Sun StorEdge™ Diagnostic Expert 1.2

Software User's Guide

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Contents

Preface

This book describes the administration and operation of the Sun StorEdge™ Diagnostic Expert version 1.2 software. The intended audience for this book includes Sun support engineers, storage area network (SAN) administrators, and direct attached storage (DAS) administrators.

How This Book Is Organized

Chapter 1 describes the software and its features.

Chapter 2 contains installation and configuration information for the Sun StorEdge Diagnostic Expert software.

Chapter 3 describes the web browser user interface and explains how to perform related tasks through this interface.

Chapter 4 explains how to display and acknowledge alarms. In addition, this chapter explains how to narrow the list of alarms.

Chapter 5 explains how to display events, how to narrow the list of events, and how to view the event's asset properties and health summary.

Chapter 6 explains how to display topology details, save a topology, or retrieve a saved topology.

Chapter 7 explains how to enable and manage notification and the certification methods that are supported by the Sun StorEdge Diagnostic Expert software.

Chapter 8 lists the diagnostic tests available from the Sun StorEdge Diagnostic Expert software.

Appendix A describes the command-line interface and explains how to perform related tasks through this interface.

Appendix B provides troubleshooting information, including common Sun StorEdge array and SAN events.

Using UNIX Commands

This document might 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

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.
[ ]	In syntax, brackets indicate that an argument is optional.	`scmadm` [`–d` *sec*] [`–r` *n*[:*n*][,*n*]...] [`–z`]
{*arg* | *arg*}	In syntax, braces and pipes indicate that one of the arguments must be specified.	`sndradm -R b {p | s}`

\	At the end of a command line, the backslash (\) indicates that the command continues on the next line.	`atm90 /dev/md/rdsk/d5 \`
		`/dev/md/rdsk/d1 atm89 \`
		`/dev/md/rdsk/d5 /bitmaps/map2 \`
		`ip sync`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Sun Documentation

Product	Title	Part Number
ESM 1.2	*Sun StorEdge Diagnostic Expert Release Notes*	817-0197
	Enterprise Storage Manager 1.2 Overview	817-1039
Installation	*Enterprise Storage Manager 1.2 Installation Guide*	817-1037
System administration	*Enterprise Storage Manager 1.2 Topology Reporter Administration and Operations Guide*	817-1111
	Sun StorEdge Enterprise Storage Manager 1.0 Configuration Service Administrator's Guide	816-4295
	Storage Automated Diagnostic Environment User's Guide, Version 2.2	817-0192
Solaris software	*Solaris Handbook for Sun Peripherals*	806-2210
Sun StorEdge T3+ array	• *Sun StorEdge T3+ Array Release Notes*	816-4771
	• *Sun StorEdge T3+ Array Start Here*	816-4768
	• *Sun StorEdge T3 and T3+ Array Regulatory and Safety Compliance Manual*	816-0774
	• *Sun StorEdge T3+ Array Installation and Configuration Manual*	816-4769
	• *Sun StorEdge T3+ Array Administrator's Guide*	816-4770
	• *Sun StorEdge T3 Array Cabinet Installation Guide*	806-7979

Product	Title	Part Number
Sun StorEdge 6120 array	• *Start Here (Documentation Guide)*	817-0198
	• *Important Safety Information for Sun Hardware Systems*	816-7190
	• *Sun StorEdge 6120 Array Installation Guide*	817-0199
	• *Sun StorEdge 6120 Array Administration and Reference*	817-0200
	• *Sun StorEdge 6120 Array Release Notes*	817-0201
	• *Sun StorEdge 6120 Array Troubleshooting Guide*	817-0828
Sun StorEdge 3000 Family* * Sun StorEdge 3310 SCSI array & Sun StorEdge 3510 FC array	• *Sun StorEdge 3000 Family User's Guide*	816-7722
	• *Sun StorEdge 3000 Family RAID Firmware 3.27 User's Guide*	816-7934
	• *Sun StorEdge 3000 Family Configuration Service 1.2 User's Guide*	816-7931
	• *Sun StorEdge 3000 Family CLI 1.2 User's Guide*	816-7297
	• *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*	816-7300
	• *Sun StorEdge 3000 Family Best Practices*	816-7325
Sun StorEdge host adapter	• *Sun StorEdge PCI FC-100 HBA Installation Manual*	805-3682
	• *Sun StorEdge SBus FC-100 Host Adapter Installation &Service*	802-7572
	• *Sun StorEdge PCI Dual FC Host Adapter Product Notes*	806-5857
	• *Sun StorEdge PCI Dual FC Host Adapter Installation Guide*	806-4199
	• *Sun StorEdge 2 Gb PCI Single FC Host Adapter Product Notes*	816-5000
	• *Sun StorEdge 2 Gb PCI Single FC Host Adapter Installation Guide*	816-4999
	• *Sun StorEdge 2 Gb cPCI Dual FC Host Adapter Product Notes*	816-5002
	• *Sun StorEdge 2 Gb PCI Dual FC Host Adapter Installation Guide*	816-5001
	• *Sun StorEdge 2 Gb cPCI Dual FC Host Adapter Product Notes*	X6769A
	• *Sun StorEdge 2 Gb cPCI Dual FC Host Adapter Installation Guide*	
Sun StorEdge 6320 system	• *Sun StorEdge 6320 Series Installation Guide*	816-7878
	• *Sun StorEdge 6320 Series Reference and Service Guide*	816-7879
	• *Sun StorEdge 6320 Series Regulatory and Safety Compliance Manual*	816-7876
	• *Sun StorEdge 6320 Series Site Prep Guide*	816-7877
	• *Sun StorEdge 6320 Series Troubleshooting Guide*	816-7881
	• Man pages (CLI commands on Storage Service Processor)	N / A
Sun StorEdge SAN 4.0 (1 Gb switches)	• *Sun StorEdge SAN 4.0 Release Guide to Documentation*	816-4470
	• *Sun StorEdge SAN 4.0 Release Installation Guide*	816-4469
	• *Sun StorEdge SAN 4.0 Release Configuration Guide*	806-5513
	• *Sun StorEdge Network 2 Gb FC Switch-16 FRU Installation*	816-5285
	• *Sun StorEdge SAN 4.0 Release Notes*	816-4472

Product	Title	Part Number
Sun StorEdge SAN 4.1 (2 Gb switches)	• *Sun StorEdge SAN 4.1 Release Guide to Documentation*	817-0061
	• *Sun StorEdge SAN 4.1 Release Installation Guide*	817-0056
	• *Sun StorEdge SAN 4.1 Release Configuration Guide*	817-0057
	• *Sun StorEdge SAN 4.1 2 Gb Brocade Silkworm Fabric Switch Guide to Documentation*	817-0062
	• *Sun StorEdge SAN 3.1 2 Gb McData Intrepid Director Switch Guide to Documentation*	817-0063
	• *Sun StorEdge SAN 4.1 Release Notes*	817-0071

Accessing Online Sun Documentation

You can view, print, or purchase a broad selection of Sun documentation, including localized versions, at:

`http://www.sun.com/documentation`

Related McData Switch Documentation

You can locate the following documentation on McData's web site:

- *Intrepid™ 6064 Director Planning Manual*
- *Intrepid™ 6064 Director Product Manager User Manual*
- *SAN Planning Guide*
- *Manager Software User Manual*
- *Command Line Interface User Manual*

Accessing McData Documentation

The URL for the McData site is `http://www.mcdata.com`.

To access the McData hardware and software documentation, from the McData web site:

1. **Click the Knowledge Center link.**
2. **Click Technical Documents.**
3. **Select and download the documentation of your choice.**

You can access additional publications are available by means of McData's secure web site. Please contact webmaster@mcdata.com for access.

Related Brocade Silkworm Switch Documentation

You can locate the following Brocade documentation on a special website provided by Brocade.

- *Brocade Silkworm 2400 Hardware Reference Manual*
- *Brocade Silkworm 2800 Hardware Reference Manual*
- *Brocade Silkworm 3800 Hardware Reference Manual*
- *Brocade Silkworm 3800 Quick Start Guide*
- *Brocade Fabric OS Reference Manual*
- *Brocade Fabric OS Procedures Guide*
- *Brocade QuickLoop User's Guide*
- *Brocade SES User's Guide*
- *Brocade WebTools User's Guide*
- *Brocade Zoning User's Guide*

Accessing Brocade Documentation

The URL for the Brocade site is `http://www.brocade.com`.

To access the Silkworm series hardware and software documentation, from the Brocade web site:

1. **Click the Partners link.**
2. **Click the Brocade Partner Network link.**
3. **Enter your User ID.**
4. **Enter your password (not included for security purposes).**

   You can obtain the User ID and password information from your Sun Partner representative. You must have a Brocade Partner login and password to access the documentation.

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`docfeedback@sun.com`

Please include the part number (817-0195) of the document in the subject line of your email.

CHAPTER 1

Introduction

The Sun StorEdge Diagnostic Expert detects and reports faults for SAN switches and reports faults for Sun StorEdge T3, T3+, and 6120 arrays, Sun StorEdge 3510 FC arrays, Sun StorEdge 6320 or 6320 SL systems, and host bus adapters (HBAs).

Sun StorEdge Diagnostic Expert Features

The following summarizes Sun StorEdge Diagnostic Expert features:

- SAN device discovery, instrumentation, and health monitoring
  - Discovers, displays, and monitors Sun StorEdge T3, T3+, and 6120 arrays, Sun StorEdge 3510 FC arrays, Sun StorEdge switches, Brocade switches, and McData switches.
  - Employs the Storage Automated Diagnostic Environment 2.2 for Sun StorEdge 6320 series systems.
  - Employs a lightweight datahost agent for HBAs.
- Diagnostic tests
  - Tests the Sun StorEdge T3, T3+, and 6120 arrays, Sun StorEdge 3510 FC arrays, and Sun StorEdge switches, Brocade switches, and McData switches.
  - A single verification diagnostic test exists for Sun StorEdge 6320 series systems
- SAN Topology for all supported devices
- Aggregation—a consolidated, centralized view of all SAN devices including supported switches, storage arrays, and HBAs.
- Notification to specified email and pager addresses and to Sun Remote Services (SRS), and SunMC Providers.
- Users can access the features using either a web-based user interface or a local or remote command line interface (CLI).

CHAPTER 2

Installing the Software

This chapter presents instructions for installing, configuring, and starting the SUNWsade and SUNWsadev packages on your system. It includes the following main topics:

Installation Requirements

The SUNWsade and SUNWsadev packages are installed on a management workstation in the /opt/SUNWsade directory. Servers running the Solaris operating environment (Solaris 8 10/01 or newer) and Sun StorEdge SAN devices are supported. Install the SUNWsade and SUNWsadev packages on a workstation that satisfies these conditions.

Data Host Requirements

The SUNWsade and SUNWsadev packages consume approximately 60 Mbyte in the default /opt directory. Reserve an additional 10 Mbyte in the /var/opt directory for the application data. Additional information related to the data host follows:

- The application runs inside a Java™ virtual machine (JVM™)[1] and will steadily consume approximately 100Mbyte of total memory.
- For SAN datapath monitoring, the data host must have access to the data path of the devices being monitored.

Server Requirements

The SUNWsade and SUNWsadev packages must be installed on only one host in the /opt/SUNWsade directory. This host is called the *management host*.

- The management host must have access to the Sun StorEdge T3, T3+, and 6120 array message log, to which Sun StorEdge array device logs are sent. The name of the file appears in the message log configuration window for each host.
- The management host must have access to the Sun StorEdge T3, T3+, or 6120 arrays and / or the Sun StorEdge network FC switch-8 and switch-16 switches over TCP / IP.

Installation Hints

You should be familiar with UNIX commands and Sun's disk array products *before* attempting to use this product.

- You must use /opt/SUNWsade as the package base directory.
- Point your web browser to http://serverName:8088, where *serverName* is the machine on which you start the application.
- You should be aware of security risks associated with installing a web server.
- Take the appropriate action to protect access to the SUNWsade and SUNWsadev default port, which is port 8088. See the section, "To Change Default Port Numbers" on page 6 if other applications are already using the default port.
- If you want a secure connection, you must point the browser to https://hostname:8443. For a more complete explanation of security, refer to "System Security" on page 14.

1. The terms "Java Virtual Machine" and "JVM" mean a virtual machine for the Java platform.

- For Sun StorEdge T3, T3+, and 6120 arrays and Sun StorEdge network FC switch-8 and switch-16 switches connected in a non-Solaris environment, the package must be installed on a Solaris server and configured to monitor the devices through the management path.
- If there are existing problems with a storage device when the package is installed, the problems might not be detected or reported. They will, however, generate an event when the error condition has been corrected.

Note – See the section, “To Change Default Port Numbers” on page 6 if other applications are already using the default ports (8088 for `HTTP`, 8443 for `HTTPS`, and 8085 for the underlying web server shutdown port).

- To ensure that you have the required JDK™ version (1.4 or higher), type the following:

```
# java -version
```

Note – You should install the latest patch cluster for your version of the Solaris operating environment before installing the required patches, because some of the patches depend on patches in the cluster.

The patch clusters are available for download at `http://sunsolve.sun.com`

▼ To Change Default Port Numbers

If the Sun StorEdge Diagnostic Expert software default ports (8088 for HTTP, 8443 for HTTPS, and 8085 for the underlying web server shutdown port) belong to another application and are therefore unavailable, you can change the default ports by using the following procedure.

1. **Type:**

```
# vi /opt/SUNWsade/web/conf/server.xml
```

2. **Scan the XML output and replace** port="8088"**,** port="8443" **or** port="8085" **with valid port numbers.**

Note – If you change port `8088`, you must also re-run `ras_install` on all datahosts running `SUNWstadh` (for instructions, refer to "`To Install the SUNWstadh` Data Host Package" on page 20). After the re-install, you must indicate the new port number on each of the datahosts.

Modifying Device Polling Interval

The output for the `/opt/SUNWsade/etc/properties/InstallerService.properties` file, which specifies the polling interval (in seconds), is shown below.

```
CC_DeviceHandler.device_polling_interval=300
```

Note – This is a global setting.

Editing the `syslog.properties` File

To modify the name of the `t3messages` file so that it matches the name in the `/opt/SUNWsade/etc/syslog.conf` file, update the `SYSLOG_FILE` property in the `/opt/SUNWsade/etc/properties/syslog.properties` file. Here you can also modify the frequency with which the application checks the file (the polling interval).

1. **To modify the device polling interval, manually change the value from 300 to a different number, then perform** `sade stop` **and** `sade start`**.**

   Refer to "Starting the Sun StorEdge Diagnostic Expert Software" on page 26 for more information.

Note – This procedure applies to the Sun StorEdge T3, T3+, and 6120 arrays.

An example fragment from a `syslog.properties` file is shown below.

```
# Syslog file name and polling interval (in seconds)

SYSLOG_FILE=messages.syslog
SYSLOG_POLL_INTERVAL=300
```

Note – The `syslog.properties` file fragment does not modify the name of any file. It simply tells the Sun StorEdge Diagnostic Expert software what you have named the `SYSLOG_FILE`.

▼ To Edit the Management Host

1. **Edit** `/etc/syslog.conf` **to add the following line:**

```
local7.info /var/adm/messages.syslog
```

2. **To force the host to apply the change to the syslog, type the following at the command line:**

```
# kill -1 <pid>
```

where `pid` is the process id of the syslog process on the host.

3. **If you want to assign a different file name for the syslog T3 messages:**

   a. **Modify Step 1 to change the file name.**

   b. **Modify the SYSLOG_FILE attribute in:**

```
# vi SUNWsade/etc/properties/syslog/syslog.properties
```

   c. **Stop and restart the Sun StorEdge Diagnostic Expert software.**

▼ To Edit the Sun StorEdge T3, T3+, or 6120 Array

1. **FTP to the target Sun StorEdge T3, T3+, or 6120 array.**
2. **Change to the following directories.**

```
# /etc/syslog.conf
# /etc/hosts
```

3. **Edit the hosts file and add the following line:**

```
<ip_address> <hostname>
```

4. **Edit the** `syslog.conf` **file and add the following line:**

```
*.info@<ip_address>
```

5. **FTP to the target Sun StorEdge T3, T3+, or 6120 array and put back the hosts and** `syslog.conf` **files.**
6. **Telnet to the target Sun StorEdge T3, T3+, or 6120 array and redirect the syslog traffic to the host by typing the following at the command prompt:**

```
# set logto *
```

Supported Configurations

The Sun StorEdge Diagnostic Expert software supports the hardware, firmware, and software versions listed in TABLE 2-1, TABLE 2-2, and TABLE 2-3.

Supported Hardware

You can use the supported firmware and software with the hardware listed in TABLE 2-1.

TABLE 2-1 Supported Hardware

Sun Product	Revision Level
Sun StorEdge arrays	Sun StorEdge T3 array (firmware 1.18) Sun StorEdge T3+ array (firmware 2.0) Sun StorEdge 6120 array Sun StorEdge 3510 FC array
Host Bus Adapters	Sun StorEdge PCI dual Fibre Channel host adapter Sun StorEdge 2 Gb FC PCI Single Channel network adapter Sun StorEdge 2 Gb FC PCI Dual Channel network adapter Sun StorEdge 2 Gb FC cPCI Dual Channel network adapter
SAN switches	Sun StorEdge network FC switch-8 and switch-16 Sun StorEdge network 2 Gb FC switch-8, switch-16, and switch-64 switches Brocade Silkworm 2400/2800 1 Gb switches Brocade Silkworm 3200/3800/12000 FC switches McData 1 Gb 6064 and 2 Gb 3232 and 6064 switches

Supported Firmware Revisions

The following firmware versions are currently supported on the Sun StorEdge Diagnostic Expert.

TABLE 2-2 Supported Firmware Revisions

Sun Product	Revision Level
Sun StorEdge T3 array	Controller card 1.18 Loop card: 5.02 flash
Sun StorEdge T3+ array	Controller card 2.1 Loop card: 5.02 flash
Sun StorEdge 6120 array	Controller card 3.0
Sun StorEdge 3510 FC array	Firmware 3.27
Sun PCI HBAs	ISP2200 FC-AL host adapter driver: 1.13.01 ISP2300 FC-AL host adapter driver: 1.13.08
Sun StorEdge 6320 system	Sun StorEdge 6120 array SystemsImageX: N/A Sun StorEdge 6320 system SystemsImageX: N/A
Sun StorEdge network Fibre Channel switches	1 Gb 8/16 port: 4.02.33 2 Gb 8/16 port: 1.3.60
Brocade switches	Brocade 2400/2800 1 Gb switches: 2.6.0g Brocade 3200/3800 2 Gb switches: 3.0.2j Brocade 12000 2 Gb switches: 4.0.0e
McData switches	McData 2 Gb 3232: v 4.0 McData 1 Gb 6064, v 4.0.100 McData 2 Gb 6064: v 4.0

Supported Software

The following software is supported on the Sun StorEdge Diagnostic Expert data host.

TABLE 2-3 Supported Software

Software	Revision Level
Solaris 8 02/02 operating system	SAN Foundation Kit Patches, version 6.24 111413-05 or newer: • 111095-12 • 111096-05 • 111097-11 • 111413-09 • 111846-05 • 113766-01 • 113767-01 • 111847-05
Solaris 9 09/02 operating system	SAN Foundation Kit Patches, version 6.24 • 113039-02 • 113040-03 • 113041-02 • 113042-03 • 113043-02 • 111847-05 • 113044-02
Web browser software	Netscape Navigator™ version 4.79 and higher Internet Explorer version 5.0 and higher
Storage Automated Diagnostic Environment Software	`SUNWstadh` data host package or Sun StorEdge Diagnostic Environment 2.2 (`SUNWstade` package)
Java	1.4 or higher

1 Java 1.4.0 requires several patches for the Solaris 8 operating system. See http://java.sun.com/j2se/1.4/install-solaris-patches.html#2.8 for a list of required patches.

Note – Download the software, related software, and updates from `http://www.sun.com/storage/san`.

Patches are available at `http://sunsolve.sun.com`

Installation Checklist

Use the information in TABLE 2-4 to make sure you perform all the steps necessary for a successful installation.

TABLE 2-4 Sun StorEdge Diagnostic Expert Software Installation Checklist

	Step	Action
☐	1	1. Download and install the following two tar packages to the same host that has been identified as your management station. Both packages are required for a full installation. The packages are located on the Installation CD. # **cd /cdrom/cdrom0/product/packages** 2. Install the `SUNWsade` and `SUNWsadev` packages by using the **`pkgadd -d .`** command.
☐	2	Select the `SUNWsade` package and be prepared to provide the complete path to a Java runtime environment (JRE) version 1.4.0. If JRE is not readily available, then you must first install the JRE 1.4.0 or higher before continuing.
☐	3	Answer whether or not you want to run the web server in secure (SSL) mode. If you answer no, then the client browser can connect using `http:` as normal. If you answer yes, then the client browser must use `https:` and all data transmitted from the web server to the client browser is encrypted. **Note:** For Secure Socket Layer (SSL) support, make sure you use JDK 1.4 or higher. This is the only JDK version that supports SSL.
☐	4	Locate potential Sun StorEdge Diagnostic Expert software patches using the SunSolve online tool. Download and install them as super user, using the `patchadd`(1M) command. See “To Install a Patch” on page 24.
☐	5	Modify the required role (`SA_Admin`) to enable the user to log in. See “To Assign the `SA_Admin` Role” on page 25.
☐	6	Start the application: # **cd /opt/SUNWsade/bin/** # **sade start** See “To Start the Sun StorEdge Diagnostic Expert Software” on page 26.
☐	7	After the installation is complete, set the environment variables `PATH` and `MANPATH`. See “To Set the Environment Variables” on page 24.

