Sun StorEdge™ Enterprise Storage Manager 1.2 Topology Reporter Administration and Operations Guide

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Preface

This document describes the administration and operation of the Sun StorEdge™ Enterprise Storage Manager 1.2 Topology Reporter. The intended audience for this document 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 describes the web-browser user interface.

Chapter 3 describes how to perform related tasks through the web-browser user interface.

Chapter 4 describes the `sstr` command line interface and how to perform related tasks through this interface.

Chapter 5 describes the `sstr_ctl` command and database backup and restore procedures.

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

Related Documentation

Application	Title	Part Number

Man pages	`sstr`
	`ssde`
	`sscs`
		Not applicable

Release and product information	*Sun StorEdge Configuration Service 1.2 Release Notes*	817-0998
	Sun StorEdge Diagnostic Expert 1.2 Release Notes	817-0197
	Sun StorEdge Enterprise Storage Manager 1.2 Roadmap	817-1039
	Sun StorEdge SAN Foundation Kit Release Notes	817-0071
	Sun StorEdge Traffic Manager Software Release Notes	817-0385
Installation	*Sun StorEdge SAN Foundation Kit Installation Guide*	817-1244
	Sun StorEdge SAN Foundation Kit Configuration Guide	817-1245
	Sun StorEdge Traffic Manager Software Installation and Configuration Guide	816-1420
System administration	*Sun StorEdge Configuration Service 1.2 Administrator's Guide*	817-0997
	Service Location Protocol Administration Guide	806-1412
User and diagnostic	*Sun StorEdge Diagnostic Expert User's Guide*	817-0195

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A broad selection of Sun system documentation is located at:

`http://www.sun.com/products-n-solutions/hardware/docs`

A complete set of Solaris documentation and many other titles are located at:

`http://docs.sun.com`

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CHAPTER 1

Introduction to the Topology Reporter

This chapter describes the following topics:

The Sun StorEdge™ Enterprise Storage Manager 1.2 Topology Reporter enables you to view and manage your storage area network (SAN) or direct-attached storage (DAS) environment. Using a web-browser user interface (UI) or the command-line interface (CLI), you can:

- View hardware assets such as hosts, host bus adapters, switches, and storage devices, including a graphical view of your environment
- Manage users, alarms, and assets
- Configure user email notification and network host notification
- Manage asset reporting (also known as discovery)
- Launch other web browser-based software applications related to devices in your environment

What is the Topology Reporter?

The topology reporter includes agent, management, and database software installed on host machines in your environment. The agent software continuously collects information from devices in your environment and stores the information in a database. This database contains the information needed to build a data model of your environment. The agent software updates the data model depending on discovered changes in device status.

You can view and manage this information at any time by using a web browser or CLI. For example, you can view a graphic representing your environment and click parts of the graphic to see details about that host machine or device.

For information on the roles of host machines, see "Management and Agent Station Host Machines" on page 5.

Chapter 2 and Chapter 4 describe how to use the web browser and CLI.

The topology reporter software also monitors events such as alarms. It displays this information through a web browser and can notify a user of the events through email or a pager. Through the Administration page, you can add or delete users, manage email notification, and set other reporting details. The software also enables you to launch device management and zoning applications through the web browser. Any changes you make are shown through the HTML pages on your web browser.

Note – The web browser and launchable applications must be installed on all relevant platforms in your SAN or DAS environment.

Discovery

Note – See also "Setting the Discovery Polling Interval" on page 32.

Discovery is the process where software agents on agent stations retrieve information about devices in your environment. The agents report it to the management station and the information is stored in the software's database. You can then view this information by using the UI or CLI at a management station.

When you can first view device status depends on the size of your environment. In a small SAN or DAS environment, you might see information immediately. In larger environments, the initial discovery might take a few minutes. Also, discovery depends on the agents being started on agent station machines.

Automatic discovery always occurs at a set interval. The software also enables you to:

- Set an interval for the software to start discovery automatically
- Manually start discovery in addition to automatic discovery

The Discover button appears on each page in the UI. A time-stamped message showing the last time the topology reporter software retrieved status about the assets and alarms in your SAN or DAS environment message is displayed next to the Discover button.

If you click Discover when a discovery is in progress, you can cancel the prior discovery and start a new one, or cancel the new discovery and allow the prior discovery to complete.

Note – If you remove a device from your environment and perform a new discovery, it is displayed as blue when you view your topology from the Topology page. Blue indicates that the device has been removed. If you change your SAN or DAS environment by adding or moving an asset (host, HBA, switch, or storage device), see "SAN and DAS Changes and Discovery" on page 33.

See the following topics for more information about discovery.

- "Discover Button" on page 23
- "Setting the Discovery Polling Interval" on page 32
- "Viewing Asset Status and Topology" on page 107
- "Managing Discovery" on page 119

Notification Services

The software uses the Simple Mail Transfer Protocol (SMTP) to send email to users each time an alarm occurs. You can decide which alarm severity level gets reported to the user and how often it is reported.

The software also enables you to send information to applications that are able to receive Simple Network Management Protocol (SNMP) traps.

See "Administering Email Servers and Network Host Notification" on page 51 and "Administering SNMP Trap Notification" on page 102.

Launching Related Applications

The software enables you to launch applications related to the devices in your SAN. These applications include:

- Sun StorEdge Diagnostic Expert software
- Sun StorEdge Configuration Service software for the Sun StorEdge T3 and T3+storage arrays
- Sun StorEdge Configuration Service software for the Sun StorEdge 6000 Family arrays and systems
- Sun StorEdge 9900 Series HiCommand software for the Sun StorEdge T3 and T3+ storage arrays
- SANsurfer Switch Manager (`SUNWsmgr`) software for Sun switches
- Web servers that reside on devices such as switches, such as Brocade Communications Systems' WebTools

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Note – You must install these launchable applications on all relevant platforms in your environment.

Management and Agent Station Host Machines

Each machine is considered a station in your environment and can have a different role:

- Management station
- Agent station

You can also install the software on one machine that acts as a management station and an agent station.

Management Station

Note – Only one machine per Service Locator Protocol (SLP) scope can be a management station. Do not install the software on more than one machine designated as a management station per scope. The management station and agent stations are considered to be in the same SLP scope when each machine has the same scope setting and locale. The *Sun StorEdge Enterprise Storage Manager 1.2 Installation Guide* describes describes how to configure the SLP scope.

The management station is the machine where you can view information about and administer your devices using the UI or CLI. You can also install the agent software on this machine and use it as a management *and* agent station.

The management station runs web server software that enables you to access the UI through a web browser. You can use the web browser on the management station or from any machine that has access to the management station.

Agent Station

The agent station can be one or more machines in your environment where the software collects information about your devices, such as hosts, host bus adapters, switches, and storage devices. You then use the UI or CLI on the management station to view this information. This information collection process is known as *discovery*.

You must install the agent station portion of the software on each host connected to a SAN or switch fabric (that is, switch and storage devices and their attributes). If you install the software on some hosts but not all, you will only partially discover information.

Log Files

Note – Over time, the `/var/opt/SUNWnsm/cre/cre_log` (if enabled) and `/opt/SUNWnsm/utils/tomcat/logs/catalina.out` files can become very large. Make sure that you check these files occasionally so that they do not consume more disk space than desired.

The software logs information to the following log files:

- `/var/sadm/install/logs/SUNWesm.log`
  `/var/sadm/install/logs/SUNWnsm.log`
  `/var/sadm/install/logs/SUNWdm.log`
  `/var/sadm/install/logs/SUNWde.log`
  `/var/opt/SUNWsade/logs/storage.log`
  `/var/opt/SUNWsade/logs/output.log`
  `These logs contains installation, removal, configuration, error, or informational messages.`
- `/var/adm/messages`

  This log contains general system error or informational messages.
- `/var/opt/SUNWnsm/pgsql/nsmdb.log`

  This log contains warnings and error messages from the topology reporter database.
- `/var/opt/SUNWnsm/tomcat/eventtranslator.log`

  This log contains messages from software about events that have occurred.

- `/opt/SUNWnsm/utils/tomcat/logs/catalina.out`

  This log contains messages from the software about any Java servlets used in the application and any errors associated with the event translator SLP registration.

- `/var/opt/SUNWnsm/cre/cre_log`

  This log contains messages from the Container Runtime Environment. By default, logging to this file is turned off.

Getting Started

After you start the software and log in through a web browser, you can perform the following tasks to get started. (See Chapter 4 for command-line interface equivalents for these tasks.)

TABLE 1-1 Getting Started Tasks List

Task	Web Browser	Command-line Interface
1. Start the software	"Starting and Stopping the Software" on page 9	"Starting and Stopping the Software" on page 9
2. Log in through a web browser.	"Logging In to the Web Browser" on page 16	Not applicable
3. Set the device polling interval for the software.	"Coordinating the Discovery Polling Interval and Alarm Expiration Threshold" on page 32	"Setting the Discovery Interval" on page 124
4. Configure email and SNMP notification.	"Administering Email Servers and Network Host Notification" on page 51	"Specifying the SMTP Mail Server" on page 124 "Administering SNMP Trap Notification" on page 102
5. Set the alarm expiration interval and alarm logging threshold.	"To Set the Alarm Expiration Time and Threshold" on page 63	"Setting the Alarm Expiration Interval" on page 122 "Setting the Alarm Logging Threshold Level" on page 123
6. Add the device management applications you can launch from a web browser.	"Managing Applications" on page 55	"Managing Applications" on page 105
7. Add users who can use the software.	"Administering Users" on page 44	"Administering Users" on page 96
8. Set the system administrator contact email address. The default setting for this address is blank.	"To Add a Contact Email Address for the admin User" on page 50	"Setting the Administrator Email Contact Address" on page 123

Starting and Stopping the Software

Ensure that you start the software on the management station and each agent station after you install and configure the software, as described in the *Sun StorEdge Enterprise Storage Manager 1.2 Installation Guide*.

- **To start the software, open a terminal window and type:**

```
# /etc/init.d/sstrd start
```

The software displays messages showing each software process starting.

- **To stop the software, open a terminal window and type:**

```
# /etc/init.d/sstrd stop
```

The software displays messages showing each software process stopping.

Hard and Nameserver Zones

Note – Nameserver zones that do not include ports are not discovered or reported in the topology reporter software. Vendor switch software might, however, show these zone types.

The topology reporter software can display information for hard zones and name server zones. Some switches enable you to configure devices within your fabric or hard zone to be part of a name server zone (also known as a soft zone).

This section describes two zone naming situations to avoid.

- "A Hard and Nameserver Zone Sharing the Same Name" on page 10
- "Nameserver Zones Sharing the Same Name" on page 11

Note – When creating zones, use a unique name for each zone.
Switches from Brocade Communications Systems force you to use unique names. Switches such as the Sun StorEdge Network FC Switch-8 and Switch-16 switch and Qlogic Corp. switches allow you to configure nonunique nameserver zone names.

A Hard and Nameserver Zone Sharing the Same Name

When you create zones using a switch management tool such as the SANsurfer Switch Manager software, you might create hard and nameserver zones with the same name. In this case, a hard zone might include an identically-named nameserver zone.

For example, FIGURE 1-1 shows:

- One hard zone named ZONE1
- One hard zone named ZONE2
- One nameserver zone consisting of hard ZONE2 member devices, also named ZONE2

When you view these identically-named zones in the topology reporter UI, the hard zone names include the phrase `(hard)` as part of the name. For example, `ZONE2(hard)`.

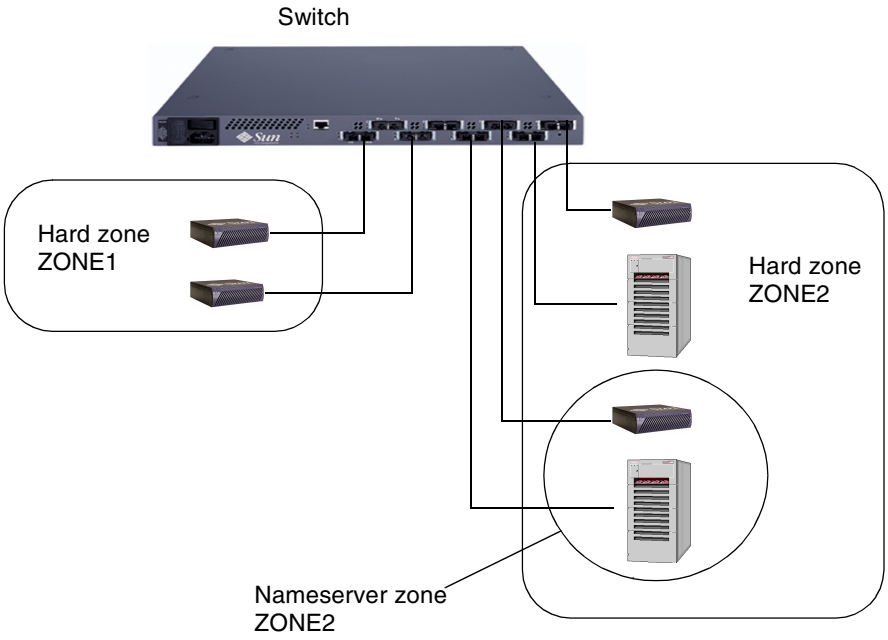

FIGURE 1-1 Hard and Nameserver Zone Naming To Avoid, Example 1

Nameserver Zones Sharing the Same Name

When you create zones using a switch management tool such as the SANsurfer Switch Manager software, you might create two nameserver zones in two different hardzones with the same name. In this case, each hard zone might include an identically-named nameserver zone.

For example, FIGURE 1-2 shows:

- One hard zone named ZONE1 with a nameserver zone named NSVR1
- Another hard zone named ZONE2 with a nameserver zone named NSVR1

In this case, when you view the nameserver zones using the topology reporter web-browser UI or CLI, only one nameserver zone named NSVR1 is shown or reported and contains the port members of both nameserver zones. (Hard zone names include the phrase `(hard)` as part of the name. For example, `ZONE2(hard)`.)

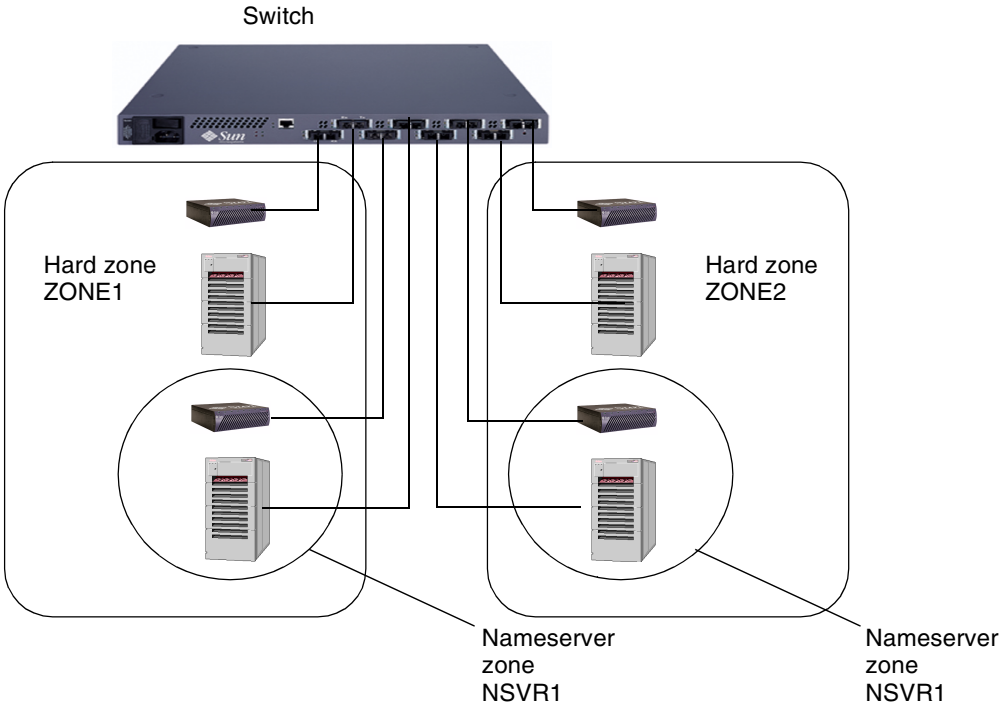

FIGURE 1-2 Hard and Nameserver Zone Naming To Avoid, Example 2

Zone Discovery When Using McDATA Switches

The topology reporter does not support zone discovery for McDATA Corporation switches. For example, if you have configured zones with any devices using these switches, the zone does not display or get reported in any UI pages or CLI commands where you can view zone information.

