# Storage Automated Diagnostic Environment 2.2 User's Guide

System Edition

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# Preface

The *Storage Automated Diagnostic Environment User's Guide* explains how to use the Storage Automated Diagnostic Environment graphical user interface (GUI) to collect data about the condition of devices associated with the Sun StorEdge 3900 and 6900 series systems and the Sun StorEdge™ 6320 and 6320SL systems.

This preface contains the following sections:


- "Intended Audience" on page xvii
- "How This Book Is Organized" on page xviii
- "Using UNIX Commands" on page xviii
- "Typographic Conventions" on page xix
- "Shell Prompts" on page xix
- "Related Sun Documentation" on page xx
- "Related Brocade Documentation" on page xxi
- "Sun Welcomes Your Comments" on page xxii


## Intended Audience

This guide is written for system administrators and support personnel who are already familiar with Sun™ disk array and storage area network (SAN) products. In addition:

- You should be familiar with UNIX commands and Sun's disk array products before attempting to use the Storage Automated Diagnostic Environment software.
- System administrators should be knowlegeable about security risks associated with installing a web server. Take the appropriate action to protect access to the `SUNWstads` port 7654.

# How This Book Is Organized

This book contains the following topics:

**Chapter 1** provides an overview and general operating instructions for the Storage Automated Diagnostic Environment.

**Chapter 2** contains detailed installation and configuration information for the Storage Automated Diagnostic Environment.

**Chapter 3** explains the maintenance functions that are necessary for setting up the Storage Automated Diagnostic Environment for the first time, or for making necessary changes, to ensure proper monitoring and notification.

**Chapter 4** explains the monitoring functions that you can perform using the Storage Automated Diagnostic Environment, including monitoring devices, monitoring topology, and monitoring logs.

**Chapter 5** discusses the functionality of Storage Automated Diagnostic Environment diagnostic tests from the GUI and the diagnostic tools that are available.

**Chapter 6** discusses the various reports and lists associated with the Storage Automated Diagnostic Environment.

**Chapter 7** explains the system tools and utilities specific to performing administrative tasks, all of which are optional. This chapter includes the Sun StorEdge 3900 and 6900 series and the Sun StorEdge 6320 and 6320SL system utilities, which enable the user to manage the components for the Sun StorEdge solutions.

**Chapter 8** briefly describes the online help associated with the Storage Automated Diagnostic Environment, including utilities, man pages, the event grid, and the GUI online help.

# Using UNIX Commands

This document does 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

# Typographic Conventions

| Typeface | Meaning | Examples |
|---|---|---|
| `AaBbCc123` | The names of commands, files, and directories; on-screen computer output | Edit your `.login` file.<br>Use `ls -a` to list all files.<br>`% You have mail.` |
| **`AaBbCc123`** | What you type, when contrasted with on-screen computer output | `% su`<br>`Password:` |
| *AaBbCc123* | Book titles, new words or terms, words to be emphasized | Read Chapter 2 in the *User's Guide*.<br>These are called *class* options.<br>You *must* be superuser to do this. |
| | Command-line variable; replace with a real name or value | To delete a file, type `rm` *filename*. |

# Shell Prompts

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

# Related Sun Documentation

| Product | Title | Part Number |
|---|---|---|
| **Sun StorEdge T3+ array** | • *Sun StorEdge T3+ Array Installation and Configuration Manual* | 816-4769 |
| | • *Sun StorEdge T3 and T3+ Array Administrator's Guide* | 816-0776 |
| **Sun StorEdge 6120 array** | • *Sun StorEdge 6120 Array Release Notes* | 816-4771 |
| | • *Sun StorEdge 6120 Array Start Here* | 816-4768 |
| | • *Sun StorEdge 6120 Array Regulatory and Safety Compliance Manual* | 816-0774 |
| | • *Sun StorEdge 6120 Array Installation and Configuration Manual* | 816-4769 |
| | • *Sun StorEdge 6120 Array Administrator's Guide* | 816-4770 |
| | • *Sun StorEdge T3, T3+, Array Cabinet Installation Guide* | 806-7979 |
| **Sun StorEdge network FC switch-8 and switch-16** | • *Sun StorEdge SAN 4.0 Release Guide to Documentation* | 816-4470 |
| | • *Sun StorEdge SAN 4.0 Release Installation Guide* | 816-4469 |
| | • *Sun StorEdge SAN 4.0 Release Configuration Guide* | 806-5513 |
| | • *Sun StorEdge SAN 4.0 Release Regulatory and Compliance Manual* | 816-5246 |
| | • *Sun StorEdge Network 2 Gbit FC Switch-16 FRU Installation* | 816-5285 |
| | • *Sun StorEdge SAN 4.0 Release Notes* | 816-4472 |
| **Sun StorEdge 3900 and 6900 series** | • *Sun StorEdge 3900 and 6900 Series Version 2.0 Installation Guide* | 816-5252 |
| | • *Sun StorEdge 3900 and 6900 Series Version 2.0 Service and Reference Guide* | 816-5253 |
| | • *Sun StorEdge 3900 and 6900 Series Version 2.0 Release Notes* | 816-5254 |
| | • *Sun StorEdge 3900 and 6900 Series Version 2.0 Troubleshooting Guide* | 816-5255 |
| **Sun StorEdge 6320 or 6320SL series information** | • *Sun StorEdge 6320 or 6320SL Series Version 1.1 Installation Guide* | 816-5252 |
| | • *Sun StorEdge 6320 or 6320SL Series Version 1.1 Reference and Service Guide* | 816-5253 |
| | • *Sun StorEdge 6320 or 6320SL Series Version 1.1 Regulatory and Safety Compliance Manual* | 816-5257 |
| | • *Sun StorEdge 6320 or 6320SL Series Version 1.1 Site Prep Guide* | 816-5256 |
| **Solaris** | • *Solaris Handbook for Sun Peripherals* | 806-2210 |

## Accessing Sun Documentation

- **View, print, or purchase a broad selection of Sun documentation, including localized versions, at:**

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

# Related Brocade Documentation

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

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

## Accessing Brocade Documentation

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

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

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

   **You can obtain the user ID and password information from your Sun Partner representative.**

**Note –** You must have a Brocade Partner login and password to access the documentation.

# Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can email your comments to Sun at:

`docfeedback@sun.com`

Please include the part number (*817-0192*) of the document in the subject line of your email.

CHAPTER 1

# Overview of the Storage Automated Diagnostic Environment

This chapter includes the following topics:


- "Introduction" on page 1
- "How the Software Works" on page 2


## Introduction

This chapter describes the Storage Automated Diagnostic Environment, which is a distributed online health and diagnostic monitoring tool for storage area network (SAN) and direct attached storage (DAS) devices. It can be configured to monitor on a 24-hour basis, collecting information that enhances the reliability, availability, and serviceability (RAS) of the storage devices.

The Storage Automated Diagnostic Environment 2.2 product encompasses several levels of functionality with different product deliverables. The current levels are as follows:

- The Device Edition (`SUNWstade` package)—supports non-Enterprise and legacy domains. The Storage Automated Diagnostic Environment 2.2 User's Guide Device Edition part number is 817-0822-10.
- The System Edition (`SUNWstads` package)—supports the Sun StorEdge 3900 and 6900 series and Sun StorEdge 6320 or 6320SL systems.

This user guide documents the System Edition.

The Storage Automated Diagnostic Environment offers the following features:

- A common web-based user interface for device monitoring and diagnostics
- Distributed test invocation by means of lists or graphical topology. You can run the tests through the Storage Automated Diagnostic Environment GUI or through the command-line interface (CLI).
- Topology grouping for multilevel hosts and components.
- Revision checking.
- Support for the Storage Service Processor and virtualization engine components of the Sun StorEdge 3900 and 6900 series and Sun StorEdge 6320 or 6320SL systems.
- Remote notification through SRS, SRS/NetConnect, Sun StorEdge℠ Remote Response service, HTTP and SNMP providers, or email.
- Encryption by way of a Secure Socket Layer (SSL) protocol to protect transmitted information.

# How the Software Works

The Storage Automated Diagnostic Environment uses a variety of system tools to monitor various devices. These system tools are executed by device-specific modules within the software. All information generated by the Storage Automated Diagnostic Environment is standardized to the common information model (CIM).

The Storage Automated Diagnostic Environment program executes at fixed intervals from the `cron`(1M) facility and relies on a configuration file describing each device that needs to be monitored. Whenever the devices can be discovered automatically, manual configuration entries are not required. The tasks required to configure the software are simplified by the use of a web browser-based GUI.

The Storage Automated Diagnostic Environment captures instrumentation data from, or associated with, the storage devices and applies rules to convert this into a set of events. These events contain information that characterizes the operational behavior of the device. Some of these events can represent conditions that require service action, in which case the event is tagged as an alert.

The Storage Automated Diagnostic Environment sends alerts and events to various recipients through a set of notification facilities, such as email, or email targeted at a pager. In addition, the software can send events as a telemetry stream through the providers to a secure central repository at Sun. This enables the information to be used for product improvement and enables Sun trained personnel to be more effective in providing service, both proactive and reactive.

Because the Storage Automated Diagnostic Environment is executed from a `cron` command and relies on the Internet services daemon (`inetd`(1M)) for communication and for the management console, storage space and resource requirements are kept at a minimum.

To minimize email transmission, the Storage Automated Diagnostic Environment keeps a state database on the local host running the agent. This database keeps state information from one execution to the next. When applicable, information is compared and only the differences are sent.

## How the Software Monitors Devices

Monitoring varies from device to device but usually consists of the following methods. The Storage Automated Diagnostic Environment typically:

- Finds and monitors message log files for the device and reports new, relevant entries
- Executes commands to probe the device for status, state, and statistics information
- Probes the device remotely for information, for devices that support remote access through a management path

## Other Functions the Software Performs

For each device, the Storage Automated Diagnostic Environment performs the following functions:

- Sends the information, by way of a discovery event, to the system administrator, the Network Storage Command Center (NSCC), or to other storage management platforms through an interface with the transport mechanisms

---

**Note –** The first access to a device yields a discovery event that collects all the information about that device.

---

- Reads the proper `/var/adm/messages` files, finds relevant entries, and reports them as events through the local email notification mechanism, if configured
- Monitors host message files for errors

- Connects directly through in-band data paths and/or out-of-band management paths (Ethernet) of Sun StorEdge devices, and collects status information
- Reads the device's configuration and state information, stores it locally in the cache, compares the results of the last run, and transmits the differences
- Reads threshold information and reports errors when the frequency threshold reaches predefined levelsDiagnostic tests have been integrated into the Storage Automated Diagnostic Environment for device diagnostics and field replaceable unit (FRU) isolation. Each test can be run individually from the command line or from the software's user interface.
- Runs tests for device diagnostics and field-replaceable unit (FRU) isolation. Each test can be run individually from the command line or from the user interface.

CHAPTER 2

# Configuration

This chapter presents instructions for configuring and starting the SUNWstads package, which is the system edition of the Storage Automated Diagnostic Environment, on your system.

This chapter includes the following main topics:


- "Host Requirements" on page 5
- "Configuring the Software" on page 6
- "Installing a Patch" on page 9
- "Launching the Storage Automated Diagnostic Environment" on page 14


## Host Requirements

The SUNWstads package is installed on a Storage Service Processor on a management workstation in the /opt/SUNWstade directory. The Storage Automated Diagnostic Environment supports the Storage Service Processor and virtualization engine components of the Sun StorEdge 3900 and 6900 series and Sun StorEdge 6320 or 6320SL systems.

## Host Access Requirements

The host must have access to the following:

- `/var/adm/messages` files, to where device logs are sent.
- `/var/adm/messages` files to where Sun StorEdge 6120 system device logs are sent. The name of the file appears on the Sun StorEdge 6120 system message log configuration screen for each host.
- Sun StorEdge 6120 arrays and/or the Sun StorEdge network FC switch-8 and switch-16 switches over TCP/IP.
- The data path of the devices being monitored (for SAN data path monitoring)

### Additional Host Information

- The host must be able to run a browser to complete and maintain the monitored configuration.
- The Storage Service Processor (which is defined as a *Solaris server host*) connects to Sun storage devices "out-of-band" through the Ethernet.

# Configuring the Software

After you have successfully installed the Storage Automated Diagnostic Environment but before you launch it, there are several tasks you must perform. These tasks include editing the configuration files and manually running the `ras_install`(1M) installation script and the `config_solution`(1M) configuration script.

- Execute the command `/opt/SUNWstade/bin/ras_install` to install the SUNWstade service and `cron`. Refer to "Running the ras_install Script" on page 8.
- Execute the command `/opt/SUNWstade/sysbin/config_solution` to create the topology, find the devices, and run the agents.

For example, execute the following command for the Sun StorEdge 6910 system:

```
# cd /opt/SUNWstade/sysbin
# ./config_solution -m 6910 -a
```

The config_solution script output is displayed:

**CODE EXAMPLE 2-1** `config_solution` script output

```
# ./opt/SUNWstade/sysbin > ./config_solution -m 6910 -a sp0: v1a:

-> found VE (v1a / 192.168.0.20 / 2900006022004188) v1b:
  -> found VE (v1b / 192.168.0.21 / 2900006022004193) v2a: v2b: sw1a:
  -> found switch (192.168.0.30 / 100000c0dd00b1f4) sw1b:
  -> found switch (192.168.0.31 / 100000c0dd0057aa) sw2a:
  -> found switch (192.168.0.32 / 100000c0dd008467) sw2b:
  -> found switch (192.168.0.33 / 100000c0dd00b170) t3b0: t3b1:
  -> found t3 (192.168.0.41 / 50020f230000aebe/50020f230000ae6c
slr-mi.370-3990-02-e-f2.044734)
t3b2: t3b3: t3be0: t3be1:t3be2: t3be3: t3be4:

====================================
|     Configuration Summary         |
------------------------------------
|  Model : 6910, Requested = 6910
|  Switch: 4, ports=8
|        : sw1a, sw1b, sw2a, sw2b,
|  Arrays: 1
|        : t3b1,
|  SVEs  : 2
|        : v1a, v1b,

====================================
NO ERRORS FOUND!
Snapshot /opt/SUNWstade/DATA/Inventory.golden saved!
Config rasagent.conf saved!
Topology created!
Running /opt/SUNWstade/bin/rasagent -d2
Agent has been run
Done.

/opt/SUNWstade/sysbin >
```

## Running the ras_install Script

The ras_install script establishes a Storage Automated Diagnostic Environment entry in the cron tab, and restarts the cron daemon. The ras_install script also alters the /etc/inetd.conf and the /etc/services files to enable the host to serve the GUI for configuring and setting up the Storage Automated Diagnostic Environment.