TABLE 2-4 Sun StorEdge Diagnostic Expert Software Installation Checklist *(Continued)*

☐	8	Point your web browser to `http://`*serverName*`:8088`, where *serverName* is the machine on which you start the application. If the web server is in secure mode, point your web browser to `https://`*serverName*`:8443`. See "To Start the Sun StorEdge Diagnostic Expert Software" on page 26.
☐	9	Enter mandatory site properties by using the Administration window. See "Using the Administration Window" on page 33.
☐	10	Add devices to the configuration for monitoring. See "To Manually Add a Device" on page 36.
☐	11	Set up notification services. See "To Enable and Manage Notification" on page 75.

System Security

The Sun StorEdge Diagnostic Expert software supports only minimal security, since the information the Sun StorEdge Diagnostic Expert software uses is not considered highly sensitive in nature. The information pertains to health and asset information, which is readily obtainable for a user who has been granted the appropriate system privileges.

The Sun StorEdge Diagnostic Expert software supports `https` communication, both through the command line interface (CLI) and the Web user interface (UI). This ensures confidentiality if the application is accessed by way of a wide area network (WAN). The Sun StorEdge Diagnostic Expert software communicates with the agents and storage devices using sockets. There is no authentication or authorization that occurs between the Sun StorEdge Diagnostic Expert software and the data host agent, or between the application and the Storage Service Processors.

Diagnostic operations require passwords that are set on the device in order for the device to run. The application stores device passwords in configuration files. The application itself is protected from access by usernames and passwords, and by having these associated with an operating system role, which permits the use of the application.

Detailed security information for each supported device is listed in “Device and Agent Security Notes” on page 15.

To insure optimal system security, perform the steps listed in the “Security Checklist” on page 16.

Device and Agent Security Notes

- All device information is sent over a standard `http` connection. No encryption is used for these connections.
- The Sun StorEdge T3, T3+, and 6120 arrays require only minimal authorization for requests of element or system properties over `http`. The authorization is set to *basic* and the authentication uses the guest user and no password.
- The Sun StorEdge T3, T3+, and 6120 arrays require a password for running diagnostic tests. This password is encoded prior to being sent to the array. The configuration file stores the password in clear text. Adequate permissions prevent this file from being accessed.
- The Sun StorEdge FC network switch, the Brocade switch, and the McData switch require a password for running diagnostic tests. Due to a problem with a legacy switch test, however, this password is observable from the process table. *Take care to protect access to the management station.*
- The Sun StorEdge 3510 array does *not* require a username or password to obtain health information or to run diagnostic tests.
- The application communicates with the Sun StorEdge 6320 series system by way of an `http` interface. Operations performed over this interface enable the user to obtain device and status information only.
- The `SUNWstadh` package, which is installed on a data host, communicates with the application by pushing information to it. No connection from the Sun StorEdge Diagnostic Expert back to the agent is currently initiated, nor will the agent accept an outside connection.

  A firewall permits connections from the data hosts to the application to provide HBA information and topology.
- The Sun StorEdge Diagnostic Expert software should have access to the SRS NetConnect machine to enable remote monitoring information to be sent. SRS Event Monitoring may require similar support. The SRS transmission does not provide any confidentiality; however, SRS information pertains only to IP addresses and system alarms.

Caution – The Sun StorEdge Diagnostic Expert software also supports the execution of diagnostic operations, which may disrupt the availability of systems, such as a Sun StorEdge T3, T3+, or 6120 array. Refer to the *Storage Automated Diagnostic Environment User's Guide* for Diagnostic Test Rules.

Security Checklist

TABLE 2-5 Sun StorEdge Diagnostic Expert Software Security Checklist

	Step	Action
		Application Access
☐	1	Invoke the CLI using `https` to ensure that transmissions are encrypted for confidentiality. **Note:** The Web UI ensures confidentiality by enabling `https` connections.
☐	2	Install the `SUNWsade` and `SUNWsadev` packages as root. **Note:** The application can only be run by a user who has root privileges.
☐	3	Insure the application user has the `SA_Admin` role **Note:** It is strongly recommended that the root user *not* be assigned the `SA_Admin` role.
		Management Station
☐	4	Host the management station on a private LAN that is able to communicate with the storage devices out-of-band.
☐	5	Protect the application and configuration files and directories by assigning appropriate read, write, and execute permissions for group and other user types.
☐	6	Restrict the user list on the management station. (See Solaris 9 documentation for information about role-based access control and how to configure the management station with the appropriate information.) **Note:** The process table on the management station can expose password information which may be sensitive.
☐	7	Install the NetConnect agent on the management station to ensure protection to where the information is passed.
		Device and Agent Security
☐	9	Install the data host agent as root. **Note:** The data host agent can only be run with root privileges.

Installing the Software Packages

This section includes the following procedures:

Note – The network, switch, and host bus adapter software packages and updates are available from `http://www.sun.com/storage/san`.

Note – Before you run the `pkgadd`(1M) command, you must have installed a Java runtime environment version 1.4.0 or greater.

▼ To Install the Software Packages

1. **See the "Installation Checklist" on page 12 for instructions on how to download the packages.**

   Both the `SUNWsade` and `SUNWsadev` packages are required for a full installation. Install the optional `SUNWstadh` package to receive and display HBA health information.

2. **Enter the `pkgadd(1M)` command and answer the prompts as shown in the following code examples.**

```
# pkgadd -d .

The following packages are available:
  1  SUNWsade      Sun StorEdge Diagnostic Expert 1.2 (Platform)
                   (sparc) 1.2.xx.xxx
  2  SUNWsadev     Sun StorEdge Diagnostic Expert 1.2 (Content)
                   (sparc) 1.2.xx.xxx

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]: a

Processing package instance <SUNWsade> from </var/tmp>

Sun StorEdge Diagnostic Expert 1.2 (Platform)
(sparc) 1.2.a6.001
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Select Java version 1.4 or greater to run application.
Default Java is (/usr/bin/java) : export PATH=/net/speserv/diag_src/tools/j2sdk1.4.0/bin:$PATH
Run webserver in secure mode? (y/n) [default n] :y
Run SSDE web server when machine reboots? (y/n) [default n] :y
## Executing checkinstall script.
Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or setgid
permissions:
  /opt/SUNWsade/etc/pamverifier <setuid root>

Do you want to install these as setuid/setgid files [y,n,?,q] y

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWsade> [y,n,?] y

Installing Sun StorEdge Diagnostic Expert 1.2 (Platform) as <SUNWsade>

## Installing part 1 of 1.
/etc/init.d/init.ssde
/opt/SUNWsade/bin/sade
/opt/SUNWsade/bin/ssde
/opt/SUNWsade/db/tables/CIMBeanUtil.sql
/opt/SUNWsade/db/tables/General.sql
/opt/SUNWsade/db/tables/Statistics.sql
/opt/SUNWsade/db/tables/Test.sql
/opt/SUNWsade/db/tables/Topology.sql
/opt/SUNWsade/db/tables/com.sun.jade.cim.bean_generic.sql
/opt/SUNWsade/docs/ReleaseNotes.txt
/opt/SUNWsade/docs/UserGuide.pdf


...
```

```
...


/opt/SUNWsade/etc/properties/policies/HBAPortSignalLossCounterChange.properties
/opt/SUNWsade/etc/properties/policies/HBAPortSignalLossCounterNotify.properties
/opt/SUNWsade/etc/properties/policies/HBAPortTxWordChange.properties
/opt/SUNWsade/etc/properties/policies/HBAPortTxWordNotify.properties
/opt/SUNWsade/etc/properties/policies/LoopCardAlertClear.properties
/opt/SUNWsade/etc/properties/policies/LoopCardAlertCreate.properties
/opt/SUNWsade/etc/properties/policies/LoopCardStateChange.properties
/opt/SUNWsade/etc/properties/policies/PowerUnitAlertClear.properties
/opt/SUNWsade/etc/properties/policies/PowerUnitAlertCreate.properties
/opt/SUNWsade/etc/properties/policies/PowerUnitStateChange.properties
/opt/SUNWsade/etc/properties/policies/SwitchPortCRCCounterChange.properties
/opt/SUNWsade/etc/properties/policies/SwitchPortCRCCounterNotify.properties
/opt/SUNWsade/etc/properties/policies/SwitchPortSignalLossCounterChange.properti
es
/opt/SUNWsade/etc/properties/policies/SwitchPortSignalLossCounterNotify.properti
es
/opt/SUNWsade/etc/properties/policies/SwitchPortTxWordChange.properties
/opt/SUNWsade/etc/properties/policies/SwitchPortTxWordNotify.properties
/opt/SUNWsade/etc/properties/policies/SyslogBatteryNoticeAlert.properties
/opt/SUNWsade/etc/properties/policies/SyslogDiskNoticeAlert.properties
/opt/SUNWsade/etc/properties/policies/SyslogErrorAlert.properties
/opt/SUNWsade/etc/properties/policies/SyslogHoldTimeAlert.properties
/opt/SUNWsade/etc/properties/policies/SystemHealthAdjustment.properties
/opt/SUNWsade/etc/properties/policies/VolumeAlertClear.properties
/opt/SUNWsade/etc/properties/policies/VolumeAlertCreate.properties
/opt/SUNWsade/etc/properties/policies/VolumeStateChange.properties
/opt/SUNWsade/etc/properties/setupformat/serack.format
/opt/SUNWsade/etc/properties/setupformat/switch.format
/opt/SUNWsade/etc/properties/setupformat/t3.format
/opt/SUNWsade/lib/hba.jar
/opt/SUNWsade/lib/libFabOsApi.so
/opt/SUNWsade/lib/libqsw.so
/opt/SUNWsade/lib/libsanbox.so
/opt/SUNWsade/lib/serack.jar
/opt/SUNWsade/lib/switch.jar
/opt/SUNWsade/lib/t3.jar
/opt/SUNWsade/sbin/brocadezone
/opt/SUNWsade/sbin/qlogicswitchzones
/opt/SUNWsade/sbin/sanbox
[ verifying class <none> ]

## Executing postinstall script.

Installation finished.
To start the application, run the following: /opt/SUNWsade/bin/sade start

Installation of <SUNWsade> was successful.
```

External Products and Packages

When the SUNWstadh package is installed on a data host, the Sun StorEdge Diagnostic Expert software receives and displays host bus adapter (HBA) health information. SUNWstadh is available on the ESM 1.2 CD.

SUNWstadh Data Host Package

Determine which product, the SUNWstadh datahost package or the Storage Automated Diagnostic Environment (SUNWstade) package will be used to monitor the host's HBAs. The SUNWstadh and SUNWstade packages cannot co-exist, and the SUNWstadh package install will abort if the SUNWstade package is already installed.

Note – You must remove the SUNWstade package prior to installing the SUNWstadh package.

If the SUNWstade package is already installed, either leave the SUNWstade package intact and monitor the host's HBAs using the Storage Automated Diagnostic Environment, or uninstall the SUNWstade package, install the SUNWstadh (data host) package, and use the Sun StorEdge Diagnostic Expert software to monitor the host's HBAs.

Be aware, however, that if the Storage Automated Diagnostic Environment (SUNWstade) is already installed and performing more functions than monitoring HBAs, removing the SUNWstade package will cause the loss of *all* SUNWstade functionality.

▼ To Install the SUNWstadh Data Host Package

To install the SUNWstadh data host package, the IP name or address of the Sun StorEdge Diagnostic Expert management station must be known. If you have not installed the Sun StorEdge Diagnostic Expert management station yet, abort this install and install the Sun StorEdge Diagnostic Expert management station first.

1. **Locate the compressed data host agent package** SUNWstadh_2.2.*xx*.tar.Z **from the ESM 1.2 CD, where** *xx* **is the version number.**

2. **Select** SUNWstadh **and answer all prompts.**

   When the pkgadd is complete, the message shown in CODE EXAMPLE 2-1 is displayed.

CODE EXAMPLE 2-1 SUNWstadh Data Host Package Installation

The following is an example of a SUNWstadh installation.

```
 ----------------------------------------------------
After the package is completely installed, execute
the program '/opt/SUNWstadh/bin/ras_install'.
This will complete the installation of SUNWstadh .
             ----------------------------------------------------
If you choose not to use cron this time, re-run
ras_install later to establish a cron entry.
             ----------------------------------------------------
# /opt/SUNWstadh/bin/ras_install
**** Installing the Package and Crons ****

  To install a Data-Host package, the IP Name/Address of the
  ESM Diagnostic Expert 1.2 management station must be known.
  If you have not installed ESM 1.2 with Diagnostic Expert 1.2
  on a management station abort this install and go install
  the ESM 1.2 package on a host to be configured as the
  management station first.

Enter the IP Name/Address:port of the management station
? The default port SUNWsade is 8088(default=:8088)#

        123.45.65.89:8088    <- example IP/PORT

        - Testing communication with host '172.20.104.27:8088' ..

  ** Found 172.20.104.27.
? Enter probing frequency (5/10/15/20/30/40/50/60/90/120)(default=10) 5

? Enter System-Admin email address:

? Enter message file location(default=/var/adm/messages)

? Do you want to C=start or P=stop the Agent cron
[C/P] : (default=C) C

** cron installed.
- Testing access to the webserver, (this will timeout after 30 secs) ...
 ***** ping '123.45.65.89' succeeded!
 Done.
```

Note – After the SUNWstadh package has been installed and configured, a device type of *data host* can be accessed using the functionality in "Using the Assets Window" on page 39. Alarms and events for the data host occur and are accessed the same as any other monitored device.

▼ To Remove the SUNWstadh Data Host Package

In order to stop monitoring a data host (SUNWstadh), the data host agent must be turned off. You can do this using ras_install.

1. **Run** ras_install **and enter P to the following question:**

```
Do you want to C=start or P=stop the Agent cron
[C/P] : (default=C)
# P
```

2. **Remove the** SUNWstadh **data host package using the following command:**

```
# pkgrm SUNWstadh
```

Sun Management Center (SunMC)

The Sun StorEdge Diagnostic Expert software is capable of sending alarms for the devices it supports to the Sun Management Center, also known as *SunMC*.

Note – If you do not plan to use the SunMC services, ignore the following information.

- SUNesraa—The SUNesraa software is designed for the SunMC agent environment and *must* be installed on a host that has the SunMC agent installed (this may or may not be the Sun StorEdge Diagnostic Expert host). The SUNesraa software receives data from the Sun StorEdge Diagnostic Expert software and forwards the data to the SunMC.
- SUNesras—The SUNesras software is optionally installed on the Sun MC server host. The SUNesras software is designed for the SunMC agent environment to support the Group Operation functionality in SunMC.

▼ To Install and Activate the SUNesraa and SUNesras Packages

1. **Install the SunMC agent on the selected host.**

   The recommended host is the Sun StorEdge Diagnostic Expert management station.

2. **Using the standard Solaris** pkgadd**(1) utility, install the** SUNesraa **software on the same host as the SunMC agent.**

3. **Use the Sun Management Center command console to start the SunMC agent and load the module called** `rasagent`**.**

   While the `rasagent` module is loading, you will be prompted to provide the management station's IP address in the Provider IP Address field.

4. **Using the Sun StorEdge Diagnostic Expert software GUI, set the SRS/SunMC fields using the Notification Configuration functionality. Refer to "Notification Providers" on page 73 for more information.**

   a. **In the *Server* field, enter the IP address or name of the host where the** `rasagent` **module is installed.**

Note – All of the above steps must occur before you add devices to the Sun StorEdge Diagnostic Expert software. Otherwise, topology information will not be sent to SunMC.

Information about adding devices is documented in "To Manually Add a Device" on page 36.

Once activated, the SunMC module receives information about monitored devices and displays alarms in the SunMC console.

For more information about SunMC, refer to `http://network.east/commu-team/symon/`, or refer to the *SunMC User's Guide*.

Sun StorEdge Diagnostic Expert Image Packages

The packages delivered as part of the `SUNWsade` tar image are listed in TABLE 2-6.

TABLE 2-6 Packages Delivered with `SUNWsade` Tar Images

Package	Description
SUNWesraa	The RASAgent module for the SUNMC agent (sparc) release 1.1, REV=2002.09.19
SUNWesras	The RASAgent module for SUNMC server (sparc) release 1.1, REV=2002.09.19
SUNWsade	Sun StorEdge Diagnostic Expert 1.2 (Platform) (sparc) 1.2.xx.xxx
SUNWsadev	Sun StorEdge Diagnostic Expert 1.2 (Content)
SUNWstadh	Datahost package

▼ To Install a Patch

1. **Using the SunSolve online tool (http://sunsolve.sun.com), always verify that you have the most recent** `SUNWsade` **and** `SUNWsadev` **patches.**

Note – When installing a new patch, stop the agents using the `sade stop` command before proceeding with the upgrade.

---

2. **Download the latest Sun StorEdge Diagnostic Expert software patch from the SunSolve online tool to a temporary workspace.**
3. **As superuser, use the `patchadd` (1M) command and answer the prompts as shown in the code examples.**

CODE EXAMPLE 2-2

```
# cd /tmp

# tar xvf xxxxxx-xx.tar
# cd xxxxxx-xx
# /opt/SUNWsade/bin/sade stop

# patchadd xxxxxx-xx .

# /opt/SUNWsade/bin/sade start
```

▼ To Set the Environment Variables

After installing the Sun StorEdge Diagnostic Expert software, you must set the environment variables `PATH` and `MANPATH` to include the directories `/opt/SUNWsade/bin` and `/opt/SUNWsade/man`.

1. **For the Korn or Bourne shell, type the following:**

```
$ PATH=/opt/SUNWsade/bin:$PATH
$ MANPATH=/opt/SUNWsade/man:$MANPATH
$ export PATH MANPATH
```

2. **For the C shell, type the following:**

```
% setenv PATH /opt/SUNWsade/bin:$PATH
% setenv MANPATH /opt/SUNWsade/man:$MANPATH
```

▼ To Verify the Installation

- **Use the `pkginfo`(1M) command. For example:**

```
# pkginfo -l SUNWsade
```

▼ To Assign the `SA_Admin` Role

The Sun StorEdge Diagnostic Expert software automatically creates an `SA_Admin` role at the time of installation.

1. **If the `SA_Admin` role has been removed, reassign it with the following command:**

```
# /usr/sbin/roleadd -c “StorADE Administrator” -s /bin/pfcsh
\ -A “solaris.device.storade.*” -P “All” SA_Admin
```

2. ***Assign* the role granted to a user by typing the following command:**

```
# usermod -R SA_Admin user-name
```

3. ***Confirm* the role granted to a user using the following command:**

```
# usr/bin/roles user-name
```

For example:

```
# usr/bin/roles admin
# SA_Admin
```

Starting the Sun StorEdge Diagnostic Expert Software

After you have installed, configured, and verified the software installation, you can start the Sun StorEdge Diagnostic Expert Software GUI from a web browser.

▼ To Start the Sun StorEdge Diagnostic Expert Software

1. **Type the following:**

```
# cd /opt/SUNWsade/bin/
# sade start
```

2. **Point your web browser to** `http://`*serverName*`:8088`**, where *serverName* is the machine on which you start the application.**

   For the secure socket layer (SSL), point your web browser to `http://serName:8443`**.**

Note – `https` security is based on the secure socket layer (SSL). The SSL encrypts and authenticates messages sent between a browser and the web server. Encryption using public key cryptography ensures the privacy of the messages sent between the client and the browser. Plain HTTP messages are sent across the network in plain ASCII. Authentication using a trusted certification authority ensures that the client can trust that the server is what it claims to be.

For complete security information, see “System Security” on page 14.

▼ To Monitor the Product Log Files

- **Type the following**:

```
# tail -f /var/opt/SUNWsade/log/storade.log
```

The Sun StorEdge Diagnostic Expert software uses log files listed in TABLE 2-7.

TABLE 2-7 Sun StorEdge Diagnostic Expert Software Log Files

Log File	Description
`catalina_log.YYYY-MM-DD.txt`	Lists the threads allocated when a request is made to the web server.
`localhost_access_log.YYYY-MM-DD.txt`	Lists the `HTTP GET` and `POST` requests to the web server.
`localhost_log.YYYY-MM-DD.txt`	Lists potential errors not reported by the application in the `storade.log` file.
`output.log`	Lists normal messages.

Rotating log files for error messages, (each with a maximum size of 500k), are displayed as follows:

`storade.log.0`

`storade.log.1`

`storade.log.2`

`storade.log.3`

▼ To Purge Database and Log Files

If the database files or log files have grown to an excessive size, you can use the purge option to clear them. The purge option requires that the web server be stopped and restarted.