However:

- The topology reporter software does discover the McDATA switch and any devices attached to it.
- McDATA Corp. switch management software such as the Enterprise Fabric Connectivity Lite Manager (EFCM Lite) can displays zones configured using this software.

CHAPTER 2

The Web-browser User Interface

This section describes how to log into and navigate the topology reporter software web-browser user interface (UI).

This chapter includes the following topics:

Logging In to the Web Browser

If you have successfully installed and started the software, log in to the software in a web browser.

Note – The topology reporter software is the starting point for the Sun StorEdge Enterprise Storage Manager, where you can launch the configuration service and diagnostic expert software. You can also launch the software from the Sun Management Center; see "Launching the Software from the Sun Management Center Software" on page 85.

Log In Page

The Log In page includes the User Name and Password fields to enable the admin, operator, and guest users to use the UI. ("Administering Users" on page 44 describes user roles.) See also "Logging In to the Web Browser" on page 16.

Note – If you have a user role of `operator` or `guest` and do not have access to the software, click the System Administrator link on the Login page to send email to the `admin` user. "To Add a Contact Email Address for the admin User" on page 50 describes how to add the system administrator contact email address to the link on the Login page.

▼ To Log In

1. **Open Netscape Navigator™.**

Note – Make sure that your web browser has cookies enabled.

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2. **Type one of the following URLs in the URL text field:**
   - For a non-secure HTTP server:

```
http://mgmt-station-hostname.domain:8180/
```

   where *mgmt-station-hostname.domain* is the management station host name and 8180 is the default port number for the topology reporter software. If you configured the port to be different, use that port number.

Note – If you are concerned about password security, use the SSL HTTP URL.

   - For a secure HTTP server:

```
https://mgmt-station-hostname.domain:8543/
```

   where *mgmt-station-hostname.domain* is the management station host name and 8543 is the default port number for the topology reporter software. If you configured the port to be different, use that port number.

   The Login page is displayed.

3. **Log in as follows for the topology reporter software:**

```
User Name: admin
Password: none; leave blank
```

Note – When you launch the diagnostic expert software, log in as the user you configured during installation.

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4. **Click the Log In button.**

   As soon as you add a user with `admin` mode privileges, the default `admin` user is deleted. See "Administering Users" on page 44.

Note – After users are added by the `admin` user and users with `admin` mode privileges, they can log in using a normal user name and password.

Browser User Interface

After you log in, you can access each page of the software by clicking its labelled tab. This section describes the following topics.

Note – The Administration page is not accessible for users with a role of operator or guest.

Keyboard Shortcuts and Other Navigation Tips

You can also navigate the UI by using keyboard shortcuts. Each page indicates the available Alt-key shortcuts by an underlined letter.

- Pressing Tab at each page also enables you to navigate the page. If you have your browser's status bar enabled, the bar shows the currently-selected choice.
- Press Tab to navigate each page in the following order:

Note – Pressing the Tab key skips the Discover button. The shortcut for this button is Alt-D.

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1. Sun logo (links to the Sun home page at `http://www.sun.com`)
2. Log Out link
3. Help link
4. Status tab
5. Assets tab
6. Alarms tab
7. Topology tab
8. Administration tab
9. Search for menu
10. Page functions

- Press the Tab key to toggle forward through the functions available from the current page.
- Press Shift-Tab to toggle backward through the available functions.

The UI also enables you to show various levels of detail about your SAN or DAS environment. Typically, you click links and buttons as on any other web page to navigate the software.

The software also displays the navigation path, also known as bread-crumbing, on each page to show how you arrived at a page. This path includes clickable, underlined links so that you can return to a certain point in your navigation instead of starting at a top level page or tab.

For example, if you just enabled a user to receive email notification of alarms and want to quickly add more users, you can click the More E-Mail Features link to return to the Add User button. See FIGURE 2-1.

The alternate method is to perform the procedure from the top level, as described in "To Create a User Email Notification Profile" on page 49.

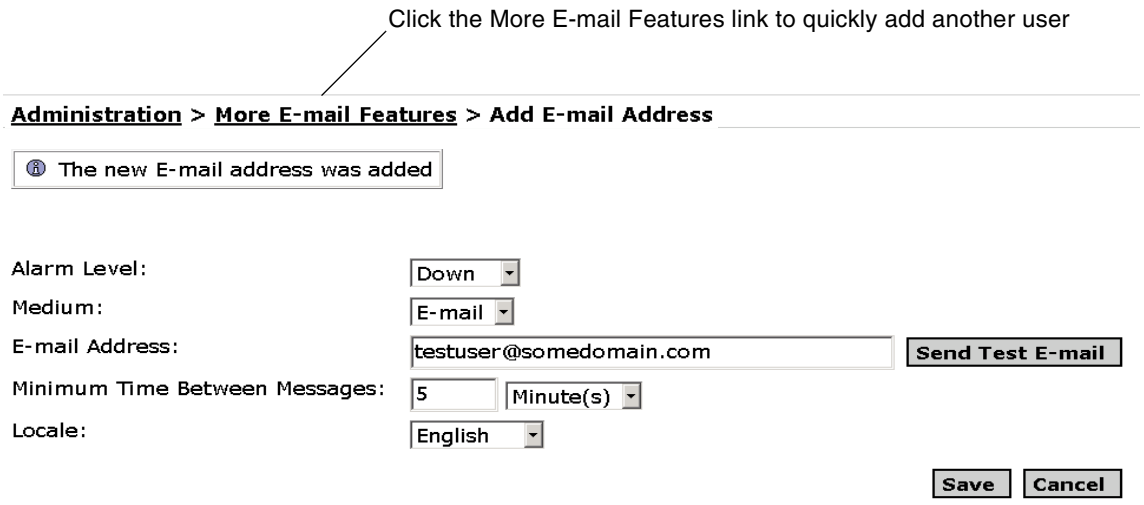

FIGURE 2-1 Navigation Links Example

Tooltips

Any page that shows a graphic consisting of icons that represent your devices and show device connections includes tooltips. That is:

- If you place your cursor over an icon, tool tip text including the device name is displayed. Click the icon to display device details.
- If you place your cursor over the vertical or horizontal lines representing connections, tool tip text displays the device path. For example, for a switch connected to a host, the tooltip text shows the host name, the HBA World Wide Name (WWN), and switch name and port.
- If you place your cursor over a badge icon, status about that device or connection line is displayed. A badge is usually represented by a small circle near the device or connection.

Search For Menu

The Search For menu appears on each page in the UI. This menu enables you to search for assets in your SAN or DAS environment.

▼ To Search for Assets

1. **Choose one of the following from the menu:**
   - Hosts
   - Switches
   - Storage
   - HBAs

   You must select an asset.
2. **Type a full or partial asset name in the text field.**
3. **Click Go to search for a particular asset.**

   The UI opens the Assets page and displays a table summarizing the asset or assets found.

Discover Button

The Discover button appears on each page in the UI. A message is displayed next to the Discover button that displays discovery status:

- A time-stamped message showing the last time the topology reporter software retrieved status about the assets and alarms in your SAN or DAS environment
- A discovery progress message, stating that an outstanding discovery is started or completed
- A confirmation message, prompting you to start a new discovery process while a previously-started discovery is still in progress

If you click Discover when a discovery is in progress, you can cancel the prior discovery and start a new one, or cancel the new discovery and allow the prior discovery to complete.

Note – If you remove a device from your environment and perform a new discovery, it is displayed as blue when you view your topology from the Topology page. Blue indicates that the device has been removed. If you change your SAN or DAS environment by adding or moving an asset (host, HBA, switch, or storage device), see "SAN and DAS Changes and Discovery" on page 33.

"Discovery" on page 3 describes how the software gets status about your SAN or DAS environment.

"Setting the Discovery Polling Interval" on page 32 describes the relationship between polling intervals and alarm intervals.

To Update the Asset and Alarm Information

1. **Click Discover.**
2. **Wait a few minutes for the software to update the information on the Asset and Alarms pages.**

Show Path Button or Menu Selection

The Show Paths button or submenu selection is available from the Topology page, Assets page, and other device-related Asset pages.

The Show Paths results page displays all existing paths between the selected host and storage device. The SAN Paths graphic might span multiple fabrics and displays both full and partial paths. A DAS Path graphic is displayed only if the host and storage device are directly connected.

Perform the following procedure to view the connection path of the device in your SAN or DAS environment.

▼ To View Paths between A Host Machine and Its Storage

1. **Click the Show Paths button or select Show Paths from the Actions menu.**
2. **Perform one of the following:**
   - Select Host Name and type the device name in the text field.
   - Select a device in the table.
3. **Click Next.**
4. **Perform one of the following:**
   - Select Storage Device Name and type the device name in the text field.
   - Select a device in the table.
5. **Click Finish.**

Summary Tables

The Status, Assets, and Alarms pages display a table that shows a status summary related to that page. The Administration page provides a Users link that shows a user summary table. The tables are sortable. Most tables include a link to more detail about a particular device.

Most tables, such as the Users summary table, include a button to select the table item in that row or column. After selecting an item, you can perform a task related to that item. For example, see "To Modify a User's Role" on page 46.

The icons shown in FIGURE 2-2 indicate that you can sort items in ascending or descending order in summary tables found on the pages. The light icon indicates the current sort order of the selected column.

Note – If the sort icons appear as text instead of as an icon, clear your browser cache and refresh the page in your browser.

▼ To Sort Items in the Summary Table

1. **Click the dark icon to sort in the opposite order.**
2. **Click an icon in another column to sort that column.**

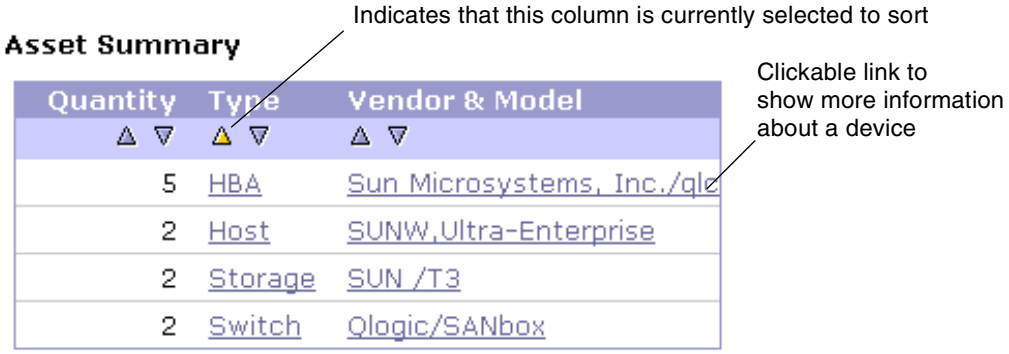

FIGURE 2-2 Table Sorting Icons

Status Page

The Status page shows an alarm summary table for SAN or DAS topology only; the Sun StorEdge Diagnostic Expert software reports minor alarms to the topology reporter software. To get more information about an alarm category, click a link in the Severity column. See FIGURE 2-3.

It also shows a table showing any installed applications that you can launch. (Some applications are embedded in devices like switches and others you can specify on the Administration page.) If the table shows a Sun StorEdge application's information as Not Registered, it is either not installed or has not been added as a launchable application on the Administration page.

This page also shows the Show Diagnostic Alarms button. When you click this button, the Sun StorEdge Diagnostic Expert software launches in separate web browser. You must have already installed this software and typed the application URL link at the Administration page. See "To Add the Sun Sun StorEdge Diagnostic Expert Software Application" on page 58.

If you already have the Sun StorEdge Diagnostic Expert software open in a web browser, clicking the Show Diagnostic Alarms button displays the Alarms page in that browser. Otherwise, a separate browser window opens, where you are prompted to log in to the software.

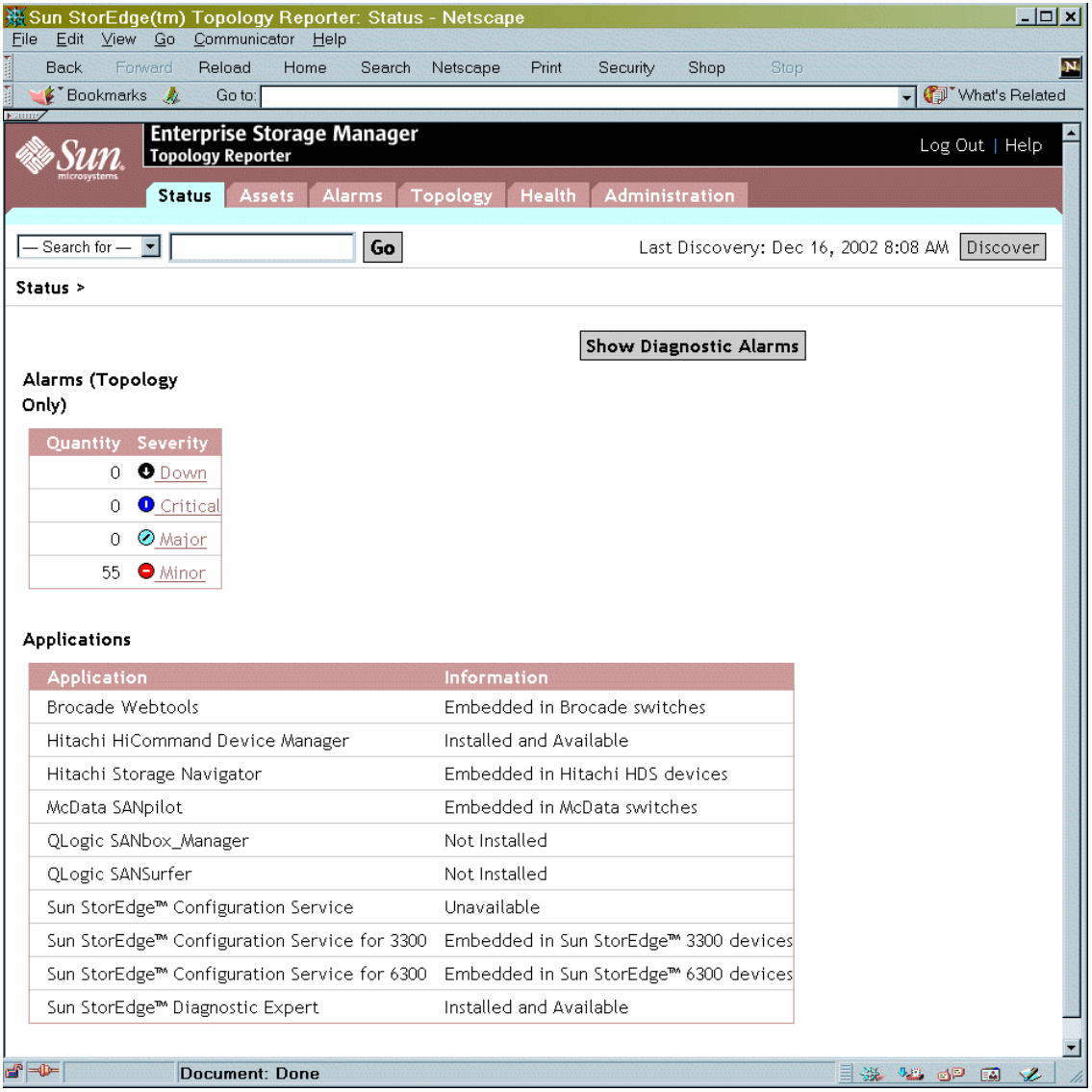

FIGURE 2-3 Status Page

Assets Page

The Assets page enables you to manage and display information about your hosts, switches, storage, and host bus adapters (HBAs). The default Assets page shows an Assets Summary table of all assets. To search for assets, see "Search For Menu" on page 22.