- Using the following procedure, you should run the ras_install script in these circumstances:
  - Before you execute the config_solution(1M) command
  - When you need to modify the cron command
  - When you install a patch
  - When you need to change the title of a host agent

## Using the Sun Management Center (SunMC) Provider

The Storage Automated Diagnostic Environment software is capable of sending alarms for the devices it supports to the Sun Management Center, also known as *SunMC*. The SUNesras software is optionally installed on the Sun MC server host.

---

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

---

### ▼ To Install and Activate the SUNesras Packages

1. **Download and install the SunMC agent on the selected host.**
2. **Using the standard Solaris pkgadd(1) utility, install the SUNesras software on the same host as the SunMC agent.**
3. **Using the Storage Automated Diagnostic Environment software GUI, set the SunMC fields. In the *IP Address* field, enter the IP address or name of the host where the SunMC module is installed. See "SunMC Provider" on page 47 for more information.**

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

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

# Installing a Patch

Patches are **not mandatory** if you have the most recent `SUNWstade` package installed. See the Sunsolve web site for the most recent patches.

---

**Note –** When installing a patch to the Storage Automated Diagnostic Environment, stop the agents before installing the patch (see "Start and Stop Agents" on page 68). Then, run `ras_install` after installing the update.

---

## ▼ To Install a Patch

1. **Download the latest Storage Automated Diagnostic Environment patch from the Sunsolve web site to a temporary workspace.**
2. **As superuser, use the `patchadd` (1M) command and answer the prompts as follows.**

```
# cd /tmp
# uncompress xxxxxx-xx.tar.Z
# tar xvf xxxxxx-xx.tar

# patchadd xxxxxx-xx .

# /opt/SUNWstade/bin/ras_install -options
```

3. **Rerun `ras_install`.**

   See "Starting the Storage Automated Diagnostic Environment Services" on page 10.

# Starting the Storage Automated Diagnostic Environment Services

1. **Run** `ras_install`.

```
# cd /opt/SUNWstade/bin
# ./ras_install

/opt/SUNWstade/sbin: cd /opt/SUNWstade
/opt/SUNWstade: cd bin
/opt/SUNWstade/bin: ras_install

   **** Installing the Package and Crons ****

? Do you want to turn on https security [Y/N](default=N)
? Select language for GUI [en] (default=en)

   *** Install ***

This script will now add the inet service to the inetd config file.
When this scripts ends, go to the IP Name/Address of the HOST configured as
port 7654, with a browser to complete the configuration.


/etc/services is now updated.
/etc/inetd.conf is now updated.

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

- Resetting the inetd services to see the new rashttp service.

- Testing access to the webserver, (this will timeout after 30 secs) ...
  ***** ping 'xxxx.central.sun.com' succeeded!
  1/6 attempting to contact agent service...

  *** Contacted agent service ***

  SUNWstade installed properly!

To complete the configuration, point your browser to http://<hostname>:7654. Use the
browser only after package has been installed on all hosts.

/opt/SUNWstade/bin:
```

2. **Indicate whether you want to turn on the security feature.**

```
Do you want to turn on https security? Y/N[1]
(Default=N)
```

1 `https` security is the Secure Sockets Layer (SSL). The SSL encrypts and authenticates messages sent between a browser and the web server. Encryption using public key cryptography ensures the privacy of the messages sent between the client and the browser. Plain HTTP messages are sent across the network in ASCII format. Authentication using a trusted certification authority ensures that the client can trust the server to be what it claims to be.

The `/etc/services` file is updated with the Storage Automated Diagnostic Environment HTTP port number (7654) to open the GUI on that port.

3. **Specify whether you want to start or stop the `cron` command.**

When you run the `ras_install` script, a `cron`(1M) entry is added to the `cron` facility, based on your answer to the following question:

```
? Do you want to C=start or P=stop Storage Automated Diagnostic Environment
cron [C/P, default=C] : C
```

---

**Note –** For testing purposes or upon initial configuration, you can skip the `cron` activation during the installation and start the `cron` command later by rerunning the `ras_install` script.

---

The text of the `cron` entry that executes is as follows:

```
0,5,10,15,20,25,30,35,40,45,50,55 * * * *  \
/opt/SUNWstade/bin/rasagent -c >> /opt/SUNWstade/log/cron.log 2>&1
```

In this example, the `cron` command attempts to start the `rasagent` program every five minutes. However, if the agent takes longer than five minutes to run, due to the size of the configuration, the program will abort.

# Sun StorEdge 6320 System Configuration Example

`config_solutions`(1M) options, shown in TABLE 2-1, are used to configure the `/var/opt/SUNWstade/DATA/Inventory.golden` file, which is included on the Storage Service Processor (the Storage Service Processor is a component of Sun StorEdge 6320 or 6320SL systems). See CODE EXAMPLE 2-2 for an example of the output from a `/var/opt/SUNWstade/DATA/Inventory.golden` file.

Creating a golden file on the Storage Service Processor is required *before* the Storage Automated Diagnostic Environment GUI is launched. If this step is not done, the Storage Automated Diagnostic Environment posts an error during discovery and prompts the user to run the command.

**TABLE 2-1** `config_solutions`(1M) options

| Options | Description |
|---|---|
| **-h**=*help* | Displays help information. |
| **-i**=*ip_prefix* | Specifies the subnet prefix. The default is `ifconfig` for `dmfe1`. |
| **-m**=*expected_model* | Specifies the specific model of the configuration. For example: `config_solution -m 6320`<br>Valid options are 6320 and 6320SL (SL means switchless). |

**Note –** The `Solution.golden` snapshot is created during the manufacture and upgrade of a Sun StorEdge 6320 or 6320 SL system. See CODE EXAMPLE 2-2 for an example of a `Inventory.golden` snapshot.

**CODE EXAMPLE 2-2** Sun StorEdge 6320 System Configuration Example

```
$ config_solution -m 6320 -a

/st:  /opt/SUNWstade/sysbin/config_solution -m 6320 -a
sp0:
t3b0:
  -> found 6120 (192.168.0.40 / 50020f230000e0eb/50020f230000ddb8
                slr-mi.501-5709-05-50.057579)
t3b1:
  -> Warning: cannot ping 192.168.0.41
     Device is not responding or not present in this configuration
t3b2:
  -> Warning: cannot ping 192.168.0.42
     Device is not responding or not present in this configuration
t3b3:
  -> Warning: cannot ping 192.168.0.43
     Device is not responding or not present in this configuration
t3be0:
  -> Warning: cannot ping 192.168.0.50
     Device is not responding or not present in this configuration
t3be1:
  -> Warning: cannot ping 192.168.0.51
     Device is not responding or not present in this configuration
t3be2:
  -> Warning: cannot ping 192.168.0.52
     Device is not responding or not present in this configuration
t3be3:
  -> Warning: cannot ping 192.168.0.53
     Device is not responding or not present in this configuration
t3be4:
  -> Warning: cannot ping 192.168.0.54
     Device is not responding or not present in this configuration
====================================
|     Configuration Summary         |
------------------------------------
|  Model : 6320, Requested = 6320
|  Switch: 0 *  ports
|         :
|  6120s : 1
|         : t3b0,
|  VEs   : 0
|         :
====================================
NO ERRORS FOUND!
Snapshot /opt/SUNWstade/DATA/Inventory.golden saved!
Config rasagent.conf saved!
Topology created!
Running /opt/SUNWstade/bin/rasagent -d2
Agent has been run
Done.

/st:
```

# Launching the Storage Automated Diagnostic Environment

After you have executed `ras_install`, you can launch the Storage Automated Diagnostic Environment graphical user interface (GUI) from a web browser. The Storage Automated Diagnostic Environment GUI is a browser-based tool that enables you to maintain and tune the functions of the software. To use the browser, point to the host (7654) of the Storage Automated Diagnostic Environment.

---

**Note –** Sun StorEdge 3900 and 6900 series and Sun StorEdge 6320 and 6320SL systems must have the `/var/opt/SUNWstade/DATA/Inventory.golden` file created on the Storage Service Processor before you launch the GUI.

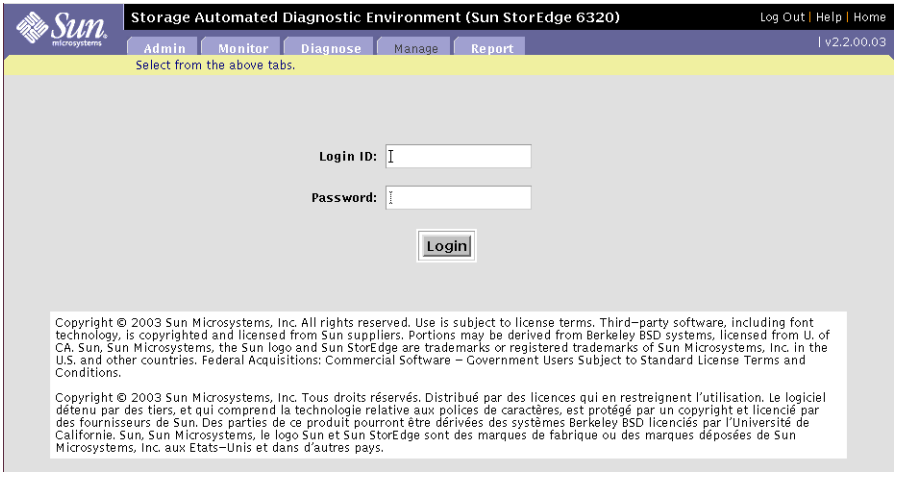
---

## ▼ To Start the Graphical User Interface

1. **Open a web browser and go to `http://hostname:7654`**

   where *hostname* is the IP address or the host name.

   The Login window is displayed.



**Note –** If you use Netscape™ 6.2.*x* with the secure socket layer (SSL) enabled, you must point the browser to `https://hostname` *without* the port number.

2. **Log in to the configuration service with your assigned login ID and password.**

   The Storage Automated Diagnostic Environment main window is displayed, and all the functionality is enabled.

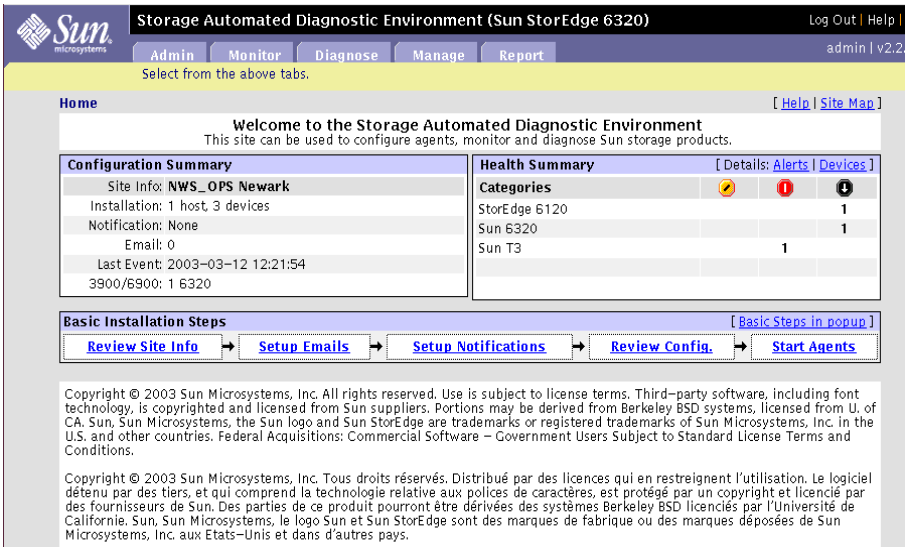
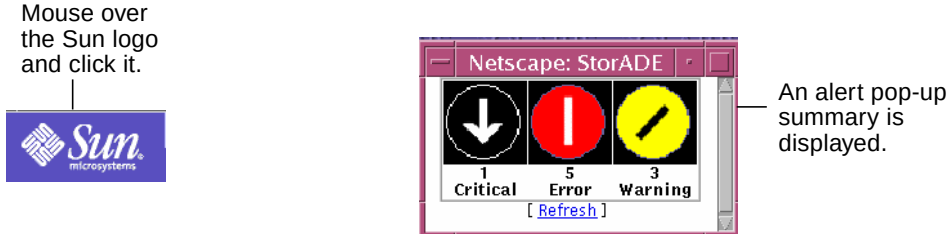



**FIGURE 2-1** Storage Automated Diagnostic Environment Main Window

3. **You can mouse over the Sun logo and click it to display a pop-up window that summarizes the alerts.**

   Use this information as the first step in fault isolation and troubleshooting.



CHAPTER 3

# Administrative Functions

This chapter describes the tasks that are necessary for maintaining the Storage Automated Diagnostic Environment, and contains the following main topics:


- "Primary Maintenance Functions" on page 18
- "Using the General Maintenance Functions" on page 23
- "Topology Maintenance" on page 59
- "System Utilities" on page 63

# Primary Maintenance Functions

**TABLE 3-1** Storage Automated Diagnostic Environment Primary Maintenance Functions

| Task | Purpose |
|---|---|
| Maintain host information<br><br>Refer to “Maintaining Hosts” on page 26. | • Supports the maintenance of host-specific information such as host name, location, and IP address.<br>• Tests the availability of the Storage Automated Diagnostic Environment on each host using the Ping Slaves function. |
| Add or update the site information.<br><br>Refer to “Maintaining Site Information” on page 24. | Supports the maintenance of customer information and configuration information, including:<br>• Customer name, contract number, and location information<br>• Default local message files<br>• Device category selection<br>• Monitoring frequency |
| Maintain devices<br><br>Refer to “Maintaining Devices” on page 30. | Supports the maintenance of device-specific information. With the Maintain devices functionality, you can update or delete existing devices. |
| Set up local email and pager notification.<br><br>Refer to “Customizing Email Deliveries” on page 34. | Enables local notification information:<br>• Enables specific events to be emailed to local administrators. Events can be categorized by device type, severity level, and event type. Events can also be summarized and sent to a pager’s email address.<br>• Enables events to be automatically translated from their internal encoded format to a human-readable format. |
| Set up a Provider.<br><br>Refer to “To Set Up Providers” on page 42. | Relays events generated by health monitors. |
| Control agent activity.<br><br>Refer to “Start and Stop Agents” on page 50. | Temporarily stops the Storage Automated Diagnostic Environment from running on a selected host. |
| Start or stop devices.<br><br>Refer to “To Activate or Deactivate Monitoring on a Device-by-Device Basis” on page 53. | If the device is being tested, or if faults are being injected into the device intentionally, temporarily stops the notifications for a specific device. |

**TABLE 3-1** Storage Automated Diagnostic Environment Primary Maintenance Functions *(Continued)*

| | |
|---|---|
| Test email.<br><br>Refer to “To Send Test Email” on page 54. | Sends test emails and messages to verify the mailing capability of the Storage Automated Diagnostic Environment. |
| Review configurations.<br><br>Refer to “To Review the Configuration” on page 54. | Verifies all configuration settings. |
| Change configuration options.<br><br>Refer to “Configuration Options” on page 55. | Enables you to change defaults on selected configuration options. |
| Optimize fault signature analysis (FSA).<br><br>Refer to “Optimization and Fault Signature Analysis (FSA)” on page 58. | Aggregates alerts that share common FRUs and attempts to summarize them into more specific groups for root cause analysis. |

## ▼ To Access the General Maintenance Window

1. **Click the Admin tab on the Storage Automated Diagnostic Environment main window.**

   Admin is divided into three sections: General Maintenance, Topology Maintenance, and System Utilities.