1. **Type the following to stop the web server:**

```
# /opt/SUNWsade/bin/sade stop
```

2. **Type the following to purge the database and log files:**

```
# /opt/SUNWsade/bin/sade purge
```

3. **Type the following to restart the web server:**

```
# /opt/SUNWsade/bin/sade start
```

Upgrading the Packages

The `pkgrm`(1M) command removes the packages from the machine. However, the information in `/var/opt` remains, in case you are upgrading the software to a newer version.

- **Remove the initial installation by typing the following command before installing the new version. For example:**

```
# pkgrm SUNWsade
```

Uninstalling the Packages

Caution – Removing the initial installation does not erase the previous configuration information. Configuration and data files, as well as the cache and topology information of each device, is retained to maintain a consistent, historical view of the Sun StorEdge devices. If you decide to completely remove the package, including the configuration and data files, see Step 2.

▼ To Completely Remove the Package

1. **To completely remove the package so that no configuration data is saved, type:**

```
# rm -rf /var/opt/SUNWsade
```

2. **To remove user roles that were added in "To Assign the `SA_Admin` Role" on page 25, type the following:**

```
# /usr/sbin/rolede1 SA_Admin
```

3. **Modify the `/etc/user_attr` file on the management station by removing any user's reference to the `SA_Admin` role.**

CHAPTER 3

Managing Administration and Assets

The user interface includes the following topics, which are described in this chapter.

Navigating the Software

The user interface enables you to show various levels of detail about your SAN environment. Typically, you click links and buttons to navigate as you would on any other web page.

The Sun StorEdge Diagnostic Expert also displays the navigation path in each window to show how you arrived there. This path includes clickable links so that you can return to a certain point in your navigation, instead of start at an upper-level window or tab.

Logging In

The Sun StorEdge Diagnostic Expert enables you to view and manage your storage area network (SAN) environment through a web browser. This section explains how to log in and navigate the web-browser user interface (UI).

If you have successfully installed and started the Sun StorEdge Diagnostic Expert, you can now log in with a web browser.

▼ To Log In:

1. **Open a web browser.**
2. **For an HTTP server, type the following URL in the URL text field**:

```
http://your-hostname:port/
```

where *your-hostname* is your system's host name and *port* is the port number you configured (the default is 8088). If the web server is in secure mode, point your web browser to `https://serverName:8443`.

3. **Log in as the user to whom the** `SA_Admin` **role is assigned.**

Refer to "To Assign the `SA_Admin` Role" on page 25 for more information.

▼ To Change the Browser Timeout Setting:

1. **Type**:

```
# vi
# cd /opt/SUNWsade/web/conf
# edit web.xml
```

2. **Scan the XML output until you find** `<session-timeout>30 </session-timeout>`, **and then change the default of** `30`**, where** `30` **is the number of minutes.**

Using the Administration Window

When you first log in, you must enter site information in the Administration window. You cannot navigate to any other screen until you submit this information. After you have entered the site information, subsequent logins direct you to the Assets Summary window.

1. **Click the Administration tab.**

   The Site Information Properties window is displayed, shown in FIGURE 3-1.

2. **To change a site property, click Edit on the Site Properties window.**

3. **Edit the product location and contact properties, and click Update.**

   You are returned to the Site Properties window, which displays the properties you have edited.

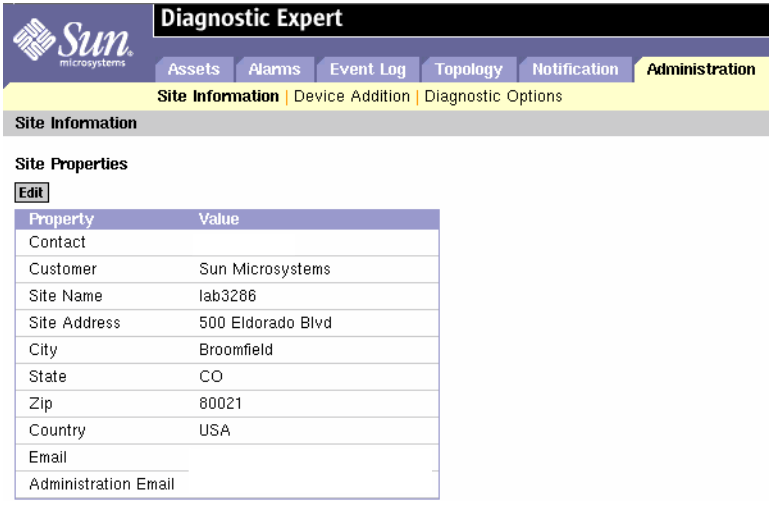


FIGURE 3-1 Sun StorEdge Diagnostic Expert Administration Window

Discovery

If the datahost package (`SUNWstadh`) is installed, the host is automatically discovered and no action is required. See "`To Install the SUNWstadh` Data Host Package" on page 20 for more information.

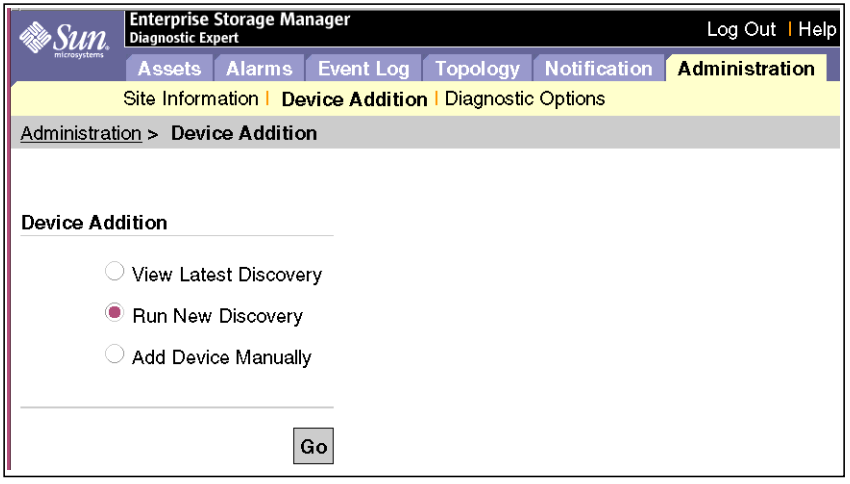
There are two additional ways you can manually add devices using the Discovery feature.

- *Run New Discovery*—The Sun StorEdge Diagnostic Expert software discovers all devices and creates a list of devices that can be monitored. You can enable any of these discovered devices by selecting it from the list of discovered devices and clicking *Add*.
- *Add Device Manually*—By adding a single device, you can retain the list of previously-discovered devices. The Sun StorEdge Diagnostic Expert software monitors all devices in the previous list, plus the new device that was added.

▼ To Run Discovery

The Run Discovery feature enables you to add a single device or a group of similar devices contained within an IP address range. Run Discovery checks to make sure that the Sun StorEdge Diagnostic Expert software is communicating with the device or devices.

1. **From the Administration menu, click Device Addition.**



Note – If you select View Latest Discovery (the default) is selected, a table of devices that have previously been discovered is displayed.

---

2. **Select Run New Discovery.**

   You are prompted to either view recently discovered devices or to run a new discovery.

   If you select Run New Discovery, the Discovery Parameters window is displayed, as shown in FIGURE 3-2.

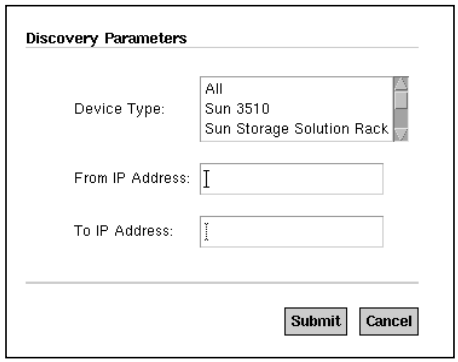


FIGURE 3-2 Asset Administration—Run New Discovery

3. **Select a device type from the Device Type list.**

   Currently-supported device types include All devices, the Sun StorEdge 3510 FC array, the Sun StorEdge 6320 System, switches (Sun, Brocade, and McData), and the Sun StorEdge T3, T3+, and 6120 array.

4. **Type the *From IP address* (the IP address where the Discovery search range begins).**

   The *From IP Address* is a required field and Discovery will not run without it.

5. **Type the *To IP Address*, (the IP address where the Discovery search range ends).**

Note – If you want to discover a single device, type the same IP address into the *From IP address* and the *To IP Address* fields.

From this information, the application discovers the devices on the network and returns a list of discovered devices.

Note – You cannot search across subnets.

If the device cannot be contacted, or if it returns information that is not consistent with the device type selected, it does not appear in the list of discovered devices.

An example of discovery parameters follows.

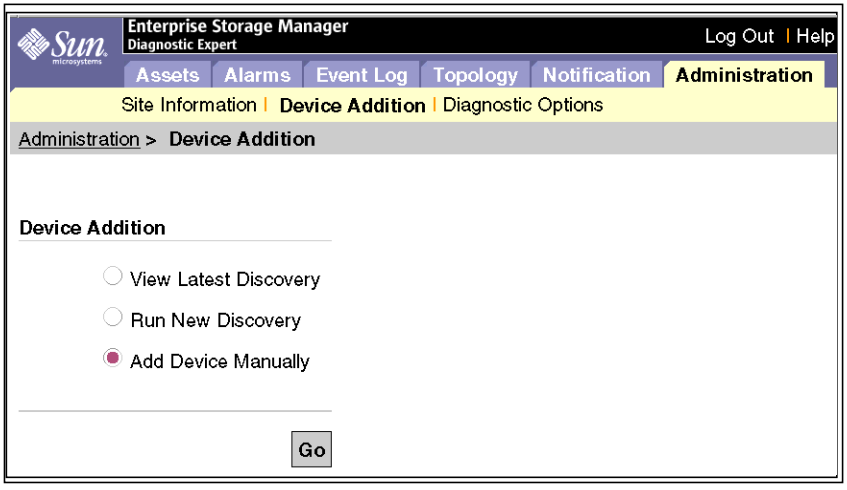
Device Type	switch
From IP Address	`172.`*xx.xxx*`.1`
To IP Address	172.*xx.xxx*.25

Note: With the information from this example, the Sun StorEdge Diagnostic Expert software queries device IP range `172.`*xx.xxx*`.1` through `172.`*xx.xxx*`.25`. A device with an IP address of `172.`*xx.xxx*`.26` is not discovered.

▼ To Manually Add a Device

The Add Device Manually feature enables you to add a Sun StorEdge 6320 or 6320SL system, a switch, a Sun StorEdge 3510 FC array, or a Sun StorEdge T3, T3+, or 6120 array. Once added, the device appears in the Topology.

1. **From the Administration menu, click Device Addition.**



2. **Click Add Device Manually and then click Go.**

The Add Device Manually window is displayed.

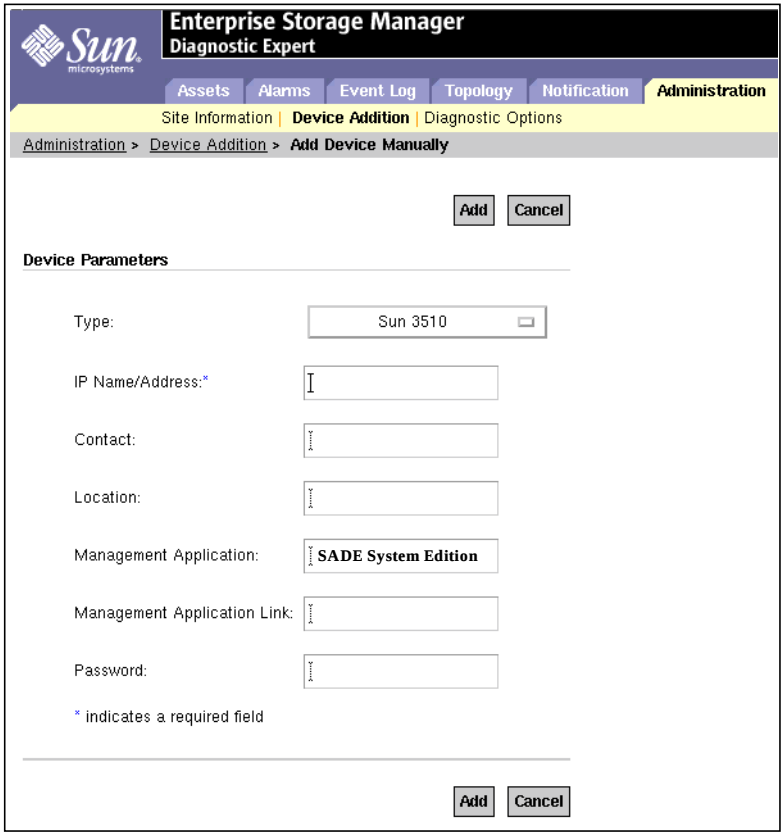


FIGURE 3-3 Administration—Add a Device

3. **Update the required fields, which are indicated by an asterisk (*), and any of the optional fields.**

TABLE 3-1 Device Parameter Fields

Device Parameter	Description
Type	Select the device type from the pull-down menu. Options include the Sun StorEdge 3510 FC array, the Sun StorEdge 6320 series solution rack, Switches (Sun StorEdge, Brocade Silkworm, and McData), and Sun StorEdge T3, T3+, and 6120 arrays.
IP Name/Address*	Enter the IP address of the device. *This is the only required field.*
Contact	Enter the name of the person responsible for the device you are adding.
Location	Enter the location of the device. The default is the location specified in Administration -- > Site Properties.
Management Application	This parameter enables users to store URL bookmarks on a device-by-device basis. It provides an easy way to launch applications without having to open a browser window and type the URL manually. Type in a meaningful name (for example, SADE System Edition). This is the name that is displayed in the Assets Summary Action column. By clicking its link from the Assets Summary page, you launch the application.
Management Application Link	Specify the Management Application URL.

* Mandatory

4. **Click Add.**

   After the device is added, a confirmation message is displayed.

Using the Assets Window

The Assets window, shown in FIGURE 3-4, enables you to monitor host, switch, and storage device properties. The Assets window also displays asset and health information and manages and monitors diagnostic functions.

Refer to Chapter 8, “Diagnostic Tests” to manage diagnostic tests for the supported storage devices.

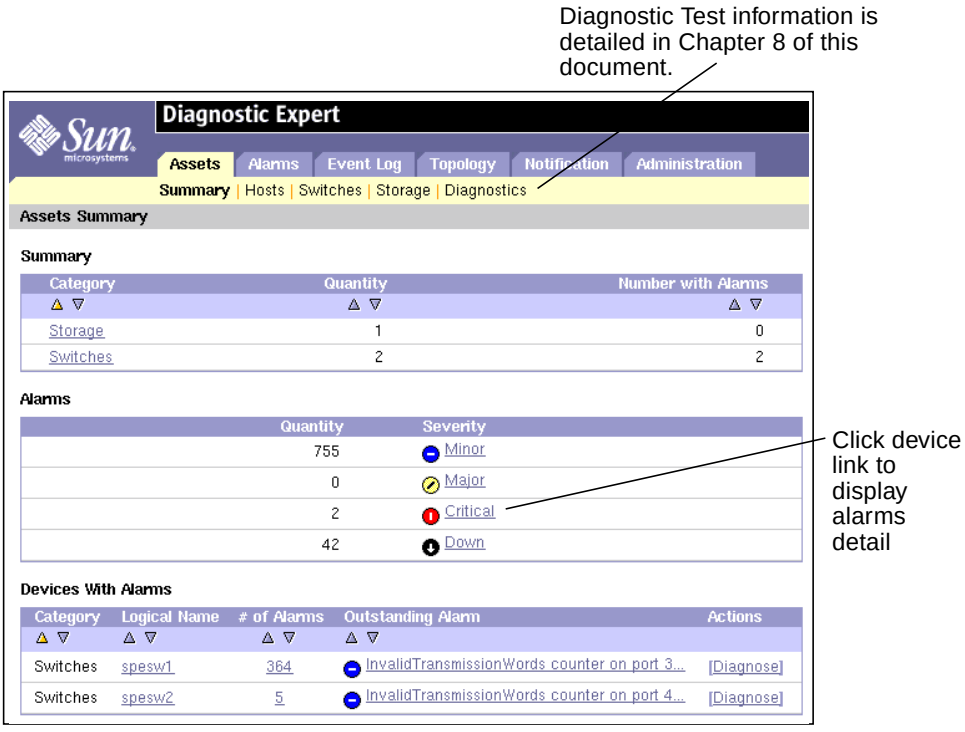


FIGURE 3-4 Assets Window

Viewing Assets

This section describes the procedures that enable the administrative user to view assets such as hosts, switches, and storage devices. The Assets window initially displays an Assets Summary table that provides a top-level view of all devices in your SAN environment.

▼ To View Details About an Asset

1. **Click the Assets tab.**

2. **Click one of the Assets links.**

   - Summary (the default view)

     Displays a summary of all devices, including alarms

   - Hosts

     This section describes how to view host machines in your SAN environment. See “Managing Hosts” on page 41 for more information.

   - Switches

     This section describes how to view switches in your SAN environment. It also describes how to launch a software application in another Web-browser to manage a switch. See “Managing Switches” on page 43 for more information.

   - Storage

     This section describes how to view storage devices in your SAN environment. It also describes how to launch a software application in another Web browser to manage a storage device. See “Managing Storage” on page 46 for more information.

   - Diagnostics

     The Diagnostic Test window enables you to view and run diagnostic tests for supported storage devices. Running diagnostic tests generate events that appear in the event log. See Chapter 8 for more information.

Managing Hosts

This section describes how to view host machines in your SAN environment.

▼ To View More Detail About a Host

1. **Click the Assets tab.**

   The Assets Summary window is displayed (see FIGURE 3-4).

2. **Click the Hosts link under the Assets tab.**

   The Host device list is displayed, as shown in FIGURE 3-5. This list includes model name, logical name, Device ID, status, IP address, location of the host, and actions you can take (for example, launch a diagnostic test or a management application).

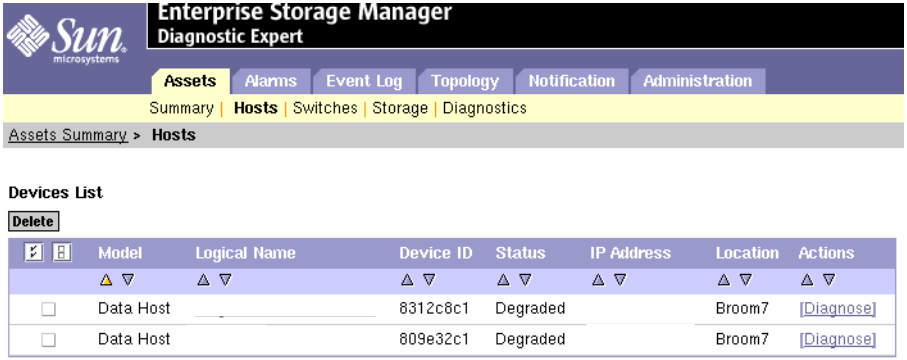


FIGURE 3-5 Host Device List Summary

3. **Click a host machine link in the Logical Name column.**

The Device Detail window is displayed, as shown in FIGURE 3-6.

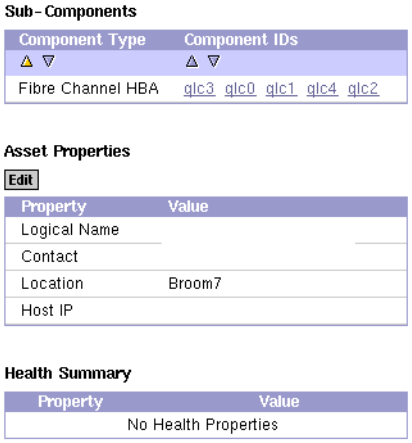
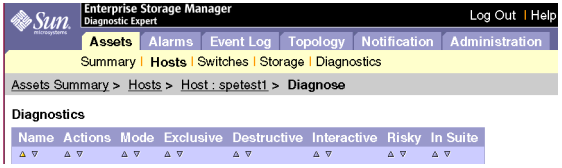


FIGURE 3-6 Host Device Detail

4. **The device detail includes:**
   - List of subcomponents—Typically, subcomponents are field-replaceable units (FRUs) that make up a device. For example, a host's FRUs are the host bus adapters (HBAs).
   - Asset Properties—Click Edit to edit the following properties:
     - Contact
     - Location
     - Host IP Address
   - Health Summary—Represents the changing states of attributes within the device that are relative to the device's current health. These attributes are updated with each polling cycle and might be updated asynchronously through events received from an agent.

5. **To view a list of tests available for the Host, click the Diagnose link from the Devices List.**

   A list of diagnostic tests available for the device is displayed.



Managing Switches

This section explains how to view switches in your SAN environment. It also explains how to launch a software application in another web browser to manage a switch.

▼ To View More Detail About a Switch

1. **Click the Assets tab.**

   The Assets window is displayed.

2. **Click the Switches link under the Assets tab.**

   A Switch device list is displayed, as shown in FIGURE 3-7.

