to change the address when you first receive the switch or if you forget the address.

The Sun StorEdge SAN 4.0 Release RARP feature automatically downloads the assigned IP address to the switch. After you cable the switch and turn the power on, the IP address is automatically assigned.

You will need the following information to change the IP address:

IP address _____	Contact the person who maintains your network for this information.
MAC address _____	See the documentation that came with your switch for the location of the MAC Address.
Switch Name _____	This is the assigned name of the switch you are installing.

▼ To Set the Network IP Address Using RARP:

1. **On a host connected to the same subnet as the switch, save your current configuration.**
2. **Check that the `/etc/ethers` file exists.**


```
# ls /etc/ethers
```

3. If you find the file, create the `/etc/ethers.SAV` backup file:

```
# cp -p /etc/ethers /etc/ethers.SAV
```

4. Back up the affected management station configuration files:

```
# cp -p /etc/nsswitch.conf /etc/nsswitch.conf.SAV  
# cp -p /etc/hosts /etc/hosts.SAV
```

5. On a host connected to the same subnet as the switch, edit the `/etc/ethers` file by adding the MAC address and switch name.

For example:

```
8:0:20:7d:93:7e switch-name
```

In this example:

- `8:0:20:7d:93:7e` is the MAC address
- `switch-name` is the name of the switch you are installing.

6. Edit the `/etc/hosts` file with the IP address and switch name.

For example:

```
192.129.122.111 switch-name
```

In this example, `192.129.122.111` is the assigned IP address.

7. Edit the `/etc/nsswitch.conf` file to reference the local system files.

To ensure that the Solaris software environment uses the changes made to `/etc/ethers` and `/etc/hosts` files, edit the `host` and `ethers` entries in the `/etc/nsswitch.conf` file so that the `files` parameter appears before the `[NOTFOUND=return]` statements.

```
hosts:      nis files [NOTFOUND=return]  
ethers:     nis files [NOTFOUND=return]
```

8. Determine whether the RARP daemon is running by typing:

```
# ps -eaf | grep rarpd
```

9. If RARP is not running, start the RARP daemon in the Solaris software environment by typing:

```
# /usr/sbin/in.rarpd -ad
```

The IP address will now automatically download to the switch after you install the switch and power on the system.

Note – RARP might not work properly if you have connected the ethernet port of the FC switch to an Ethernet switch; this is due to the long time it might take for the Ethernet switch to transmit the RARP. In such a case you can use the management tools to change the IP address. See the documents that came with your switch.

10. Power off the switch and then power it back on.

11. Verify the switch IP address.

```
# ping <ip-address>
```

For example:

```
# ping 192.129.122.111
```

12. If the RARP daemon has started, return to the window in which the daemon was activated.

Perform the `Control-C` key sequence to stop the daemon operation.

Note – The IP address setting for the switch that you obtain using RARP is not a permanent setting until RARP is disabled.

▼ To Make the IP Address Setting Permanent

If you have a Sun switch, refer to the *SANbox2-16 Installer's/User's Manual*. See the the chapter on configuring a switch.

For a non-Sun switch, see the documentation delivered with the switch.

Software Components and Patches

For the most recent versions and patches, refer to the *Sun StorEdge SAN 4.0 Release Notes*, available at

http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/SAN/Software

TABLE 3-1 Minimum Software Component Versions and Patches

Non-Bundled Software	Minimum Version	Minimum Patch
Recommended and Security Patches - Solaris 8	10/01	
Sun StorEdge Network Foundation Software package		SUNWsan
Sun StorEdge Network Foundation Software patch		111847-04
Sun StorEdge Traffic Manager patch		111412-09
fctl/fp/fcp/usoc driver patch		111095-10
fctl/fp/fcp/usoc driver patch		108982-09
fcip driver patch		111096-04
/kernel/drv/qlc driver patch		108984-08
/kernel/drv/qlc driver patch		111097-10
luxadm, liba5k and libg_fc patch		109529-06
luxadm, liba5k and libg_fc patch		111413-08
/kernel/fs/specfs		111588-03
cfgadm fp plug-in 32-bit		SUNWcfpl
cfgadm fp plug-in 64-bit		SUNWcfplx
cfgadm fp plug-in for Library patch		111846-04