2. **Use the General Maintenance functions to configure the Storage Automated Diagnostic Environment.**

   TABLE 3-2 provides a description of each general maintenance function.

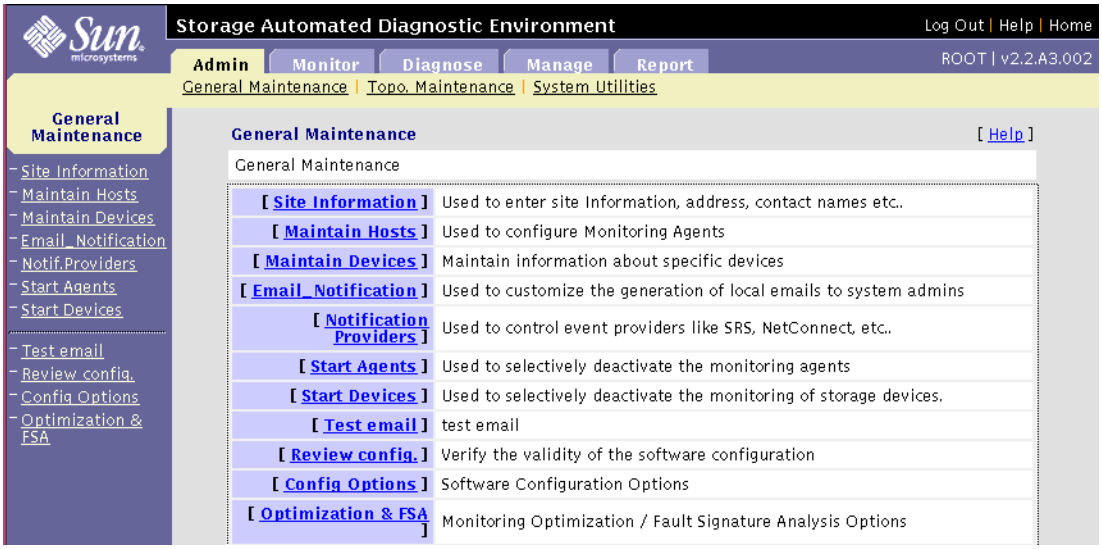



**FIGURE 3-1** General Maintenance Window

**TABLE 3-2** General Maintenance Functions

| General Maintenance Function | Description |
|---|---|
| Site Information | Complete the mandatory fields, denoted with an asterisk (*) before you proceed. |
| Maintain Hosts | Enables agent configuration. |
| Maintain Devices | Enables the Storage Automated Diagnostic Environment to manually add devices or delete unwanted devices or to change the agent's reference to the device(s) being monitored. |
| Email Notification | Enables the configuration of certain types of events for specific device types, and sends an automatic email to a list of multiple users' email addresses.<br><br>This option can be fully customized to streamline notifications; for example, in addition to specifying email addresses, you can specify pager numbers. |
| Notification Providers | The selections you make here instruct the Storage Automated Diagnostic Environment to use the appropriate protocol to send the device data collected by the agent modules back to Sun. |
| Start / Stop Agent | Enables the Storage Automated Diagnostic Environment to start or stop agents from executing. |
| Start / Stop Devices | Enables the Storage Automated Diagnostic Environment to start or stop the alert notification of an event for one or more selected devices.<br><br>This function does not stop the monitoring of the device and the interface to the provider. |
| Test Email | Enables the Storage Automated Diagnostic Environment to generate a generic email and send it to the list of recipients configured during Email Notification. |

**TABLE 3-2** General Maintenance Functions *(Continued)*

| | |
|---|---|
| Review Config | Enables the Storage Automated Diagnostic Environment to verify all settings and to display instructions for those that have been missed or for those that should be double-checked. |
| Config Options | Use this window to update existing configuration options. |
| Optimization/FSA | Fault Signature Analysis (FSA) aggregates alerts that share common suspect FRUs. After a set of events is generated, but before the events are sent as email or sent to the NetConnect provider, the FSA module attempts to summarize into fewer and more specific, actionable events. The aggregation of events often points to a root cause of the problem, whereas events are merely *symptoms* of a problem. |

# Using the General Maintenance Functions

This section explains how to use the functionality in the General Maintenance section and contains the following topics:


- "Maintaining Site Information" on page 24
- "Maintaining Hosts" on page 26
- "Maintaining Devices" on page 30
- "Customizing Email Deliveries" on page 34
- "Using Providers" on page 41
- "Start and Stop Agents" on page 50
- "To Send Test Email" on page 54
- "To Review the Configuration" on page 54
- "Configuration Options" on page 55

# Maintaining Site Information

On a new installation, the mandatory site information is filled in with default data. The customer must update the mandatory fields shown in FIGURE 3-2.

## ▼ To Maintain Site Information

1. **From the General Maintenance Window (**FIGURE 3-1**), select Site Information and complete the mandatory fields on this page.**

   The fields with an asterisk (*) are mandatory.

2. **Click Submit.**

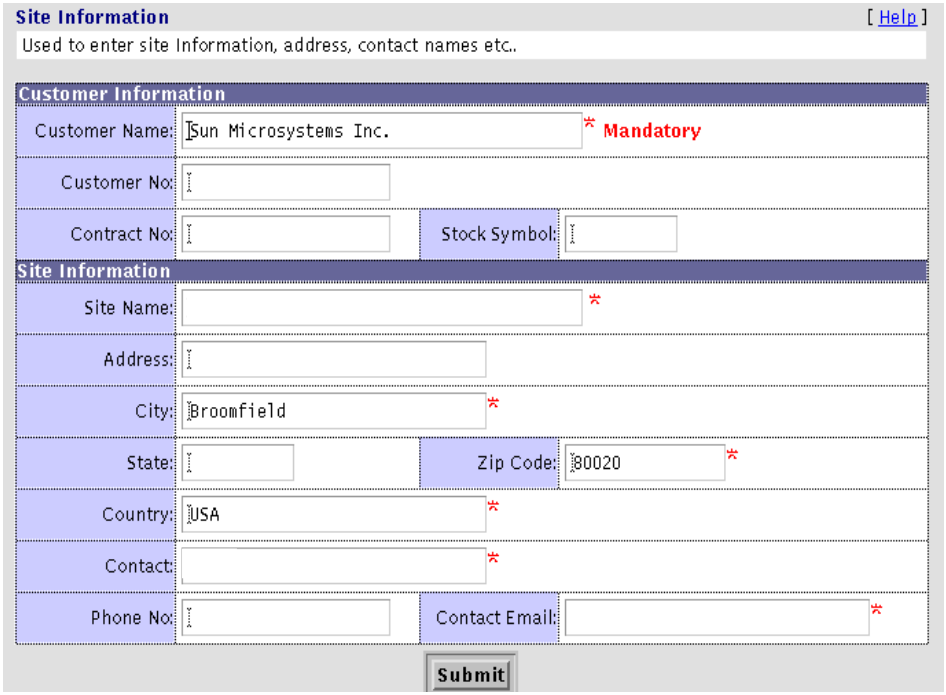



**FIGURE 3-2** Maintain Site Information Window

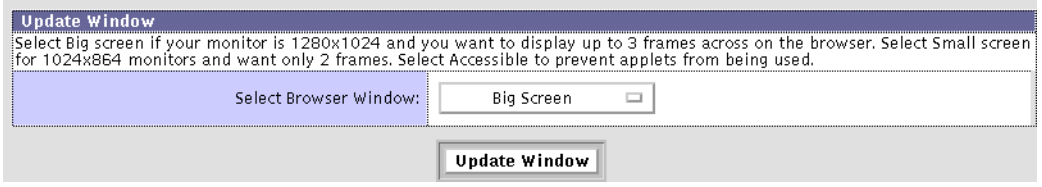
TABLE 3-3 describes the fields in the Storage Automated Diagnostic Environment Maintain Site Information window.

**TABLE 3-3** Site Information

| Field | Action |
|---|---|
| Customer Name | Type your company name. |
| Customer No. | Type your company's customer number. |
| Contract No. | Type your company's contract number. |
| Stock Symbol | Enter your company's stock market symbol as a unique company identifier. |
| Site Information | Type your site name and address. Include a contact person's name and either an email address or a phone number. |

## ▼ To Customize the Window Settings

You can configure the browser window's size and indicate whether to show or hide the left frame menu. Using the Config Options Update Window functionality from the General Maintenance menu (FIGURE 3-1), you can select one of the window options described in the list that follows:




- Big Screen—Displays three frames: the left frame table of contents, the top frame (with tracking links), and the main topic window.
- Small Screen—Displays three frames: the left frame table of contents, the top frame (with tracking links), and the main topic window.
- No Frames—Displays the top frame (with tracking links) and the main topic window only.

---

**Note –** Most of the GUI windows in this guide are shown using the No Frames option.

---

- No Frames + Accessible—Displays the top frame (with tracking links) and the main topic window, as with No Frames, but enables the user to use keystroke combinations to perform tasks instead of using the mouse.

# Maintaining Hosts

When the Storage Automated Diagnostic Environment package is installed on a host, it registers with the agent and an entry is added to the Maintain Hosts window.

---

**Note –** For this automatic registration to work, you must first install and run the agent. (“Y” appears in the Active field of the Maintain Hosts window.)

---

This section covers the following topics:


- “To Display the Maintain Hosts Window” on page 26
- “To Update the Master Configuration” on page 29
- “Update Host Options” on page 28
- “Setting Up Sun StorEdge 6120 Array Message Monitoring” on page 29


## ▼ To Display the Maintain Hosts Window

- **Click the Maintain Hosts link on the General Maintenance menu.**

The Maintain Hosts window is displayed.

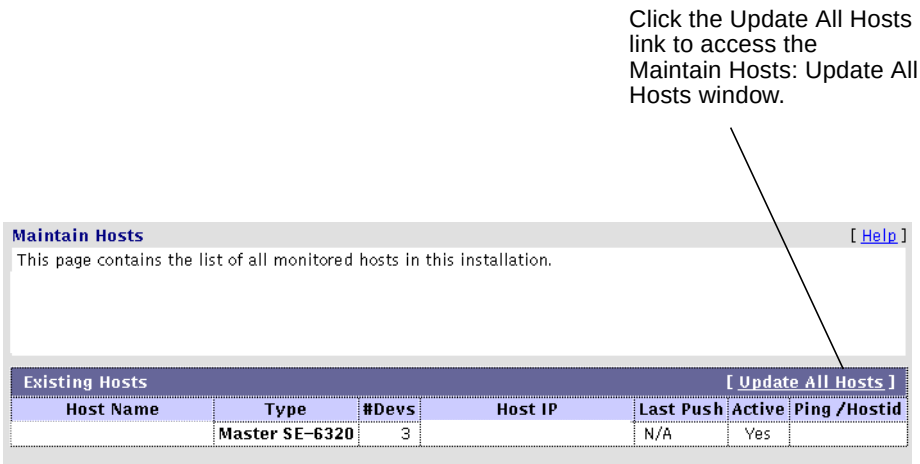



**FIGURE 3-3** Maintain Hosts Window

**Note –** You can click the Host Name link from the Maintain Hosts window to launch the Update Host window. The Update Host window enables you to update fields, as required.

In addition, you an click the Update All Hosts link from the Maintain Hosts window to change the monitoring frequency setting for all hosts at one time, as shown in FIGURE 3-5.

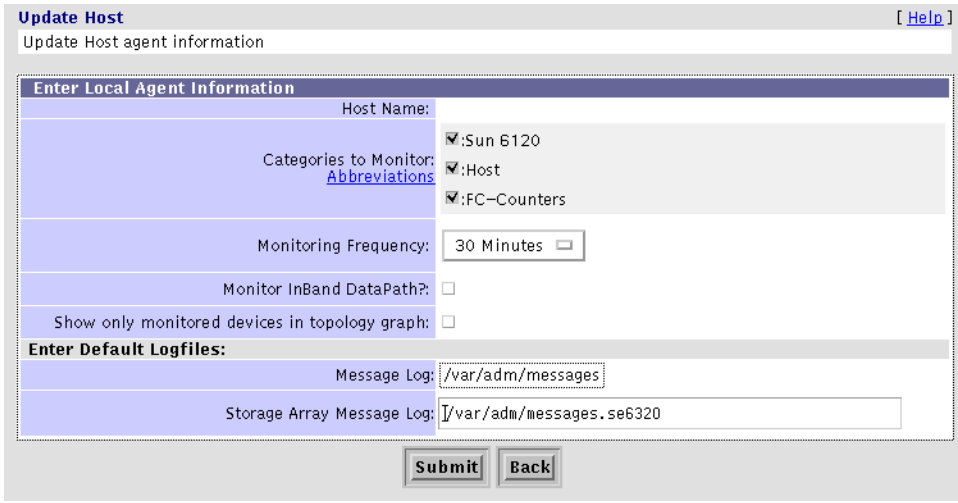



**FIGURE 3-4** Maintain Hosts: Update Host Window

## Update Host Options

TABLE 3-4 describes the buttons in the the Storage Automated Diagnostic Environment Update Host window.