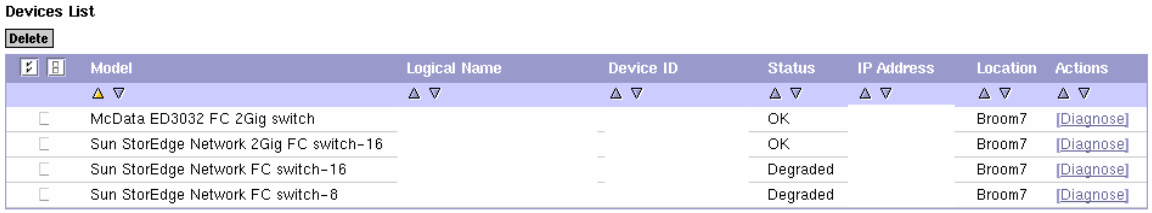


FIGURE 3-7 Switch Device List Summary

3. **This list includes model name, logical name, Device ID, status, IP address, location of the switch, and actions you can take (for example, launch a diagnostic test or a management application).**

4. **Click a switch link in the Logical Name column.**

   The Device Detail window is displayed, as shown in FIGURE 3-8.

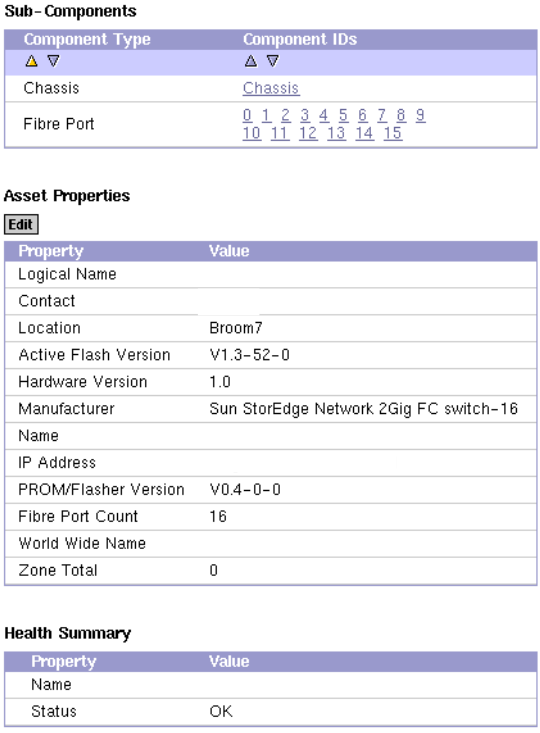


FIGURE 3-8 Switch Device List Detail

5. **The detail includes:**
   - List of subcomponents—Typically, subcomponents are field-replaceable units (FRUs) that make up a device. For example, a switch's FRUs are the chassis and Fibre Ports.
   - Asset Properties—Click Edit to edit the following properties:
     - Contact Name
     - Location
     - Management application and management application link
     - Switch password
   - Health Summary—Represents the changing states of attributes within the device that are relative to the device's current health. These attributes are updated with each polling cycle and might be updated asynchronously through events received from an agent.

6. **To view a list of tests available for the switch, click the Diagnose link from the Devices List.**

▼ To Delete a Switch

When you delete a switch, you instruct the Sun StorEdge Diagnostic Expert to stop monitoring the switch permanently. Once deleted, however, you can add the switch back in using the instructions in “Discovery” on page 34, or “To Manually Add a Device” on page 36.

1. **Click the Assets tab.**

   The Assets window is displayed.

2. **Click the Switches link under the Assets tab.**

   A Switch summary table is displayed.

3. **Click the corresponding checkbox to select the switch.**

4. **Click Delete.**

   The switch will no longer be monitored.

Managing Sun Switch Credentials

The discovery agent of the Sun StorEdge Diagnostic Expert contacts the switch for its status and identification. The switch then requires a user name and password to access the devices. Use these procedures to manage the IP addresses of the switch and to add an authorized user so that the switch can report its status to the Sun StorEdge Diagnostic Expert.

▼ To Find the Sun Switch IP Address, User Name, and Password

The typical default login information for a Sun switch:

```
Username: admin
Password: password
```

- **Click the switch graphic in “Topology” on page 65 to see the switch IP address.**

  The user name and password must match the settings you entered for the switch when you used the switch’s management tool.

Managing Storage

This section explains how to view storage devices in your SAN environment. It also explains how to launch a software application in another web browser to manage a storage device.

Currently-supported storage devices include the Sun StorEdge 3510 FC array, the Sun StorEdge 6320 series solution rack, switches (Sun StorEdge, Brocade Silkworm, and McData), and Sun StorEdge T3, T3+, and 6120 arrays.

▼ To View More Detail About a Storage Device

1. **Click the Assets tab.**

   The Assets window is displayed.

2. **Click the Storage link under the Assets tab.**

   A Storage Devices List summary is displayed, as shown in FIGURE 3-9. The Storage Device List Summary includes model number, logical name, Device ID, Status, IP address, location of the storage device, and actions you can take (for example, launch a diagnostic test or a management application).

Note – *No Contact* in the Status field means the Sun StorEdge Diagnostic Expert has not been able to communicate with the storage device.

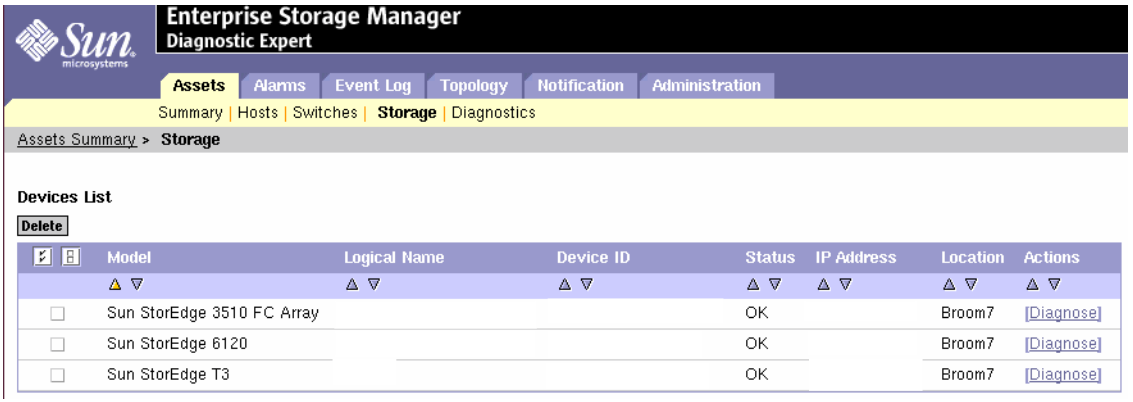


FIGURE 3-9 Storage Device List Summary

3. **Click a device link in the Logical Name column.**

The Device Detail page is displayed, as shown in FIGURE 3-10.

Sub-Components

Component Type	Component IDs
Channel	0 1 2 3 4 5 6
Disk Array Controller	0x3
Disk Drive	2-112 2-113 2-114 2-115 2-116 2-117 2-118 2-119 2-120 2-121 2-122 2-123
Logical Disk	ld0 ld1

Asset Properties

Edit

Property	Value
Logical Name	
Contact	
Location	Broom7
Controller Count	2
Revision	3510 327F v2.13
Disk Count	12
Midplane Count	1
Serial Number	
Port Count	12
Power Count	2
Unit Count	1
User of System	Not Specified

Health Summary

Property	Value
IP Address	
Status	OK

FIGURE 3-10 Storage Device Detail

The detail includes:

- List of subcomponents, including component type and FRU IDs—typically sub-components are field replaceable units (FRUs) that make up a device. For example, an array's FRUs might be the controllers, disks, and power supplies.
- Asset Properties—Click Edit to edit the following properties:
  - Contact Name
  - Location
  - Management application
  - Management application link
  - Password.

- Health Summary—Represents the changing states of attributes within the device that are relative to the device's current health. These attributes are updated with each polling cycle and might be updated asynchronously through events received from an agent.

4. **To view a list of tests available for the storage device, click the Diagnose link.**

▼ To Delete a Storage Device

When you delete a storage device, you instruct the Sun StorEdge Diagnostic Expert to stop monitoring the storage device permanently. Once deleted, however, you can add the storage device back in using the instructions in "Discovery" on page 34 or "To Manually Add a Device" on page 36.

1. **Click the Assets tab.**

   The Assets page is displayed.

2. **Click the Storage link under the Assets tab.**

   A Storage Device summary table is displayed.

3. **Click the device's corresponding checkbox to select the storage device.**

4. **Click Delete.**

   The storage device will no longer be monitored.

Monitoring Sun StorEdge T3, T3+, and 6120 Array Syslogs

The Sun StorEdge Diagnostic Expert is able to monitor Sun StorEdge T3 , T3+, and 6120 array syslogs. Syslogs detect conditions that are reported by the device's firmware, by way of syslog text messages.

All monitored Sun StorEdge T3, T3+, or 6120 arrays must be configured to log all syslog entries to a single file on the management host, which the Sun StorEdge Diagnostic Expert will periodically check. In addition, the management host must be configured to receive the syslog entries.

For instructions about how to set up the `syslog` configuration, refer to "Editing the `syslog.properties` File" on page 7.

CHAPTER 4

Alarms

The Alarms window enables you to view, acknowledge, or unacknowledge alarms.

This chapter includes the following topics:

Understanding Terminology

The terms *event*, *alert*, and *alarm* are often unclear. Each term can be briefly described as follows:

- An *event* is a notification that contains information about something that has occurred on the device. There are many types of events, and each type describes a different occurrence.
- An *alert* is a notification about an event that requires user intervention. For example, if a power supply fails, two events are generated:
  - A `StateChangeEvent`, indicating that the power supply's state has changed from normal to fault.
  - A `StateChangeAlert`, indicating that the power's supply state change from normal to fault warrants the user's attention.
- An *alarm* is the user interface mechanism by which a user manages an alert. The user can manage an alarm by acknowledging it.

Understanding the Flow of Events and Alarms

The exchange of information between the Storage Automated Diagnostic Environment 2.2 software or the Data Host agent (SUNWstadh) and the Sun StorEdge Diagnostic Expert software is shown in FIGURE 4-1.

Note – Storage Automated Diagnostic Environment 2.2 software = SADE 2.2
Sun StorEdge Diagnostic Expert software = SSDE

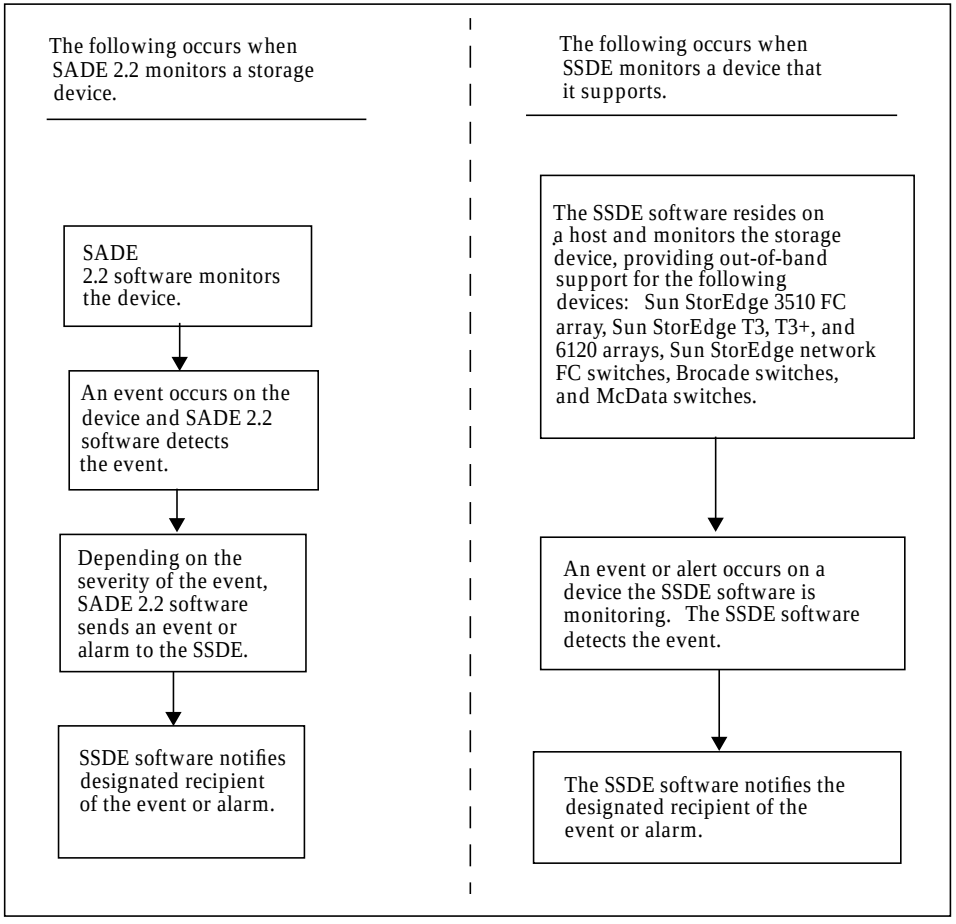


FIGURE 4-1 Flow of Events and Alerts

If the event is actionable (an alert), it appears as an alarm in the Alarms section. If the event is not actionable, it appears in the Event Log section. Refer to “Understanding Terminology” on page 49 for a definition of the terms *event*, *alert*, and *alarm*.

Using the Alarms Window

The Sun StorEdge Diagnostic Expert software reports alarms, occurring at four alarm levels, shown in TABLE 4-1.

TABLE 4-1 Alarm Severity Levels

Alarm Severity Level	Description
Down	A fatal nonrecoverable error has occurred. For example, this error level occurs when a storage array is offline or unreachable.
Critical	A serious error has occurred. For example, this alarm type might occur if one or more subsystems fail. This alarm type requires immediate attention.
Major	A serious error has occurred. For example, this alarm type might occur if one subsystem has failed. This alarm type requires immediate attention.
Minor	An error or user action has occurred. For example, the `admin` user might have removed an asset. However, the error does not require immediate attention.

▼ To Display Alarm Information

1. **Click the Alarms tab.**

   The Alarms window is displayed, as shown in FIGURE 4-2.

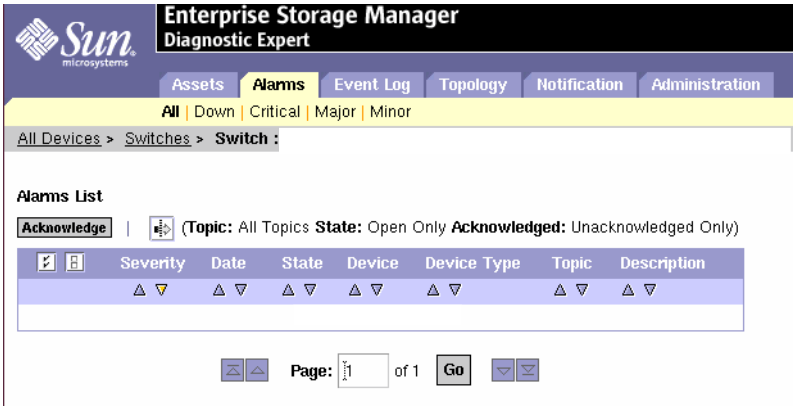


FIGURE 4-2 Alarms Page

2. **The default view in the Alarms List shows all alarms.**

3. **Perform either of the following:**

   - Choose one of the following links below the Alarms tab to view alarms of that severity level:
     - All
     - Down
     - Critical
     - Major
     - Minor
   - Click the link in the Description column to view details about that alarm.

4. **If the number of alarms requires more than one page to be displayed, scroll down and select the next page to display.**

   Alarms are listed by severity level.

▼ To Narrow the List of Alarms

Filters provide a means by which you can narrow your list of displayed alarms. The Acknowledge button preserves the Alarms list.

1. **From the Alarms list, click the boxed arrow icon, displayed to the right of the Acknowledge button.**

An Alarm Filter dialog box is displayed.

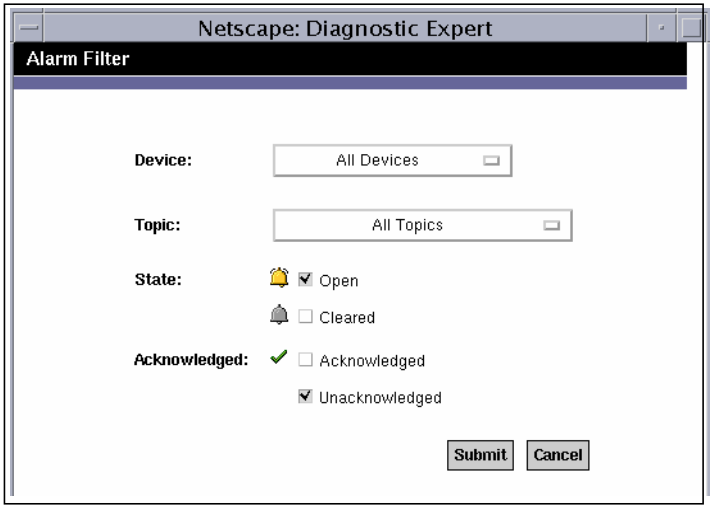


FIGURE 4-3 Alarm Filter Dialog Box

2. **Filter the alarms displayed based on the following criteria:**

   - **Device**—Select the device type from the pull-down menu. Options include Host, Sun StorEdge 6320 System, switches (Sun, Brocade, and McData), Sun StorEdge T3, T3+, and 6120 array, and the Sun StorEdge 3510 FC array.
   - **Topic**—The default is *All Topics*. Options are listed in TABLE 4-2.

TABLE 4-2 Alarm Topics

Alarm Topic	Description
All Topics	The default. All alarm topics are displayed.
Communication State Change Alert	The status of a component has changed. For example, the Sun StorEdge 6120 array has reported that a disk failed and requires user intervention.
FRU State Change Alert	The status of a FRU has changed. For example, the power supply's state has changed from normal to fault.
Log Entry Alert	An event has occurred with the log entry.

   - **State**—The default is *Open*. Click *Cleared* to clear an alarm.
   - **Acknowledged**—Indicate whether the alarm has been acknowledged—the default is Unacknowledged.

3. **Click Submit.**

   A list of alarms for the specified criteria is displayed, as shown in FIGURE 4-4.

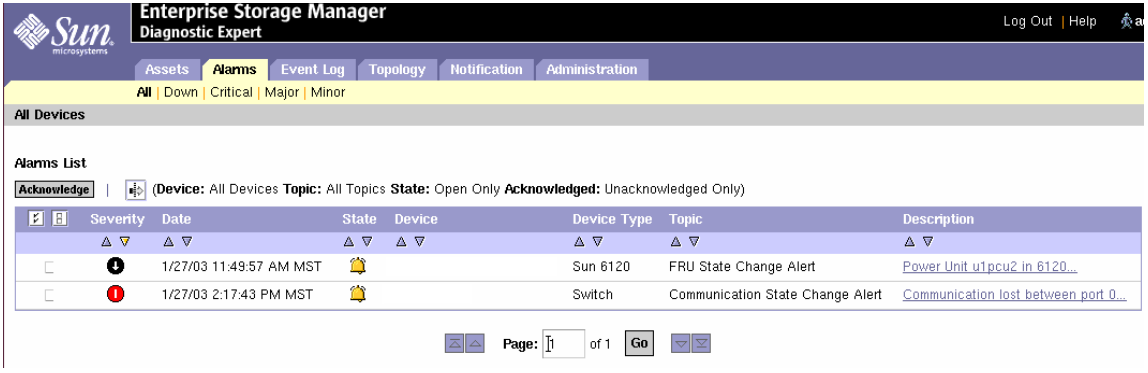


FIGURE 4-4 Alarms List

4. **From the Alarms List, click a link in the Description column to display the Alarm Details window.**

   The Alarm Details window provides recommended action for fault resolution. In addition, it provides a link to the Assets Summary window.

   Depending on the alarm's topic, the Alarm Details window might also display a correlated event or a correlated alarm. Correlated events and alarms are those that occurred in conjunction with the alarm you are currently viewing.

5. **To view details about alarms by severity level, click one of the links under the Alarms page tab:**

   - All (default view)
   - Down
   - Critical
   - Major
   - Minor

Alarm Information from the Assets Page

In addition to the information in the section "To Display Alarm Information" on page 52, you can gather alarm information from the Assets window. See the Assets Window in Chapter 3.

The Assets window enables you to administer and manage domain properties. In addition to displaying alarm detail, the Assets window also displays asset and health information, and manages and monitors diagnostic functions.

1. **From the Assets page, click the severity link to display the alarm detail for the specified severity level.**

   Severity links (minor, major, critical, and down) are displayed with each device.