TABLE 3-1 Minimum Software Component Versions and Patches (*Continued*)

Non-Bundled Software	Minimum Version	Minimum Patch
/kernel/drv/ses		110614-02
Solstice Disk Suite™ 4.2.1	4.2.1	108693-06
ssd_patch		109524-11
Sun 2Gb Switch Firmware	1.3.40	
SanBox Manager (SUNWsmgr2)	1.3.40	
Sun StorEdge PCI Single Fibre Channel Network Adapter Fcode x6799a	1.13.7	
Sun StorEdge PCI Dual Fibre Channel Network Adapter+ Fcode x6727a	1.13.7	
Sun StorEdge SBus Dual Fibre Channel Host Adapter X6757A	1.13.06	112244-01
Sun StorEdge cPCI FC Dual Port Adapter X6748A	1.13	111853-01
Sun StorEdge 2G FC PCI Single Channel Network Adapter X6767A	1.13.08	
Sun StorEdge 2G FC PCI Dual Channel Network Adapter X6768A	1.13.08	
StorageTek™ 9840 Native FC	1.28.126	
Sun StorEdge T3 Firmware	1.17b	109115-09
Sun StorEdge T3 18Gb disk Firmware		109115-09
Sun StorEdge T3+ Firmware	2.00.00	112276-01
VERITAS Volume Manager™	3.2	111904-04 111909-04
VERITAS File System	3.4	
Instant Image™	3.0	
Fast Write Cache™	3.0	
SNDR	3.0	
VERITAS NetBackup™	3.4	110539-04
Solstice Backup™	6.0	

Note – The host can be running the Sun StorEdge SAN 4.0 software at the same time it is connected to a 1G switch with the SAN 3.0 software.

Installing and Upgrading the SAN Software

After you install your hardware in the configuration you have decided upon, and after you have activated your switch(es), you must install the SAN software.

You can obtain the Sun StorEdge installation script at the Sun Download Center.

<http://www.sun.com/software/download/>

The installation script is a wrapper around `pkgadd` and `patchadd`. In the course of installation, it installs PatchPro 2.0.1. It honors your SVR4 install policies.

Installing SAN Software for the First Time

- 1. Download the script.**

The `install_it` script can be downloaded from the Sun Download Center.

- 2. Become root and type `install_it`.**

The script checks for adequate installation space and makes sure appropriate tools are in place. It then installs or upgrades the required software packages. The following message displays:

This utility will install PatchPro and all required support software. It is a wrapper around pkgadd and patchadd. It will honor your SVR4 install policies and will backout all changes if anything goes wrong.

Patches may be applied in support of the installation. For that reason, this utility should be run on a quiet system with no active windowing, preferably in single user mode. If reboot is required, you will see a message at the end of the installation.

This installation will preserve critical data files by executing a shell script with root permission.

Would you like to continue with the installation? [y,n,?,q] y

3. Type **y**.

It begins the installation and lists the packages and patches it installs..

```
Beginning installation ...
Now installing supporting packages...
  SUNWjhrt
  == installed successfully
  SUNWjsse
  == installed successfully
  SUNWsdh
  == installed successfully
  SUNWapcy
  == installed successfully
  SUNWppmn
  == installed successfully
  SUNWcert
  == installed successfully
Now installing required patches...
  108940-07
  == already applied
  SUNWppro
  == installed successfully

Installation is complete and verified. Be sure to:

  o Add /opt/SUNWppro/bin to your PATH. Set this in your
    .cshrc or .profile to make it permanent.
  o If you have not installed the PatchPro patch
    certificates, see /opt/SUNWppro/README for
    instructions.
  o If you have not installed the Sun certificates, see
    /etc/certs/SUNW/README for instructions.
  o Run the /opt/SUNWppro/bin/uninstallpatchpro script to
    uninstall PatchPro.
```

4. Follow the instructions in the script to configure PatchPro 2.0.1.

The password for your initial installation is `changeit`.