**TABLE 3-4** Update Host Buttons

| Field | Required Action |
|---|---|
| Categories to Monitor | Select from the available categories supported *with this instance* of the Storage Automated Diagnostic Environment. You must make at least one selection.<br><br>Categories from which to choose include:<br>• Sun StorEdge 6120 array<br>• Host<br>• FC-Counters |
| Monitoring Frequency | Select a variable between 5 and 120 minutes. This frequency variable affects how often the Storage Automated Diagnostic Environment executes. 5 minutes is the default.<br><br>Monitoring frequency does not affect the `cron`. The `cron` will initiate the Storage Automated Diagnostic Environment agent's execution, but it is the Storage Automated Diagnostic Environment agent's task to query this variable and test whether it is time for the Storage Automated Diagnostic Environment agent to run. |
| Monitor InBand Data Path | Select this checkbox to enable monitoring of the in-band data path. |
| Show Only Monitored Devices in Topology Graph | When checked, Topology shows only the devices in the Topology graph. In addition, if a device is manually deleted, it does not appear in the Topology. |
| Message Log | The path for the message log (for example, `/var/adm/messages`), which displays the history of status messages. |
| Storage Array Message Log | The path for the host's Sun StorEdge 6120 array Message Log (for example, `/var/adm/messages.se6320`). The path shows the location to where the Sun StorEdge 6120 array logs are being sent.<br><br>**Note:** You can check and verify the path by looking at the `/etc/syslog.conf` on the host. |

## ▼ To Update the Master Configuration

1. **Click the Update All Hosts link from the Maintain Hosts window to update all devices at the same time.**

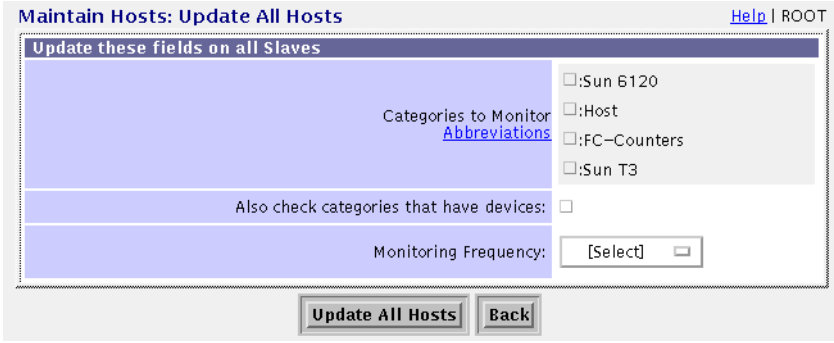



**FIGURE 3-5** Update All Hosts Window

# Setting Up Sun StorEdge 6120 Array Message Monitoring

For the Storage Automated Diagnostic Environment software package to monitor messages from a Sun StorEdge 6120 array, you must mirror the Sun StorEdge 6120 array's `/syslog` to a host with the Storage Automated Diagnostic Environment installed, which has been configured to monitor Sun StorEdge 6120 arrays.

1. **See the *Sun StorEdge 6120 array documentation* for procedures about how to set up the Sun StorEdge 6120 arrays and the host to forward `/syslog` messages.**
2. **For information about how to configure each host with the name given to the Sun StorEdge 6120 array message log file, refer to "Update Host Options" on page 28.**

# Maintaining Devices

Use the Maintain Devices window to configure the host that monitors each device. You can also use this window to change the name the storage device will use as a reference through its email notifications.

This section covers the following topics:


- "To Display the Maintain Devices Window" on page 30
- "To Add Information About a Device" on page 31
- "To Update a Device Manually" on page 32
- "To Delete a Device" on page 33
- "To Display a Renamed Device" on page 34


## ▼ To Display the Maintain Devices Window

1. **Click the Maintain Devices link in the General Maintenance window.**

The Maintain Devices window is displayed.

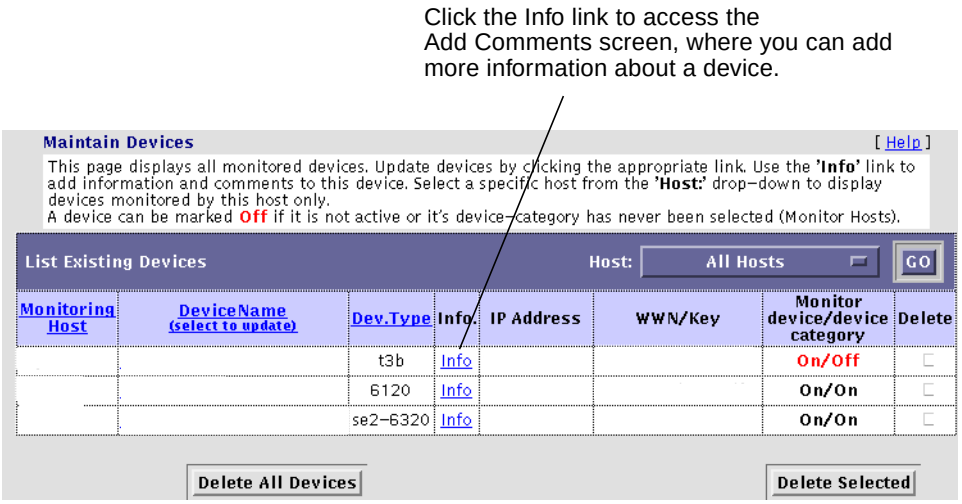



**FIGURE 3-6** Maintain Devices Window

## ▼ To Add Information About a Device

- **Click the Info link from the Maintain Devices window to access the Comments window.**

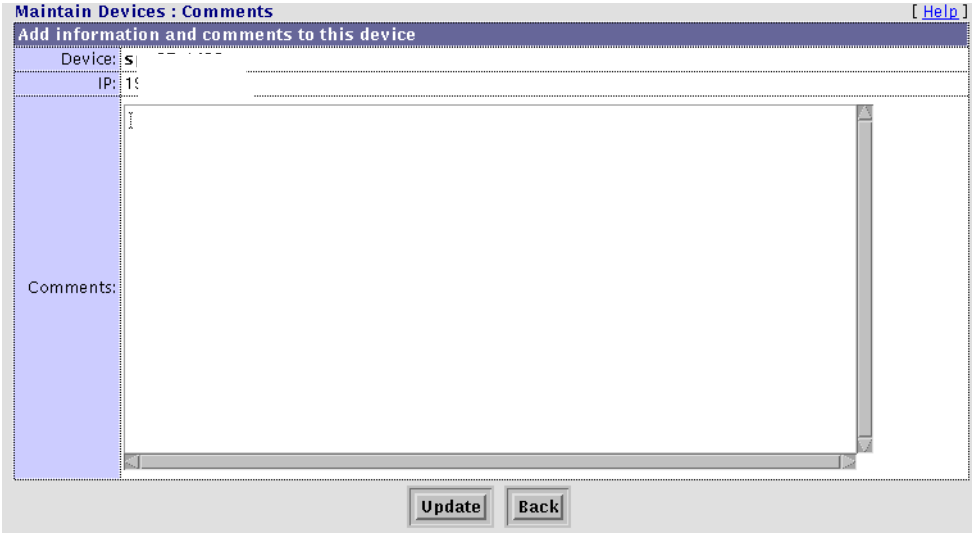



**FIGURE 3-7** Maintain Devices: Comments Window

The Maintain Devices: Comments window enables you to add more information about a device. For example, you can enter the device's serial numbers, its location, or whether the components are associated with a Sun StorEdge 6320 system device

## ▼ To Update a Device Manually

1. **Click the Maintain Devices link from the General Maintenance menu.**

   The Maintain Devices window is displayed.

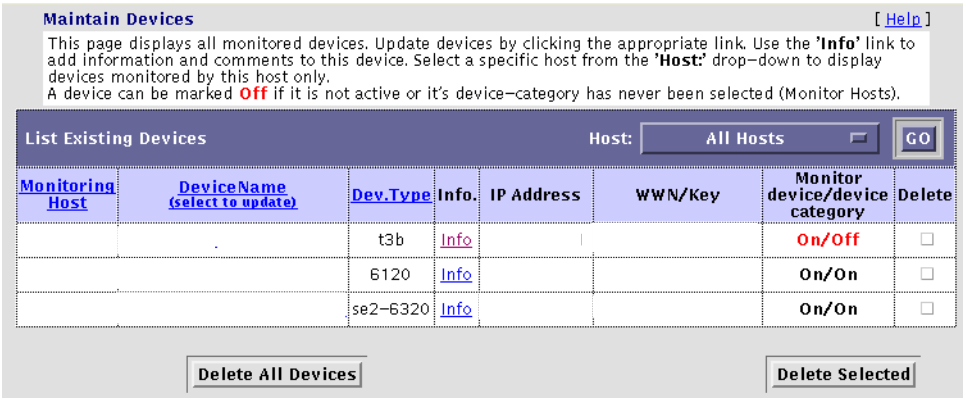



**FIGURE 3-8** Maintain Devices window

---

**Note –** The IP Address is a unique number that identifies the device. The worldwide name and Key number are unique identifiers for a specific FRU. Although none of the identifiers are user-maintainable, they help Sun service representatives troubleshoot by enabling them to track the FRUs to specific Sun StorEdge T3, T3+, or 6120 arrays.

---

2. **Select the device you want to update from the Device Name column.**

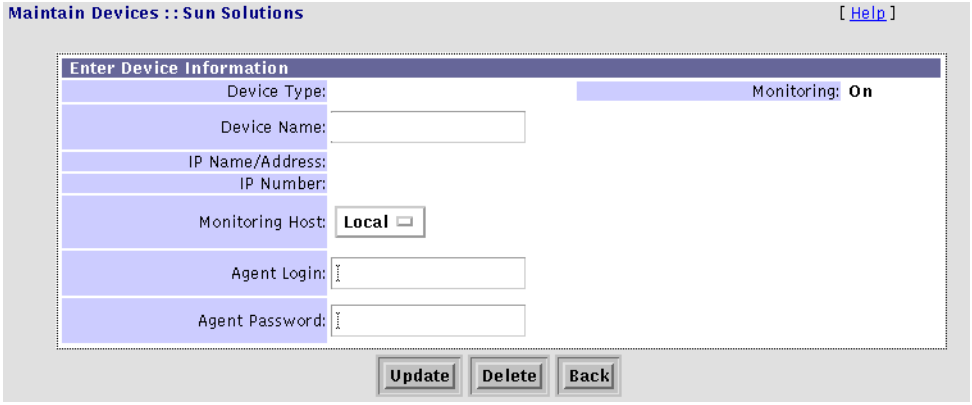



**FIGURE 3-9** Maintain Devices: Update Device Window

3. **Correct the necessary fields and click Update.**

---

**Note –** Changing the name of the device changes only the *reference* to that device within the Storage Automated Diagnostic Environment. It does not affect the access or reference to that device within the operating system.

---

---

**Note –** If you change the configuration of a device, you must *delete* that unwanted device, using the functionality described in "To Delete a Device" on page 33.

The Storage Automated Diagnostic Environment topology does not display a device until you manually add and discover the device using the functionality described in "Maintaining Devices" on page 30.

---

## ▼ To Delete a Device

You can delete an unwanted device after the device has been removed from the site or if device monitoring is no longer needed.

1. **Click the Maintain Devices link from the Maintenance menu.**

   The Maintain Devices window is displayed.

2. **Select the device you want to delete from the Device Name column.**

   The device's maintenance screen is displayed.

3. **Click Delete.**

---

**Note –** Deleting a device from the configuration does not remove access to the device instrumentation in the cache immediately. However, access is cleared the next time you manually run the agent. For detailed information, see "To Run the Agent Manually" on page 67.

State information for the deleted device is also maintained until the agent's next run. Therefore, the device can be removed from a configuration and still be viewed in the Topology window and Instrumentation window as a snapshot in time until you take a new Topology snapshot.

---

### ▼ To Display a Renamed Device

If you rename a device and then execute the agent from the command line or from the GUI, the Storage Automated Diagnostic Environment displays a message that the previous device has been removed. The Storage Automated Diagnostic Environment Topology will not display the renamed device, however, until you take a new Topology snapshot.

You can avoid this problem by doing the following:

- Manually add the worldwide name (WWN) into the Storage Automated Diagnostic Environment configuration file, which is located in the /var/opt/SUNWstade/DATA/rasagent.conf file.

---

**Note –** Unless you remove the SUNWstade directory or perform a clean ras_install operation, the configuration file remains on the system between upgrades.

---

## Customizing Email Deliveries

You can use the Local Email/Pager Notifications window to customize the generation of email messages to yourself or to other administrators at their companies. For example, if you are interested in receiving only high-priority alerts coming from Sun StorEdge 6120 arrays, you can create a specialized notification for this instance only.

---

**Note –** Alerts are sent only to valid email addresses that you have entered through the Email Notification function. Local notification does *not* send mail to the email provider.

---

This section presents the following procedures:


- "To Set Up Local Email and Pager Notifications" on page 35
- "To Update or Delete an Existing Email Address" on page 38
- "To Clear a Specified Number of Maximum Email Messages" on page 38


### ▼ To Display the Email Notification Window

- **Click the Email_Notification link from the General Maintenance menu.**

The Email Notification window is displayed.

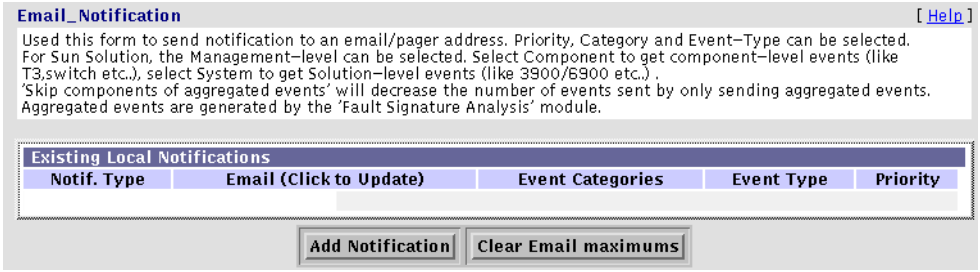



**FIGURE 3-10** Email Notification Window

---

**Note –** The local email/pager notifications feature is optional and does not affect the main transmission functions of the software.

---

## ▼ To Set Up Local Email and Pager Notifications

In addition to sending the RAS information collected by the Storage Automated Diagnostic Environment, you can send a customizable subset of the event-driven messages from the host directly to local system administrators at the customer's site by email.