2. **By clicking the device's corresponding severity link, you are directed to an alarms list, shown in** FIGURE 4-5**.**

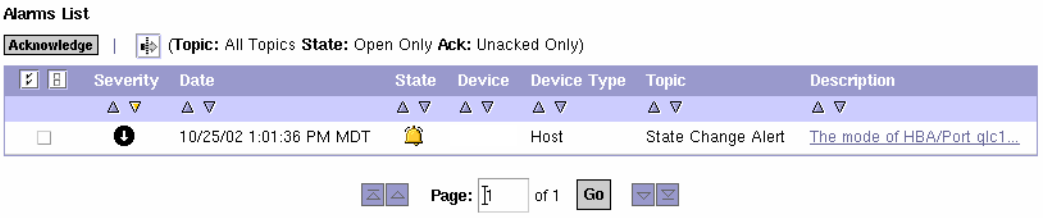


FIGURE 4-5 Alarms List

If the condition that caused the alarm is cleared (that is, if the hardware is repaired and the appropriate clearing event is generated), or if the user has acknowledged the alarm by using the Alarms functionality (see "Alarms" on page 49 for more information), then the badge is no longer displayed.

CHAPTER 5

Events

Events are generated as the result of a change in the state of a monitored device. Any change in telemetry can cause an event. Events can also be generated in response to the discovery or audit of a device or the application.

Note – If the event is actionable (an alert), it will also appear as an alarm in the Alarms window. If the event is not actionable, it is only displayed in the Event Log window.

Refer to “Understanding Terminology” on page 49 for a definition of the terms *event*, *alert*, and *alarm*.

This chapter includes the following topics:

Displaying the Event Log

An event is a notification that contains information about something that has occurred on a device. There are many types of events, and each type describes a different occurrence.

1. **To display the event log, click the Event Log tab.**

   The Events List page is displayed, as shown in FIGURE 5-1. The default view in the Events List shows all events.

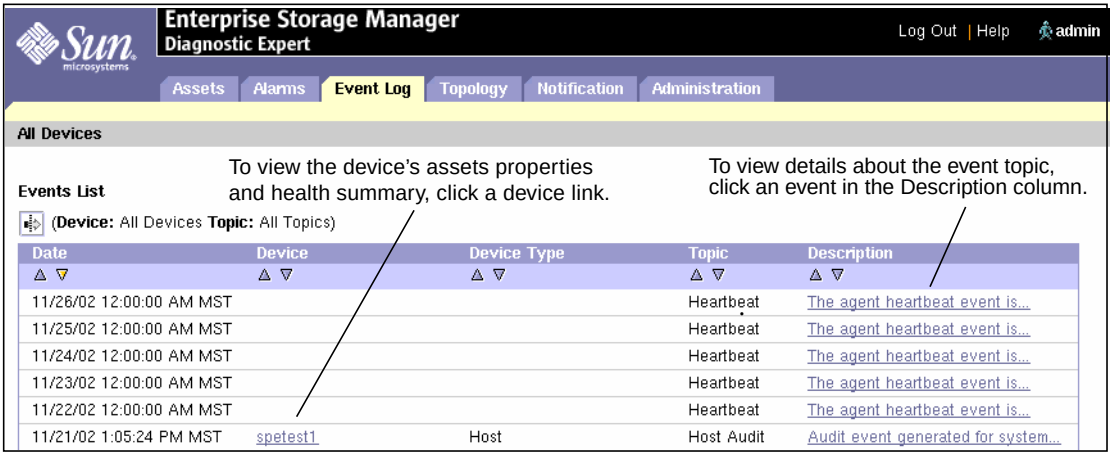
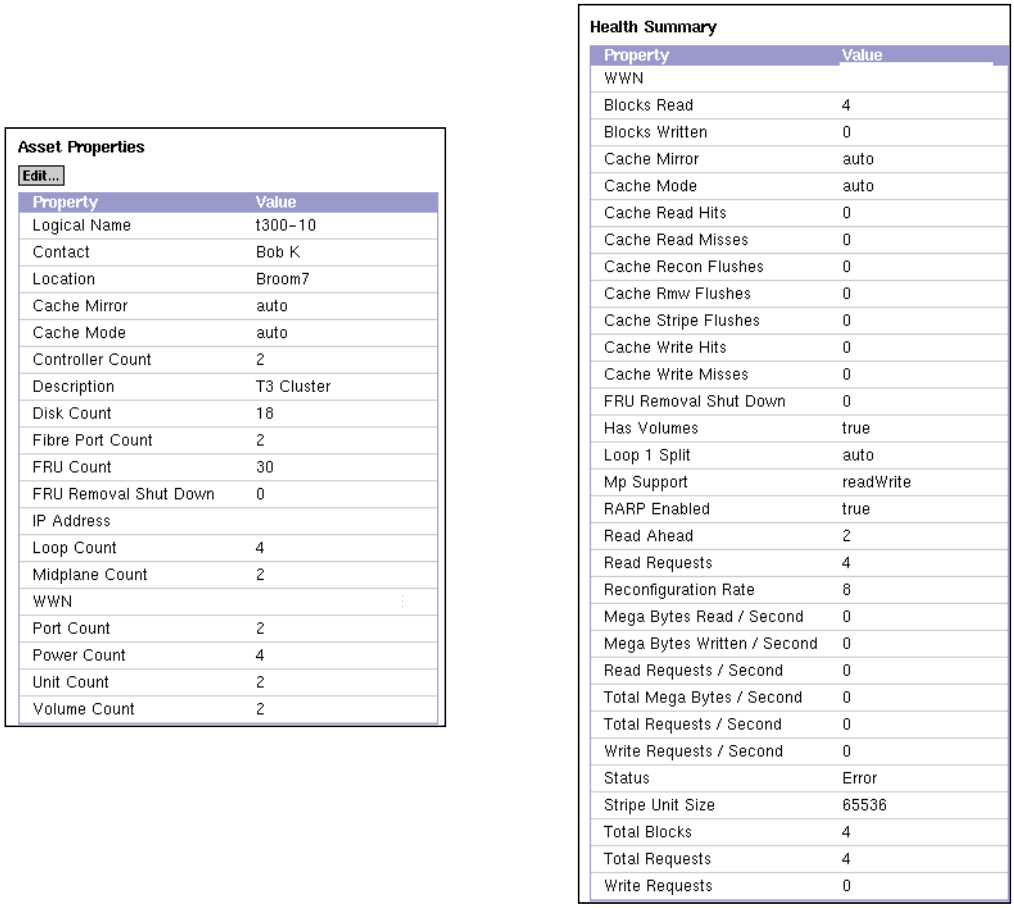


FIGURE 5-1 Event Log Window

2. **If the number of events requires more than one page to display, scroll down the page, type a page number, and click Go.**

   By default, events are listed in the order in which they occurred, with the most recent event listed first.

3. **Click a Device link to view the device's Assets Properties and Health Summary window, shown in the following figure.**



Asset Properties

Edit...

Property	Value
Logical Name	t300-10
Contact	Bob K
Location	Broom7
Cache Mirror	auto
Cache Mode	auto
Controller Count	2
Description	T3 Cluster
Disk Count	18
Fibre Port Count	2
FRU Count	30
FRU Removal Shut Down	0
IP Address	
Loop Count	4
Midplane Count	2
WWN	
Port Count	2
Power Count	4
Unit Count	2
Volume Count	2

Health Summary

Property	Value
WWN	
Blocks Read	4
Blocks Written	0
Cache Mirror	auto
Cache Mode	auto
Cache Read Hits	0
Cache Read Misses	0
Cache Recon Flushes	0
Cache Rmw Flushes	0
Cache Stripe Flushes	0
Cache Write Hits	0
Cache Write Misses	0
FRU Removal Shut Down	0
Has Volumes	true
Loop 1 Split	auto
Mp Support	readWrite
RARP Enabled	true
Read Ahead	2
Read Requests	4
Reconfiguration Rate	8
Mega Bytes Read / Second	0
Mega Bytes Written / Second	0
Read Requests / Second	0
Total Mega Bytes / Second	0
Total Requests / Second	0
Write Requests / Second	0
Status	Error
Stripe Unit Size	65536
Total Blocks	4
Total Requests	4
Write Requests	0

FIGURE 5-2 Asset Properties and Health Summary

4. **From the Events List, click the Description link to view details about that event, including the event's topic, the date the event occurred, its severity, the device, and the device type. Event details are shown in** FIGURE 5-3**.**

The corresponding Event Details window is displayed.

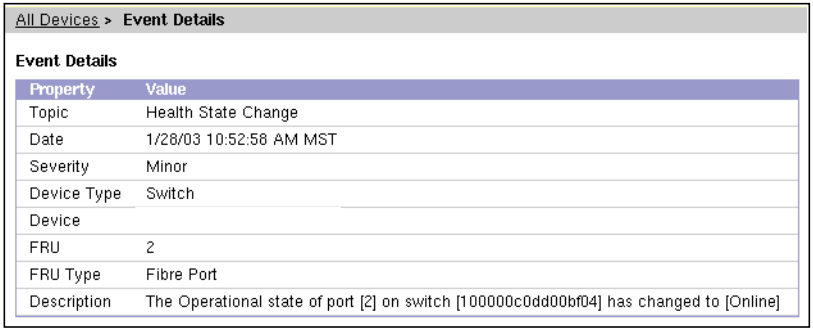


FIGURE 5-3 Event Details window

▼ To Access Health Information From the Assets Summary Window

You can view the asset properties and health summary at the component level or the subcomponent level. To access health information about an individual FRU, click the corresponding Component ID to the right of the component on the Assets Summary window.

1. **Click the Assets tab.**

2. **Click the Summary link.**

   The Assets Summary window is displayed.

3. **Click a device in the Category column.**

   The Devices List is displayed.

4. **Click a device in the Logical Name column.**

   The Asset Properties and Health Summary are displayed.

5. **Click the corresponding Component ID to the right of the component type.**

   The Asset Properties and Health Summary at the FRU (component) level is displayed.

Narrowing the List of Events

Filters provide a means by which you can narrow your list of displayed events.

1. **From the Events List summary window, click the boxed arrow icon.**

An Event Filter dialog box is displayed, as shown in FIGURE 5-4.

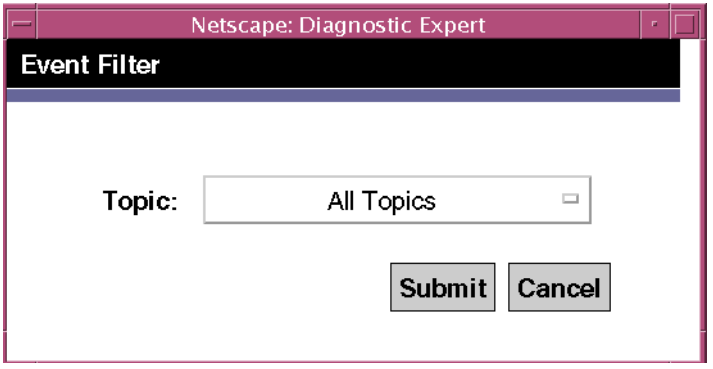


FIGURE 5-4 Event Filter Dialog Box

2. **Narrow the event list by selecting an event topic from the list in the following table. *All Topics* is the default.**

Event Topic	Description
All Topics	Default. All event topics are displayed.
Agent Boot	
Device Audit Host Audit Topology Audit	Audits occur weekly.
Agent Discovery Device Discovery Host Discovery Topology Discovery	Discovery events occur the first time the agent probes a storage device. It creates a detailed description of the monitored device and sends it by using an active notifier, such as the Sun Remote Services (SRS) Net Connect service or email.
Diagnostic Start	A diagnostic test has been selected.
Diagnostic Update	A diagnostic test has been updated.
Device Removal	A device has been removed from the monitored pool.
FRU Addition	A new FRU has been added to a device.
FRU Removal	A FRU has been removed from a device.
Host Removal	A host has been removed from the monitored pool.
Heartbeat	The Heartbeat is verification that the Sun StorEdge Diagnostic Expert software is running properly.
Communication State Change Device State Change Health State Change	The status of a component has changed. Examples: • A device has changed from disabled to ready-enabled, has been replaced, or has been brought back online. • The Sun StorEdge T3, T3+, or 6120 array has reported that a disk failed. • The status of a LUN in a Sun StorEdgeT3, T3+, or 6120 array has changed from unmounted to mounted and is now available.
Topology Addition	A new component or link has been added to topology.
Topology Removal	An existing component or link has been removed from topology.

Note – The Storage Automated Diagnostic Environment software Event Grid enables you to sort events by component, category, or event type. The Event Grid displays an event, describes its severity, and tells what, if any, action should be taken. Refer to the Storage Automated Diagnostic Environment software, version 2.2, User's Guide for more information.

3. **Click a link in the Events List Device field (See** FIGURE 5-1**) to display the device's Asset Properties and Health Summary screen, shown in** FIGURE 5-2**.**

Note – You can view the asset properties and health summary at the component level or the sub-component level. To access information about an individual FRU, click the corresponding FRU ID to the right of the component on the Assets Summary screen.

Depending on the event's topic, the Assets Property screen might also display a correlated alarm. Correlated alarms are those that occurred in conjunction with an event you are currently viewing.

CHAPTER 6

Topology

The Sun StorEdge Diagnostic Expert Topology displays all currently configured and monitored devices, including the three major device-type categories of host, switch, and storage array, and links, which represent connections between the ports of these devices.

This chapter includes the following topics:

Using the Topology Window

The main topology page displays all devices, as shown in FIGURE 6-1.

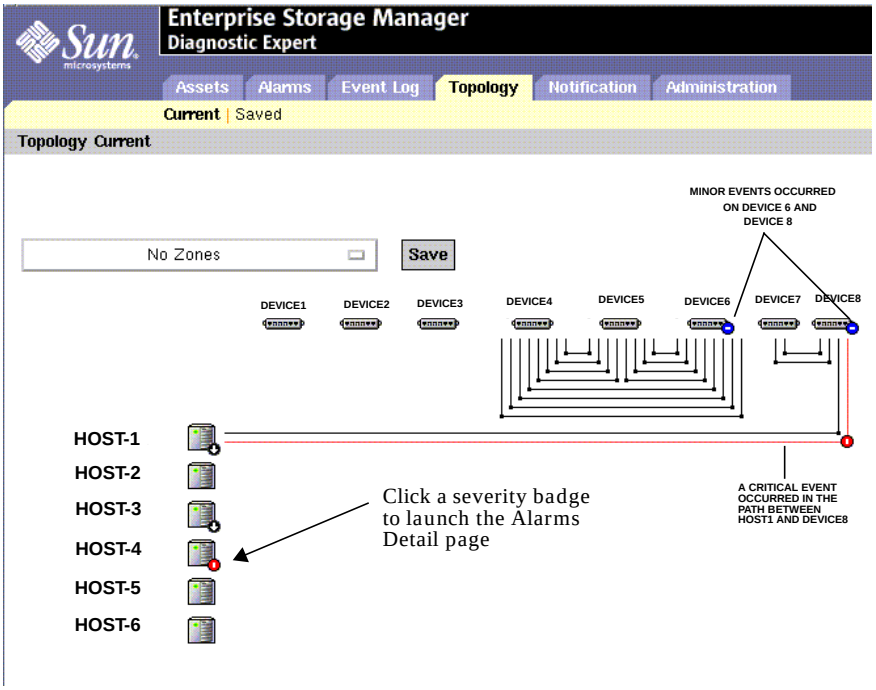


FIGURE 6-1 Example of a Topology Window

▼ To View Topology Details

1. **Click a host or a device from the topology.**

   A view of the device is displayed.

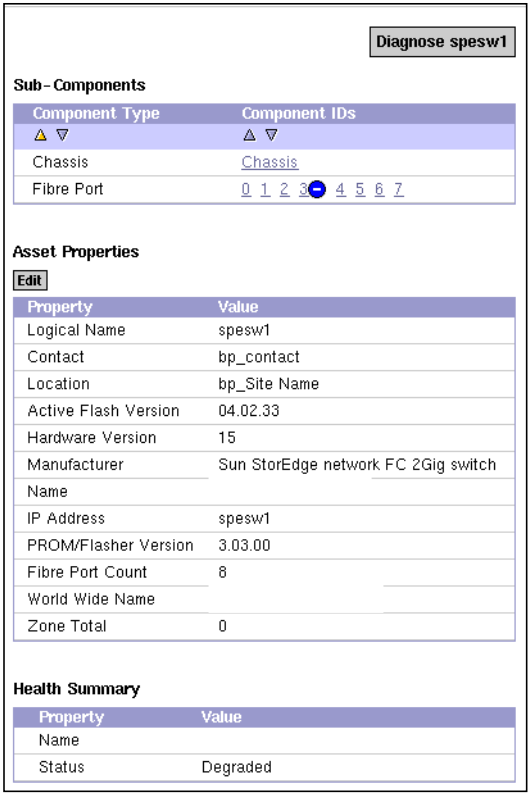


FIGURE 6-2 Topology Details

2. **From this table, you can gather additional information about the status of the device, ports, and connections between ports and devices and an overall health summary.**

▼ To Save the Current Topology Snapshot

You might want to save a topology snapshot for future retrieval.

Note – You can also click Save on any of the graphical views of the topology. A name prompt is displayed, and the named topology is added to the Saved Topologies table.

---

1. **From the Topology window, click Save.**

   The following window is displayed.

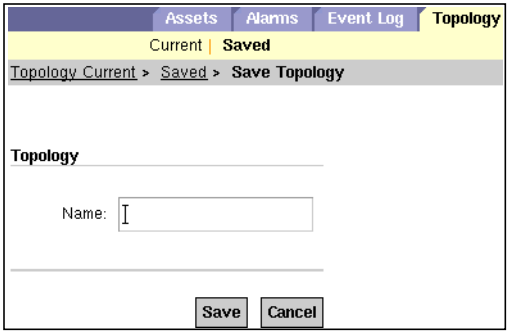


FIGURE 6-3 Save Topology View

2. **Type a name of the topology in to the Name text box and click Save.**

   A list of saved topologies is displayed.

3. **Select the test's corresponding check box and click Add.**

   The system automatically date and time stamps the topology and archives it.

▼ To Retrieve a Saved Topology Snapshot

1. **From the Current Topology page, click the Saved link.**

   The Saved Topology page is displayed.

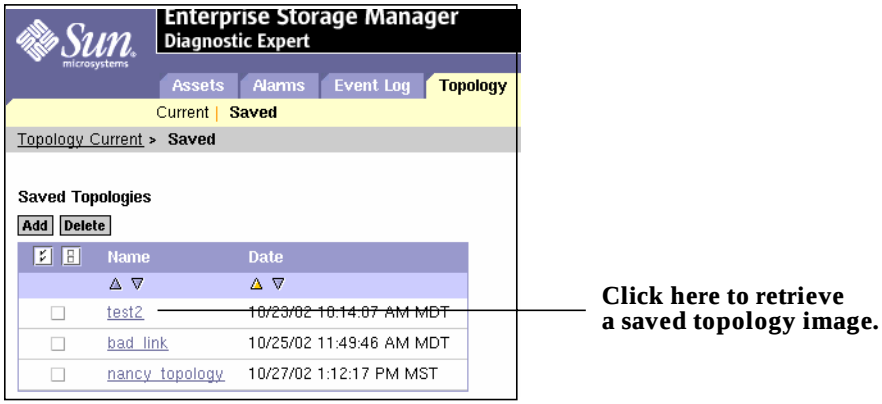


FIGURE 6-4 Retrieve Saved Topology window

2. **Launch a saved topology by clicking a link in the Name field.**

   For security purposes, you will be prompted to log in again with your user name and password. Sun StorEdge Diagnostic Expert's ability to retrieved a saved topology snapshot is useful in understanding and troubleshooting state change events.

3. **To delete a topology from Saved Topology, click Delete.**

4. **To resave a topology for future retrieval, click Add.**

Navigating the Topology

- **To view the device's subcomponents, asset properties, and health summary, click the device with the left mouse button.**

Note – Click Edit from the Asset Properties and Health Summary window to edit device parameters.

- **Topology displays the most recent and most severe alarm for each device or link. To view the Alarm Details window, click a severity badge icon on the Topology.**

Note – For a Topology snapshot, the only alarms captured are those alarms that existed at the time the snapshot was taken.

Alarm Details

Acknowledge | Update | Reset

Property	Value
Topic	FRU State Change Alert
Date	11/26/02 6:13:27 AM EST
Severity	Down
Device Type	Sun T3
Device	spet32
FRU	u2p1
FRU Type	Fibre Port
Probable Cause	Sun StorEdge Traffic Manager has detected a fault in the path and failed over the path. Or, a T3 component has failed and caused the failover in which case there will be other StorADE alarms regarding the root cause.
Recommended Action	1.Use the appropriate diagnostic tools from the data host whose path has failed over to diagnose and repair the fault in the path (HBA, Cable, or component in the T3). 2.Once the fault from item 1 has been repaired, Check /var/adm/messages on the data host accessing the T3 to learn which WWN is now accessing the volume whose path has failed over. 3.Use "luxadm probe" to determine which paths are accessing which luns. 4.Use luxadm failover primary "path to lun" to resume using the repaired controller path.
Description	Failover mode has changed for port u2p1 on controller 2ctr of the indicated device. Unit u2 now owns volume v2 and Unit u2 owns volume v1.
Correlated Event	Failover mode has changed for port u2p1 on controller 2ctr of the indicated device. Unit u2 now owns volume v2 and Unit u2 owns volume v1.
Cleared	No
Acknowledged	No
Note	

In addition to device badges (minor, major, critical, and down), faults related to Inter Switch Links *(ISLs)* also display the appropriate severity:

- Minor badge (blue) displays a blue link.
- Major badge (yellow) displays a yellow link.
- Critical badge (red) displays a red link.
- Down badge (black) displays a black link.