If this is not the first time you have configured PatchPro, you must use your own PatchPro password.

A sample .log output for the PatchPro 2.0.1 certificates:

```
Ready to configure PatchPro Security Certificates
-----
You must respond yes to each of the certificate confirmations for
PatchPro to complete the installation.
-----

Importing Certificate smicacert
Enter keystore password:  changeit
Owner: O=Sun Microsystems Inc, CN=Sun Microsystems Inc CA (Class B)
Issuer: CN=Sun Microsystems Inc Root CA, O=Sun Microsystems Inc,
C=US
Serial number: 1000006
Valid from: Mon Nov 13 11:23:10 PST 2000 until: Fri Nov 13 11:23:10
PST 2009
Certificate fingerprints:
MD5:  B4:1F:E1:0D:80:7D:B1:AB:15:5C:78:CB:C8:8F:CE:37
SHA1: 1E:38:11:02:F0:5D:A3:27:5C:F9:6E:B1:1F:C4:79:95:E9:6E:D6:DF
Trust this certificate? [no]:  yes
Certificate was added to keystore
import Certificate smirootcert
Enter keystore password:  changeit
Owner: CN=Sun Microsystems Inc Root CA, O=Sun Microsystems Inc,
C=US
Issuer: CN=GTE CyberTrust Root, O=GTE Corporation, C=US
Serial number: 200014a
Valid from: Tue Nov 07 14:39:00 PST 2000 until: Thu Nov 07 15:59:00
PST 2002
Certificate fingerprints:
MD5:  D8:B6:68:D4:6B:04:B9:5A:EB:34:23:54:B8:F3:97:8C
SHA1: BD:D9:0B:DA:AE:91:5F:33:C4:3D:10:E3:77:F0:45:09:4A:E8:A2:98
Trust this certificate? [no]:  yes
Certificate was added to keystore

Importing certificate patchsigning
Enter keystore password:  changeit
Owner: CN=Enterprise Services Patch Management, O=Sun Microsystems
Inc
Issuer: O=Sun Microsystems Inc, CN=Sun Microsystems Inc TEST CA
Serial number: 1100008e
Valid from: Fri May 04 12:51:08 PDT 2001 until: Sat May 04 12:51:08
PDT 2002
Certificate fingerprints:
MD5:  32:DA:24:BA:D6:8F:30:73:AB:05:24:7B:79:29:B6:FB
SHA1: 05:F0:6A:D1:13:20:C9:BD:F4:5B:93:9A:7A:17:D0:54:1B:5A:D8:4C
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

```
Enter name of your systems proxy server. (Type "local" if you would
prefer to not access the remote server.)
```

```
Proxy server name : <name.domain.company.com>
```

```
Enter port number of your proxy server.
```

```
Proxy port number : <port number>
```

```
PatchPro Configuration set.
```

```
Check PatchPro for patchadd patches
```

```
Assessing patches needed for your system...
```

```
.....
Retrieved patch list...
```

```
No patches required.
```

```
Download of patches completed.
```

```
No Patchadd patches need to be installed.
```

```
Installing StorEdge SAN packages -
```

```
Package SUNWsmgr2 : Optional.
```

```
Do you wish to install SUNWsmgr2 : SANbox Manager, QLogic Fibre
Channel Administration
```

```
[y,n,?] n
```

```
Package SUNWsmgr2 : Installation Declined
```

```
Package SUNWsan : Installed Successfully
```

```
Package SUNWcfpl : Installed Successfully
```

```
Package SUNWcfplx : Installed Successfully
```

```
StorEdge SAN packages installation completed.
```

```
Check PatchPro for StorEdge SAN patches.
```

```
Assessing patches needed for your system...
```

```
.....
Retrieved patch list...
```

```
Downloading patches to ./var/spool/pkg/patchpro...
```

```
.....
/var/spool/pkg/patchpro/111412-08.jar has been validated.
```

```
/var/spool/pkg/patchpro/111095-08.jar has been validated.
```

```
/var/spool/pkg/patchpro/111096-04.jar has been validated.
```

```
/var/spool/pkg/patchpro/111097-08.jar has been validated.
```

```
/var/spool/pkg/patchpro/111413-07.jar has been validated.
```

```
/var/spool/pkg/patchpro/111846-03.jar has been validated.
```

```
StorEdge SAN patch installation completed.  
  