1. **From the Email Notification window, click the Add Notification button.**

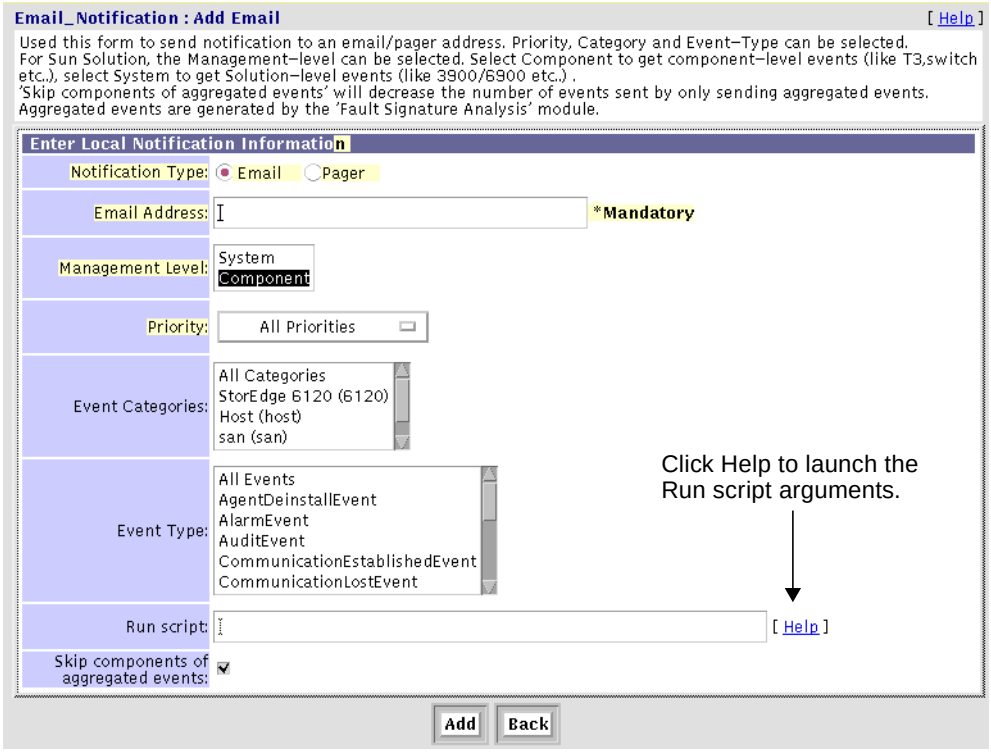



**FIGURE 3-11** Email Notification: Add Email Window

2. **Type one or more email addresses into the Email Address text box.**

3. **For each email address, select one from each of the following pull down menus:**

   - Management level
     - System (Sun StorEdge 3900 or 6900 series and Sun StorEdge 6320 or 6320SL system)
     - Component
   - Event Categories
     - All Categories (the default)
     - Sun StorEdge 6120 array
     - Host
     - SAN
   - Priority
     - All Priorities is the default. Other priority options include:
     - 0 = information (green). This is the lowest priority.
     - 1 = warning (yellow)
     - 2 = error (red)
     - 3 = down (red). The device is down.
     - Warning+Error+Down
     - Actionable
   - The Event Type list—Select from a list of event types, categorized by device type.
     - All Events is the default. Other Event options include:
     - Agent Deinstall Event
     - Alarm Event
     - Audit Event
     - Communication Established Event
     - Communication Lost Event
     - Discovery Event
     - Heartbeat Event
     - Location Change
     - Removal Event
     - State Change Event
     - Statistics
     - Topology Event
     - Link Event
     - Diagnostic Test
   - Skip components of aggregated events—Click this check box to decrease the number of events sent by sending only aggregated events. Aggegated events are those generated by the Fault Signature Analysis module.

4. **Click Update.**

   The Storage Automated Diagnostic Environment sends the specific event-type messages, by device type, to one or more email addresses you specified.

## ▼ To Update or Delete an Existing Email Address

1. **Click an existing email link from the Email Notification window.**

   The Email Notification : Update Email window is displayed.

2. **Make the necessary changes and click Update or Delete.**

## ▼ To Clear a Specified Number of Maximum Email Messages

For events that produce frequent error messages, you can specify the number of times you are notified. If the maximum number is set to a value other than “no maximum” (the default), you can receive an email 5, 10, 20, or 50 times within an eight-hour period. The last email message indicates that it is the final notification you will receive within the eight-hour time period.

1. **To set the maximum email number, see “To Change Configuration Options” on page 55.**

2. **To clear a previously set value, click Clear Email maximums from the Email Notification window.**

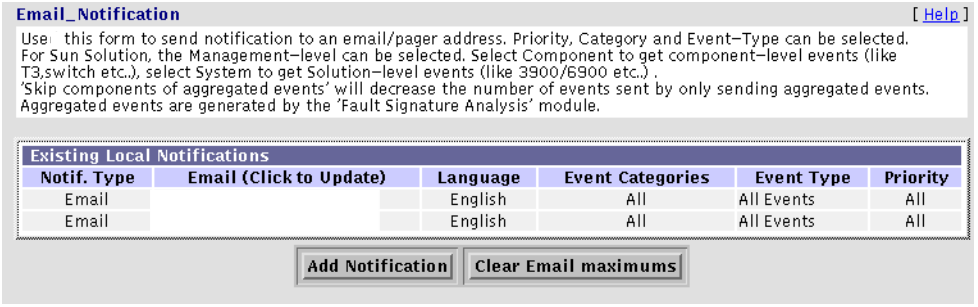



**FIGURE 3-12** Clear Email Maximums Window

The specified email maximum numbers are cleared and all events are now emailed every time the agent is run.

---

**Note –** If you have set the maximum number of email messages to 10, have received 10 messages on the same component within an eight-hour time period, and want to receive more email notifications, you must click the Clear Email maximums button.

---

## *Run Script Arguments*

This function enables you to run a script along with each event sent in an email. This script is executed for each new event and receives the following arguments:

**TABLE 3-5** Run Script Arguments

| Argument | Description |
|---|---|
| -C [category] | The category of the event (for example, t3) |
| -S [severity] | The severity of the event (for example, 1=warning, 2=error, 3=down) |
| -E [event_type] | Event type |
| -T [target] | The target number of the event (for example: switch:10000023EA345A) |
| -N [TargetName] | The name of the target (for example, switch-1a) |
| -D [description] | The description of the event |

**Note –** Email might not be sent if the system is not properly configured to send mail to the recipient. This is primarily evident in Storage Service Processor environments where the Storage Service Processors are on a subnet and there is no gateway to the intended recipient.

Refer to the *Sun StorEdge 3900 and 6900 Series Service and Reference Manual* or the *Sun StorEdge 6320 or 6320SL System Service and Reference Manual* for more information.

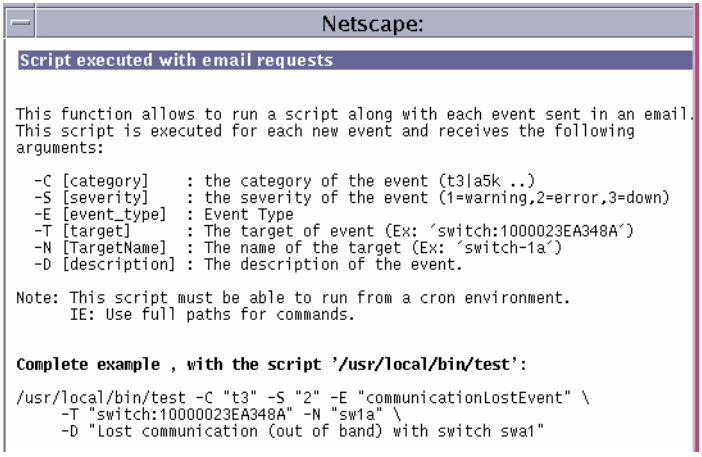



**FIGURE 3-13** Run Script Arguments

# Using Providers

Storage Automated Diagnostic Environment Providers encode data and interface with transport mechanisms, which transmit information to the storage management platforms about configured storage devices. A provider's main function is to relay events generated by health monitors.

The Storage Automated Diagnostic Environment supports seven Providers: Email, Net Connect, StorADE Enterprise (SAE), Sun Remote Services (SRS), Sun StorEdge Remote Response Service (SSRR), Sun Management Console (SunMC), and Simple Network Management Protocol (SNMP) Traps.

This section discusses the following topics:


- "To Set Up Providers" on page 42
- "Email Provider" on page 43
- "SAE Provider" on page 45
- "NetConnect Provider" on page 44
- "SRS Provider" on page 45
- "SSRR Provider" on page 46
- "SNMP Traps" on page 49
- "SunMC Provider" on page 47


## ▼ To Display the Notification Provider Maintenance Window

- **Click the Providers link from the Maintenance menu.**

The Notification Provider Maintenance window (FIGURE 3-14) is displayed.

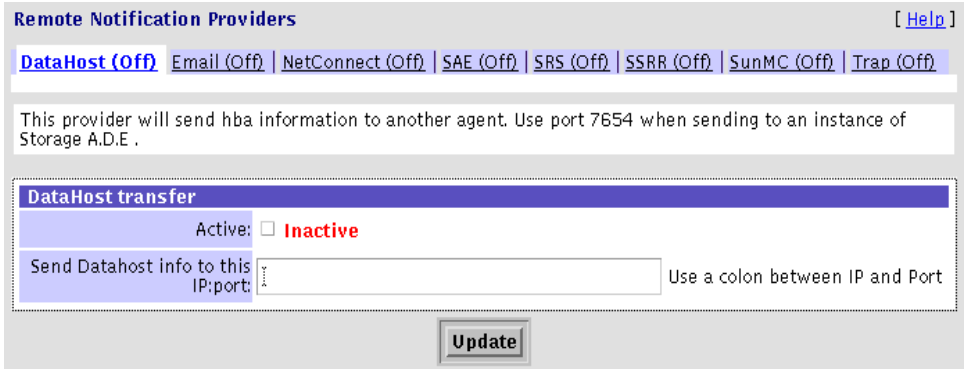



**FIGURE 3-14** Notification Provider Window

## ▼ To Set Up Providers

- **To set up one of the Providers, complete the required fields shown in** TABLE 3-6**.**

  The provider types are described in the following sections.

**TABLE 3-6** Providers

| Provider | Required Action |
|---|---|
| Email | • Select the Active check box.<br>• Type the email address to where the messages will be sent. |
| NetConnect | • Select the Active check box.<br>• Type the maximum size, in Kbytes, of RAS information that the Storage Automated Diagnostic Environment agent will collect and transport. |
| SAE<br>StorADE Enterprise, also known as the Sun StorEdge Diagnostic Expert. | • Select the Active check box.<br>• Type the IP address of the Sun StorEdge Diagnostic Expert management console.<br>• Type the number of hours for heartbeat frequency. |
| SRS<br>(Sun Remote Services) | • Select the Active check box.<br>• Type the IP address of the SRS console. |
| SSRR<br>(Sun StorEdge Remote Response Service) | • Select the Active check box.<br>• Select or deselect Use Proxy. The Proxy can be used when the modem is not set up. |
| SunMC<br>(Sun Management Console) | • Select the Active check box.<br>• Type the SunMC console IP address.<br>• Type the number of hours for heartbeat frequency. |
| SNMP Traps<br>(Simple Network Management Protocol) | • Select the Active check box.<br>• Type the IP name and address that identifies the host to the network. You can provide information for up to five IP addresses.<br>• Specify the port number. Default is 162.<br>• Specify the minimum alert level: Warnings, Error, or Down. |

## Email Provider

The Email Provider (FIGURE 3-15) emails specific events to local administrators and sends summarized events to a pager's email address. This is an Intranet mechanism for transporting reliability, availability, and serviceability (RAS) information collected by the Storage Automated Diagnostic Environment agent. Although the extracted information is used to improve products and service, the information is not monitored by Sun Service personnel.

For information about how to categorize events by device type, severity level, and event type, see "To Set Up Local Email and Pager Notifications" on page 35.

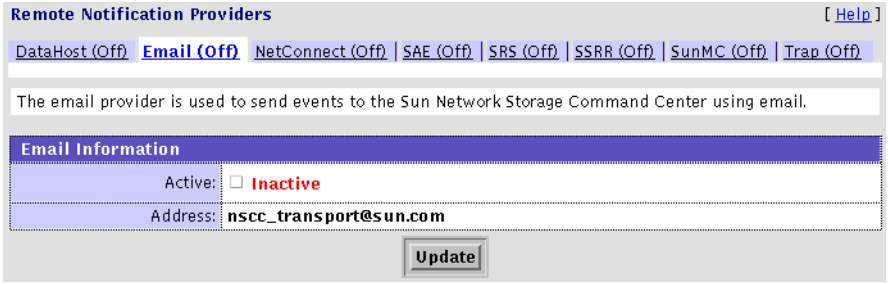



**FIGURE 3-15** Email Provider Window

## NetConnect Provider

The NetConnect Provider (FIGURE 3-16) is a part of the SRS family of products. NetConnect uses internet-based technology, which avoids the need for additional dedicated network connections at the customer site. All available instrumentation, events, and topology information is sent to the Network Storage Command Center (NSCC).

Although the extracted information is used to improve products and service, the information is not monitored by Sun Service personnel. Currently, the storage information is not available by way of the NetConnect portal.

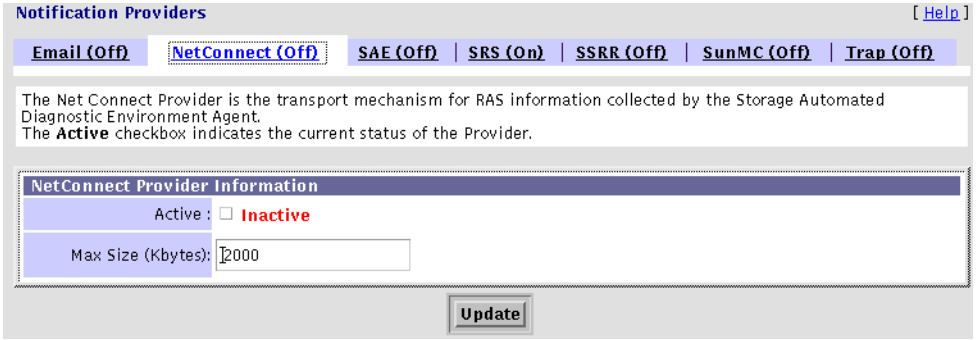



**FIGURE 3-16** NetConnect Provider Window

---

**Note –** The host must be the same host that is configured as the relay in an SRS NetConnect Provider configuration.

---

## SAE Provider

The SAE Provider (FIGURE 3-17) is used primarily when the Storage Automated Diagnostic Environment is installed on a Storage Service Processor in a Solution. When the SAE Provider is activated, the Storage Automated Diagnostic Environment sends events to the Sun StorEdge Diagnostic Expert.

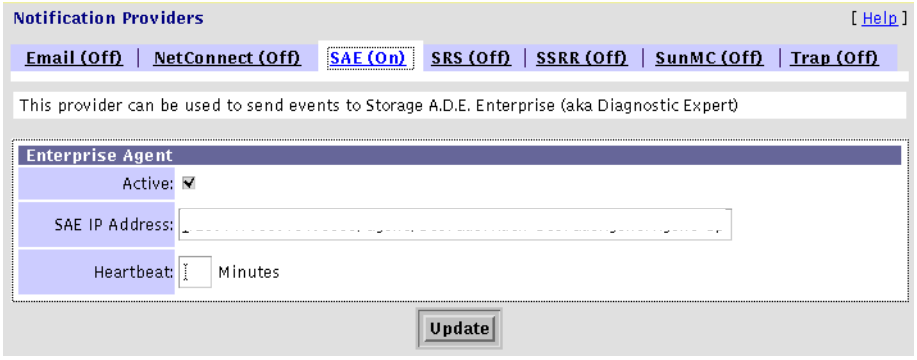



**FIGURE 3-17** SAE Provider Window

## SRS Provider

The Storage Automated Diagnostic Environment pulls the storage device events and channels them through a sender, which sends the event data, written in XML, to the SRS station. The SRS Notification Provider (FIGURE 3-18) transports RAS information collected by the monitoring agent. All available instrumentation, events, and topology information is sent to the Network Storage Command Center (NSCC), where it is monitored by Sun service personnel.