The summary table also shown on each top-level Assets page (such as the Switches page) can include links to device details and connection paths, depending on the asset page you select.

To search for assets, see "Search For Menu" on page 22.

▼ To Show Details about an Asset

- **Click one of the links under the Assets page tab:**
  - Summary—default view for this page
  - Hosts
  - Switches
  - Storage
  - HBAs

Alarms Page

The Alarms page enables you to display information about any current alarms in your SAN or DAS environment. The default view on this page shows all current topology reporter alarms. You can sort the alarms by severity, description, and time the alarms occurred. You can view alarm details by clicking the alarm Description link in the summary table.

This page also includes the Show Diagnostic Alarms button. When you click this button, the Sun StorEdge Diagnostic Expert software launches in separate web browser. You must have already installed this software and typed the application URL link at the Administration page. See "To Add the Sun Sun StorEdge Diagnostic Expert Software Application" on page 58.

▼ To Show Details about Alarms by Severity Level

1. **Click the Alarms tab.**

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

2. **Perform one of the following:**
   - Click the Down, Critical, Major, or Minor link to view all alarms of that level.
   - Click the link in the Description column to view details about a particular alarm.

   A page showing the alarm details is displayed.

▼ To Show Alarms from Diagnostic Expert

1. **Click the Show Diagnostic Alarms button.**

2. **Perform one of the following:**
   - If the Sun StorEdge Diagnostic Expert software is already open in a web browser, click the Show Diagnostic Alarms button to display the Alarms page in that browser.
   - If the Sun StorEdge Diagnostic Expert software is not open in a web browser, a separate browser window opens, where you are prompted to log in to the software.

Note – If you are displaying alarms by a particular severity level in the topology reporter web browser and click Show Diagnostic Alarms, the diagnostic expert web-browser window opens to show alarms at thatseverity level.

Topology Page

The Topology page displays a Fabrics summary table that provides the following links:

- All Fabrics - Click this link to display your entire SAN fabric as a graphic
- Fabric Name - Click a link to display that fabric portion of your SAN as a graphic
- Switches - Click a switch link to view details about that switch

The table also lists the number of hosts and storage devices in the related fabrics. The page also includes:

- DAS link that displays directly-attached storage details
- Show Paths button that enables you to show the connection paths between a host and a storage device.

See "Viewing Your SAN or DAS Environment (Topology Tab)" on page 36.

Health Page

The Health page enables you to launch the Sun StorEdge Diagnostic Expert software in a separate browser window. This software requires a user name and password. See "Launching the Sun StorEdge Diagnostic Expert Software (Health Tab)" on page 84. If this software is not installed, it can be added as described in "Managing Applications" on page 55.

Administration Page

Note – The Administration page is not accessible to users with a role of `operator` or `guest`. "Administering Users" on page 44 describes user roles.

The Administration page enables a user with the `admin` role to perform the following tasks:

- Add, delete, or modify the users who can access the topology reporter
- Define who is notified by email when a device alarm occurs
- Set email and related options
- Launch the Sun StorEdge Diagnostic Expert software to view Diagnostic Alarm Notification settings
- Set alarm expiration (that is, how long alarms are reported in minutes, hours, or days)
- Manage launchable device management applications
- Set the polling interval for device discovery by the topology reporter software

The Administration page includes the View Diagnostic Alarm Notification button. Click this button to launch a separate Sun StorEdge Diagnostic Expert web-browser window. If a window is already open, the window displays the diagnostic expert notification page.

Setting the Discovery Polling Interval

The Administration page enables the admin user to set the discovery polling interval in minutes. Once set, this polling interval determines how often the software retrieves information and status about devices in your SAN or DAS environment. Depending on your environment size, you can have the software poll devices more or less frequently.

In a small SAN or DAS environment where the device configuration is stable and device state does not change very often, you might set the polling interval to 15 minutes.

In an environment where device configuration is less stable or in a large SAN environment where the device configuration is complex, you might set the polling interval to a longer time, perhaps 30 minutes.

Coordinating the Discovery Polling Interval and Alarm Expiration Threshold

You might need to coordinate the polling interval time and the alarm expiration threshold. For example, if you set the polling interval at 10 minutes and alarm expiration threshold at 5 minutes, it is possible that alarms might have occurred and expired (that is, not been reported to the software). You would not see alarms in the UI but they would have occurred.

Note – See "To Set the Alarm Expiration Time and Threshold" on page 63.

▼ To Set the Discovery Polling Interval

1. **Click the Administration tab.**
2. **Scroll down to the Miscellaneous area.**
3. **Enter a number in the Polling Interval text field.**
4. **Click Save.**

SAN and DAS Changes and Discovery

Discovery is the process where software agents on agent stations retrieve information about devices in your environment. The agents report it to the topology reporter software and you can then view this information by using the topology reporter UI or CLI at a management station.

The software performs its discovery process according to a set interval. If you add or delete assets like hosts, switches, HBAs, and storage in your environment, you can perform a manual discovery to ensure that the new asset is reporting its status to the software.

▼ To Perform a Manual Discovery After a Change to Your SAN or DAS Configuration

1. **Change, add, or delete an asset.**
2. **Wait five to seven minutes.**

   Waiting a few minutes gives the software a chance to discover a new asset. This discovery takes a few minutes, depending on the size of your SAN or DAS environment.
3. **Manually perform a discovery.**

   a. **If you have not done so already, log into the software.**

   b. **Click the Assets tab.**

   c. **Click the Discover button.**

      The asset information is displayed on the Assets page.

CHAPTER 3

Using the Software Through the Web-browser User Interface

The topology reporter enables you to view and manage your storage area network (SAN) or direct-attached storage (DAS) environment through a web browser. You can also add and launch external applications such as the Sun StorEdge Diagnostic Expert software.

This chapter describes the following topics:

Viewing Your SAN or DAS Environment (Topology Tab)

The Topology page enables you to view your SAN or DAS environment. After successfully logging in to the topology reporter software, the default page that displays is the Fabric Graph page. The page shows a graphic consisting of icons that represent devices and connection paths in your storage area network.

This page also is displayed if you click the All Fabrics link in the Fabrics table that shows on the SAN Fabric Inventory page. See "SAN Fabric Inventory" on page 37.

The page also includes a Show Paths button; see "Show Path Button or Menu Selection" on page 24. The resulting page from the button enables you to display the connection path between a host and its related storage.

This section describes procedures for the following:

- "To Show the Topology Graph or Device Details" on page 39
- "To Show Host-to-Storage Device Paths (Show Paths)" on page 40
- "To View Zone Details" on page 42
- "To Display a Fabric's Zone" on page 42
- "To Show the DAS Inventory" on page 43

See also:

- "Tooltips" on page 21
- "Hard and Nameserver Zones" on page 10
- "SAN and DAS Changes and Discovery" on page 33

SAN Fabric Inventory

The Topology Fabric Inventory page shown in FIGURE 3-1 displays a Fabrics summary table that provides the following links:

- All Fabrics - Click this link to display your entire SAN fabric as a graphic
- Fabric Name - Click a link to display that fabric portion of your SAN as a graphic
- Switches - Click a switch link to view details about that switch
- Zones - Click a zone link to view details about the fabric's zones

The table also lists the number of hosts and storage devices in the related fabrics. The page also includes:

- DAS link that displays directly-attached storage details
- Show Paths button that enables you to show the connection paths between a host and a storage device.

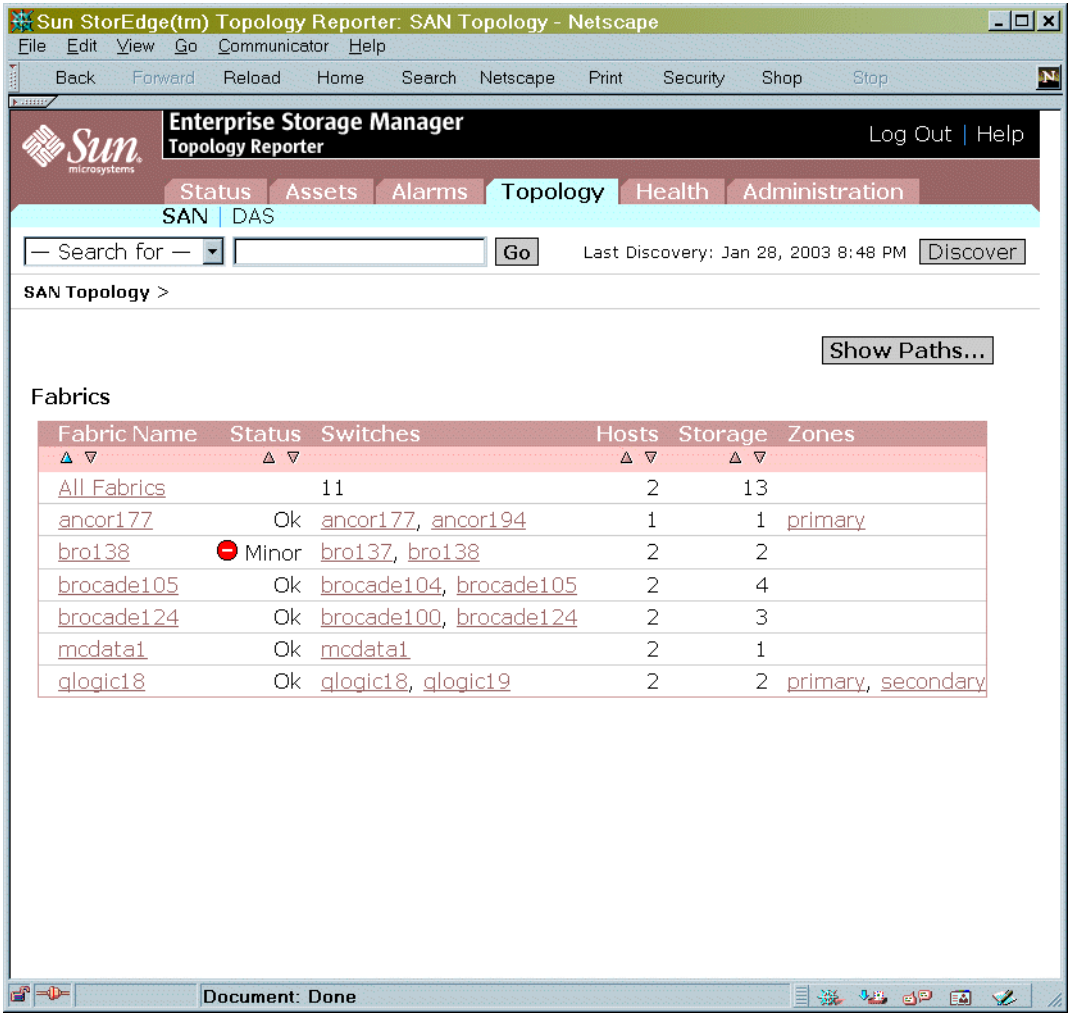

FIGURE 3-1 Example SAN Topology Page with Fabric Summary Table

▼ To Show the Topology Graph or Device Details

1. **Click the Topology tab.**

   The Fabrics summary table is displayed.

2. **Perform one of the following steps.**

   - Click the DAS link (DAS) to show a table with clickable links for the host and its attached storage device.
   - Click the SAN link (SAN) to show a table of fabrics in the SAN. The table includes clickable links for the Fabric Name, Switches, and Zones.
   - Click the Show Paths button to show SAN and DAS paths between the hosts and storage devices.
   - Click All Fabrics or a Fabric Name in the fabric table to show a graphical representation of your SAN.
   - Click a zone link in the summary table to show a Zone Details summary table.
   - Click a link in the Switches column to show switch device details.

     The page displays device details. From this page, you can perform switch actions. See "Switches" on page 70.

▼ To Show Host-to-Storage Device Paths (Show Paths)

Note – The Show Paths button or submenu selection is available from the Topology page, Assets page, and other device-related Asset pages. The resulting page from the button or selection enables you to display the connection path between a host and its related storage.

---

1. **Click the Show Paths button or select Show Paths from the More Actions submenu.**
2. **Perform one of the following:**
   - Select Host Name and type the device name in the text field.
   - Select a device in the table.
3. **Click Next.**
4. **Perform one of the following:**
   - Select Storage Device Name and type the device name in the text field.
   - Select a device in the table.
5. **Click Finish.**

   The Show Paths results page displays all existing paths between the selected host and storage device. The SAN Paths graphic might span multiple fabrics and displays both full and partial paths. A DAS Path graphic is displayed only if the host and storage device are directly connected.

   This resulting page also includes a Physical Connectivity selection from the View menu. See "To View Physical Connectivity Details" on page 41.

▼ To View Physical Connectivity Details

1. **Perform one of the following:**
   - Perform the steps in "To Show Host-to-Storage Device Paths (Show Paths)" on page 40
   - Click a Fabric Name link in the summary table on the SAN Fabric Inventory page (see "SAN Fabric Inventory" on page 37)
2. **Select Physical Connectivity from the View menu.**
3. **Click Details.**

   The Physical Connectivity Details summary table shows all connections for the selected device, including:
   - Switch name link that shows device details when clicked
   - Switch port
   - Port connection, if applicable
   - Connected device link (this link can be a host, HBA port, switch, or storage device detail link)
   - Connected device vendor and model
4. **Click any link to shows details for the device.**

▼ To View Zone Details

1. **Click the Topology tab.**

   The Fabrics summary table is displayed.

2. **Click a link in the Zones column.**

   The Zone Details summary table is displayed. The Zone Details summary table shows the following:

   - Switch name
   - Switch port
   - Connected device name (click this link for device details)
   - Connected device vendor and model number

   The table includes a clickable link for the zone fabric's switch. Click the switch name link for switch actions; see "Switches" on page 70.

▼ To Display a Fabric's Zone

1. **Click the Topology tab.**

   The Fabrics summary table is displayed.

2. **Click the fabric name in the Fabric column.**

3. **From the View menu, select a zone name.**

   The zone graphic appears. Each icon can be clicked to show details about that device.

4. **Click Details to display a Zone Details table containing information about the switches in this zone.**

   The Zone Details summary table is displayed. The Zone Details summary table shows the following:

   - Switch name
   - Switch port
   - Connected device name (click this link for device details)
   - Connected device vendor and model number

Note – See also "Hard and Nameserver Zones" on page 10.

▼ To Show the DAS Inventory

1. **Click the Topology tab.**
2. **Click the DAS link under the Topology tab.**

   The Direct Attached Storage summary table appears, containing device detail links for the host machines and attached storage devices.
3. **Click one of the following to show device details:**
   - Host link in the Host column or the Show DAS Details button
   - Storage device link in the Storage column

Administering Users

The following sections describe how to administer users through the Administration page. As the `admin` user, you can add, modify, and delete users that you authorize to use the software. Once added, a user can log into the software using his or her user name and password. The user role determines user privileges. TABLE 3-1 describes user roles.

TABLE 3-1 User Roles

User Role	Description
`admin`	An `admin` user has all administration privileges. The `admin` user can add, modify, and delete users, attributes, and devices in the software.
`operator`	An `operator` user can use most of the software features except those that add, modify, or delete users, attributes, and devices. This user can delete alarms. The Administration page in the UI is not available to this user.
`guest`	A `guest` has read-only privileges and can use most features of the software except those that add, modify, or delete users, attributes, and devices. The `guest` user can launch applications if the user has login access to them. The Administration page in the UI is not available to this user.