Installation of Sun StorEdge SAN completed Successfully  
#
```

5. Reboot your system.

If a previous version of a package is installed, the script installs the more up-to-date one. If the current version of the package is installed, the script does not reinstall it.

If, for any reason, the script fails, all the installed packages and patches, except for PatchPro2.0.1, are removed.

If the script fails, you may want to install the software manually. See Appendix A.

Upgrading Existing SAN Software

Before starting the upgrade, ensure that all required software and patches are accessible. For more information on required software, see Chapter 3.

The upgrade process is almost identical to the process for installing SAN software for the first time. When you asked for a password, however, you must use the one already on your system, rather than the first time `changeit`.

See “Installing SAN Software for the First Time” on page 13 for instructions.

If the script fails, and you want to install the SAN software manually, see Appendix B.

Alternate Installation of a New SAN

This appendix contains the following topics that describe how to install a new SAN system if you chose the manual method:

- “Required Software Components” on page 19
 - “Downloading Patches and Packages” on page 20
 - “Installing the Software” on page 21
-

Required Software Components

The following software components may be required for your particular SAN system. Refer to the documentation for each individual product to ensure proper installation.

Software Components

- Sun StorEdge Traffic Manager

This is available as a patch that can be installed on a system running at least Solaris 8 10/01. It should be installed with the latest revision of the Sun StorEdge Network Foundation software.

- Sun StorEdge Network Foundation Software

This software is included with the Solaris operating environment upgrades for the FC switch product. It includes the drivers to support switches, management tools, and storage devices.

- Solstice DiskSuite

Solstice DiskSuite is an unbundled software product that is delivered with the Solaris software. Solstice DiskSuite provides host-based storage management, such as mirroring and striping of disks, which provides greater reliability and volume size. Solstice DiskSuite 4.2.1 also implements RAID 5.

- VERITAS Volume Manager

VERITAS Volume Manager is a separately installed software product that provides host-based storage management, such as disk labeling, mirroring, striping, and RAID 5.

- `cfgadm` plugin for Fabric on-demand node creation

This component is delivered with the Solaris software upgrades for the FC switch product. It is used to discover SAN-attached devices, in addition to creating and deleting nodes for those devices. These features are implemented through the `cfgadm` framework. See the `cfgadm_fp(1M)` man page for additional information.

- SANbox Manager

The SANbox Manager is software supplied with the Sun switch. This software provides management capabilities, such as maintaining zones, setting port attributes, and setting up cascades switches.

Downloading Patches and Packages

You can download the required software components from the web sites listed in TABLE A-1.

TABLE A-1 Software Download Web Sites

Software	Downloading Web Site
Packages	http://www.sun.com/software/download
patches	http://sunsolve.sun.com

Note – You can also get all the patches for your configuration from the SunSolve web site. If you use PatchPro 2.0.1 to generate a patch list, a text file, `patchpro_dnld_yyyy.mm.dd@hh:mm:ss:zzz.txt`, with the installation order is included. Follow the installation order defined in TABLE A-2.

PatchPro Interactive

▼ To Download Patches

1. At <http://sunsolve.sun.com>, select **Patches** from the menu at the left.
2. **From the pulldown search menu select Storage Product.**
The PatchPro page appears.
3. **Select Network Storage Products.**
The PatchPro Interactive page appears.
4. **Select the PatchPro Interactive link.**
5. **Select StorEdge SAN 4.0 Release, if you have a SANbox2, or Brocade SAN Release.**
6. **At the bottom of the page, click Generate Patch List.**
A list of required patches in the correct installation order appears.
7. **Download the patches.**

Installing the Software

Use patchadd to install the recommended patches in sequence.

TABLE A-2 lists the required software.

TABLE A-2 Software Installation Sequence

Patch or Package	Software
Solaris 8	Solaris 8 10/01
8_Recommended	Solaris 8 Recommended and Security patch cluster
SUNWsan	Sun StorEdge Network Foundation Software
SUNWcfpl	cfgadm plug-in 32-bit package
SUNWcfplx	cfgadm plug-in 64-bit package

TABLE A-2 Software Installation Sequence (*Continued*)

Patch or Package	Software
111847-04	Sun StorEdge Network Foundation Kit patch
110614-02¹	ses driver patch
108982-09 ¹	fctl/fp/fcp/usoc driver patch
108984-08 ¹	/kernel/drv/qlc driver patch
109529-06	luxadm, liba5k and libg_fc patch
111412-08	Sun StorEdge Traffic Manager patch
111413-08	luxadm/liba5k and libg_fc patch
111095-10	fcp/fp/fctl/usoc drivers patch
111096-04	fcip driver patch
111097-10	qlc driver patch
111588-03 ¹	/kernel/fs/specfs patch
111846-04	cfgadm plug-in library patch
SUNWsmgr2	SANbox Manager package

1. Patch may have been included with the operating system.

▼ To Install the Software

- 1. Install Solaris 8 10/01.**
- 2. Install the latest Solaris 8 Recommended Security patch cluster.**
See the README file for patch installation instructions and notes.
- 3. Install SUNWsan package.**