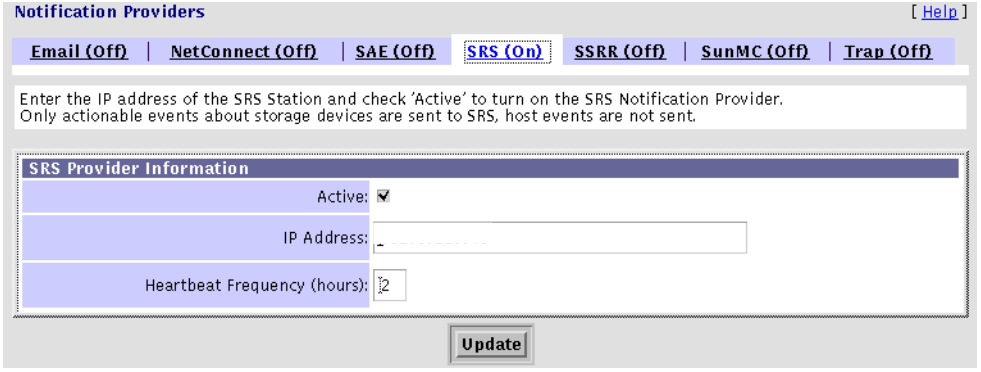



**FIGURE 3-18** SRS Provider Window

## SSRR Provider

The Sun StorEdge Remote Response (SSRR) Provider (FIGURE 3-19) uses modem technology with UNIX-to-UNIX Communication Protocol (UUCP). SSRR software is required on the customer data host. The SSRR Provider is intended for customers who have purchased a remote support service offering and have supplied phone lines to enable the modem phone home capability. The Storage Automated Diagnostic Environment, which records events, resides on the Storage Service Processor.

All available instrumentation, events, and topology information is sent to the Network Storage Command Center (NSCC). This information is monitored by Sun Service personnel and is used to improve products and service.

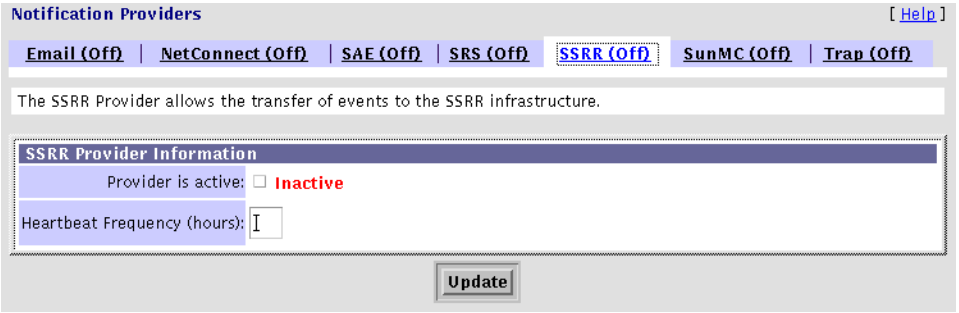



**FIGURE 3-19** SSRR Provider Window

After the Storage Automated Diagnostic Environment identifies the event:

1. The Storage Automated Diagnostic Environment logs the event and alerts Sun engineers by email or pager if the data falls outside predefined tolerances.
2. The Sun engineer, located behind a firewall, accesses the SSRR server and runs a script.

   The script initiates a call to the customer's modem and supplies logins and passwords to the client Network Terminal Concentrator (NTC) and the Storage Service Processor.
3. The script negotiates a secure point-to-point protocol (PPP) connection between the customer's Storage Service Processor and the SSRR server and automatically logs the Sun engineer in to the customer's Storage Service Processor.
4. The Sun engineer can then access SAN components to remotely diagnose and perform a number of maintenance routines.

**Note –** If the Storage Automated Diagnostic Environment is run either manually or from the `cron` command, and the SSRR Provider is selected, but the SSRR software is not installed or is not configured properly, the following error message appears:

```
***ERR: Cannot find Machine name in Permissions file.
```

## SunMC Provider

The SunMC Provider (FIGURE 3-20) enables the Storage Automated Diagnostic Environment to send actionable events and monitoring topologies to the SunMC Console (FIGURE 3-21), which displays the alarms and alert text. SunMC information is similar to and compatible with Sun Remote Services (SRS). SunMC can send information to SRS, in which case the SRS Provider need not be activated in the Storage Automated Diagnostic Environment.

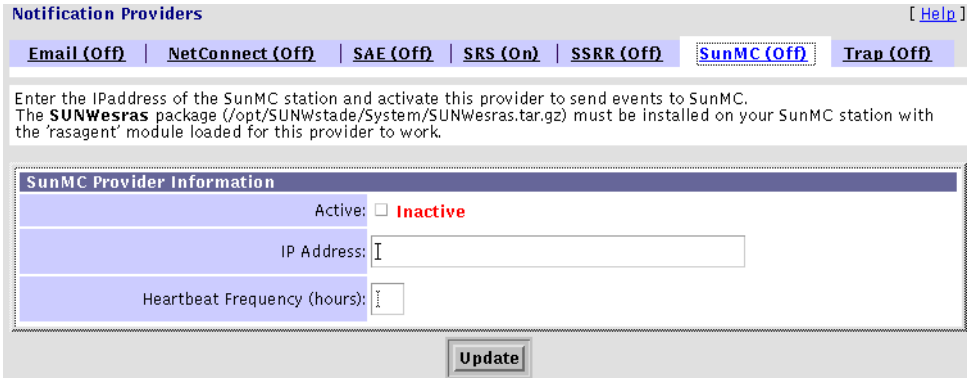



**FIGURE 3-20** SunMC Provider Window

*To Activate and Use the SunMC Provider*

1. **Download and install the SunMC agent on the selected host. See "To Install and Activate the SUNesras Packages" on page 8 for more information.**

2. **In the *IP Address* field (shown in the "SunMC Provider Window" on page 47), enter the IP address or name of the host where the SunMC agent is installed and click Update.**

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

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

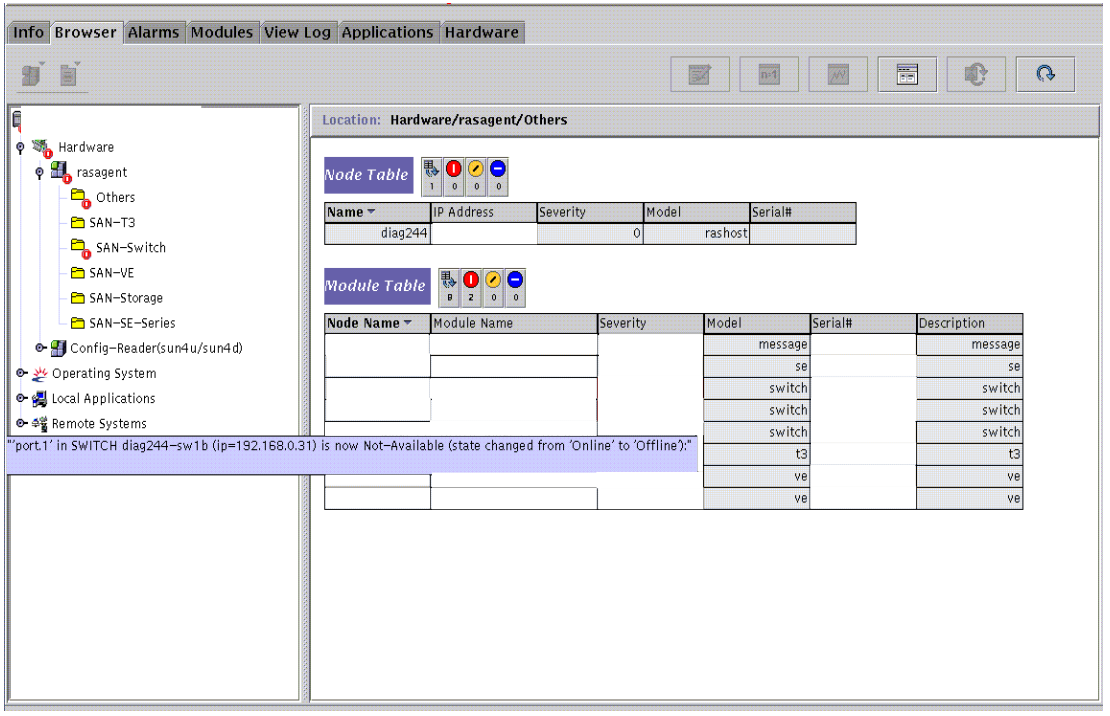



**FIGURE 3-21** SunMC Console Window

All available instrumentation, events, and topology information is sent to the Network Storage Command Center (NSCC). This information is monitored by Sun Service personnel and is used to improve products and service.

## SNMP Traps

The SNMP Traps Provider (FIGURE 3-22) enables the Storage Automated Diagnostic Environment to send traps to external management systems for all actionable events that occur during monitoring.

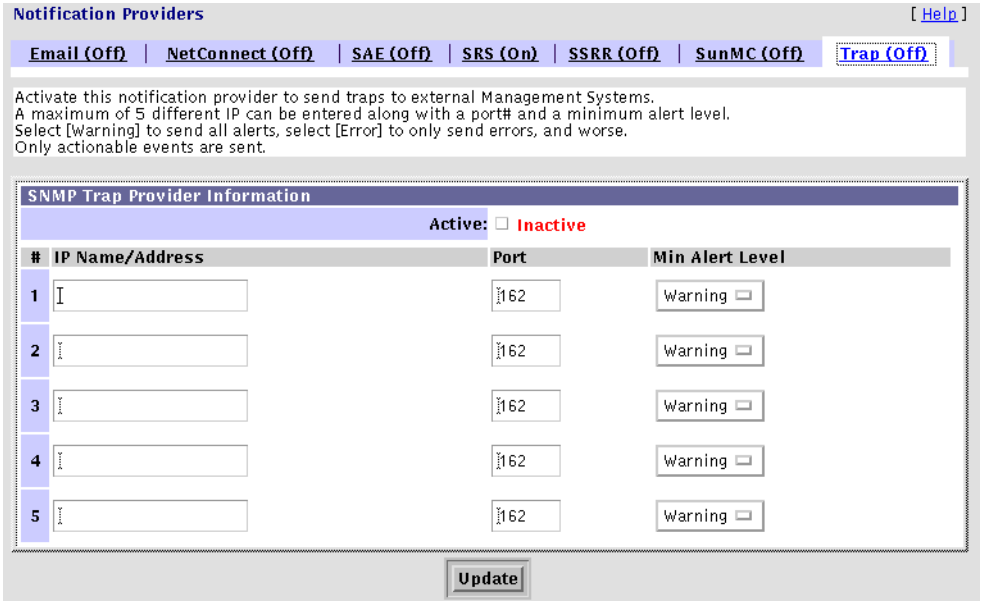



**FIGURE 3-22** SNMP Traps Provider Window

When an alert occurs, it is sent to the SNMP transport as an SNMP trap. An SNMP trap listener can use the `StorAgent.mib SNMP MIB` file, which is included in the SUNWstade package to decode these alerts.

The alerts contain the following information:

- Storage Automated Diagnostic Environment agent location
- Storage Automated Diagnostic Environment device to which the alert pertains
- Alert level
- Message content

---

**Note –** SNMP-capable management application software is required for the SNMP Provider.

---

# Start and Stop Agents

You can control agent activity to temporarily stop the Storage Automated Diagnostic Environment from running on a selected host. You can also avoid creating email notifications on false errors when a device is being tested and faults are injected intentionally.

---

**Note –** By default, the master Monitoring function does not automatically default to *On*. You must manually enable Monitoring to *On*.

---

The subsections associated with controlling agent activity are as follows:


- "To Display the Start Agents Window" on page 50
- "To Disable a Specific Agent" on page 51
- "To Disable the `cron` Using the GUI" on page 52
- "To Disable the `cron` Using the CLI" on page 52
- "To Activate or Deactivate Monitoring on a Device-by-Device Basis" on page 53


## ▼ To Display the Start Agents Window

1. **Click the Admin link in the Storage Automated Diagnostic Environment main window.**
2. **Click the Start Agents link on the General Maintenance menu.**

   The Start Agents window is displayed.

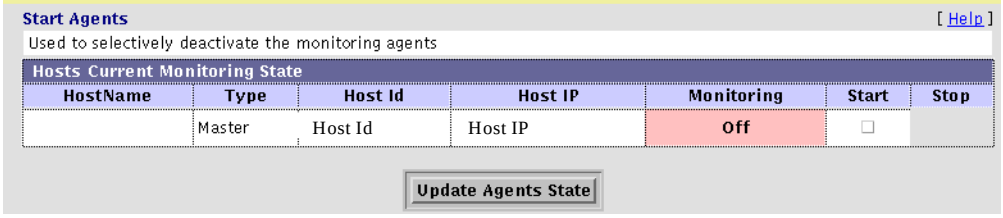



**FIGURE 3-23** Start Agents window

---

**Note –** To control email notifications for specific devices, See "To Activate or Deactivate Monitoring on a Device-by-Device Basis" on page 53.

---

There are several ways to stop the Storage Automated Diagnostic Environment monitoring agents from probing a storage array.

## ▼ To Disable a Specific Agent

When you disable a specific agent, you stop that agent but other devices continue to be monitored.

1. **From the Maintain Hosts window, click an existing Host Name link and update the fields as required. See “Maintaining Hosts” on page 26 for more information.**

FIGURE 3-24 lists *all* devices currently supported by the Storage Automated Diagnostic Environment.

---

**Note –** The devices listed in *Categories to Monitor* depend on your system configuration.

---

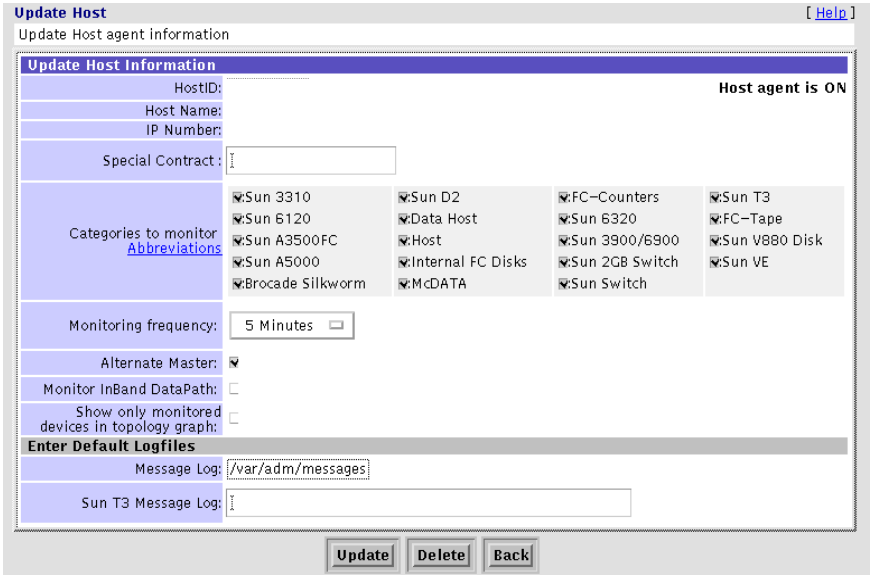



**FIGURE 3-24** Stop a Specific Agent

2. **Deselect the device in Categories to Monitor.**

   By default, all devices are selected.