The topics described include the following:

Before You Add a User

Before you add a user, consider the following:

- Add only those users that already have a user account on the management station
- Users can use their Solaris (UNIX) passwords to log in. They can safely use these passwords because they are encrypted before verification
- `root` and `bin` cannot be added to or use the software

▼ To Add a User

1. **Click the Administration tab.**
2. **Click the Users link under the Administration tab.**

   The Manage Users page is displayed.
3. **Click the Add User button.**
4. **Type the user name of the user you are adding in the User Name text field.**

   The user name is the user's login name for the machine where the management station software is installed. The software authenticates the user against the machine's list of users. The software then stores the user information in the software's data base.
5. **Choose a user role from the Role menu.**

   See TABLE 3-1 for a user role description.
6. **Click Save.**

   A confirmation message is displayed. The user can now log in to the software using his or her normal user name and password.

▼ To Modify a User's Role

1. **Click the Administration tab.**
2. **Click the Users link under the Administration tab.**
   The Manage Users page is displayed.
3. **Click the button in the Users table to select the user to modify.**
4. **Click the Modify User button.**
5. **Choose a user role from the Role menu.**
   See TABLE 3-1 for a user role description.
6. **Click Save.**
   A confirmation message is displayed. The user can now log in to the software.

▼ To Delete a User

1. **Click the Administration tab.**
2. **Click the Users link under the Administration tab.**
   The Manage Users page is displayed.
3. **Click the button in the Users table to select the user to delete.**
4. **Click the Delete User button.**
5. **Click the Delete button.**

▼ To Display Information About Users

1. **Click the Administration tab.**
2. **Click the Users link.**
   The Manage Users page is displayed. This page displays all users currently authorized to use the software and their role.

If An Admin User Password is Lost or Forgotten

If a user with the role of `admin` forgets or loses his or her password and no other users with the `admin` role exist, the administrator of the management station machine must clear the user database.

Caution – This procedure erases all user login information for the software.

▼ To Erase User Login Information from the Data Base

1. **Log into the management station as user** `sstr001`**.**

```
# rlogin hostname sstr001
Password:
```

Note – The `sstr001` user is created by the software installation process which does not set a password. To set a password for the `sstr001` user, use the `passwd` command. See the `passwd`(1) man page.

2. **Source the database environment file to configure the database environment variables.**

```
Bourne or Korn shell
# . /opt/SUNWnsm/util/pgsql/nsm1/bin/postgres.env

C shell
# source /opt/SUNWnsm/util/pgsql/nsm1/bin/postgres.env
```

3. **Access the database.**

```
# psql
```

4. **At the database prompt, delete the user table information and exit.**

   The pound sign (#) in this case does not indicate a root user Solaris prompt.

```
#nsm1 delete from userpo;
#nsm1 \q
```

Managing User Email Notification

Note – You must enable email notification for the software to use this feature. See "Administering Email Servers and Network Host Notification" on page 51.

When a device alarm occurs, email is sent by the software to users designated by the `admin` user. The Notification section of the Administration page enables the `admin` user to manage this capability.

This section describes the procedures that enable the `admin` user to manage user email notification:

▼ To Create a User Email Notification Profile

1. **Click the Administration tab.**
2. **Click the More E-mail Features button.**

   The More E-mail Features page is displayed. This page also displays a summary table of users who receive notification of alarms.
3. **Click the Add button in the Alarm Levels section.**

   The Add E-mail Address page is displayed.
4. **Choose an alarm level from the Alarm Level menu.**

   The user you create receives email notification of alarms occurring at this level. For example, select Critical to send all Critical alarms.

   Tip – If you want the user to receive notification of other alarms levels, repeat all steps in this section for each alarm level for that user.

   ---

5. **Choose how the user receives notification from the Medium: menu.**

   You can choose to send notification through email or to a pager address.
6. **Type the user email address in the E-mail Address text field.**

   Click the Send Test E-mail button to ensure that the email address is correct and operating.
7. **Type the minimum time between notification messages in the text field.**

   Choose the time interval from the menu: Minutes, Hours, or Days.
8. **Choose the user's locale from the Locale menu.**
9. **Click Save.**

▼ To Modify a User Notification Profile

1. **Click the Administration tab.**
2. **Click the More E-mail Features button.**

   The More E-mail Features page is displayed. This page also displays a summary table of users who receive notification of alarms.
3. **Click the button in the Alarm Level table to select the user to modify.**
4. **Click the Modify button.**

   The Modify E-mail Address page is displayed. You can change the medium, email address, notification interval, and locale.
5. **Click Save.**

   A confirmation message is displayed.

▼ To Delete a User Notification Profile

1. **Click the Administration tab.**
2. **Click the More E-mail Features button.**

   The More E-mail Features page is displayed. This page also displays a summary table of users who receive notification of alarms.
3. **Click the button in the Alarm Level table to select the user to delete.**

   The Delete E-mail Address page is displayed and asks if you want to delete the user.
4. **Click the Delete button.**

   A confirmation message is displayed.

▼ To Add a Contact Email Address for the admin User

1. **Click the Administration tab.**
2. **Scroll down the page to the Miscellaneous section.**
3. **Type an email address for the `admin` user in the Contact E-mail text field.**

   This email address is the address associated with the system administrator link on the Login page (see "Log In Page" on page 16).
4. **Click Save.**

Administering Email Servers and Network Host Notification

When a device alarm occurs, email is sent by the software to users designated by the `admin` user. The host machine where the alarm occurred also routes the alarm information to a management station machine. You can then view this alarm information on the Alarm page.

The Notification section of the Administration page enables the `admin` user to manage this capability. This section describes the procedures that enable the `admin` user to manage the Simple Mail Transfer Protocol (SMTP) and Simple Network Management Protocol (SNMP) servers and notification:

▼ To Enable and Manage SMTP Email Notification

1. **Click the Administration tab.**
2. **Select the On or Off buttons in the Notification E-mail section:**

   These buttons enable or disable the email notification feature. See also "Managing User Email Notification" on page 48.
3. **Click the More E-Mail Features button to access SMTP server and alarm features.**

   The More E-mail Features page is displayed. This page also displays a summary table of users who receive notification of alarms.
4. **Enter the IP address or host name of the SMTP server machine in the IP or Host text field.**

   The host name of the machine that will manage the notification feature must be the fully qualified host name including the domain. For example, `martha.xyzcorp.com`.
5. **Click Save.**

   A confirmation message is displayed.

▼ To Enable SNMP Notification

1. **Click the Administration tab.**
2. **Select the On or Off buttons in the Notification SNMP section:**

   These buttons enable or disable the SNMP alarm trap notification feature.
3. **Click Save.**

▼ To Add a Host for SNMP Notification

1. **Click the Administration tab.**
2. **Click the More SNMP Features button to access SNMP server and alarm features.**

   The More SNMP Features page is displayed. This page also displays a summary table of host machines that receive SNMP alarm traps that occur in the SAN or DAS.
3. **Click the Add button.**

   The Add SNMP Contract page is displayed.
4. **Select an alarm level to trap from the Alarm Level menu.**
5. **Enter the IP address or host name of an SNMP host machine in the Hostname text field.**

   The host name of the management station machine where SNMP traps are routed must be the fully qualified host name including the domain. For example, `martha.xyzcorp.com`.
6. **Enter a port number in the Port Number text field.**

   The default SNMP port is 162.
7. **Click Save.**

   A confirmation message is displayed.

▼ To Modify SNMP Notification Attributes

1. **Click the Administration tab.**
2. **Click the More SNMP Features button to access SNMP server and alarm features.**

   The More SNMP Features page is displayed. This page also displays a summary table of host machines that receive SNMP alarm traps that occur in the SAN or DAS.
3. **Click the Modify button.**

   The Modify SNMP Contract page is displayed. You can change the SNMP host's host name, SNMP port, and alarm level from this page.
4. **Enter the IP address or host name of an SNMP host machine in the Hostname text field.**

   The host name of the management station machine where SNMP traps are routed must be the fully qualified host name including the domain. For example, `martha.xyzcorp.com`.
5. **Enter a port number in the Port Number text field.**

   The default SNMP port is 162.
6. **Click Save.**

   A confirmation message is displayed.

▼ To Delete an SNMP Notification Host

1. **Click the Administration tab.**
2. **Click the More SNMP Features button to access SNMP server and alarm features.**

   The More SNMP Features page is displayed. This page also displays a summary table of host machines that receive SNMP alarm traps that occur in the SAN or DAS.
3. **Choose a host machine to delete in the SNMP Notification summary table.**
4. **Click the Delete button.**

   A delete confirmation page is displayed.
5. **Click the Delete button to delete the host machine from the database.**

Managing Applications

Users can launch software applications associated with devices in the software from the Assets page. For example, you can launch the following software that helps manage devices:

- Sun StorEdge Configuration Service software for the Sun StorEdge T3, T3+, and 6120 storage arrays
- Sun StorEdge Diagnostic Expert software
- Hitachi HiCommand software
- SANsurfer Switch Manager (SUNWsmgr) software for Sun switches
- McDATA Enterprise Fabric Connectivity (EFC) Switch Management application
- Web servers that reside on devices such as switches, such as Brocade Communications Systems' WebTools or McDATA Corp. SAN Pilot

This section describes the procedures that enable the `admin` user to add web-browser-based launchable applications to the UI.

- "Using the Configuration Service for Sun StorEdge T3, T3+, and 6120 Arrays" on page 56
- "To Select an Application for Managing Sun StorEdge T3 and T3+ Arrays" on page 57
- "To Select an Application for Managing Sun StorEdge 6120 Arrays" on page 57
- "To Add the Sun Sun StorEdge Diagnostic Expert Software Application" on page 58
- "To Add the McDATA Enterprise Fabric Connectivity (EFC) Switch Management Application" on page 58

See also:

- "To Launch a Software Application To Manage a Switch" on page 72
- "To Launch a Software Application to Manage a Storage Device" on page 81

Using the Configuration Service for Sun StorEdge T3, T3+, and 6120 Arrays

You can use the configuration service software as the device management tool for Sun StorEdge T3, T3+ and 6120 arrays. Consider the following:

- If you have already logged into the configuration service software in a separate web-browser window, this separate window displays information about the device when you click the Launch Device Manager button from the storage Assets page.

Note – If you already have a configuration service web-browser window open and click the Launch Device Manager button, a new window **does not** open. That is, another instance of the software is not launched.

- If you have not logged into the configuration service software in a separate web-browser window, you must log in and discover the device in the launched web-browser window. For instance, the array must already be configured for discovery by the configuration service or discovery fails. If the device is already configured for discovery, log in and the device is discovered automatically.

See the configuration service documentation listed in "Related Documentation" on page xx.

▼ To Select an Application for Managing Sun StorEdge T3 and T3+ Arrays

1. **Click the Administration tab.**
2. **Scroll down the page to the Applications section.**
3. **Choose an application for managing Sun StorEdge T3 and T3+ arrays from the T3 Management menu:**
   - Sun StorEdge Configuration Service
   - Hitachi HiCommand Device Manager
4. **Type the related application's uniform resource locator (URL) address in the Hitachi HiCommand Device Manager or Sun StorEdge Configuration Service text field.**

   This application launches when you click the Launch Device Manager button associated with storage devices from the storage Assets page.
5. **Click Save.**

See "Using the Configuration Service for Sun StorEdge T3, T3+, and 6120 Arrays" on page 56 and "To Launch a Software Application to Manage a Storage Device" on page 81.

▼ To Select an Application for Managing Sun StorEdge 6120 Arrays

1. **Click the Administration tab.**
2. **Scroll down the page to the Applications section.**
3. **Choose an application for managing Sun StorEdge 6120 arrays from the SE6120 Management Application menu:**
   - Sun StorEdge Configuration Service
   - Sun StorEdge Configuration Service for 6120
4. **Type the related application's uniform resource locator (URL) address in the Sun StorEdge Configuration Service text field.**

   This application launches when you click the Launch Device Manager button associated with storage devices from the storage Assets page.
5. **Click Save.**

▼ To Add the Sun Sun StorEdge Diagnostic Expert Software Application

1. **Click the Administration tab.**
2. **Scroll down the page to the Applications section.**
3. **Type the Sun StorEdge Diagnostic Expert software application uniform resource locator (URL) address in the Sun StorEdge Diagnostic Expert text field.**

   This application launches when you click the Launch Health Application button on the Health page.
4. **Click Save.**

▼ To Add the McDATA Enterprise Fabric Connectivity (EFC) Switch Management Application

---

Note – If you do not add the McDATA EFC Manager application, the switch management application (SAN Pilot) embedded on the McDATA Switch launches from the Device Manager button instead.

---

1. **Click the Administration tab.**
2. **Scroll down the page to the Applications section.**
3. **Type the McDATA EFC Manager application path name in the McDATA EFC Manager text field.**

   This application launches when you click the Launch Device Manager button associated with McDATA switch devices from the switch Assets page.
4. **Click Save.**

Managing Alarms

This section describes the procedures that enable the `admin` user to view and manage alarms. The Status page is the default page shown after you log in and it shows an Alarms summary table.

Showing Alarms from Diagnostic Expert

The Status page also shows the Show Diagnostic Alarms button. When you click this button, the Sun StorEdge Diagnostic Expert software launches in separate web browser. You must have already installed this software and typed the application URL link at the Administration page. See "To Add the Sun Sun StorEdge Diagnostic Expert Software Application" on page 58.

Note – If you already have the Sun StorEdge Diagnostic Expert software open in a web browser, clicking the Show Diagnostic Alarms button displays the Alarms page in that browser. Otherwise, a separate browser window opens, where you are prompted to log in to the software.

Alarm Severity Levels

The software reports topology reporter alarms occurring at four alarm levels shown in TABLE 3-2.

TABLE 3-2 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 your immediate attention.
Major	A serious error has occurred. For example, this alarm type might occur if one subsystem has failed. This alarm type requires your immediate attention.
Minor	An error or user action has occurred that requires your attention. For example, the `admin` user might have removed an asset. However, the error does not require your immediate attention.

▼ To View Alarm Details

1. **Click the Alarms tab.**

   The Alarms page is displayed. The default view in the Alarms table shows all alarms.

2. **(Optional) Click Show All Rows to display all reported alarms.**

   If a large number of alarms exist, it might take a few minutes to display them all.

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

   - Choose one of the following links 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.

   The page shows the alarm details. See TABLE 3-2 for a description of alarm severity levels.

4. **To return to the alarm summary table, click the All link.**

▼ Example: To Find the Device that Caused An Alarm

Note – You can use the Sun StorEdge Diagnostic Expert to check device health and view more detailed status. You can also check the alarm status that is reported to the topology reporter software as a result of clicking the alarm Description link in the summary table.

---

1. **Click the Alarms tab.**
2. **Click a Description link.**

   An Alarm table is displayed that includes alarm details. For example, note the items in this example in **bold text**:

CODE EXAMPLE 3-1 Alarm Description Details

```
Details:    Alarm Gen Service Communication Lost:: category=Array;
            vendor=SEAGATE ; model=ST336605FSUN36G ; subject=Connection Lost on
            Array model object with key =
            CIM_UnitaryComputerSystem:CreationClassName=
            CIM_UnitaryComputerSystem:Name=20000004cf721260:;
            source=
            com.sun.netstorage.mgmt.service.nsm.alarmgen.domestic.AlarmGenServi
            ceImpl;
            subjectTime=Wed Dec 11 08:34:37 MST 2002; sourceTime=Wed Dec 11
            08:34:37 MST 2002; sourceSeqNum=-3475726889546796934; postSeqNum=
            null; topic=status.Fault.Array.SEAGATE :ST336605FSUN36G ; severity=
            3; type=com.sun.netstorage.mgmt.event.nsm.alarmgen
```

3. **Use the Search For menu on this page.**

   a. **Select Storage in the Search For Menu.**

   b. **Type the device name (here, 20000004cf721260).**

   c. **Click Go.**

   The Search Results page enables you to display more details about and perform actions on this device by using the More Actions menu. You can also launch a device management application, if one is available.