```
# pkgadd -d pkg-location SUNWsan
```

- 4. Install cfgadm plug-in library packages SUNWcfpl and SUNWcfplx.**

```
# pkgadd -d pkg-location SUNWcfpl  
# pkgadd -d pkg-location SUNWcfplx
```


5. Install the SAN Foundation Kit `SUNWsan` patch 111847-04.

Use the `patchadd` command.

```
# patchadd patch-location/111847-04
```

6. Install `ses` driver patch 110614-02.

```
# patchadd patch-location/110614-02
```

7. Install Solaris driver patches.

The two patches may have been included in your operating system.

```
# patchadd patch-location/108982-09  
# patchadd patch-location/108984-08
```

8. Install `luxadm/libg_fc/liba5k` patch 109529-06.

Patch 109529-06 may have been included with your operating system. Use the `showrev` command to see if it has been included.

```
# patchadd patch-location/109529-06
```

9. Install Network Storage Traffic Manager patch 111412-09.

```
# patchadd patch-location/111412-09
```

10. Install the `luxadm/liba5k` and `libg_fc` patch 111413-08.

```
# patchadd patch-location/111413-08
```

11. Install the `luxadm/libg_fc/liba5k` patch 111413-08.

```
# patchadd patch-location/111413-08
```

12. Install `fc/fp/fctl/usoc` drivers patch 111095-10.

```
# patchadd patch-location/111095-10
```

13. Install fcip driver patch 111096-04.

```
# patchadd patch-location/111096-04
```

14. Install qlc driver patch 111097-10.

```
# patchadd patch-location/111097-10
```

15. Install specfs patch 111588-03.

Patch 111588-03 may have been installed with your operating system. Use the `showrev` command to see if has already been installed

```
# patchadd patch-location/111588-03
# showrev -p | grep 111588
```

16. Install cfgadm plug-in library patch 111846-04.