3. **Click Update.**

The most efficient way to stop the software from monitoring entirely is to stop the `cron` from executing. You can stop the `cron` from executing using the GUI or the CLI.

## ▼ To Disable the `cron` Using the GUI

1. **Click the Admin link in the Storage Automated Diagnostic Environment main window.**
2. **Click the Start Agents link on the General Maintenance menu.**

   The Start Agents window is displayed.

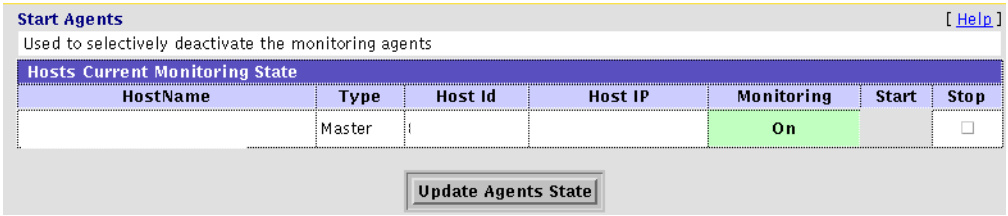



**FIGURE 3-25** Start Agents window

3. **Enable the host's corresponding Stop check box.**
4. **Click Update Agents State.**

## ▼ To Disable the `cron` Using the CLI

1. **Execute** `ras_install`.

   See "Running the ras_install Script" on page 8 for more information.

2. **Select** `P` **to postpone the execution of** `rasagent` **from the** `cron`**.**

   This removes the `cron` entry that starts the agent every five minutes.

---

**Note –** This step does not immediately stop any existing agent execution of the. To ensure all activity has ended, use the ps command . For example:

---

```
# ps -ef | grep ras
```

## ▼ To Activate or Deactivate Monitoring on a Device-by-Device Basis

To access the Start Devices Monitoring window:

1. **Click the Start Devices link from the General Maintenance menu.**

   The Start Devices window is displayed.

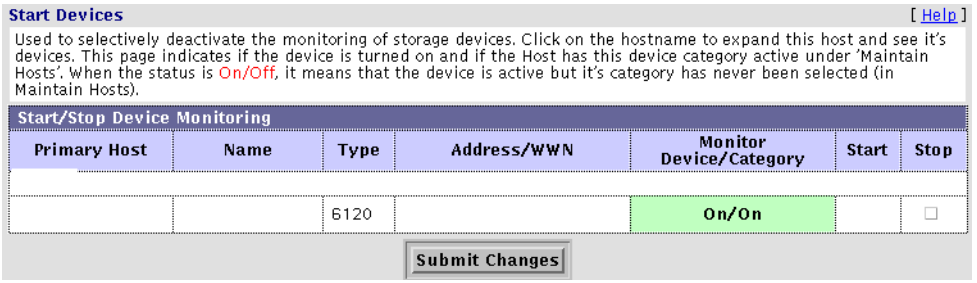



**FIGURE 3-26** Start / Stop Devices Window

2. **To start or stop devices, select the appropriate check box.**
   - When Monitoring is *on*, the Stop check box is available.
   - When Monitoring is *off*, the Start check box is available.
3. **Click Submit Changes.**
4. **If the device is being tested or if faults are being injected into the device intentionally, select the Stop check box to temporarily stop the local notifications for a specific device.**

---

**Note –** Monitoring continues when the device is deactivated (turned off). However, email notifications do not occur for any faults that are detected while the device monitoring is in this state. Consequently, any errors that have been detected are logged and sent by means of the NetConnect Provider, but not by means of email notification.

---

## ▼ To Send Test Email

Use the Test Email window to send test email messages, and to verify that the mailing capability of the Storage Automated Diagnostic Environment is installed and working properly.

1. **Click the Test Email link from the General Maintenance menu.**

   The Test Email window is displayed.

2. **Type your email address into the Email Address text box.**

3. **Type a brief comment into the Message text box.**

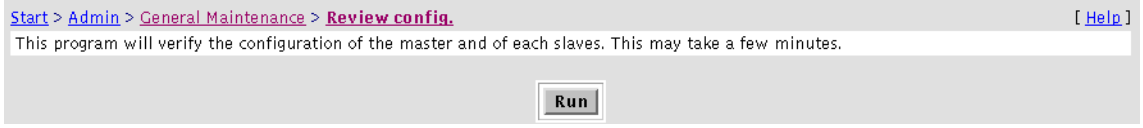
   If you leave the Message text box blank, the test email contains a default message with the words *Test Message* in the subject line. If you place a carriage return in the Message field, you cannot enter text. To restart, click in the Message text box and enter text.


## ▼ To Review the Configuration

Once you have completed your configuration and you want to verify all settings, follow these steps:

1. **Select the Review Configuration link from the General Maintenance menu and click Run.**

   The Review Configuration is displayed.




2. **If necessary, follow the displayed instructions for settings that you might have missed or that you need to double-check.**

# Configuration Options

The Configuration Options window enables you to change the defaults on selected configuration options.

---

**Note –** If the host is behind a firewall (for example, in a Storage Service Processor environment), e-mails cannot be sent unless the e-mail address is on the customer's LAN.

---

## ▼ To Change Configuration Options

1. **Click the Config Options link on the General Maintenance menu.**

   The Config Options window is displayed.

2. **Update existing configuration options using the information in** FIGURE 3-27 **and** TABLE 3-7**.**

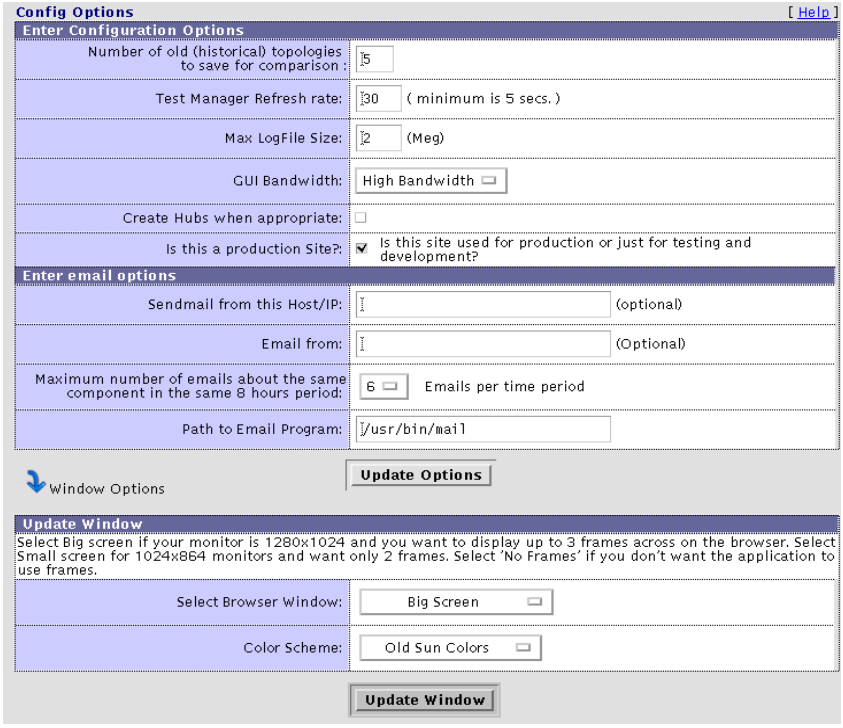



**FIGURE 3-27** Configuration Options

**TABLE 3-7** Configuration Options

| Configuration Option | Description |
|---|---|
| ***Configuration Options5*** | |
| Number of old (historical) topologies to save for comparison | Type the number of topologies to save in Topology History for comparison. The default is 5. |
| Test Manager Refresh rate | Specify the window refresh (reload) rate for test output. The default is 30 seconds, and the minimum refresh rate is 5 seconds. |
| Max Event File Size | Specify, in megabytes, the maximum event file size. Used to limit data packet size to notification providers. The default is 2. |
| GUI Bandwidth | Specify the bandwidth for low- and high-speed local area network (LAN). The default is High Bandwidth. |
| Create Hubs when appropriate | Select this check box if you want Hubs to be drawn in the Topology. |
| Is this a production site? | The default is checked (Y), which means this is a production site. |
| ***Email Options*** | |
| Send mail from this Host/IP (optional) | |
| Email From: (optional) | Type the “from” email address. |
| Maximum number of emails about the same component in the same 8 hours period | Specify the maximum number of email messages about a specific event to be sent within an 8 hour period. The default is No maximum. Options include 2, 4, 6, or 8. You can also clear the specified maximum number of email messages using “Customizing Email Deliveries” on page 34. |
| Path to Email Program | Use to change the local email program path. |
| ***Window Options*** | |

**TABLE 3-7** Configuration Options *(Continued)*

| Configuration Option | Description |
|---|---|
| Update Browser Window | Use to configure the default GUI screen size.<br>• Big Screen—Displays three frames: the left frame window, the top window (with tracking links), and the main topic window.<br>• Small Screen—Displays three frames, as with the Big Screen selection, but the frames are smaller.<br>• No Frames—Displays the top window (with tracking links) and the main topic window only.<br>• No Frames + Accessible—Displays the top window (with tracking links) and the main topic window, as with No Frames, but enables the user to perform tasks using keystroke combinations instead of using the mouse.<br>**NOTE:**<br>The browser does not support Topology if the No Frames + Accessible option is selected.<br>If you want to use the Topology functionality, select Big Screen, Small Screen, or No Frames. |
| Color Scheme | Use to configure the default GUI screen color scheme. |

# Optimization and Fault Signature Analysis (FSA)

The Fault Signature Analysis (FSA) option enables the aggregation of alerts that share common suspect FRUs. The FSA module collects the events and summarizes them into fewer and more specific, actionable events. The collection of events often points to a root cause of a problem, whereas single events are merely *symptoms* of the problem

To aggregate events, click the appropriate checkbox, based on information found in TABLE 3-7.

---

**Note –** The Fault Signature Analysis requires two agent intervals to run. For example, if the agent is set to run every 5 minutes, then 10 minutes are needed for the first FSA.

---

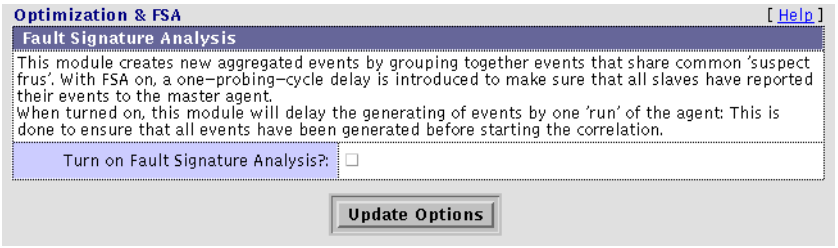



**FIGURE 3-28** Fault Signature Analysis

# Topology Maintenance

The Storage Automated Diagnostic Environment's graphical storage area network (SAN) interface displays all fabric components and the state of those components. Fabric components include switch ports, storage controllers, and disks, along with more specialized components such as fans, batteries, power, and volumes.

SAN agents collect counter information based on error messages and telemetry information. This information is then used in the topology drawing to indicate link failures.

---

**Note –** Brocade switch configurations using segmented loop (SL) zones can be monitored and diagnosed, but the topology views do not show connections between devices.

---

This section includes the following topology procedures that you can perform using the Storage Automated Diagnostic Environment:


- "To Display the Topology Window" on page 60
- "To Create a Topology Snapshot" on page 60
- "To Display Topology History" on page 62

## ▼ To Display the Topology Window

1. **Click the Admin link in the Storage Automated Diagnostic Environment main window.**

   Administration is divided into three sections: General Maintenance, Topology Maintenance, and System Utilities.

2. **Click Topology Maintenance.**

   The Topology Maintenance window is displayed.

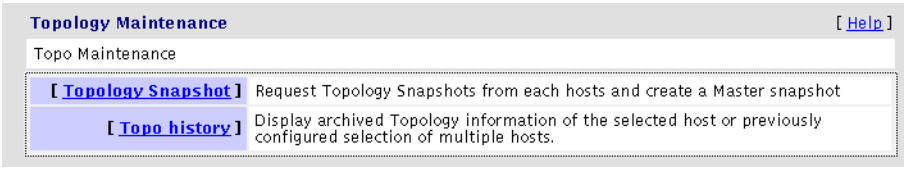



**FIGURE 3-29** Topology Maintenance Window

---

**Note –** To view a topology, you must first execute the `ras_install` command to start the Storage Automated Diagnostic Environment services, then run the `config_solution` command to create the topology, find the devices, and run the agents.

---

## ▼ To Create a Topology Snapshot

Use the Topology Snapshot function to create and update the topology view from the host or to review error details.

Before you create a Topology snapshot, make sure there are no failed over paths. If there are failed over paths, the Topology view does not properly display them.

1. **From the Topology Maintenance window, click the Topology Snapshot link.**

   The Topology Snapshot window is displayed.

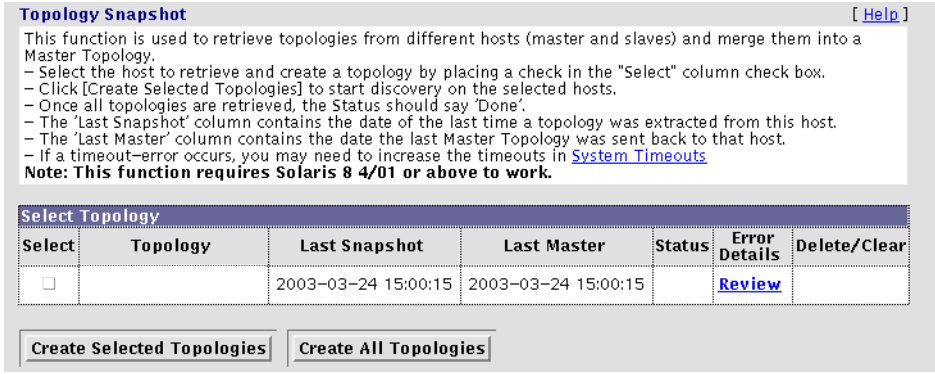



**FIGURE 3-30** Topology Snapshot Window

2. **Select the check box that corresponds to the topology and click Create Selected Topologies or Create All Topologies.**

   While the system creates the selected topology, the status is in one of two states:

   - Running—Discovery is running on the selected host, and the system creates and retrieves the selected topology.
   - Done—The topology has been created and is ready for you to retrieve.

     a. Click the Review link to review the error details, if applicable.

     b. Click the Clear link in the Delete column to clear a selected topology.