If the condition that caused the alarm is cleared (that is, if the hardware is repaired and the appropriate clearing event is generated), or if you have acknowledged the alarm using the Alarms functionality (see “Alarms” on page 49 for more information), then the severity badge is removed from the Topology view.

- **Move your mouse over a severity badge to see a brief description of the alarm in the toolbar.**
- **Move your mouse over a link to see the port-to-port connection, such as** `link qlogic16:7 - qlogic17:7`**, in the toolbar.**

CHAPTER 7

Notification Configuration

This chapter describes the procedures that enable you to manage user email notification. This chapter includes the following topics:

Notification Providers

Notification providers are responsible for transmitting the events and alerts generated by the Sun StorEdge Diagnostic Expert software to external systems. These external systems use these events and alerts for other purposes, such as management and remote monitoring.

The Sun StorEdge Diagnostic Expert supports four providers:

- Email
- NetConnect version 2 and 3
- Sun Remote Service (SRS)
- SunMC

The information in TABLE 7-1 briefly describes each notification provider.

TABLE 7-1 Sun StorEdge Diagnostic Expert Software Notification Providers

Provider	Description
Email	A mechanism for transporting event and alert information collected by the Sun StorEdge Diagnostic Expert software. The information collected is emailed to specified local administrators.
NetConnect	Part of the Sun Remote Services (SRS) Net Connect service. This service uses internet-based technology, which avoids the need for additional dedicated network connections at the customer site.
SRS / SunMC	• The Sun StorEdge Diagnostic Expert pulls the storage device events and channels them through a sender, which sends the event data, written in XML, to the SRS station. The SRS provider is a frame relay mechanism by which alerts are sent to the SRS console. The SRS console is monitored by Sun-trained personnel. • The SunMC provider enables the Sun StorEdge Diagnostic Expert software to send actionable events and monitoring topologies to the SunMC console, which displays the alarms and alert text. SunMC information is similar to and compatible with SRS.

▼ To Enable and Manage Notification

1. **Click the Notification tab.**

   The Notification Configuration window is displayed.

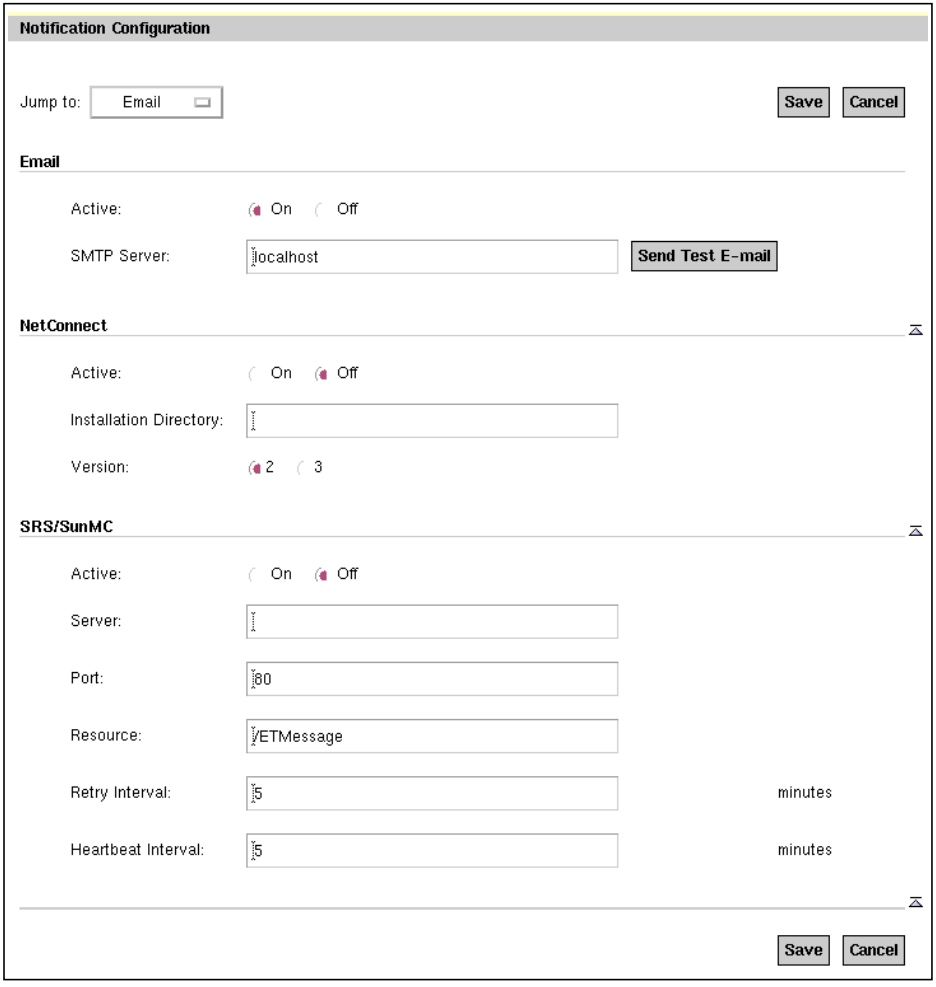


FIGURE 7-1 Notification Configuration screen

2. **Select the On or Off button for the Active option in each provider section.**

   These buttons enable and disable the notification features.

3. **Complete the other required fields, as shown in the following table.**

TABLE 7-2 Notification Configuration Properties

Provider	Configurable Properties
Email	• SMTP Server—The hostname to where email messages are sent for delivery. The default is localhost. • Send Test E-mail—Send test email messages to make sure the SMTP server is running.
NetConnect	• Installation Directory—Because there are two NetConnect versions (2 or 3), there is no default Installation Directory path. The paths are as follows: • NetConnect 2—`/opt/SUNWnc` • NetConnect 3—`/opt/SUNWsrs`
Sun Remote Service (SRS) SunMC	• Version—The version of NetConnect that will be used: 2 or 3. • Server—The IP address of the SRS or SunMC server machine where the SRS or SunMC console is installed. • Port—The port at which the SRS or SunMC console server is listening. The default is 80. • Resource—The name of the web page where the SRS or SunMC console accepts data. The default is `/ETMessage`. • Retry Interval (in minutes)— If delivery of the notification information to the SRS or SunMC console fails, the retry interval is the number of minutes the system waits before it tries again to deliver the information. The default is 1 minute. • Heartbeat Interval (in minutes)—The heartbeat interval notifies the SRS or SunMC console that the Sun StorEdge Diagnostic Expert is running properly. The default is 1 minute.

4. **Click Submit.**

   A confirmation message is displayed.

Email Notification Parameters

The Email provider transports event and alert information collected by the Sun StorEdge Diagnostic Expert software by way of email, to the local SMTP server that was specified in the Notification Configuration window.

An Email Notification contract binds a set of criteria to an email address. Creating an Email Notification contract also creates a Contract ID, which can be used by the ssde command line interface (CLI) to display and delete contracts.

▼ To Add an Email Address

You can add email recipients or modify existing email recipients using the Email Notification window, shown in FIGURE 7-2.

1. **From the Notification menu, click the Email Notification link.**

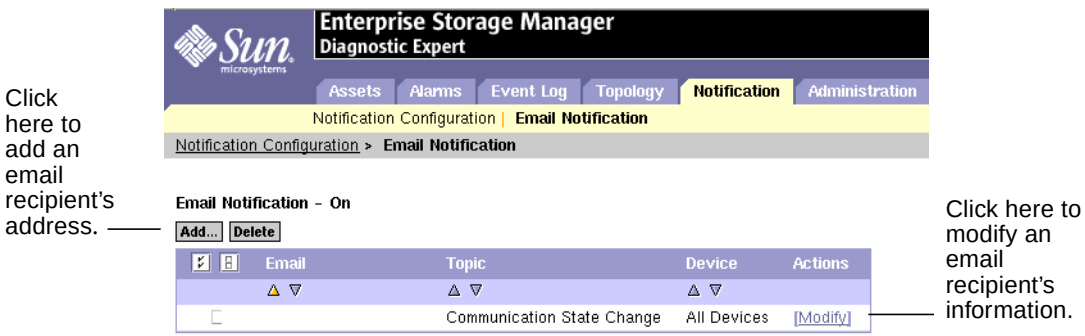


FIGURE 7-2 Email Notification window

A list of current email recipients is displayed.

2. **Click Add to add an email recipient's address.**

   The Add Email Notification window, shown in FIGURE 7-3, is displayed. See TABLE 7-3 for a description of the Email Notification Contract fields.

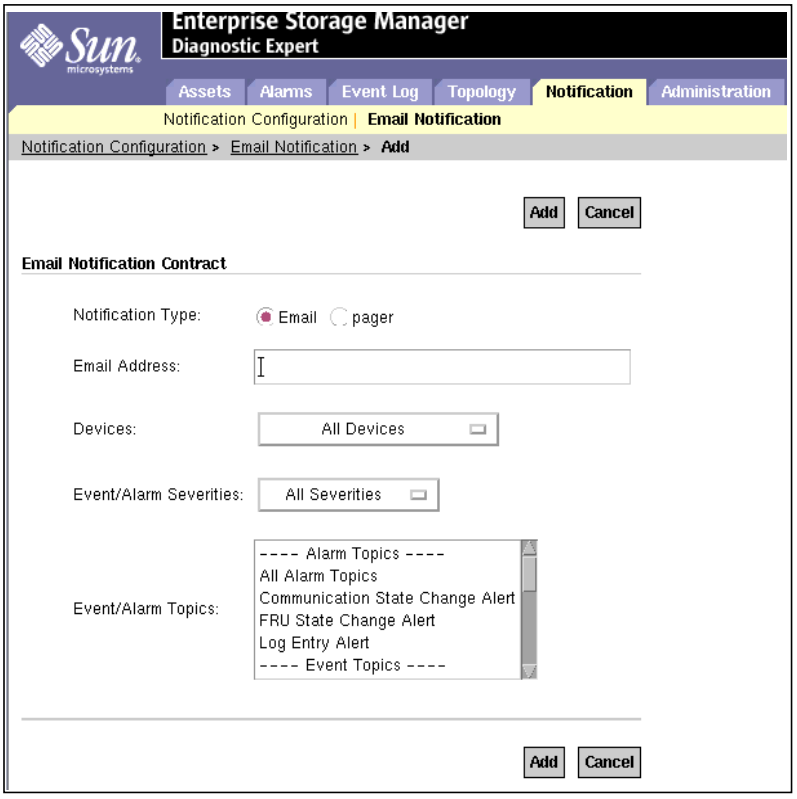


FIGURE 7-3 Add Email Notification window

3. **Specify the notification type: email or pager. Pager notifications are smaller in content than email notifications.**

Note – While it is possible to receive email about both Alarms and Events, it is recommended that you only subscribe to Alarms. Events provide additional detail to the conditions monitored by Sun StorEdge Diagnostic Expert through alarms. If you do subscribe to Events, expect to receive a heavier volume of email.

TABLE 7-3 Email Notification Parameters

Email Notification Parameters	Configurable Properties
Email Address	Type an email address (for email notification) or a pager email address for pager notification.
Devices	Select the devices for which you will be notified from the Devices drop-down list.
Event / Alarm Severities	Severities include: • All Severities (the default) • Major • Critical • Down
Event / Alarm Topics **Note:** If you narrow your list of topics by selecting individual topics, be sure to *deselect* the All Topics option by selecting the default button. It does not deselect automatically.	The default is All Topics. Options include: **Event/Alarm Topics** • All Event Topics • All Alarm Topics **Event Topics** • Agent Discovery • Communication State Change • Device Discovery • Device Removal • Device State Change • Diagnostic • FRU Addition • FRU Removal • Health State Change • Log Entry • Topology **Alarm Topics** • Communication State Change Alert • FRU State Change Alert • Log Entry Alert

4. **Click Add.**

   You are returned to the Email Notification screen and a Notification Addition confirmation message is displayed.

▼ To Delete an Email Notification Contract

- **To delete an email notification contract from the list, select its corresponding check box and click Delete.**

  A Notification Deletion confirmation message is displayed.

▼ To Modify an Email Recipient's Information

- **In the Email Notification window, click the Modify link that corresponds to the email recipient.**

  The Modify Notification Parameters window is displayed.

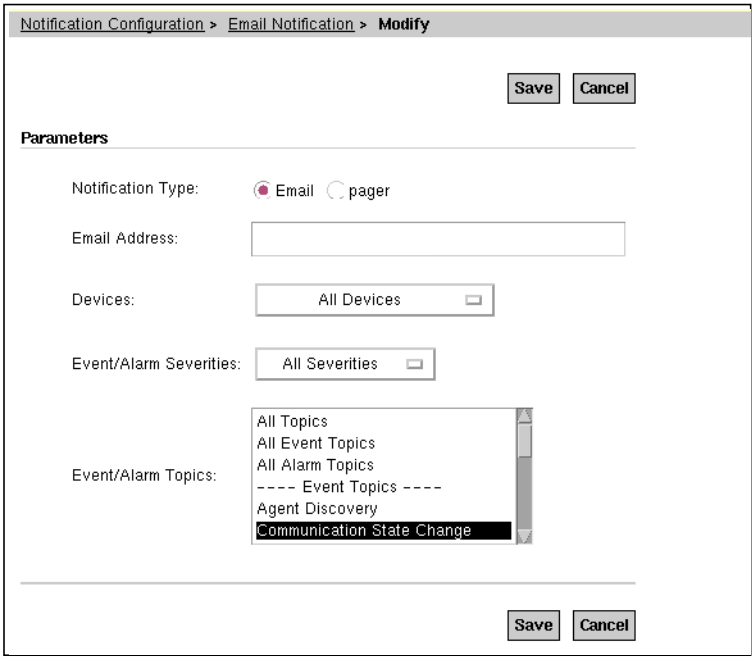


FIGURE 7-4 Modify Email Notification Parameters

5. **Change some or all of the defaults, as described in** TABLE 7-3**.**

6. **Click Save.**

   You are returned to the Email Notification window and a Notification Update confirmation message is displayed.

Other Notification Parameters

Unlike with Email Notification, you cannot customize the parameters for NetConnect, SRS, or SunMC. You can, however, make NetConnect, SRS, or SunMC active or inactive, and you can modify the fields on the main Notification Configuration window, as shown in FIGURE 7-5.

See TABLE 7-2 for descriptions of the SRS and SunMC fields.

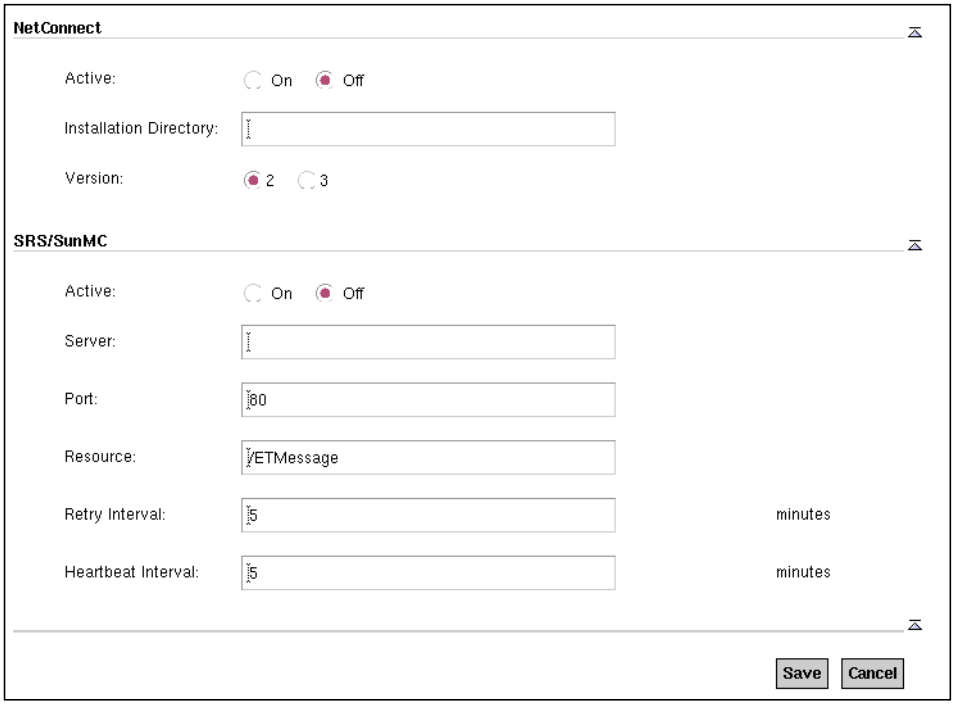


FIGURE 7-5 SRS and SunMC Notification Parameters

CHAPTER 8

Diagnostic Tests

The Diagnostic Test window enables you to view and run diagnostic tests for supported storage devices. Running diagnostic tests generate events that appear in the event log.

This chapter includes the following topics:

Viewing Diagnostic Tests

When a test is initiated, showing incremental updates and completed test results, a test's status page is displayed. By invoking Diagnostic Options, which resumes the updates, you can view a running test's progress, even if you exit the test's status page.

▼ To View Diagnostic Tests

1. **From the Assets menu, select Diagnostics.**

   The Diagnostic View page is displayed. If a test is running, it will be displayed in the Current Diagnostics section; otherwise, a No Diagnostics Running message is displayed.

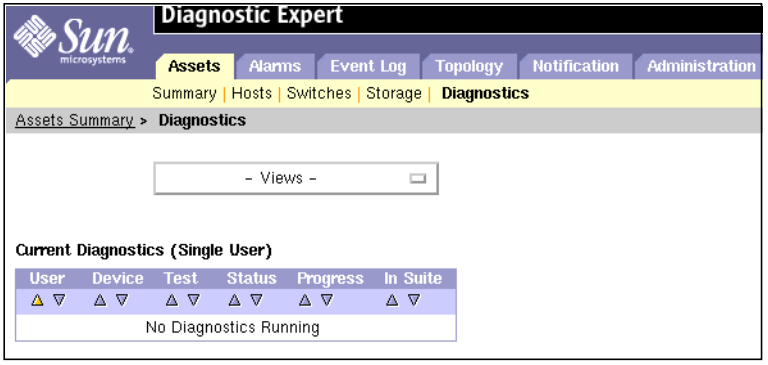


FIGURE 8-1 Assets—View DiagnosticTests

2. **To narrow the list of tests, specify a Single User, All Users, or Archived Diagnostics from the Views pull-down menu.**

3. **To view a test that has completed its run, select Archived Diagnostics from the Views pull-down menu.**

   A list of all tests and the status of each test that has been archived is displayed.

Launching Diagnostic Tests

1. **Click the Assets tab.**

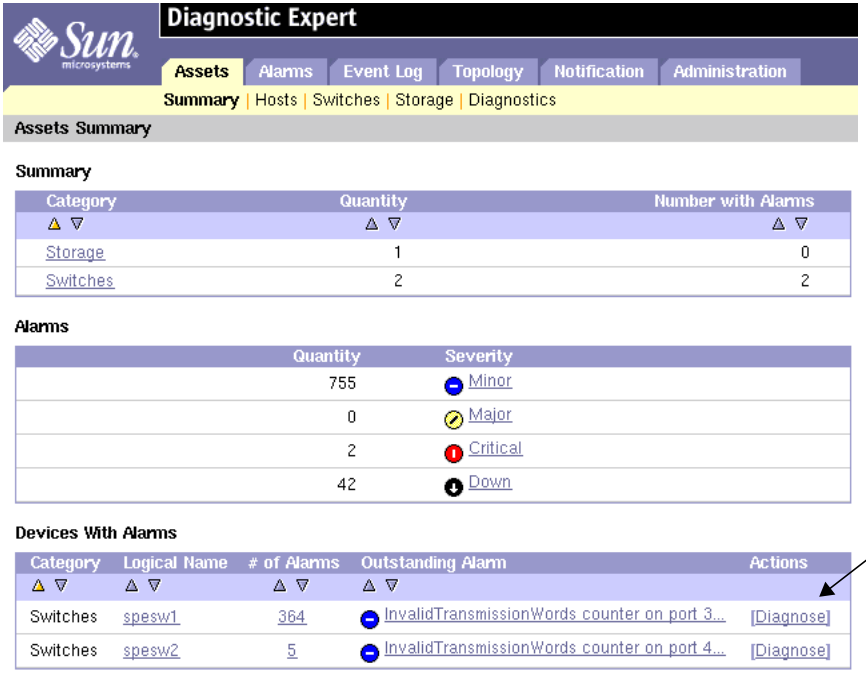
   The Assets page is displayed.

2. **Click a device link (Host, Switch, or Storage) under the Assets tab.**

   The Devices List summary is displayed. This table includes model number, logical name, Device ID, Status, IP address, and location of the device.

3. **To launch a diagnostic test, click the Diagnose link in the Devices with Alarms Actions column.**

   The diagnostic tests available for the specified device are listed.