▼ To Set the Alarm Expiration Time and Threshold

Note – Ensure that you coordinate the polling interval time and the alarm expiration threshold. For example, if you set the polling interval at 10 minutes and alarm expiration threshold at 5 minutes, alarms might have occurred and expired (that is, not been reported to the software). You would not see alarms in the UI, but they would have occurred. See "Coordinating the Discovery Polling Interval and Alarm Expiration Threshold" on page 32.

---

1. **Click the Administration tab.**
2. **Set the alarm expiration time in the Alarms section:**
   a. **Type a number in the Expiration Time text field.**
   b. **Choose a time interval from the Expiration Time menu.**

      Choose Minutes, Hours, or Days. This option sets how long the alarm remains active, is reported on the Alarms page, and then is closed by the software.
3. **Choose an alarm severity level from the Log Threshold menu in the Logging section.**

Note – All topology reporter alarm events are at the Minor level.

   The level that you choose enables the software to log alarms of that level and below to the log file. For example, select Critical to see all Critical, Major, and Minor alarms.
4. **Click Save.**

▼ To Delete Alarms

1. **Click the Alarms tab.**

   The Alarms page is displayed. The default view in the Alarms table shows all alarms.

2. **Select one or more alarms in the All Alarms table by clicking the check box to the left of the Alarm Severity column.**

3. **Click the Delete Alarms button.**

   A confirmation page is displayed.

4. **Click the Delete button.**

5. **To delete alarms by alarm severity level, choose one of the following links below the Alarms tab to view alarms of that severity level:**

   - Down
   - Critical
   - Major
   - Minor

   See TABLE 3-2 for a description of alarm severity levels.

6. **Repeat Step 2 to Step 5 to continue deleting alarms.**

Viewing and Managing Assets

This section describes the procedures that enable the `admin` user to view and manage assets such as hosts, switches, storage, and host bus adapters (HBAs). The Assets page initially shows an Assets summary table that provides a top-level view of all devices in your SAN or DAS environment.

See "Summary Tables" on page 25 for a description of summary tables.

Searching for Assets

To search for assets in your environment, see "Search For Menu" on page 22.

Show SAN Connectivity Button or Menu Choice

The page that displays when you click this button or menu choice shows all devices in the SAN (across multiple fabrics) connected to the selected host or device:

- A graphic with icons representing connected devices
- A View submenu that enables you to change or filter the topology view, showing all zones (Physical Connectivity) or specific zone details
- Connectivity details when you click the Details button for the currently-displayed device

▼ To Show Asset Details

- **Click one of the links under the Assets page tab:**
  - Summary—default view for this page
  - Hosts
  - Switches
  - Storage
  - HBAs

A summary table for the selected asset is displayed. The summary table also shown on each top-level Assets page (such as the Switches page) can include links to device details and connection paths, depending on the asset page you select.

TABLE 3-3 list the assets and sections that describe the details.

TABLE 3-3 Managing and Viewing Assets

Asset	See This Section
Host machine	"Hosts" on page 67 "To View More Detail About a Host Machine" on page 68 "To View More Detail About Host Machine HBA Connectivity" on page 69 "To View the Paths Between the Host Machine and Its Storage Devices" on page 69
Switches	"Switches" on page 70 "To View More Detail About a Switch" on page 71 "To View Switch Ports" on page 72 "To Launch a Software Application To Manage a Switch" on page 72 "To Remove a Switch From the Software" on page 73 "Managing Switch Credentials" on page 74
Storage	"Storage" on page 77 "To View More Detail About a Storage Device" on page 78 "To View the Connection Path of the Storage Device in the SAN or DAS Environment" on page 79 "To View Storage Device Port Connections" on page 80 "To View Storage Device LUNs" on page 80 "To Launch a Software Application to Manage a Storage Device" on page 81 "To Remove a Storage Device from the Software" on page 81
HBAs	"Host Bus Adapters" on page 82 "To View More Detail About an HBA" on page 82 "To View HBA Path and Port Connections" on page 82

Hosts

The Hosts page, available from the Hosts link on the Assets page, shows a summary table containing the following information:

- Host name

  Click a link in the Name column to show the Details page.
- The vendor and model name
- The operating environment and revision level

This page also includes Remove and Show SAN Connectivity buttons and a More Actions submenu.

▼ To Remove a Host

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

   A Hosts summary table is displayed. This table includes links for the host machine and vendor name.
3. **Click the option button to select the host machine.**
4. **Click the Remove button to remove the host from the software.**

▼ To View More Detail About a Host Machine

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

   A Hosts summary table is displayed. This table includes links for the host machine and vendor name.
3. **Click a host machine link in the Name column.**

   The Details page is displayed. The detail includes:

   - Actions menu, which enables you to:
     - Remove this host - click to remove a host machine from topology reporter. Removing a host or other device deletes it from the list of devices that the software will discover
     - Show SAN Connectivity - see "Show SAN Connectivity Button or Menu Choice" on page 65
     - Show DAS - display any directly-attached storage details, including host HBA ports and connected storage devices
     - Show Paths - enables you to display a graphical representation of all existing paths between the selected host and storage device. See "Show Path Button or Menu Selection" on page 24
     - Show HBA Ports - displays HBA port details, including information such as World Wide Name, port type, and so on
   - Vendor and model name
   - The operating environment and revision level
   - Links to the host machine's HBAs
   - An Annotation text field that is used to include additional information or messages about the device
4. **To associate a comment with an asset, type message text in the Annotation text field and click Save.**

▼ To View More Detail About Host Machine HBA Connectivity

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

   A Hosts summary table is displayed. This table includes links for the host machine and vendor name.
3. **Click the option button to select the host machine.**
4. **Select Show HBA Ports from the Actions menu.**

   The resulting page shows HBA details for the HBAs installed in this host.

HBA Ports for v4u-220c

HBA	Status	Address ID	Port WWN	Port Type	Node WWN
v4u-220c:c2	OK	108700	210100e08b27e84e	N	200100e08b27e84e
v4u-220c:c3	OK	108f00	210000e08b07e84e	N	200000e08b07e84e
v4u-220c:c4	OK	104700	210100e08b24fa52	N	200100e08b24fa52
v4u-220c:c5	OK	104f00	210000e08b04fa52	N	200000e08b04fa52
v4u-220c:c6	OK	108100	210100e08b2425b3	N	200100e08b2425b3
v4u-220c:c7	OK	108300	210000e08b0425b3	N	200000e08b0425b3
v4u-220c:c8	Unknown	0	210000e08b07a0b6	Unknown	200000e08b07a0b6
v4u-220c:c9	OK	11100	210100e08b27a0b6	N	200100e08b27a0b6

FIGURE 3-2 HBA Port Detail Table

Note – The HBA link consists of two separate links for host and HBA port details in the form of *hostname*:*port*. Click these *hostname* and *port* links for device details

---

▼ To View the Paths Between the Host Machine and Its Storage Devices

See "Show Path Button or Menu Selection" on page 24 and "Viewing Your SAN or DAS Environment (Topology Tab)" on page 36.

Switches

This section describes how to view and manage switches in your SAN or DAS environment. "To Launch a Software Application To Manage a Switch" on page 72 describes how to launch a software application in another web browser to manage a switch.

The Switches page, available from the Switches link on the Assets page, shows a summary table containing the following information:

- Switch name and IP address
- World Wide Name (WWN)
- Vendor and model name
- The firmware revision level

This page also includes Remove and Launch Device Manager buttons and a More Actions submenu. The submenu choices are:

- Show SAN Connectivity - enables you to display a graphical representation of all existing paths between the selected host and storage device. See "Show SAN Connectivity Button or Menu Choice" on page 65.
- Show Diagnostic Alarms - launches the Sun StorEdge Diagnostic Expert software in separate web browser. You must have already installed this software and typed the application URL link at the Administration page. If you already have the Sun StorEdge Diagnostic Expert software open in a web browser, clicking the Show Diagnostic Alarms button displays the Alarms page in that browser. Otherwise, a separate browser window opens, where you are prompted to log in to the software.
- Show Ports - displays switch port details, including information such as World Wide Name, port number, and status. See "Show Path Button or Menu Selection" on page 24.

▼ To View More Detail About a Switch

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

   A Switches summary table is displayed.
3. **Click a switch name link in the Name column.**

   The Switch Details page is displayed and shows the following:

   - Actions submenu, which enables you to:
     - Remove a switch - click to remove a switch from topology reporter. Removing a switch device deletes it from the list of devices that the software will discover
     - Launch Device Manager button - opens a switch management application in a separate browser or other window
     - Show SAN Connectivity - see "Show SAN Connectivity Button or Menu Choice" on page 65
     - Show Diagnostic Alarms - launches the Sun StorEdge Diagnostic Expert software in separate web browser. You must have already installed this software and typed the application URL link at the Administration page
     - Show Ports - displays switch port details, including information such as World Wide Name, port number, and status. See "Show Path Button or Menu Selection" on page 24
   - IP address and WWN
   - Vendor and model name
   - Firmware revision level
   - Domain ID
   - An Annotation text field that is used to include additional information or messages about the device
4. **To add a comment about the asset, type message text in the Annotation text field and click Save.**

▼ To View Switch Ports

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

   A Switches summary table is displayed.
3. **Click a switch name link in the Name column.**
4. **Choose Show Ports from the Switch Actions menu.**

   The Ports summary table is displayed.
5. **Click the option button in the table to select a port.**
6. **Click the Show Attached Ports button.**

   The Attached Ports table is displayed. Note that the device in the Device column is a clickable link. When clicked, the link then displays a device details page.

▼ To Launch a Software Application To Manage a Switch

Note – See also "Managing Applications" on page 55.

---

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

   A Switches summary table is displayed.
3. **Click an option button next to the device name to select that device.**
4. **Click the Launch Device Manager button.**

   The software launches the related switch management application in another web page. For example, the launched software for Brocade Communications Systems switches require that you provide a user name and password to log in to the web server residing in the switch. For switches using the SANsurfer software, a window opens, requiring you to enter a host name (for example, *hostname*:0.0) where the application will display.

▼ To Remove a Switch From the Software

1. **Click the Assets tab.**

   The Assets page is displayed.

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

3. **Click an option button next to the device name to select that device.**

4. **Click Remove.**

   A confirmation page is displayed.

5. **Click Remove.**

   The switch is removed from the software database of devices in your SAN or DAS environment.

Managing Switch Credentials

The discovery agent of the software contacts the hardware 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 hardware and add an authorized user so that the switch can report its status to the software.

Note – If the switch requires a user name and password to access the devices and you have not entered this information through the browser user interface or command-line interface, you might see error messages related to XML parsing or other exceptions. To fix this, you need to enter the switch information into the software.

Finding the Switch IP Address, User Name, and Password

The typical out-of-the-box default login information for a switch is:

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

To find the IP address, contact your system administrator or click the switch graphic in the Topology page 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.

Note – This step makes the software aware of switch user names and passwords and does not change existing switch settings.

▼ To Add a Switch Credential Profile

Note – These steps makes the software aware of switch user names and passwords and does not change existing switch settings.

---

1. **Click the Administration tab.**
2. **Click the Out-of-band Credentials link under the Administration tab.**
   The Out-of-band Credentials page is displayed.
3. **Click the Add button.**
4. **Type the required information in the related text field:**
   - Address—IP address of the switch
   - User Name—The user's login name for the switch. Typically this field is `admin`.
   - Password—The default is a blank password if you choose not to use one.
   - Verify Password—If you use a password, type it again.
5. **Click Save.**
   A confirmation page is displayed.

▼ To Modify a Switch Credential Profile

6. **Click the Out-of-band Credentials link under the Administration tab.**
   The Out-of-band Credentials page is displayed.
7. **Click the option button next to the IP Address column to select a user.**
8. **Click the Modify button.**
9. **Type the required information in the related text field:**
   - User Name—The user's login name for the switch. Typically this field is `admin`.
   - Password—The default is a blank password if you choose not to use one.
   - Verify Password—If you use a password, type it again.
10. **Click Save.**
    A confirmation page is displayed.

▼ To Delete a Switch Credential Profile

1. **Click the Administration tab.**
2. **Click the Out-of-band Credentials link under the Administration tab.**
   The Out-of-band Credentials page is displayed.
3. **Click the option button next to the IP Address column to select a user.**
4. **Click Delete.**
   A confirmation page is displayed.
5. **Click Delete.**
6. **Click Save.**

Storage

The Storage page, available from the Storage link on the Assets page, shows a summary table containing the following information:

- Disk drive or storage device name - Click a link in the Name column to show the Details page.
- Status and IP address
- Vendor and model name
- Firmware revision level

This page also includes Remove and Launch Device Manager buttons and a More Actions submenu. The submenu choices are:

- Show SAN Connectivity - enables you to display a graphical representation of all existing paths between the selected host and storage device. See "Show SAN Connectivity Button or Menu Choice" on page 65
- Show Paths - see "Show Path Button or Menu Selection" on page 24
- Show Diagnostic Alarms - launches the Sun StorEdge Diagnostic Expert software launches in separate web browser. You must have already installed this software and typed the application URL link at the Administration page. If you already have the Sun StorEdge Diagnostic Expert software open in a web browser, clicking the Show Diagnostic Alarms button displays the Alarms page in that browser. Otherwise, a separate browser window opens, where you are prompted to log in to the software
- Show Ports - displays port details, including information such as World Wide Name, port number, and status
- Show LUNs - view LUN details

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

▼ To View More Detail About a Storage Device

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed.

3. **Click a storage name link in the Name column.**

   The Detail page is displayed. The detail includes:

   - More Actions submenu, which enables you to:
     - Remove this device
     - Launch Device Manager
     - Show SAN Connectivity - see "Show SAN Connectivity Button or Menu Choice" on page 65
     - Show Diagnostic Alarms - launches the Sun StorEdge Diagnostic Expert software launches in separate web browser. You must have already installed this software and typed the application URL link at the Administration page.
     - Show Ports - displays port details, including information such as World Wide Name, port number, and status
     - Show Paths - see "Show Path Button or Menu Selection" on page 24
     - Show LUNs - see "To View Storage Device LUNs" on page 80
   - IP address and WWN
   - Vendor and model name
   - Firmware revision level
   - An Annotation text field that is used to include additional information or messages about the device

4. **To add a comment about the asset, type message text in the Annotation text field.**

5. **Click Save.**

   A confirmation page is displayed.

▼ To View the Connection Path of the Storage Device in the SAN or DAS Environment

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed.

3. **Click the link in the Name column to select a device.**

4. **Choose Show Paths from the Storage Actions menu.**

5. **Perform one of the following at the displayed page:**

   - Select Host Name and type the device name in the text field.
   - Select a device in the table.

6. **Click Next.**

7. **Perform one of the following:**

   - Click the option button and type a storage name in the Storage Device Name text field.
   - Click the option button in the table to select one of the devices.

8. **Click Finish.**

   The Show Paths results page displays all existing paths between the selected host and storage device. The SAN Paths graphic might span multiple fabrics and displays both full and partial paths. A DAS Path graphic is displayed only if the host and storage device are directly connected.

   See also:

   - "Tooltips" on page 21
   - "Show Path Button or Menu Selection" on page 24
   - "Viewing Your SAN or DAS Environment (Topology Tab)" on page 36

▼ To View Storage Device Port Connections

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed which shows the port WWN and node WWN.