```
# patchadd patch-location/111846-04
```

17. Reboot the system.

For each of the storage devices, upgrade the software, firmware, or configuration. The components should be upgraded to the revision levels outlined in Table 3-1 “Minimum Software Component Versions and Patches” on page 11.

After performing the above steps, you can leverage additional features provided by the Sun StorEdge SAN 4.0 Release. You can configure the SAN for:

- 2 Gb Switches
- 2 Gb Host Bus Adapters
- Heterogeneous Switches
- Large Configuration Support

Upgrading the SAN

This appendix contains the following topics regarding how to upgrade your SAN system to the latest version by the manual method.



Caution – The Sun StorEdge SAN 4.0 Release obsoletes some older hardware, such as the Sun StorEdge A3500 and the A5x00, as well as some SC tape drives. You must have a new 2Gb switch for the software to function properly.

Downloading Patches

See TABLE A-1 on page 20 for all the locations of patches and packages to download. Download all patches to the host prior to beginning the upgrade procedure. Patches are available at the Sun Download Center
<http://www.sun.com/software/download/>

Verifying Upgrade Compliance

Before starting the upgrade, ensure that your system is stable and that all required software and patches are accessible. For more information on required software, see Chapter 3, TABLE 3-1, “Minimum Software Component Versions and Patches” on page 11.

▼ To Download Patches Using PatchPro Interactive

1. At <http://sunsolve.sun.com>, select Patches from the menu at the left.
2. From the pulldown search menu select Storage Product.
The PatchPro page appears.
3. Select Network Storage Products.
The PatchPro Interactive page appears.
4. Select the PatchPro Interactive link.
5. Select StorEdge SAN 4.0 Release, if you have a SANbox2, or Brocade SAN Release.
6. At the bottom of the page, click Generate Patch List.
A list of required patches in the correct installation order appears.
7. Download the patches.

▼ Preparing to Upgrade the Software

If you have multiple hosts on your SAN, you can upgrade them simultaneously or one at a time without affecting your SAN environment. Hosts that are not being upgraded will not be affected during the upgrade. You can upgrade the host software one host at a time or several hosts in parallel.

Be aware that you may lose formerly supported devices if you continue.



Caution – Your system will be unavailable to users and the SAN during the upgrade procedure.

The order in which the SAN components should be upgraded follows:

1. **Familiarize yourself with the required software components, versions and patches.**
See Chapter 4, TABLE 3-1, “Minimum Software Component Versions and Patches” on page 11.
2. **Back up all data.**

Volume Management

Solstice DiskSuite

If you are using Solstice DiskSuite as your volume manager, refer to the "*Solstice DiskSuite 4.2.1 Reference Guide*," part number 806-3204, available at <http://docs.sun.com>. It contains instructions for upgrading your operating system.

Veritas Volume Manager

If you are using Veritas Volume Manager, refer to the *Veritas Volume Manager Installation Guide* for special instructions about upgrading your system. There are several steps that need to be followed prior to your system upgrade.

3. Upgrade the Solaris Operating System.

To take advantage of full Fabric support for your SAN, you must upgrade to at least Solaris 8 Update6 10/01. For information on how to upgrade your systems, refer to *Solaris 8 Installation Supplement*, part number 806-5182, available at <http://docs.sun.com>.

Software Installation

4. Follow Step 6 through Step 15 on page 23 of Appendix A.

SAN Management Software

If this system is being used as a SAN Management host, follow the steps in this section.

5. Upgrade the storage firmware and configuration.

For each storage device, upgrade the software, firmware, or configuration. The components should be upgraded to the revision levels outlined in TABLE 3-1, "Minimum Software Component Versions and Patches" on page 11 in Chapter 3.

6. Reboot the system.

7. For each of the storage devices, upgrade the software, firmware, or configuration.

The components should be upgraded to the revision levels outlined in TABLE 3-1, "Minimum Software Component Versions and Patches" on page 11 in Chapter 3.

You can leverage additional features provided by the Sun StorEdge SAN 4.0 Release.
You can configure the SAN for:

- 2 Gb Switches
- 2 Gb Host Bus Adapters
- Heterogeneous Switches
- Large Configuration Support

Glossary

This glossary contains a definitions for terms used in this guide.

Terms