Click here to launch a diagnostic test. The diagnostic tests available for the specified device are listed.

FIGURE 8-2 Launch a Diagnostic Test

Using Switch Tests

This section describes the switch tests that are available from the Sun StorEdge Diagnostic Expert software GUI. The switch tests are as follows:

Sun StorEdge Network FC Switch Test

The Sun StorEdge Network FC Switch Test, shown in FIGURE 8-3, is used to diagnose the Sun StorEdge Network 1 Gb FC switches. This test runs the port diagnostic on connected switch ports. While the Sun StorEdge Network FC Switch Test is running, the port statistics are monitored for errors.

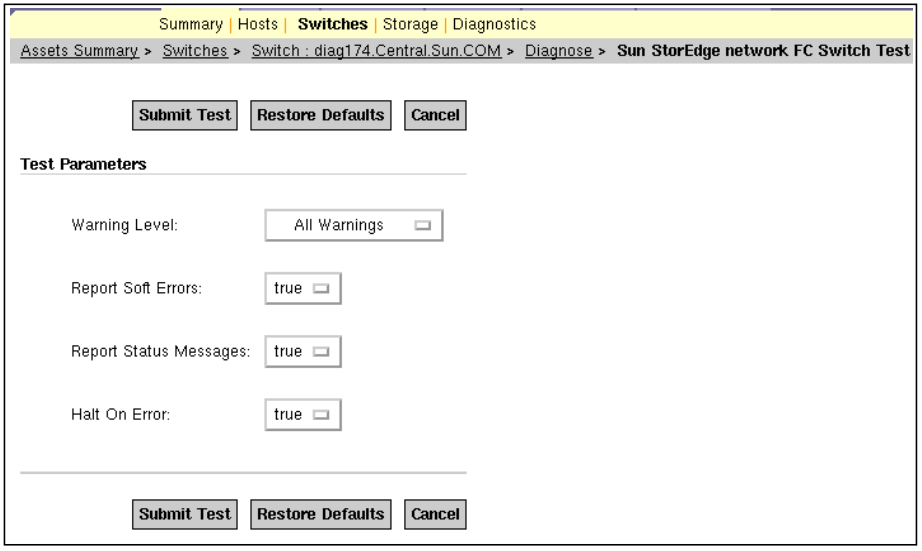


FIGURE 8-3 Sun StorEdge Network FC Switch Tes

The Sun StorEdge Network FC Switch Test parameters are listed in TABLE 8-1.

TABLE 8-1 Sun StorEdge Network FC Switch Test Parameters

Option	Description
Warning Level	Default is All Warnings.
Report Soft Errors	Default is true.
Report Status Messages	Default is true.
Halt On Error	Default is true.

Sun StorEdge Network FC Switch Loopback Test

The Sun StorEdge Network FC Switch Loopback Test, shown in FIGURE 8-4, is used to diagnose the Sun StorEdge Network 1 Gb FC switches. This test runs the port diagnostic on connected switch ports.

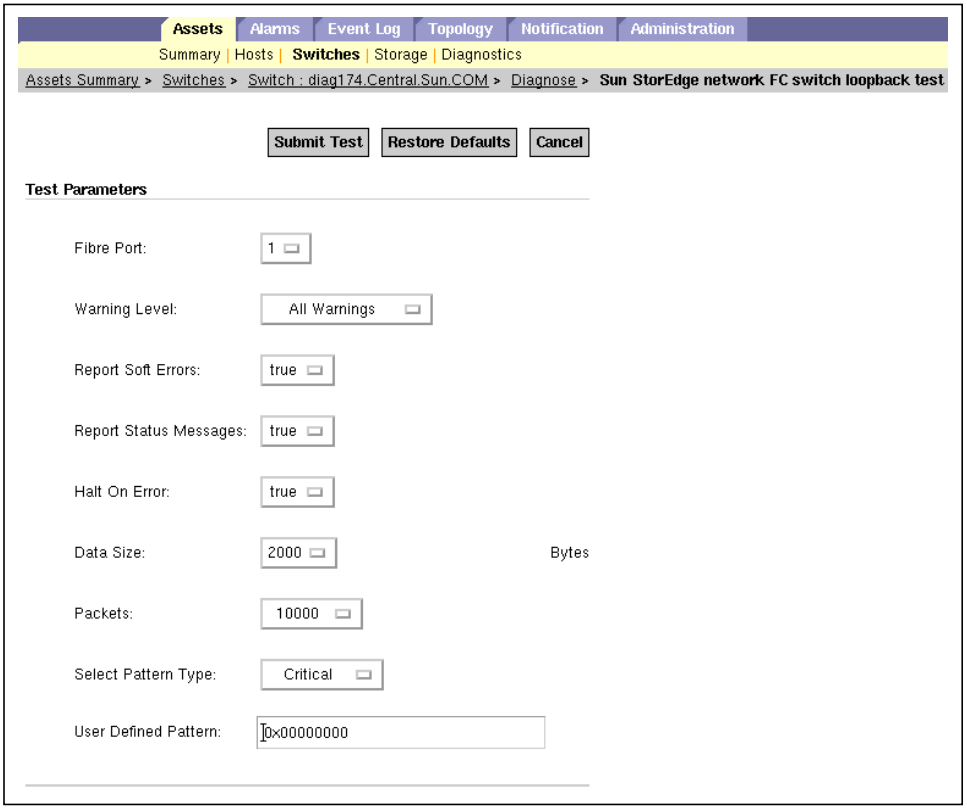


FIGURE 8-4 Sun StorEdge Network FC Switch Loopback Test

The Sun StorEdge Network FC Switch Loopback Test parameters are listed in TABLE 8-2.

TABLE 8-2 Sun StorEdge Network FC Switch Loopback Test Parameters

Option	Description
Fibre Port	Default is 1.
Warning Level	Default is All Warnings.
Report Soft Errors	Default is yes.
Report Status Messages	Default is yes.
Halt On Error	Default is yes, stop the test if an error occurs.
Data Size	Default is 2000 bytes.
Packets	Default is 10,000.
Select Pattern Type	Gives the user the choice of user pattern: • Critical patterns (10 of the most critical patterns) • All patterns (a complete list of test patterns)
User Defined Pattern	Specifies the default pattern, in hexadecimal format, to be used for the port test.

Sun StorEdge Network FC Switch Test

The Sun StorEdge Network FC Switch Test, shown in FIGURE 8-5, diagnoses the Sun StorEdge Network Fibre Channel switches. This test runs the port diagnostic on connected switch ports.

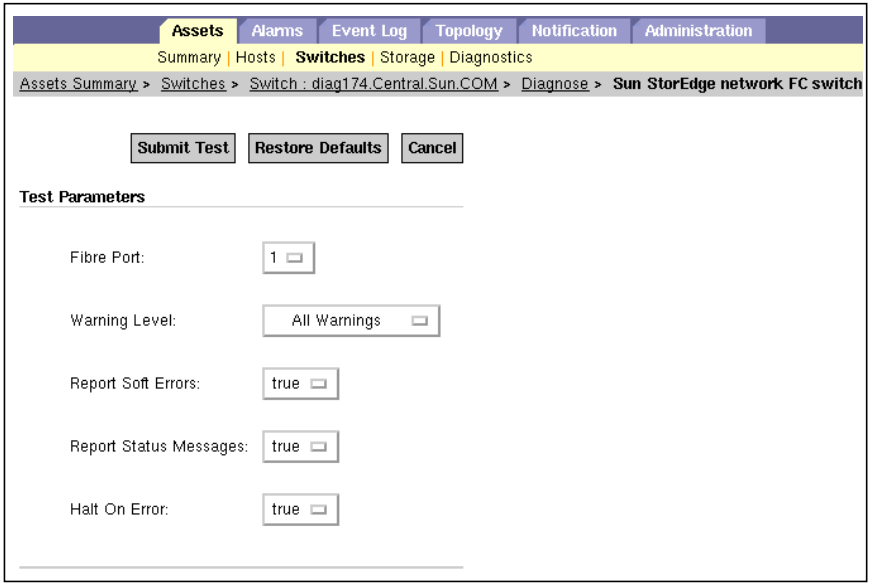


FIGURE 8-5 Sun StorEdge Network FC Switch Port Status Test

The Sun StorEdge Network FC Switch Port Status Test parameters are listed in TABLE 8-3.

TABLE 8-3 Sun StorEdge Network FC Switch Port Status Test Parameters

Option	Description
Fibre Port	Default is 1.
Warning Level	Default is All Warnings
Report Soft Errors	Default is True.
Report Status Messages	Default is True.
Halt on Error	Default is True, stop the test if an error occurs.

Sun StorEdge FC-2 Switch Loopback and Pattern Test

The Sun StorEdge FC-2 Switch Loopback and Pattern Test, shown in FIGURE 8-6, is used to diagnose the Sun StorEdge 2 Gb Fibre Channel switches. The test runs the port diagnostic on connected switch ports. While the test is running, the port statistics are monitored for errors.

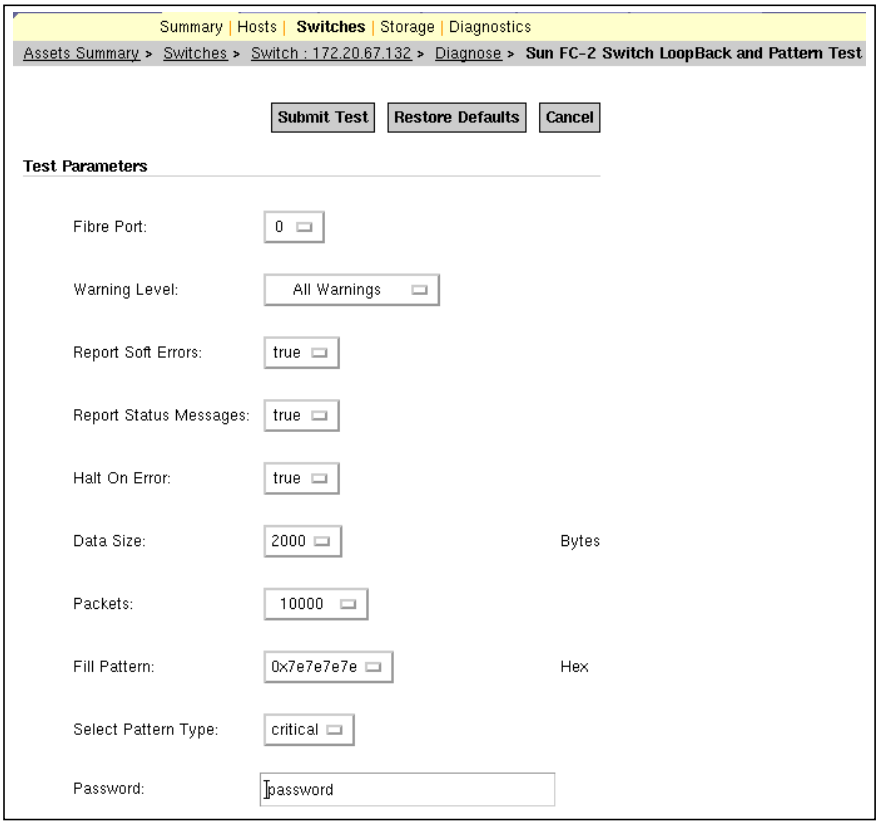


FIGURE 8-6 Sun StorEdge FC-2 Switch Loopback and Pattern Test

The Sun StorEdge Network FC-2 Switch Loopback and Pattern Test parameters are listed in TABLE 8-4.

TABLE 8-4 Sun StorEdge Network FC-2 Switch Loopback and Pattern Test Parameters

Option	Description
Fibre Port	
Warning Level	Default: All Warnings.
Report Soft Errors	Default is true.
Report Status Messages	Default is true.
Halt On Error	Default is true.
Data Size	Default is 2,000 bytes.
Packets	Default is 10,000.
Fill Pattern	Specifies the default pattern, in hexadecimal format, to be used for the port test.
Select Pattern Type	Gives the user the choice of user pattern: • Critical patterns (10 of the most critical patterns) • All patterns (a complete list of test patterns)
Password	A password is required for the Sun StorEdge Network 2 Gb FC switches.

Brocade Loopback and Pattern Test

The Brocade Loopback and Pattern Test, shown in FIGURE 8-7, diagnoses Brocade switch devices. This test runs the port diagnostic on connected switch ports. While the test is running, the port statistics are monitored for errors.

Note – Brocade Fibre Channel switch configurations using segmented loop (SL) zones can be monitored and diagnosed, but the Topology view does not display connections between the devices.

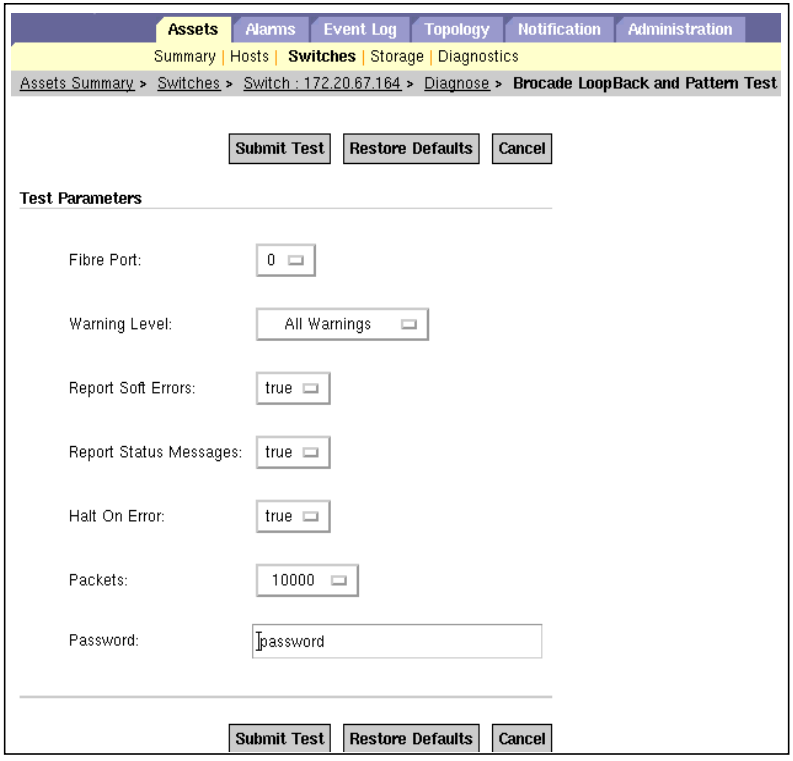


FIGURE 8-7 Brocade Loopback and Pattern Test

The Brocade Loopback and Pattern Test parameters are listed in TABLE 8-5.

TABLE 8-5 Brocade Loopback and Pattern Test

Option	Description
Fibre Port	Default is 0.
Warning Level	Default is All Warnings.
Report Soft Errors	Default is true.
Report Status Messages	Default is true.
Halt On Error	Default is true.
Packets	Default is 10,000 packets.
Password	A password is required for the Brocade switches.

Using Storage Tests

This section describes the Sun StorEdge array tests that are available from the Sun StorEdge Diagnostic Expert GUI. The storage tests are as follows:

Sun StorEdge T3, T3+, and 6120 Loop Test

The Sun StorEdge T3, T3+, and 6120 Loop Test, shown in FIGURE 8-8, runs `health_check`, which runs `fast_test` on all four loops.

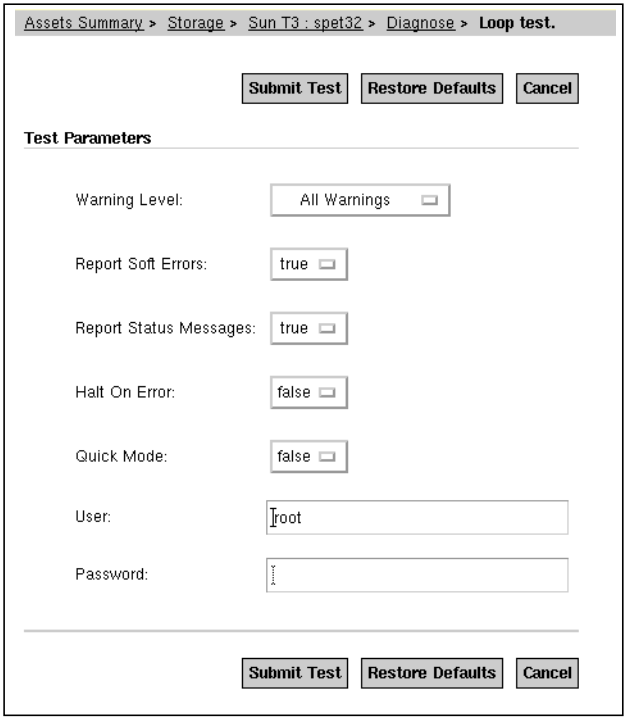


FIGURE 8-8 Sun StorEdge T3+ Array Loop Test

The Sun StorEdge T3, T3+, and 6120 Arrray Loop Test Parameters are shown in TABLE 8-6.

TABLE 8-6 Sun StorEdge T3, T3+, and 6120 Array Loop Test Parameters

Option	Description
Warning Level	Default is All Warnings.
Report Soft Errors	Default is true.
Report Status Messages	Default is true.
Halt on Error	Default is false.
Quick Mode	Default is false.
User	Must be superuser.
Password	The Sun StorEdge array telnet password enables the Sun StorEdge Diagnostic Expert software to log in to the Sun StorEdge array device. The root password is required.

Sun StorEdge T3, T3+, and 6120 Array Verify Volume Test

The Sun StorEdge T3, T3+, and 6120 Array Verify Volume Test, shown in FIGURE 8-9, enables array administrators to execute manual parity checks on existing volumes. Parity checking applies only to RAID 1 and RAID 5 volumes. Check the data parity before performing tape backup overwrite cycles, approximately once every 30 days.

Ensure that system health is in optimal condition before running the Sun StorEdge T3, T3+, and 6120 Array Verify Volume Test. For example, make sure that no LUNs are under reconstruction, that the status of all disks is zero, and that other, similar conditions are resolved before performing this procedure.

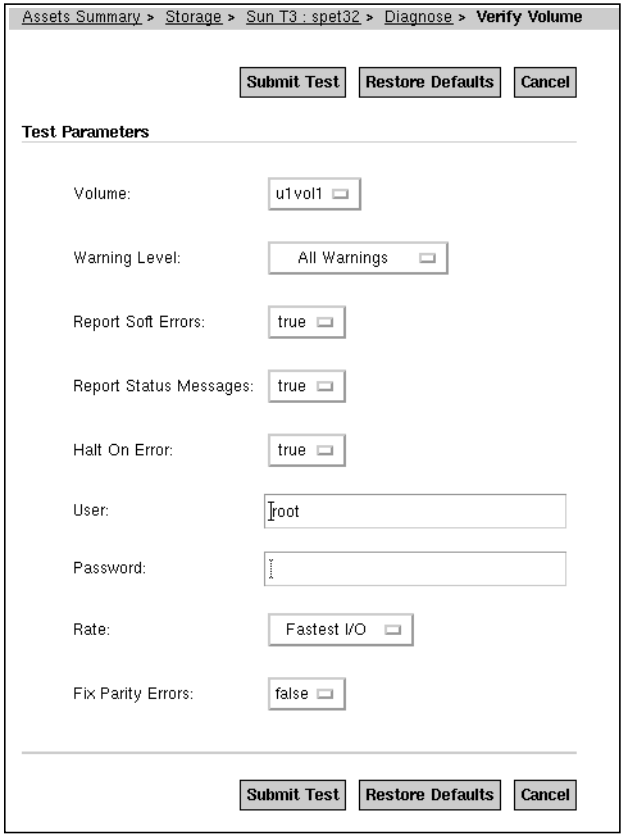


FIGURE 8-9 Sun StorEdge T3+ Array Verify Volume Test

The Sun StorEdgeT3, T3+ and 6120 Array Verify Volume Test Parameters are shown in TABLE 8-7.

TABLE 8-7 Sun StorEdge T3, T3+, and 6120 Array Verify Volume Test Parameters

Option	Description
Volume	Specifies volume number: 1 or 2. Default is volume 1.
Warning Level	Default: All Warnings
Report Soft Errors	Default: Yes
Report Status Messages	Default: Yes
Halt on Error	Default: Yes
User	Must be superuser (root)
Password	The Sun StorEdge T3+ array telnet password enables the Sun StorEdge Diagnostic Expert to log in to the Sun StorEdge T3+ array device. The password is required.
Rate	Default is Fastest I/O.
Fix Parity Errors	Default is no.

Sun StorEdge 3510 FC Array Test

The Sun StorEdge 3510 FC Array Test, shown in FIGURE 8-10, is an out-of-band test that enables discovery and instrumentation for the following Sun StorEdge 3510 array components: the controller card, disk drive, logical disk drive, and channel information.