3. **Click the link in the Name column to select a device.**

4. **Choose Show Ports from the Storage Actions menu.**

5. **Click the option button in the table to select a device.**

6. **Click the Attached FPorts button.**

   The Attached Ports page is displayed, showing a Ports summary table. The table includes the Port Type, Port WWN, Device Type, and Device columns. Note that the device in the Device column is a clickable link. This link displays switch or other device details table.

▼ To View Storage Device LUNs

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed.

3. **Click the option button next to the Name column to select a device.**

4. **Choose Show LUNs from the More Actions menu.**

   The LUNs summary table is displayed. Note the storage device link that, when clicked, shows storage device details. See "To View More Detail About a Storage Device" on page 78.

▼ To Launch a Software Application to Manage a Storage Device

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed.

3. **Click an option button next to the device name to select that device.**

4. **Click the Launch Device Manager button.**

   The software launches the related storage management application in another web page. For example, the launched configuration service software for Sun StorEdge T3 storage arrays requires that you provide a user name and password to log in to the software.

   See "Managing Applications" on page 55 and "Using the Configuration Service for Sun StorEdge T3, T3+, and 6120 Arrays" on page 56.

Note – If you already have a configuration service web-browser window open and click the Launch Device Manager button, a new window **does not** open. That is, another instance of the software is not launched.

▼ To Remove a Storage Device from the Software

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   A Storage summary table is displayed.

3. **Click the option button next to the Name column to select a device.**

4. **Click the Remove button.**

   A confirmation page is displayed.

5. **Click the Remove button.**

   The storage device is removed from the software database of devices in your SAN or DAS environment.

Host Bus Adapters

This section describes how to view and manage HBAs in your SAN or DAS environment.

▼ To View More Detail About an HBA

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   An HBA summary table is displayed. This table includes device path, device name links, host name, vendor or model name, and firmware revision level.

3. **Click a device name link in the Path column.**

   The Device Detail page is displayed. The detail includes:

   - Host name of the machine where the HBA is installed
   - Device path
   - Vendor or model name
   - Firmware revision level
   - Show Ports button to view HBA port details

▼ To View HBA Path and Port Connections

1. **Click the Assets tab.**

   The Assets page is displayed.

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

   An HBA summary table is displayed. This table includes device path, device name links, host name, vendor or model name, and firmware revision level.

3. **Click the option button next to the Device Path column to select a device.**

4. **Click the Show Ports button.**

   A Ports Device Details page is displayed. The table shown includes two buttons:

   - Show Paths button
   - Show Attached Ports button

5. **Click the Show Paths button.**

6. **Perform one of the following at the displayed page:**
   - Click the option button and type a host name in the Host Name text field.
   - Click the option button in the table to select one of the hosts.
7. **Click Next.**
8. **Perform one of the following:**
   - Click the option button and type an IP address in the Storage Device IP Address text field.
   - Click the option button in the table to select one of the devices.
9. **Click Finish.**

   The Show Paths page under the Topology tab is displayed. A graphic showing the path from your host to the storage device appears on this page. See "Viewing Your SAN or DAS Environment (Topology Tab)" on page 36.
10. **Perform** Step 1 **to** Step 4**.**
11. **Click the Show Attached Ports button.**

    The Attached Ports table is displayed.

    Note that the device in the Device column is a clickable link. This link displays the Device Details page related to the device attached to the HBA port. For example, if the device is a switch, see "To View More Detail About a Switch" on page 71.

Launching the Sun StorEdge Diagnostic Expert Software (Health Tab)

When you click the Health tab, another web browser opens to enable you to use the Sun StorEdge Diagnostic Expert software. This software requires a user name and password.

You add this application as described in "Managing Applications" on page 55.

Note – If you already have a Sun StorEdge Diagnostic Expert web browser window open and click the Launch Health Application button, a new window **does not** open. That is, another instance of the software is not launched.

▼ To Launch the Sun Sun StorEdge Diagnostic Expert Software

1. **Click the Health tab.**
2. **Click Launch Sun StorEdge Diagnostic Expert.**

   A new web browser opens and prompts you to log into the software.
3. **Enter a user name and password.**

   The Master Configuration window is displayed. See the *Sun StorEdge Diagnostic Expert User Guide* (part number 817-0195-10) for more information.

Launching the Software from the Sun Management Center Software

The topology reporter software includes components that enable it to work with the Sun™ Management Center software. If you have installed and configured the software according to the procedures in the *Sun StorEdge Enterprise Storage Manager 1.2 Software Installation Guide* (part number 817-1037-10), you can use the Sun Management Center software to view management and agent station status and to launch the topology reporter web-browser user interface.

▼ To Launch the Software from the Sun Management Center Main Console

1. **Open the Sun Management Center main console window.**

   See the *Sun Management Center 3.0 Software User's Guide* (part number 806-5942-10, available at `http://docs.sun.com`) for information.

2. **Select the machine configured as the topology reporter management station from the Sun Management Center main console window.**

3. **Make sure that the management and agent station software is running on the selected machine.**

   - Click Tools and select Details.

   The Details window is displayed. See FIGURE 3-3.

   - Click the Browser tab and expand Remote Systems until the Topology Reporter folder is shown.
   - Select the Topology Reporter folder.

   Make sure that the management and agent station Value is `installed` and the Status is `running`.

   - Close the Details window and return to the Sun Management Center main console window.

4. **Click Tools and select Enterprise Storage Manager from the menu.**

   See FIGURE 3-4.

5. **A web browser window is displayed.**

6. **Log in to the software as described in "Logging In to the Web Browser" on page 16.**

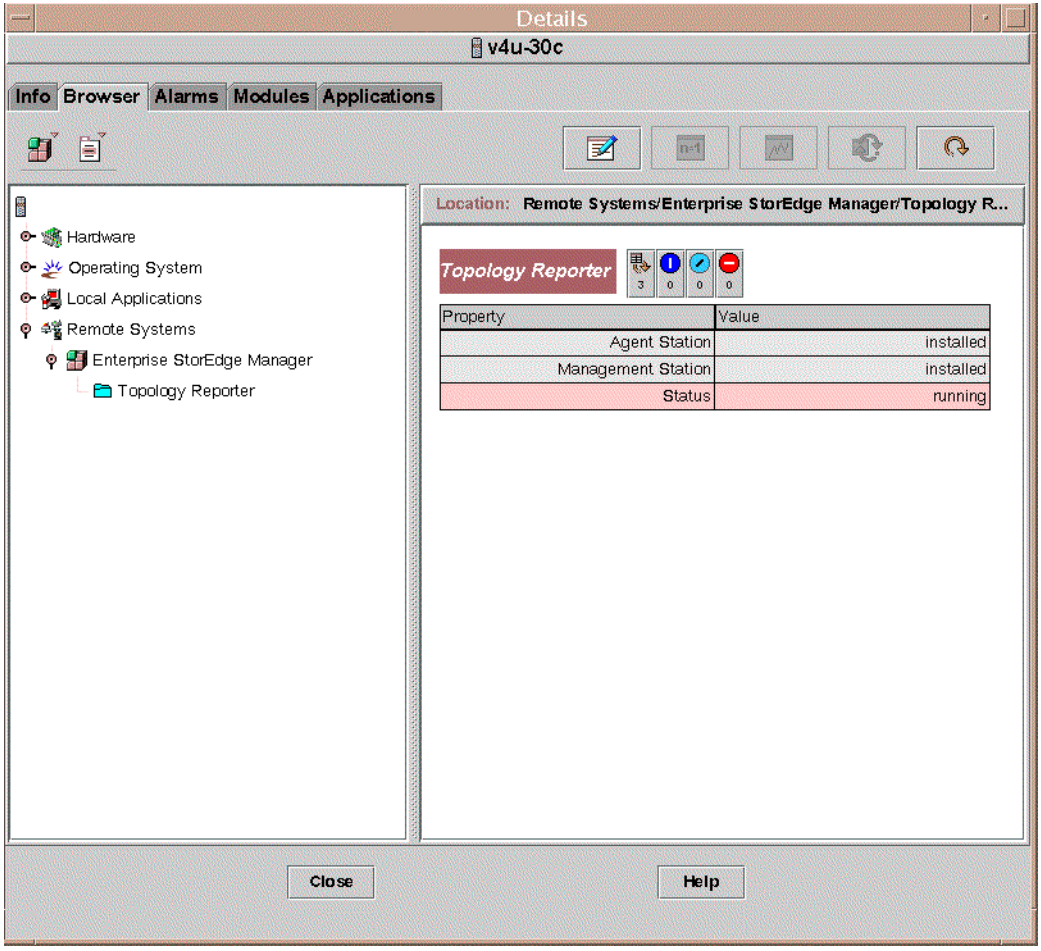

FIGURE 3-3 Sun Management Center Details Window

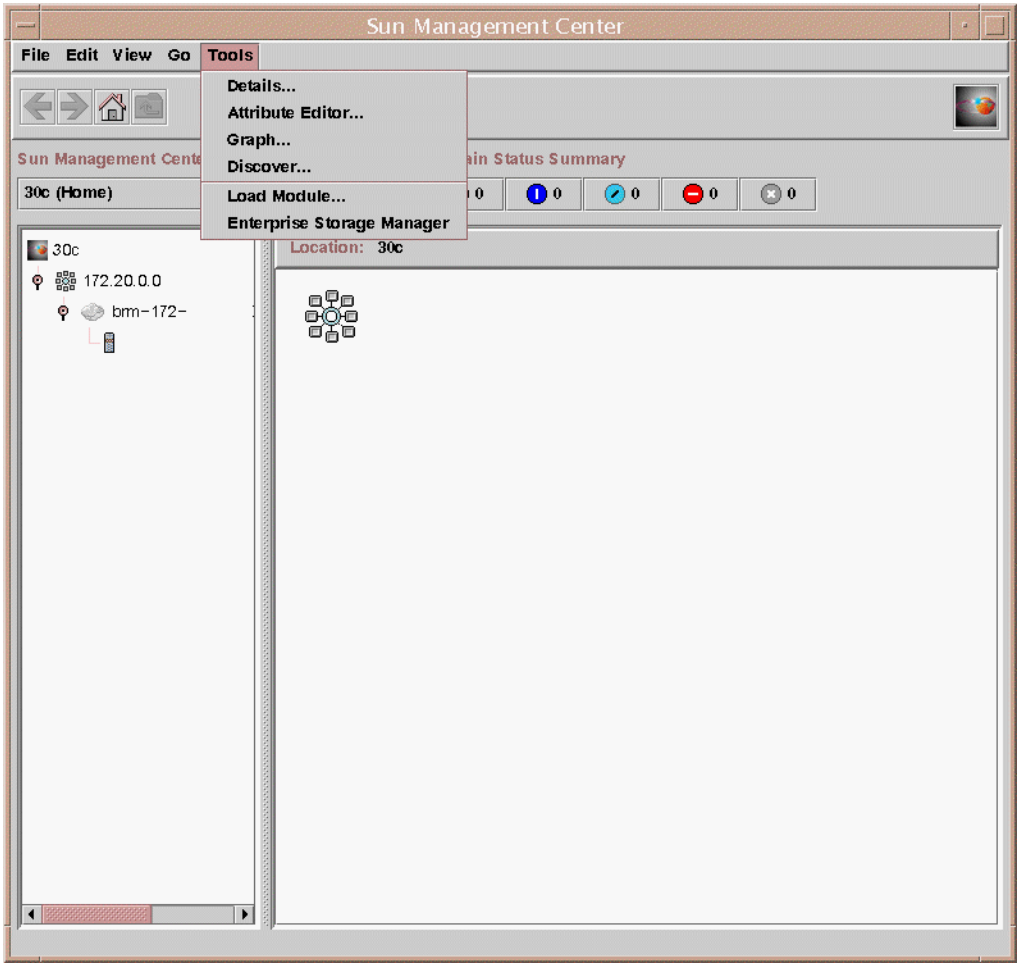

FIGURE 3-4 Sun Management Center Tools Menu

CHAPTER 4

Using the Software Through the Command Line Interface (sstr Command)

Note – Issue these commands from the management station.

This chapter describes the topology reporter `/opt/SUNWnsm/bin/sstr` command line and options. The `sstr` command enables you to perform the same software operations as you can 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.

This chapter includes the following topics:

Command Syntax and Usage Summary

The `sstr`(1M) command is the command-line interface (CLI) for the software. The `sstr` command enables you to display your storage area network (SAN) and direct-attached storage (DAS) host, host bus adapter (HBA), switch, and storage device information. It also enables you to manage users, alarms, and user email options. These commands are the CLI equivalent of functions that are also available from the UI.

You can type this command with its subcommands and options from a terminal command line from the management station. Depending on your role as identified by the administrative user `admin`, you might not be able to execute all commands. The three roles associated with the software permissions are `admin`, `operator`, and `guest` (TABLE 3-1).

▼ To Display a List of Subcommands

- **Type:**

```
# sstr --help
```

▼ To Display a Usage Summary of the Subcommands

- **Type:**

```
# sstr subcommand --help
```

where *subcommand* is one of the subcommands shown in TABLE 4-1.

Short and Long Option Names

Note – When you use a double hyphen option, do not type a space between hyphens.

The `sstr` command can accept a short or long name for each option. A short name option requires a single hyphen (`-`). A long name option requires a double hyphen (`--`). This section shows the short name and the long name options separated by a comma. For example, `sstr add-user -r,--role guest` *user-name*.

sstr Subcommand Table

TABLE 4-1 shows the subcommands sorted by alphabetical order. You can also see the `sstr`(1M) man page.