- AL_PA** Arbitrated Loop Physical Address. An AL_PA is an eight-bit value used to identify a device attached to a Fibre Channel arbitrated loop.
- Ap_Id** Attachment Point Identifier. The port identifier for either a host or a storage device connected to a switch. For example, c0 identifies the host port and c0::50020f23000063a9 identifies an array.
- Cascade**
- Broadcast Zone** Zone type used to filter broadcast traffic away from end nodes that cannot use or interpret it. A port will broadcast to all ports in the same Broadcast Zone(s) in which the port is defined. Broadcast zoning is primarily used for doing IP over Fibre Channel or when mixing IP and SCSI traffic on the switch. These zones are not yet useful or interesting in Suns current SAN implementations.
- Cascade** Connection of two or more switches together to increase the number of available ports or to allow for increased distances between components of the SAN.
- E_port** Expansion port used to connect FC -SW2 compliant switches to one another.
- Fabric Ports (F_Port)** Fabric port on a Fibre Channel switch. Switch ports used to connect to the fabric capable storage devices, such as the Sun StorEdge T3+ array or Sun StorEdge 39x0, 69x0 and 99x0 series, and host bus adapters.
- Fabric** One or more switches in a Fibre Channel network. It is also common to refer to something as a "Fabric device" or being in "Fabric mode."
- Fabric Loop Ports (FL_Port)** A port that is able to transmit under fabric protocol and also has arbitrated loop capabilities.

FC-SW-2 The second generation of the Fibre Channel Switch Fabric Standard defined by ANSI.

G_Port Generic port; a port that can operate as either an E_port or F_port. A port is defined as a G_port when it is not yet connected or has not yet assumed a specific function in the fabric.

Initiator Each host bus adapter port connection that provides a path to a storage device. An active initiator provides a path that is online. An inactive initiator provides a standby path when the Sun StorEdge Traffic Manager software is enabled.

Inter-Switch Link

(ISL) A segment or cable connecting two cascaded switches. Does not include cables from host to the switch or from storage devices to the switch.

N_Port A Fibre Channel port that supports point-to-point or Fabric connections.

Name Server Zones (NS

zones) A set of name server (NS) ports that can contain F_, FL_, G_, GL_ and E_Ports. The ports receive name server information (port number, type, address, WWN, etc). NS zones can be port-based or WWN-based.

Private Loop Fibre Channel Arbitrated Loop (FC-AL) with 8-bit addressing that supports up to 126 device connections with no fabric attachment (F and FL ports). Private loops are closed systems incapable of seeing outside the loop.

Public Loop Arbitrated loop that supports Fabric login and services. Provides 24-bit Fibre Channel addressing and up to 16 million node connections fabric wide. Uses name server (NS) ports.

Segmented Loop Ports

(SL_Ports) A port connected to a private loop device. SL_ports make a switch behave like a hub, but with the advantage of better performance and the ability to segment the private loop into SL Zones for ease of administration and isolation of resources. Ports in SL zones do not communicate with ports in NS zones. Supports the Sun StorEdge A5200, A3500FC arrays and FC tape devices. SL zones contain SL-Ports only.

Segmented Loop Zones

(SL zones) A set of SL_ports on the switch that behave as a single private loop. This grouping behaves like a hub, but with the advantage of better performance and the ability to segment the private loop into SL zones for ease of administration and isolation of resources.

Transfer or Trunk Ports

(T_Ports) Switch ports from the SAN 3.0 release used to connect to other switches in a cascade. T_ports are used to attach a port on one switch to a port on another switch. Replaced by E_ports in SAN 4.0 release.

**Translative Loop Ports
(TL_Ports)**

Ports on the switch that allow private-to-public and public-to-private loop connectivity. TL_Ports present private devices to a fabric as if they were public so they can communicate with the off-loop devices, such as public devices connected to F_Ports and FL_Ports and private devices on other TL_Port loops. Supports the Sun StorEdge T3 arrays. Hosts recognize arrays that use TL_ports as fabric devices.

Zone A set of ports or WWNs and their connected devices that have been grouped together to control information exchange.

Zoning Function of the switch that allows segregation of devices. Zoning is done for a variety of reasons, such as security, simplicity, performance, or dedication of resources.