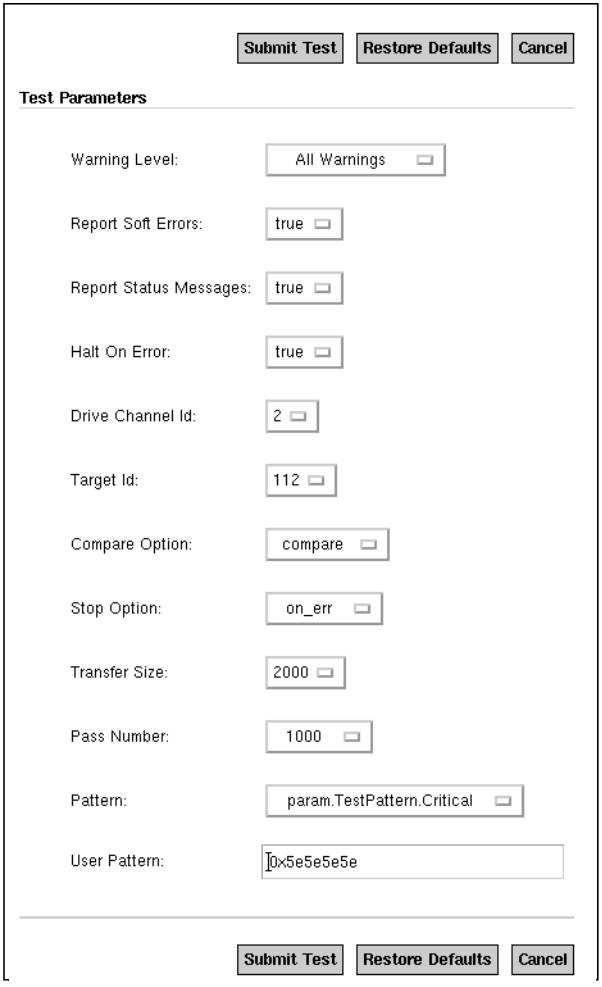


FIGURE 8-10 Sun StorEdge 3510 FC Array Test

The Sun StorEdge3510 FC Array Test Parameters are shown in TABLE 8-8.

TABLE 8-8 Sun StorEdge 3510 FC Array Test Parameters

Option	Description
Warning Level	Default is All Warnings.
Report Soft Errors	Default is true.
Report Status Messages	Default is true.
Halt On Error	Default is true.
Drive Channel Id	Options include 2 (the default), 3, 6
Target Id	Options include 112 (the default), 113, 114, 115, 116, 117, 118
Compare Option	Options include compare (the default), and noncompare
Stop Option	Default is `on_err`.
Transfer Size	Default is 2,000.
Pass Number	Default is 1,000.
Pattern	Default is Critical. Options include User, All Patterns
User Pattern	`0x5e5e5e5e`

Sun Storage Solution Rack Test

The Sun Storage Solution Rack Test, shown in FIGURE 8-11, aids the validation and fault isolation of the Sun StorEdge 6320 system components

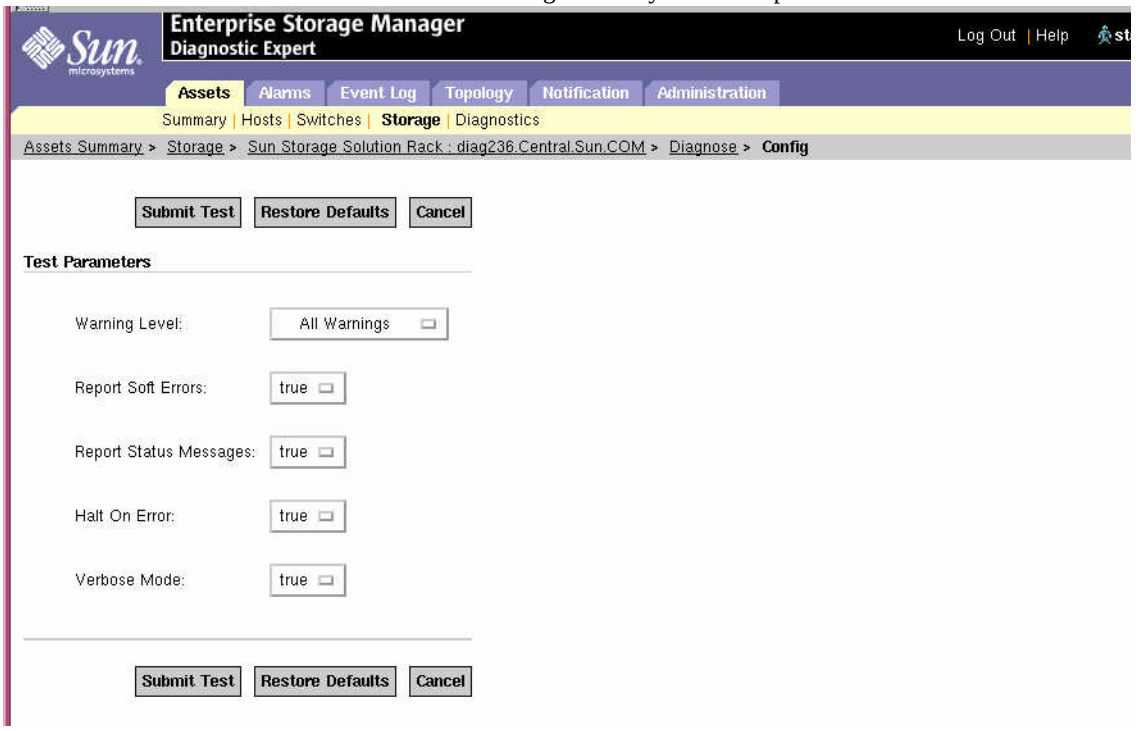


FIGURE 8-11 Sun Storage Solution Rack Test

The Sun Storage Solution Rack Test Parameters are shown in TABLE 8-9

TABLE 8-9 Sun Storage Solution Rack Test Parameters

Option	Description
Warning Level	Default: All Warnings. Options include All Warnings, No Warnings, Missing Resources, and Testing Impacts.
Report Soft Errors	Default is True.
Report Status Messages	Default is True.
Halt on Error	Default is True.
Verbose Mode	Default is True.

Viewing Archived Diagnostics

The Archived Diagnostics window enables you to view diagnostic tests that have currently run.

1. **From the Assets menu, select Diagnostics.**

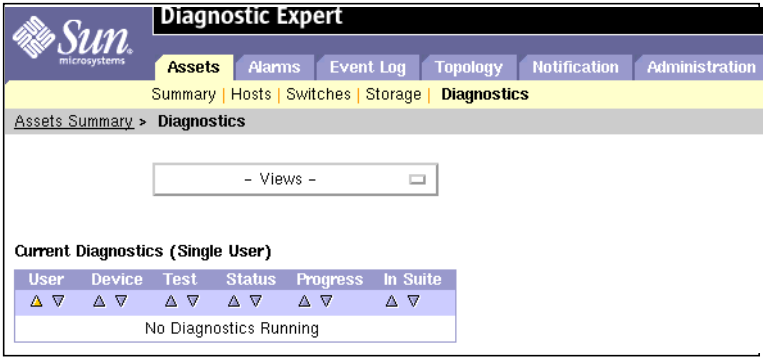


FIGURE 8-12 Assets—View DiagnosticTests

2. **Specify Archived Diagnostics from the Views pulldown menu.**

A list of currently-running diagnostic tests is displayed.

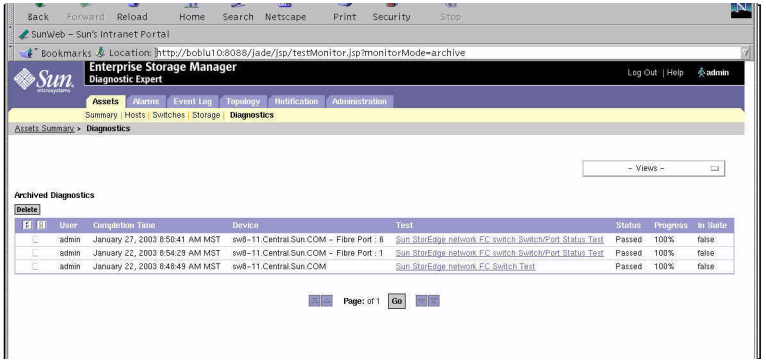


FIGURE 8-13 Archived Diagnostic Tests

APPENDIX **A**

Commands

This chapter describes the Sun StorEdge Diagnostic Expert software's `/opt/SUNWsade/bin/` command line and options.

The `ssde`(1M) command is the command-line interface (CLI) for the Sun StorEdge Diagnostic Expert software. The `ssde` command enables you to display your storage area network (SAN) host, switch, and storage device information.

Note – Issue these commands from the management station's command line.

This appendix includes the following topics:

The `ssde` command enables you to perform the same software operations that you can perform by using the web browser user interface (UI). Any changes you make by using this command are shown in the UI when you refresh or reload the related page in your browser.

Security

- You can print any of the `ssde` commands in secure mode by using the `-s` or `--secure` parameter. For example:

```
ssde -s topology
```

- A `secure=true` entry in the hidden `.ssde` file renders all `ssde` commands secure, meaning that they are encrypted and password-protected.

If the `.ssde` file is not present, or if the file is present but some entries are missing, the default parameters are as follows:

```
https.server=local_host
server=local_host
https.port=8443
port=8088
username=<the user will be prompted for this>
password=<the user will be prompted for this>
```

The user can bypass the default parameters and instead use the command line arguments, as shown in the following example.

```
# ssde help --server spetest1 --port 8088 --username admin --password admin
```

Commands Sorted by Function

TABLE A-1 shows the ssde commands sorted by function.

TABLE A-1 ssde Commands Sorted by Function

Command	Description	See This Section
General Commands		
`ssde about`	`-h, --help` Prints information about the version of `ssde` you are using.	Not applicable
`ssde help`	Prints help information about available subcommands for the application you are using.	Not applicable
Managing Assets		

`ssde asset`	`-h, --help`
	Prints the usage information.
	`-a, --all`
	Prints a summary of devices with errors and an alarm summary.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
	`--show-id` *id*
	Displays the alarm identification number.
	`--from` *number* `--to` *number*
	Specifies the range of alarms you want to display.
	`--closed`
	Overwrites the default parameter of 50.
		"Managing Administration and Assets" on page 31

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section
Managing Health		

`ssde health`	`-h, --help`
	Prints the health properties of a device or field-replaceable unit.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
		"Managing Administration and Assets" on page 31

Managing Devices		

`ssde add-device`	`-h, --help`
	Prints the usage information.
	`-t, --type`
	Specifies the type of device.
	`-n, --name`
	Specifies the name of the device.
	`-i, --ip`
	Specifies the IP address of the device.
		"To Manually Add a Device" on page 36

`ssde list-devices`	`-h, --help`
	Prints the usage information.
	`-a, --all`
	Prints a summary of all devices
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
		"To View Details About an Asset" on page 40

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section
Managing Device Discovery		

`ssde discover`	`-h, --help`
	Prints the usage information.
	`-t, --type`
	Specifies the type of device.
	`-i, --ip`
	Specifies the IP address of the device.
	`-r, --range`
	Specifies the range of IP addresses to be searched.
		"To Run Discovery" on page 34

Managing Topology		
`ssde topology`	`-h, --help` Prints the current topology of all devices.	"Topology" on page 65
Managing Tests		

`ssde list-tests`	`-h, --help`
	Prints the diagnostic tests available for this device.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
		"Diagnostic Tests" on page 83

`ssde monitor-tests`	`-h, --help` Prints the usage information.	"Diagnostic Tests" on page 83

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section

`ssde run-test`
 	
Note:
You must specify the **[-n** *diagnostic* **]** and **[-d** *device* **]** parameters to run a test.
 	
The **[-s** *sync***], [-f** *fru* **]**, and **[-p** *properties* **]** parameters are optional.
	`-h, --help`
	Prints the usage information.
	`-n, --name` *diagnostic*
	Specifies the name of the diagnostic test to run.
	`-d, --device`
	Specifies the hostname, IP address, or worldwide name of the device.
	`-s, --sync`
	Specifies the synchronized mode. This option waits for the diagnostic test to complete.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
	`-p, --properties`
	Overwrites the default diagnostic properties.
		"Diagnostic Tests" on page 83

`ssde test-options`	`-h, --help`
	Prints the parameters of a diagnostic test.
	`-n, --name`
	Specifies the name of the diagnostic test for which you want to view options.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
		"Viewing Archived Diagnostics" on page 102

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section
Managing Alarms		

`ssde alarms`
 	
Note:
By default, the **alarms** command displays only open and unacknowledged alarms.
	`-h, --help`
	Prints the usage information.
	`-a, --open --closed --acked --unacked`
	Prints a summary of all alarms, including the open alarms, closed alarms, acknowledged alarms, and unacknowledged alarms.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of the field-replaceable unit.
	`--show-id` *id*
	Displays the alarm identification number.
	`--from` *number* `--to`*number*
	Specifies the range of alarms you want to display.
	`--closed`
	Displays closed alarms.
	Note:
	By default, the first 50 alarms are displayed. To overwrite this behavior, specify:
	`--from` *number* `--to` *number.*
		"Using the Alarms Window" on page 51

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section

`ssde alarm-details`
 	
Note:
You cannot run the `-h` and `-i` commands together. Doing so displays the help.
	`-h, --help`
	Prints the usage information.
	`-i, --id`
	Specifies the identification number of the alarm.
	`--alarm-number` *number*
	Specifies the detail of a specified alarm.
		"Using the Alarms Window" on page 51

`ssde delete-alarms`	`-h, --help`
	Prints the usage information.
	`--date` *date*
	Prints the date before the date alarms should be deleted.
	`--open --closed --acked --unacked`
	Deletes specified alarms. Options include open alarms, closed alarms, acknowledged alarms, and unacknowledged alarms.
		"Using the Alarms Window" on page 51

Managing Events		

`ssde events`	`-h, --help`
	Prints the usage information.
	`-a, --all`
	Prints a summary of all events.
	`-d, --device`
	Specifies the host name, IP address, or worldwide name of the device.
	`-f, --fru`
	Specifies the name of a field-replaceable unit.
	`--show-id` *id*
	Displays the identification numbers of events.
		"Displaying the Event Log" on page 58

TABLE A-1 ssde Commands Sorted by Function *(Continued)*

Command	Description	See This Section

`ssde event-details`	`-h, --help`
	Prints the usage information.
	`-i, --id`
	Specifies the identification number of the event.
	`--event-number` *number*
	Displays the detail of a specified event.
		"Displaying the Event Log" on page 58

`ssde delete-events`	`-h, --help`
	Prints the usage information.
	`--date` *date*
	Prints the date before the date events should be deleted.
	`--open --closed --acked --unacked`
	Deletes specified events. Options include open events, closed events, acknowledged events, and unacknowledged events.
		"Displaying the Event Log" on page 58

Administering Email Servers and Host Notification		

`ssde notification`	`-h, --help`
	Prints the usage information.
	`-e, --email`
	Prints all notification email contracts.
	`-d, --delete` *contract*
	Deletes the specified notification contract.
		"Notification Providers" on page 73

APPENDIX **B**

Troubleshooting

Array Policies

TABLE B-1 describes events that might occur in a Sun StorEdge T3, T3+, and 6120 array subsystem.

TABLE B-1 Sun StorEdge T3, T3+, and 6120 Array Policies

Policy Rule	Description
Loop card state change	• From good state to failed state. • From failed state to good state.
Controller card state change	• From good state to failed state. • From failed state to good state.
Disk drive state change	• From good state to failed state. Disk drive is not available. • From failed state to good state. Disk drive is available. A disk drive in a Sun StorEdge T3, T3+, or 6120 array has two ports—port1 and port2. If either of these ports experiences a state change, then the state change event is generated.

TABLE B-1 Sun StorEdge T3, T3+, and 6120 Array Policies *(Continued)*

Policy Rule	Description
Power supply state change	• From good state to failed state. Power supply unit is not available. • From failed state to good state. Power supply unit is available. This state change is generated when the temperature of the power supply is: • Too high. The temperature is higher than the lab-specified threshold. • Unknown. The temperature returns to normal.
Sun StorEdge T3 array volume state change	• From mounted to unmounted. The state of a LUN changes from available to unavailable. • From unmounted to mounted. The state of a LUN changes from unavailable to available.
State change of a battery inside a Sun StorEdge T3, T3+, or 6120 array power supply	• From normal to fault. • From fault to normal.

SAN Policies

TABLE B-2 describes events that might occur on switch and HBA port counters at the SAN level.

TABLE B-2 SAN Policies

Event	Description
For switches and HBA port counters	
Change in the invalid transmission word counter of a port on a switch or HBA	• The frequency default is 10/1 hour. • The quiet time default is 6 minutes. Indicates that the state of the link that is connected to the port may be bad.
Change in the CRC error counter of a port on a switch or HBA	• The frequency default is 10/24 hours. • The quiet time default is 0 minutes.
Change in LossOfSignal counter of a port on a switch or HBA	• The frequency details is 10/1 hour. • The quiet time default is 6 minutes.

Glossary

alarm A message with an attached level of severity

array A disk subsystem, comprised of multiple disk drives, that functions as a single large, fast, super-reliable device. Arrays are designed to provide high performance, high availability, and increased storage capacity.

DAS Direct Access Storage

diagnosis A process to determine the fault cause and corrective action

diagnostic A test to uncover faults

fault coverage The percentage of faults detected against all possible faults or against all faults of a given type.

fault detection The ability of a diagnostic to uncover a fault, given that a fault exists.

Fibre Channel A cost-effective gigabit communications link deployed across a wide range of hardware. Commonly used for SAN configurations.

Fibre Channel switch A networking device that can send packets directly to a port associated with a given network address.

FRU Field Replaceable Unit. An assembly that a manufacturer replaces on failure of an assembly component.

hard zone *Hard zones* isolate ports through internal switch hardware; no communication across hard zone boundaries is possible. Hard zoning provides a way of isolating a set of ports from other ports within the fabric. This enables security and resource dedication. If hard zones are enabled, name server zones do not communicate across defined hard zone boundaries

HBA Host Bus Adapter. A controller board connecting the I/O expansion bus to the fibre channel subsystem.

HTTP HyperText Transfer Protocol

In-Band Refers to the connections and devices that are *inside* the data path (the opposite of *out-of-band*). For example, the Sun StorEdge T3, T3+, and 6120 arrays are monitored from the host that has access to the array message log files, so information is considered to be *in-band*.

IP Internet Protocol

LUN Logical Unit Number. The major and minor device numbers make up the logical unit numbering sequence for a particular device connected to a computer.

LUN mapping The ability to change the virtual LUN as presented to the server from storage. This enables such benefits as the ability of a server to boot from the SAN without requiring a local disk drive. Each server requires LUN 0 to boot.

LUN masking The characteristic that enables an administrator to dynamically map an HBA to a specified LUN. This provides an individual server or multiple servers access to an individual drive or to multiple drives, and prohibits unwanted server access to the same drives.

NSCC Sun's Network Storage Command Center

Out-of-Band Refers to the connections and devices that are not in the data path (the opposite of *in-band*). For example, the Storage Service Processor does not have access to the data that is stored on the Sun StorEdge 3900 and 6900 series storage subsystems, so information is considered to be *out-of-band*.

PCI Peripheral Component Interconnect. This is a high-performance 32-bit or 64-bit local bus that provides a host-processor-independent interface and an interconnect mechanism between highly integrated peripheral components.

RAS Reliability, Availability, and Serviceability

remote monitoring The ability to monitor the functionality and performance of a hardware system from a location other than where the hardware resides.

remote support The ability to directly or indirectly troubleshoot, diagnose, and service computer hardware from a location other than where the hardware resides.

RSS Remote Support Service. Software delivered with the service processor bundle.

SAN Storage Area Network

SCSI Small Computer Systems Interface. An industry standard for connecting disk and tape devices to a workstation.

segmented loop (SL) zone SL zones on the switch allow the division of the fabric into zones that define the ports that communicate with each other. A particular port can be placed in only one SL zone, with no overlapping SL zones. If hard zones are enabled, SL zones do not communicate across defined hard zone boundaries.

Note: Brocade FC switch configurations using SL zones can be monitored and diagnosed, but the topology views will not show connections between the devices.

soft zone Soft zones are also called *Name Server zones*. Soft zoning is usually implemented at the switch firmware level or any management software that is running on a switch. Soft zones may overlap; that is, a particular port can be in one or more zones. Soft zones can be created using one of the following methods: port identifier, World Wide Name (WWN), or FC address.

SRS Sun Remote Services (SRS) is Sun's portfolio of services, comprised of SRS Event Monitoring and SRS NetConnect, customizable Sun storage self-management, and 24/7, proactive, mission-critical system monitoring by Sun.

storage service processor Sun's rack-mountable server, preconfigured with advanced remote management and monitoring capabilities. The service processor monitors the SAN and provides service and support access for Sun engineers.

T3, T3+, 6120 Array Sun's hardware-based array, featuring Fibre Channel architecture that provides the basis for modular network storage.

World Wide Name(WWN) A number used to identify devices (for example, Sun StorEdge arrays and switches) in a Solaris environment.

zone A dedicated path beteen a LUN and the HBA to which it is mapped.

zoning Refers to the segregation of SAN resources from other SAN resources. By specifying a zone, a subnetwork is created, which is controlled by and relative to switches that provide different levels of connectivity between hosts and devices in the SAN.

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