TABLE 4-1 `sstr` Subcommands Sorted By Alphabetical Order

Command and Subcommand	Description	See This Section
add-user	Add a user to the database of users authorized to use the software.	"Administering Users" on page 96
add-credential	Add a credential profile (the user name, password, and IP address) for the out-of-band switches currently configured in the software.	"Managing Switch Credentials (IP Addresses and User Login)" on page 113
alarm	Display details about a specific alarm by *alarm-id*. Use the `sstr alarms` command to list all current alarms with their IDs.	"Managing Alarms" on page 106
alarms	Display a list of all current alarms in your SAN or DAS.	"Managing Alarms" on page 106
application applications	Display or add the external applications that are launchable from the browser interface.	"Managing Applications" on page 105
assets	Display a brief summary of your SAN or DAS assets: host, host bus adapter (HBA), switch, and storage devices.	"Viewing Asset Status and Topology" on page 107
connectivity	Display the device path for the specified host, HBA, switch, or storage device *device-name*.	"Viewing Asset Status and Topology" on page 107
create-email-notification	Add a user who will receive notification of an alarm according to the alarm severity level by email or pager.	"Managing User Email Notification" on page 99
create-snmp-notification	Enables you to add the type of alarm notifications and host machine to report to the SNMP client by alarm level, hostname, port number, and locale.	"Administering SNMP Trap Notification" on page 102
credentials credential	Display the user name, password, and IP address for the out-of-band switches currently configured in the software.	"Managing Switch Credentials (IP Addresses and User Login)" on page 113
das	Display DAS (direct-attached storage) topology instead of SAN topology.	"Viewing Asset Status and Topology" on page 107
delete-alarm	Delete an alarm by its ID number. Use the `sstr alarms` command to show alarm IDs.	"Managing Alarms" on page 106
delete-email-notification	Remove a notification.	"Managing User Email Notification" on page 99

TABLE 4-1 `sstr` Subcommands Sorted By Alphabetical Order *(Continued)*

Command and Subcommand	Description	See This Section
delete-snmp-notification	Deletes an email or SNMP alarm notification by its ID. The `sstr snmp-notification` command shows the ID.	"Administering SNMP Trap Notification" on page 102
discover	Enables the admin user to start asset discovery (to retrieve the current status about hosts, HBA, switches, and storage devices in the SAN or DAS environment) or to show the last time asset discovery occurred.	"Managing Discovery" on page 119
email-notification	Enables the admin user to change the attributes of a user who will receive notification of an alarm.	"Managing User Email Notification" on page 99
email-notifications	Display a list of email alarm notifications or enable or disable the notification feature.	"Managing User Email Notification" on page 99
fabric fabrics	Enables you to display a system view of all assets in the specified SAN fabric.	"Viewing Asset Status and Topology" on page 107
hba	Display information about a specific HBA.	"Managing Host Bus Adapters" on page 117
hbas	Display information about all host bus adapters (HBAs) in your SAN.	"Managing Host Bus Adapters" on page 117
hba-ports	Display information about HBA ports.	"Managing Host Bus Adapters" on page 117
host	Display information about the host specified by *hostname*.	"Managing Host Machines" on page 109
hosts	Display information about all hosts in your environment.	"Managing Host Machines" on page 109
modify-address	Change existing settings.	"Managing Switch Credentials (IP Addresses and User Login)" on page 113
modify-user	Change existing user attributes.	"Administering Users" on page 96
paths	Display the paths between the host and its attached storage. The information shown includes the fabric, zone, switch name, switch port, device name, device type, and device port.	"Managing Host Machines" on page 109

TABLE 4-1 `sstr` Subcommands Sorted By Alphabetical Order *(Continued)*

Command and Subcommand	Description	See This Section
port-connections	Display information about the storage device, host bus adapter, or switch, such as status, World Wide Name (WWN), and so on.	"Managing Switches" on page 111
remove-credential	Deletes a switch credential profile (IP address and associated user information).	"Managing Switch Credentials (IP Addresses and User Login)" on page 113
remove-hba	Remove the specified HBA from the list of devices managed by the software.	"Managing Host Bus Adapters" on page 117
remove-host	Remove the specified host from the list of devices managed by the software.	"Managing Host Machines" on page 109
remove-storage	Deletes a storage device from the set of devices being managed by the software	"Managing Storage" on page 115
remove-switch	Deletes the specified switch from the device set being managed by the software.	"Managing Switches" on page 111
remove-user	Delete a current user.	"Administering Users" on page 96
set-property *property*, where *property* is one of: alarm-expiration contact-email discovery-interval email-notification logging-threshold snmp-notification smtp-server t3-application se6120-application	Set software settings such as alarm expiration time, alarm logging threshold, asset discovery interval, and so on.	"Setting Software Properties" on page 122
show-properties	Display all current software settings.	"Showing Properties" on page 121
snmp-notification	Enables the admin user to change the attributes of the machine that receives the SNMP trap notification information.	"Administering SNMP Trap Notification" on page 102
storage	Display information for a specific storage device.	"Managing Storage" on page 115

TABLE 4-1 `sstr` Subcommands Sorted By Alphabetical Order *(Continued)*

Command and Subcommand	Description	See This Section
storage-list	Display a list of storage devices in the SAN by World Wide Name (WWN). To show information for a single storage device, use the *device-name* where *device-name* is a name such as `t3-49`.	"Managing Storage" on page 115
storage-luns	Display a list of logical unit numbers (LUNs) for a specified storage device.	"Managing Storage" on page 115
storage-ports	Display a list of ports for the specified storage device.	"Managing Storage" on page 115
switch	Display detailed information about the specified switch named *switch-name*.	"Managing Switches" on page 111
switches	Display a list of switches.	"Managing Switches" on page 111
switch-ports	Display detailed information about the switch ports for the specified switch named *switch-name*.	"Managing Switches" on page 111
users	Display information about all users added by the administrator.	"Administering Users" on page 96

Administering Users

This section describes the `sstr` commands for administering users—adding, modifying, deleting, and displaying them. When added, a user can log into the software using his or her user name and password. The user role determines user privileges. See also "If An Admin User Password is Lost or Forgotten" on page 47.

Note – Do not add the superuser (root) user to the list of authorized users. The software cannot authenticate this user.

Before You Add a User

Before you add a user, consider the following:

- Add only those users that already have a user account on the management station
- Users can use their Solaris (UNIX) passwords to log in. They can safely use these passwords because they are encrypted before verification
- `root` and `bin` cannot be added to or use the software

sstr add-user

Note – The superuser user has a default role of guest, a user with read-only privileges.

This command enables the software administrator (a user with a role of `admin`) to add users to the software database of authenticated users. Once added, a user can log into the software using his or her username and password.

If you do not specify a user's role, the default role is `guest`.

Syntax

`sstr add-user` [`-r` ,`--role` *role*] *user-name*

where:

`admin`	An `admin` user has all administration privileges. The `admin` user can add, modify, and delete users, attributes, and devices in the software.
`operator`	An `operator` user can use most of the software features except those that add, modify, or delete users, attributes, and devices. This user can delete alarms. The Administration page in the UI is not available to this user.
`guest`	A `guest` has read-only privileges and can use most features of the software except those that add, modify, or delete users, attributes, and devices. The `guest` user can launch applications if the user has login access to them. The Administration page in the UI is not available to this user.
user-name	The user-name is the user's login name for the machine where the software is installed. The software authenticates the user against the machine's list of users. The software then stores the user information in the software's data base.

sstr modify-user

This command enables the `admin` user to change a user's current role. If you do not specify a user's role, the default role is `guest`.

Syntax

`sstr modify-user` [`-r` ,`--role` *role*] *user-name*

sstr remove-user

This command enables the admin user to remove a user from the software's list of authorized users.

Syntax

sstr remove-user *user-name*

sstr users

Use this command to show information about all users who have been added by the software administrator using the sstr add-user command. This command shows the user name and role.

Syntax

sstr users

Managing User Email Notification

When a device alarm occurs, email is sent by the software to users designated by the `admin` user. These commands enable the `admin` user to manage this capability:

- "`sstr email-notifications`" on page 99
- "`sstr create-email-notification`" on page 99
- "`sstr email-notification`" on page 100
- "`sstr delete-email-notification`" on page 101

See also "Enabling and Disabling Notification" on page 125.

`sstr email-notifications`

This command enables you to display all users who are currently configured to receive email notification of alarms and notification ID information.

Syntax

```
sstr email-notifications
```

`sstr create-email-notification`

This command enables the `admin` user to add a user who will receive notification of an alarm according to the alarm severity level. The user receives the notification by email or a pager.

Syntax

`sstr create-email-notification -e,--email-address` *email-address*
[`-a,--alarm-level` *severity*] [`-m,--medium` {`email | pager`}]
[`-t,--min-interval` *interval*] [`-l,--locale` *locale*]

where:

email-address	The email address of the user to be notified.
severity	The severity level of the alarm. Valid levels are: **down** A fatal nonrecoverable error has occurred. **critical** A serious error has occurred **major** A somewhat serious error has occurred. **minor** An annoying error has occurred.
email pager	The medium to use to send the notification. If not specified, the default is **email**.
interval	The minimum time between messages, in minutes. The default is 0.
locale	The user locale of sent messages. *locale* is one of the following: english french japanese simplified chinese Ensure that you enclose simplfied chinese in quotes ("simplified chinese") if you specify this locale.

`sstr email-notification`

This command enables the `admin` user to change the attributes of a user who will receive notification of an alarm.

Syntax

`sstr email-notification -e,--email-address` *email-address id*
[`-m,--medium {email | pager}`] [`-t,--min-interval` *interval*]
[`-l,--locale` *locale*]

where:

email-address	The email address of the user to be notified.
id	The notification identification. Use the `sstr email-notifications` command without options to display the related notification *id*.

email pager	The medium to use to send the notification. If not specified, the default is **email**.
interval	The minimum time between messages, in minutes. The default is 0.
locale	The user locale of sent messages. *locale* is one of the following: english french japanese simplified chinese Ensure that you enclose simplfied chinese in quotes (“simplified chinese”) if you specify this locale.

`sstr delete-email-notification`

This command deletes the email notification by ID.

Syntax

`sstr delete-email-notification` *id*

where:

id	The notification identification. Use the `sstr email-notifications` command without options to display the related notification *id*.

Administering SNMP Trap Notification

This section describes the `sstr` commands that enable the `admin` user to manage the Simple Network Management Protocol (SNMP) servers and notification.

These commands enable the `admin` user to manage the SNMP trap notification service. This server routes SNMP traps that occur in the SAN or DAS to a particular machine hosting applications that can receive the traps.

See also "Enabling and Disabling Notification" on page 125 and "Specifying the SMTP Mail Server" on page 124.

`sstr snmp-notifications`

This command enables you to display the SNMP details (alarm level, host name, port number, and locale) of all machines that are currently configured to receive SNMP trap information.

Syntax

```
sstr snmp-notifications
```

sstr create-snmp-notification

This command enables the admin user to add the type of alarm notifications reported to the specified SNMP host name by alarm level, port number, and locale.

Syntax

sstr create-snmp-notification -h *hostname* [-a *severity*] [-p *portnumber*]

where:

hostname	The host name of the machine receiving the SNMP trap information. *hostname* must be the fully qualified hostname including the domain. For example: martha.xyzcorp.com
severity	The severity level of the alarm. Valid levels are: **down** A fatal nonrecoverable error has occurred. **critical** A serious error has occurred **major** A somewhat serious error has occurred. **minor** An annoying error has occurred.
portnumber	The SNMP port of the specified machine. The default port is 162.

sstr snmp-notification

This command enables the admin user to change the attributes of the machine that receives the SNMP trap notification information.

Syntax

sstr snmp-notification *id* [-h *hostname*] [-a *severity*] [-p *portnumber*]

where:

id	The notification identification. Use the `sstr snmp-notifications` command without options to display the related notification *id*.
hostname	The host name of the machine receiving the SNMP trap information. *hostname* must be the fully qualified hostname including the domain. For example: `martha.xyzcorp.com`
severity	The severity level of the alarm. Valid levels are: **`down`** A fatal nonrecoverable error has occurred. **`critical`** A serious error has occurred **`major`** A somewhat serious error has occurred. **`minor`** An annoying error has occurred.
portnumber	The SNMP port of the specified machine. The default port is 162.

`sstr delete-snmp-notification`

This command enables the `admin` user to delete the SNMP notification by ID.

Syntax

`sstr delete-snmp-notification` *id*

where:

id	The notification identification. Use the `sstr snmp-notifications` command without options to display the related notification *id*.

Managing Applications

This section describes the commands that enable the `admin` user to manage software applications. Users can launch these external applications from the software UI.

See also "Specifying the Sun StorEdge T3 Array Application" on page 125.

This command enables you to show the software application that is currently configured in the software. The application information includes its name and its path or Uniform Resource Locator (URL) location.

Syntax

```
sstr applications
```

sstr application

This command enables the `admin` user to change the application path or URL.

Syntax

`sstr application` [`-l` *location*] *app-name*

where:

location	The path or URL where the software application is located.
app-name	The name of the software application.

Managing Alarms

This section describes the `sstr` commands that enable the `admin` user to manage alarms according to their ID and severity level.

See also "Setting the Alarm Expiration Interval" on page 122 and "Setting the Alarm Logging Threshold Level" on page 123.

`sstr alarms`

The commands enables you to display a list of current alarms in your SAN or DAS.

Syntax

```
sstr alarms
```

`sstr alarm`

This command enables you to display details about a specific alarm by *id*. Use the `sstr alarms` command to list all current alarms with their IDs.

Syntax

`sstr alarm` *id*

where:

id	The alarm identification. Use the `sstr alarms` command without options to display the related alarm *id*.

`sstr delete-alarm`

This command enables the `admin` user to delete alarms according to their IDs.

Syntax

`sstr delete-alarm` *id*

where:

id	The alarm identification. Use the `sstr alarms` command without options to display the related alarm *id*.

Viewing Asset Status and Topology

These commands enable you to display the assets and the system view of assets (also known as topology).

sstr assets

This command displays a brief summary of all assets: host, host bus adapter (HBA), switch, and storage devices.

Syntax

```
sstr assets
```

sstr connectivity

This command enables you to display the device path for the specified host, HBA, switch, or storage device.

Syntax

`connectivity` *device-name* [*zone-name* [*fabric-name*]]

Where:

device-name	Shows only the specified device by name. If the name includes a space character (for example, HBA 1), enclose the name in double quotes ("HBA 1").
zone-name	Shows only the specified SAN fabric zone. If the name includes a space character (for example, Zone 1), enclose the name in double quotes ("Zone 1").
fabric-name	Specifies the zone fabric name; use this option when two or more fabrics have a zone with the same name.

sstr fabrics

This command displays all fabrics in the SAN.

Syntax

```
sstr fabrics
```

sstr fabric

This command enables you to display a system view of all assets in the specified SAN fabric.

Syntax

`sstr fabric` *fabric-name* [*zone-name*]

Where:

fabric-name	Shows only the specified SAN fabric by name. If the name includes a space character (for example, Primary 1), enclose the name in double quotes (“Primary 1”).
zone-name	Shows only the specified SAN fabric zone. If the name includes a space character (for example, Zone 1), enclose the name in double quotes (“Zone 1”).

sstr das

This command displays DAS (direct-attached storage) topology instead of SAN topology.

Syntax

```
sstr das
```

Managing Host Machines

This section describes the commands that enable the `admin` user to show and manage host machines in the SAN or DAS configuration.

`sstr hosts`

This command enables you to display information about all host machines: host name, vendor or model, and operating environment.

Syntax

`sstr hosts`

`sstr host`

This command enables the `admin` user to show information about a specific host machine and include a text message to associate with the host.

Syntax

`sstr host [-a,--annotation` *annotation*`]` *hostname*

where:

annotation	Text message to associate with this host. Include this text in double-quotes (" ").
hostname	Name of host machine to display.

`sstr paths`

This command enables you to show the storage device path for the named host and storage device.

Syntax

`sstr paths -h,--hostname` *hostname* `-s,--storage` *storage-name*

where:

hostname	Name of host machine to display.
storage-name	Name of the storage device to display.

`sstr remove-host`

This command enables you to remove the specified host from the list of devices managed by the software.

Syntax

`sstr remove-host` *hostname*

where:

hostname	Name of host machine to remove.

Managing Switches

This section describes the commands that enable the `admin` user to show and manage the switch hardware in the SAN or DAS environment.

`sstr switches`

This command enables you to display information about all switches in your environment, including device name, WWN, vendor or model name, and firmware revision level.

Syntax

```
sstr switches
```

`sstr switch`

This command enables you to display information about a specific switch.

Syntax

`sstr switch` [`-a,--annotation` *annotation*] *device-name*

where:

annotation	Text message to associate with this device. Include this text in double-quotes (" ").
device-name	*device-name* is a name such as `ancor155`.

`sstr switch-ports`

This command enables you to display information about a specific switch port number.

Syntax

`sstr switch-ports` *device-name*

where:

device-name	*device-name* is a name such as `brocade55`.

`sstr port-connections`

This command enables you to display information about ports attached to switches.

Syntax

`sstr port-connections` *WWN*

where:

WWN	*WWN* is a port World Wide Name of the device such as: `200000c0dd006e31.`

`sstr remove-switch`

This command enables the `admin` user to remove the switch device from the list of devices managed by the software.

Syntax

`sstr remove-switch` *device-name*

where:

device-name	*device-name* is a name such as `brocade55`.

Managing Switch Credentials (IP Addresses and User Login)

The discovery agent of the software contacts the hardware 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 hardware and add authorized users so that the switch can report its status to the software.

Note – If the switch requires a user name and password to access the devices and you have not entered this information through the browser user interface or command-line interface, you might see error messages related to XML parsing or other exceptions. To fix this, you need to enter the switch information into the software.

The typical out-of-the-box default login information for a switch is:

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

To find out the IP address, contact your system administrator. The user name and password must match the settings you entered for the switch when you used the switch's management tool.

Note – These commands make the software aware of switch user names and passwords and does not change existing switch settings.

After you configure the credentials and the software discovers the switch, click the switch graphic in the Topology page to display the switch IP address.

`sstr credentials`

This command displays the user name and IP address of all switch users currently configured in the software.

Syntax

```
sstr credentials
```

sstr add-credential

This command adds and specifies a user name, password, and IP address profile to associate with a switch device and its related settings.

Syntax

`sstr add-credential -u,--username` *user-name* [`-p,--password` *password*] *ip-address*

where:

user-name	User name to associate with an IP address.
password	Password to assign to the user. The default is a blank password if you do not use this option.
ip-address	IP address of the user.

sstr credential

This command enables the admin user to change a user name, password, and IP address associated with a switch. If you do not specify a password, the current password is replaced with a blank password.

Syntax

`sstr credential -u,--username` *user-name* [`-p,--password` *password*] *ip-address*

sstr remove-credential

This command deletes a profile associated with a device. Execute the `sstr credentials` command after using this command to confirm that the IP address and user is removed.

Syntax

`sstr remove-address` *ip-address*

Managing Storage

This section describes the commands that enable the `admin` user to show and manage the storage devices, ports, and logical unit numbers (LUNs) in the SAN or DAS environment.

`sstr storage-list`

This command enables you to display information about the storage in your environment.

Syntax

`sstr storage-list`

`sstr storage`

This command enables you to display information about a specific storage device in your environment. Information includes the device World Wide Name (WWN), IP address, vendor or model type, and firmware revision level.

Syntax

`sstr storage` [`-a`,`--annotation` *annotation*] [`-i`,`--ip-address` *ip-address*] *device-name*

where:

annotation	Text message to associate with this device. Include this text in double-quotes (" ").
ip-address	IP address of the device.
device-name	*device-name* is a node World Wide Name (WWN) name of the storage device.

sstr storage-luns

This command enables you to display a list of LUNs for the specified device.

Syntax

`sstr storage-luns` *device-name*

where:

device-name	*device-name* is a name such as `t3-49`.

sstr storage-ports

This command enables you to display a list of storage device ports.

Syntax

`sstr storage-ports` *device-name*

where:

device-name	*device-name* is a name such as `t3-49`.

sstr remove-storage

This command enables the `admin` user to remove the storage device from the list of devices managed by the software.

Syntax

`sstr remove-storage` *device-name*

where:

device-name	*device-name* is a name such as `t3-49`.

Managing Host Bus Adapters

This section describes the commands that enable the `admin` user to show and manage the host bus adapters (HBAs) in each host machine.

`sstr hbas`

This command enables you to display information about all HBAs in your SAN or DAS environment, including device path, host name, vendor or model name, and driver or firmware revision level.

Syntax

```
sstr hbas
```

`sstr hba`

This command enables you to display information about a specific HBA in your SAN or DAS environment, including device path, host name, vendor or model name, and driver and firmware revision.

Syntax

`sstr hba` *device-path*

where:

device-path	*device-path* is a device path such as: `/devices/pci@1f,1f,2000/SUNW,qlc@1/fp@0,0:devctl`

sstr hba-ports

This command enables you to display information about HBA ports in your SAN or DAS environment.

Syntax

`sstr hba-ports` *device-path*

where:

device-path	*device-path* is a device path such as: `/devices/pci@1f,1f,2000/SUNW,qlc@1/fp@0,0:devctl`

sstr remove-hba

Delete a specific HBA from the storage environment.

Syntax

`remove-hba` *device-path*

where:

device-path	*device-path* is a device path such as: `/devices/pci@1f,1f,2000/SUNW,qlc@1/fp@0,0:devctl`

Managing Discovery

This command enables the `admin` user to show the last time asset discovery occurred (`--last`) or to start asset discovery. See also "Setting the Discovery Interval" on page 124.

`sstr discover`

Syntax

`sstr discover [-l,--last]`

SAN and DAS Changes and Discovery

Discovery is the process where software agents on agent stations retrieve information about devices in your environment. The agents report it to the software and you can then view this information by using the UI or CLI at a management station.

The first discovery process occurs at system startup time after you install the software. The software then performs its discovery process according to a set interval. If you add or delete assets like hosts, switches, HBAs, and storage in your environment, you can perform a manual discovery to ensure that the new asset is reporting its status to the software.

▼ To Perform a Manual Discovery After a Change to Your SAN or DAS Configuration

1. **Change, add, or delete an asset.**
2. **Wait five to seven minutes.**

   Waiting a few minutes gives the operating environment a chance to register changes to the SAN or DAS environment. This adjustment takes a few minutes, depending on the size of your SAN or DAS environment.
3. **Manually perform a discovery and check for the new asset:**

   a. Type:

```
# /opt/SUNWnsm/bin/sstr discover
```

   b. Check for the new asset by typing:

```
# /opt/SUNWnsm/bin/sstr assets
```

Showing Properties

This command enables you to show the current settings for the software, including the following:

- Alarm expiration time
- Alarm logging threshold
- Discovery interval
- Sun StorEdge T3 array launchable application
- Email (SMTP) and Trap (SNMP) notification status
- SNMP server
- Email contact address

`sstr show-properties`

Syntax

```
sstr show-properties
```

Setting Software Properties

This command enables the `admin` user to set properties such as the following:

Setting the Alarm Expiration Interval

This command enables the `admin` user to set the alarm expiration time. That is, how long the alarm remains active and is then closed. Use this command without options to display the current alarm expiration interval. If you specify more than one option, the largest unit is used.

Note – See also "Coordinating the Discovery Polling Interval and Alarm Expiration Threshold" on page 32.

`sstr set-property alarm-expiration`

Syntax

`sstr set-property alarm-expiration` [`-m` ,`--minutes` *minutes* | `-h` ,`--hour` *hours* | `-d` ,`--days` *days*]

where:

minutes	Specifies how long the alarm remains active in *minutes.*
hours	Specifies how long the alarm remains active in *hours.*
days	Specifies how long the alarm remains active in *days.*

Setting the Alarm Logging Threshold Level

This command enables the `admin` user to set the alarm severity level to log into the `/var/sadm/install/logs/SUNWnsm.log` file. When the alarm reaches the specified or a greater severity level, it is logged.

`sstr set-property logging-threshold`

Syntax

`sstr set-property logging-threshold` [*severity*]

where:

severity	The severity level of the alarm. Valid levels are: `down` - A fatal nonrecoverable error has occurred. `critical` - A serious error has occurred `major` - A somewhat serious error has occurred. `minor` - An annoying error has occurred.

Setting the Administrator Email Contact Address

This command shows or sets the `admin` user contact email address. To show the current address, use the command without options.

`sstr set-property contact-email`

Syntax

`sstr set-property contact-email` [*admin-email-address*]

where:

admin-email-address	The email address of the `admin` user.

Setting the Discovery Interval

This command enables the `admin` user to set the interval at which discovery occurs.

Note – See also "Coordinating the Discovery Polling Interval and Alarm Expiration Threshold" on page 32.

`sstr set-property discovery-interval`

Syntax

`sstr set-property discovery-interval` *polling-interval*

where:

polling-interval	The interval in minutes when the software starts polling all assets.

Specifying the SMTP Mail Server

This command enables the `admin` user to specify the mail server to use for notification. Use this command without options to display the current mail server.

`sstr set-property smtp-server`

Syntax

`sstr set-property smtp-server` [*hostname*]

where

ip-address	The IP address of the mail server machine.
hostname	The host name of the mail server machine. *hostname* must be the fully qualified hostname including the domain. For example: `martha.xyzcorp.com`

Enabling and Disabling Notification

These commands enable the admin user to turn email (SMTP) and trap (SNMP) notification on. Use the command without options to see the current setting.

sstr set-property email-notification

Syntax

```
sstr set-property email-notification [on | off]
```

sstr set-property snmp-notification

Syntax

```
sstr set-property snmp-notification [on | off]
```

Specifying the Sun StorEdge T3 Array Application

This command enables the `admin` user to set or display the name of the management application for the Sun StorEdge T3 storage arrays. Use this command without options to see the current name.

sstr set-property t3-application

Syntax

`sstr set-property t3-application` [*app-name*]

where:

app-name	The name of the software application: `SSCS` or `HiCommand`

Specifying the Sun StorEdge 6000 Family Application

This command enables the `admin` user to set or display the name of the management application for the Sun StorEdge 6000 Family storage. Use this command without options to see the current name.

`sstr set-property se6120-application`

Syntax

`sstr set-property se6120-application` [*app-name*]

where:

app-name	The name of the software application: SSCS or SSCS6120. SSCS is the Sun StorEdge configuration service software; SSCS6120 is the Sun StorEdge configuration service software for the Sun StorEdge 6000 Family.

CHAPTER 5

The sstr_ctl Command

This chapter describes the `sstr_ctl`(1M) command. Use this command to configure, start, and stop the topology reporter software. You can also back up and restore the software database.

This chapter includes the following topics:

Command Syntax and Usage Summary

The `/opt/SUNWnsm/bin/sstr_ctl` command is the command-line interface for administrative control of the software. (It does not control the features of the software. See the `sstr`(1M) man page.)

Type this command with its subcommands from a terminal command line.

Syntax

```
sstr_ctl [start|stop|-s|-b|-r|-c|-p|-v] [-h|--help]
```

TABLE 5-1 `sstr_ctl` Subcommands

Option	Description
start	Starts all software components. See "Starting and Stopping the Software" on page 129.
stop	Stops all software components. See "Starting and Stopping the Software" on page 129.
-s (--status)	Displays the currently-running software components.
-b (--backup)	Backs up the database information. See "Backing Up and Restoring the Database" on page 132.
-r (--restore)	Restores the database information. See "Backing Up and Restoring the Database" on page 132.
-c (--configure)	Configures the software. See "Configuring the Software" on page 130.
-p (--printcfg)	Displays the current software properties, such as configured ports, Apache and Tomcat server names, and so on. See "Displaying Software Properties" on page 134.
-v (--version)	Displays the version information.
-h (--help)	Shows a syntax usage statement.

Short and Long Option Names

Note – When you use a double hyphen option, do not type a space between hyphens.

The `/opt/SUNWnsm/bin/sstr_ctl` command can accept a short or long name for each option. A short name option requires a single hyphen (-). A long name option requires a double hyphen (--) You can use the short or long name options when using this command.

For example, to show software status, type one of the following:

- **`sstr_ctl -s`**
- **`sstr_ctl --status`**

Starting and Stopping the Software

Ensure that you start the software on the management station and each agent station after you install and configure the software, as described in the *Sun StorEdge Enterprise Storage Manager 1.2 Installation Guide*.

- **To start the software, open a terminal window and type:**

```
# /opt/SUNWnsm/bin/sstr_ctl start
```

The software displays messages showing each software process starting.

- **To stop the software, open a terminal window and type:**

```
# /opt/SUNWnsm/bin/sstr_ctl stop
```

The software displays messages showing each software process stopping.

Configuring the Software

Use the `/opt/SUNWnsm/bin/sstr_ctl` command to configure the software on your management station and each agent station (the command detects the station type). The command displays a series of prompts to set your configuration. In most cases, you can accept the default answers.

The example in CODE EXAMPLE 5-1 shows the user responses in **bold** text.

If You Configure the Software More Than Once

If you install and configure the software and then want to reconfigure it later, you must stop the software. If you do not stop the software and it is running while you attempt to configure it, the software detects that ports are in use.

When you run the `sstr_ctl -c` command, the software allows you to choose the next available port number. For example, it will allow you to choose port 8280 but not port 8180.

- **To stop the software, type the following on the management station and each agent station:**

```
# /opt/SUNWnsm/bin/sstr_ctl stop
```

Default Ports for Installation

The default ports for the software are:

Port Number	Description
8180	Non- Secure Socket Layer (SSL) port. For example: `http://`*hostname*`:8180/nsm/`
8543	SSL port. For example: `https://`*hostname*`:8543/nsm/`
1024	Apache HTTP server port
5437	Postgres SQL data base port

Where Configuration Information is Stored

When you successfully complete the procedures in this section, the software writes this information to the `/opt/SUNWnsm/etc/sstr.properties` file.

Caution – Do not manually edit this file. Use the `sstr_ctl -c` command only.

CODE EXAMPLE 5-1 Configuration Script Example Responses

```
Run PostgreSQL server on port 5437 [y,n,?] y

Run Tomcat non-SSL server on port 8180 [y,n,?] y

Run Tomcat SSL server on port 8543 [y,n,?] y

Run Apache server on port 1024 [y,n,?] y

Do you want to use the Apache email address drew@hostname.domain y,n,?] y

Do you want to use the SLP scope nsmscope [y,n,?] y

Configuration successful.
```

▼ To Configure the Software

1. **Log into your machine as the root user.**
2. **Configure the software.**

```
# /opt/SUNWnsm/bin/sstr_ctl -c
```

3. **Respond to the prompts shown in** CODE EXAMPLE 5-1 **with your system information.**

See "Starting and Stopping the Software" on page 129 and "Logging In to the Web Browser" on page 16.

Backing Up and Restoring the Database

The agent software collects information from devices in your environment and stores it in a database. This database then contains information to build a data model of your environment. The agent software polls your environment and updates the data model based on any new events or changes in device status.

You can manually back up and restore the database information using the `sstr_ctl` command. To automatically back up the database, use these commands as part of a `cron`(1M) job.

Note – You can choose to back up and restore the database as the `sstr001` user. This user is created by the software installation process which does not set a password. To set a password for the `sstr001` user, use the `passwd` command. See the `passwd`(1) man page.

▼ To Back Up the Database

1. **At the management station, back up the database by typing:**

```
# /opt/SUNWnsm/bin/sstr_ctl --backup
```

The software displays messages showing each software process stopping. It also displays the following messages when it starts backing up the database.

```
Performing SSTR PostgreSQL database backup.

SSTR PostgreSQL database backup process complete.

Performing SSTR CRE backup.

SSTR CRE backup process complete.

SSTR backup process complete.
```

2. **Restart the software.**

```
# /opt/SUNWnsm/bin/sstr_ctl start
```

The software displays messages showing each software process starting.

▼ To Restore the Database

1. **At the management station, restore the database by typing:**

```
# /opt/SUNWnsm/bin/sstr_ctl --restore
```

The software displays messages showing each software process stopping. It also displays the following messages when it starts restoring up the database.

```
Performing SSTR PostgreSQL database restore.

SSTR PostgreSQL database restore process complete.

Performing SSTR CRE restore.

SSTR CRE restore process complete.

SSTR restore process complete.
```

2. **Restart the software.**

```
# /opt/SUNWnsm/bin/sstr_ctl start
```

The software displays messages showing each software process starting.

Displaying Software Properties

The `sstr_ctl --printcfg` command displays the current software properties, such as configured ports, Apache and Tomcat server names, and so on.

The command prints the contents of the `/opt/SUNWnsm/etc/sstr.properties` file.

Checking for Running Software Components

Perform the following steps to ensure that the required software application processes are running.

▼ To Check for Running Components

- **Check for running components.**

```
# /opt/SUNWnsm/bin/sstr_ctl --status
```

The following messages are displayed (if the machine is both station types, all messages display):

- **If the machine is a management station:**

```
Status of Sun StorEdge(TM) Topology Reporter Components

Core Components:

PostgreSQL for SSTR.............running.
The CRE for SSTR................running.
Tomcat for SSTR.................running.

Supporting Applications:

SLP.............................running.
iPlanet iMQ.....................running.
```

- **If the machine is an agent station:**

```
Status of Sun StorEdge(TM) Topology Reporter Components
Core Components:

Apache for SSTR.................running.
SLP.............................running.
```

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