3. **Click Review in the Error Details column to launch a pop-up window that displays topology errors.**

---

**Note –** If a timeout occurs during this process, you may need to increase the timeout specifications, using the System Timeout functionality. For information, see “To Change System Time-Out Settings” on page 64.

---

4. **Verify the Topology view.**

# ▼ To Display Topology History

With the Display Topology History function you can compare and delete current Topology snapshots, or you can view, compare, or delete previously stored Topology snapshots.

1. **From the Topology Maintenance window, click the Topology History link.**

   The Topology History window is displayed.

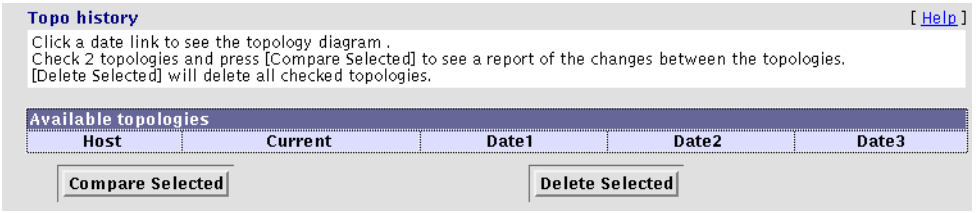



**FIGURE 3-31** Topology History Window

2. **Do one or more of the following:**

   - To see a summary of the changes between two topologies, select two hosts and the corresponding Current check box, and then click Compare Selected.

     The host must have at least two topologies to use the Compare Selected feature.
   - To delete a topology, select one or more topologies and the corresponding check box, and then click Delete Selected.
   - To view a previously stored Topology snapshot, double-click the date link in the Date1, Date2, or Date3 column.

     The oldest snapshot is displayed first.
   - To compare or delete previously stored Topology snapshots, select the corresponding check box in the Date1, Date2, or Date3 column.
     - To compare two or more previously stored snapshots, click Compare Selected.
     - To delete one or more previously stored snapshots, click Delete Selected.

# System Utilities

The Utilities section contains optional tools you can use for Storage Automated Diagnostic Environment administration.

The following topics are included:


- "To Change System Time-Out Settings" on page 64
- "To Erase a Device's Cache" on page 66
- "To Run the Agent Manually" on page 67
- "To Email Configuration Information" on page 68
- "To Change the Root Password" on page 70


## ▼ To Display the System Utilities Window

1. **Click the Admin link in the Storage Automated Diagnostic Environment main window.**
2. **Click the System Utilities link.**

   The System Utilities window is displayed.

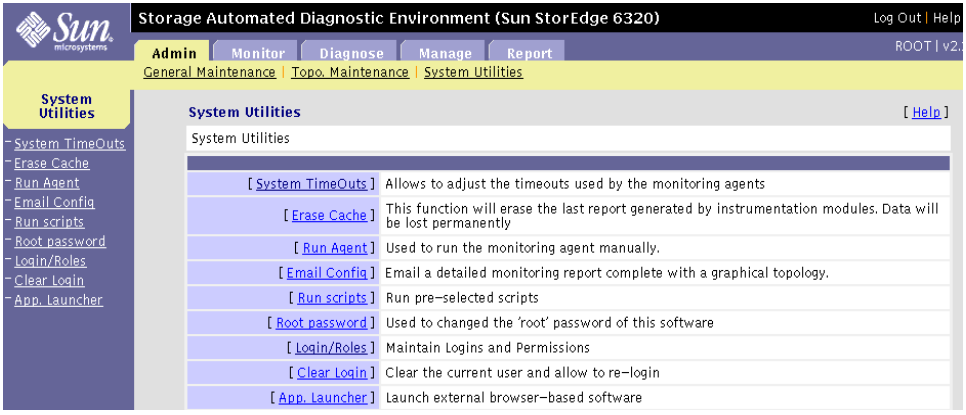



**FIGURE 3-32** System Utilities Window

## ▼ To Change System Time-Out Settings

System timeouts are the values the Storage Automated Diagnostic Environment agent uses to ensure that it does not spend too much time waiting on a response for commands to return.

1. **Click System TimeOuts in the System Utilities window.**

   The System TimeOuts window is displayed.

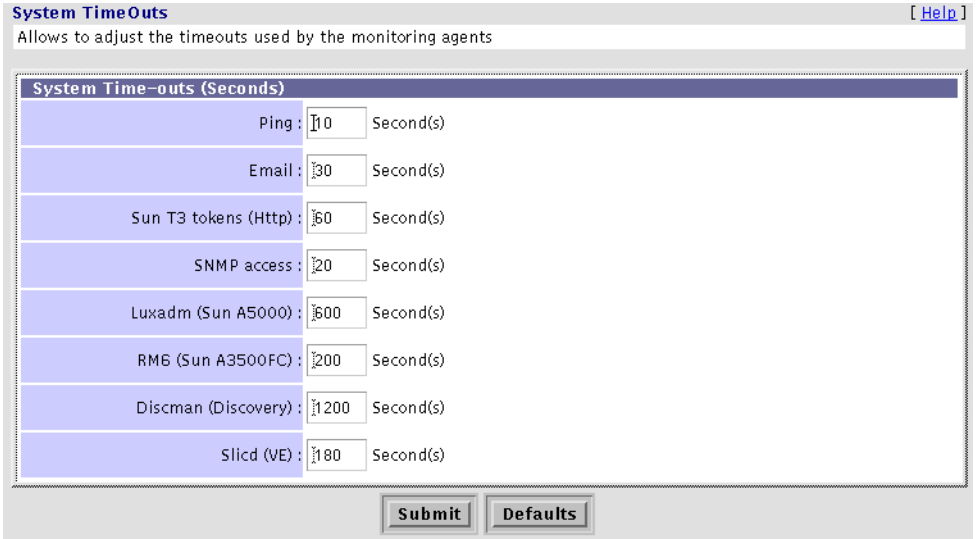



**FIGURE 3-33** System TimeOuts Window

2. **Change the default settings for scheduled timeouts and click Submit.**

   Refer to TABLE 3-8 for definitions of timeout settings.

3. **To return to the default settings, click Defaults.**

**TABLE 3-8** Timeout Settings

| Setting | Definition |
|---|---|
| Ping | The timeout used to perform a ping. The default is 10 seconds. |
| Email | The timeout used when sending email messages. The default is 30 seconds. |
| Sun T3, T3+, tokens (HTTP) | The timeout used when extracting token information from a Sun StorEdge T3, T3+, or 6120 array. The default is 60 seconds. |
| SNMP access | The timeout used to query switches that support Simple Network Management Protocol (SNMP). The default is 20 seconds.<br>For more information about SNMP, see “SNMP Traps” on page 49. |

# ▼ To Erase a Device's Cache

When you select an existing device, the last report in the cache for that device is erased. This forces the Storage Automated Diagnostic Environment agent to regenerate events.

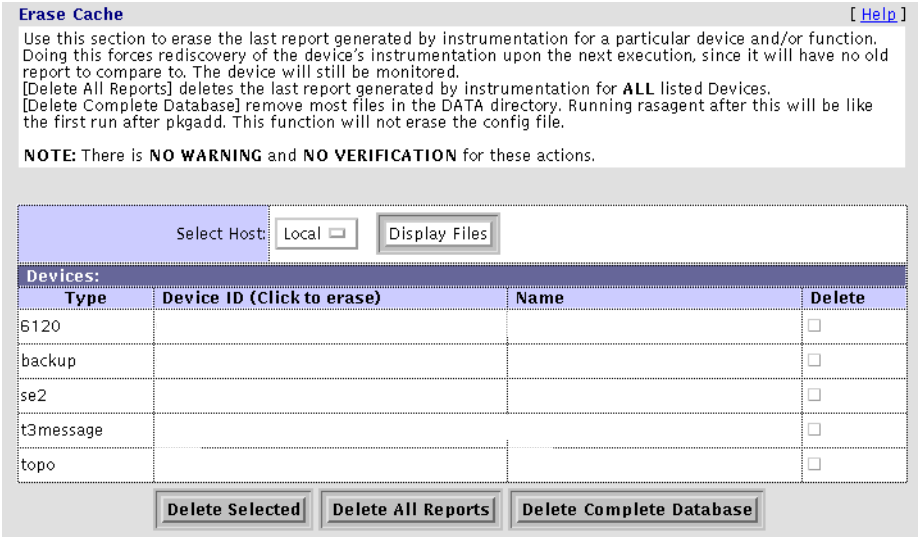



**FIGURE 3-34** Erase Cache Window

**Caution –** There are no safeguard messages for this function. Once you have selected a device, the instrumentation report for that device is immediately erased.

The Erase Device Cache function erases the cache of all the selected devices, and the list is removed. Although the device's cache is erased, however, the device continues to be monitored.

1. **Select a host from the Select Host pull-down menu, and click Display Files.**

   A list of devices for the selected host is displayed.

2. **Select the device's corresponding Delete check box to erase the device's cache. You can also delete all reports related to the device, or delete the entire database.**

   The device is removed from the list, the reports are deleted from the database, or the entire database is deleted, depending on which option you select.

## ▼ To Run the Agent Manually

Although the Storage Automated Diagnostic Environment is normally run from the `cron` facility, the Run Agent function enables you to run the Storage Automated Diagnostic Environment manually.

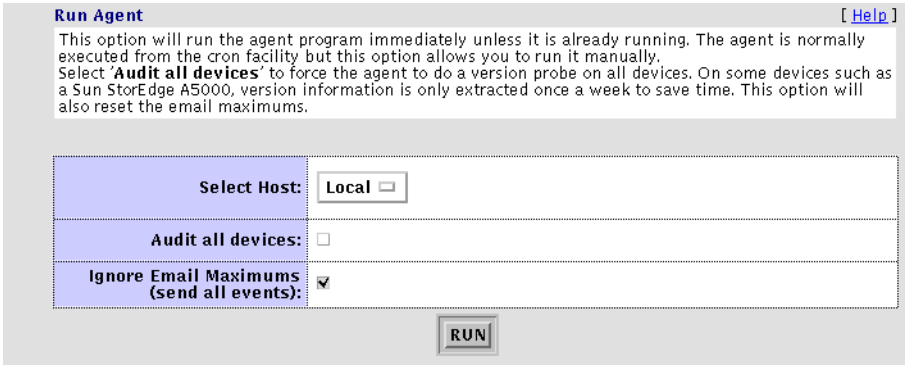



**FIGURE 3-35** Run Agent Window

1. **Select a host from the Select Host pull-down menu.**
2. **In the section “Configuration Options” on page 55, you can specify the maximum number of emails that will be sent within an 8-hour period about a specific event. The default is no maximum.**

   **If you check Ignore Email Maximums, the system overrides current specifications and sends all events. You can also clear the specified maximum number of emails using “Customizing Email Deliveries” on page 34.**
3. **After you have selected or deselected the options, click RUN.**

   A summary report displays the status of all the components that are running.

# ▼ To Email Configuration Information

Using the Email Configuration functionality, you can forward a detailed configuration report to specified email recipients. The configuration report includes a list of all monitored devices and the most recent instrumentation report available for each device. You can also forward Topology information using email.

---

**Note –** Email might not be sent if the system is not properly configured. This is primarily evident in Storage Service Processor environments where the Storage Service Processors are on a subnet and there is no gateway to the intended recipient. For more information refer to the *Sun StorEdge 6320 or 6320SL Series Hardware Installation and Service Manual*.

---

1. **Click the Email Config link in the System Utilities window.**

   The Email Config window is displayed.

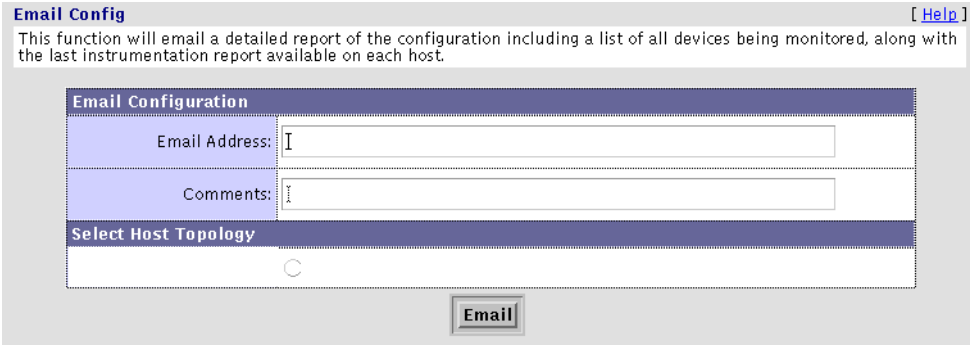



**FIGURE 3-36** Email Config Window

2. **Type an email address in the Email Address field and click Email.**

---

**Note –** The Email Configuration function enables Sun personnel to view customer information. However, in order for them to view the topology in an emailed configuration report, the browser must have access to Sun's internal wide area network (SWAN).

---

## ▼ To Run Multiple Scripts

The Run Scripts window enables you to run several command-line programs from the GUI.

1. **Click Run Scripts in the System Utilities window.**

The Run Scripts window is displayed.

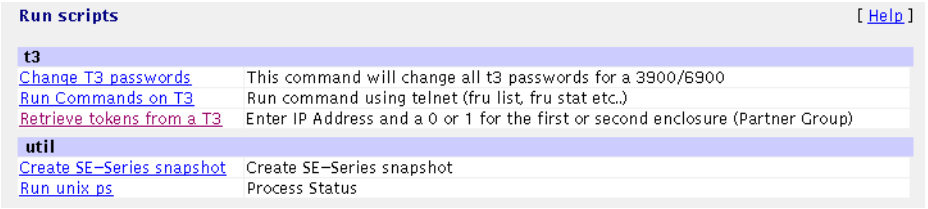



**FIGURE 3-37** Script List

2. **Click a script from the script list. An example of a script is shown in** FIGURE 3-38**.**

TABLE 3-9 provides a brief description of the scripts that are currently available for the Sun StorEdge 6120 array.

**TABLE 3-9** Sun StorEdge T3, T3+, and 6120 Array Scripts

| Script Option | Description |
|---|---|
| Sun StorEdge T3, T3+, and 6120 Array Scripts | |
| Change T3 passwords | This command changes the password of all Sun StorEdge 6120 arrays that are components of a Sun StorEdge 6320 or 6320SL system. |
| Run Commands on T3 | This command enables you to run Sun StorEdge 6120 array commands, such as `fru list` and `fru stat`, using Telnet. |
| Retrieve tokens from a T3 | This script enables you to enter the IP address and a `0` or `1` to specify the first or second enclosure. |

3. **Make changes, if necessary, to the script, and click Run Command.**

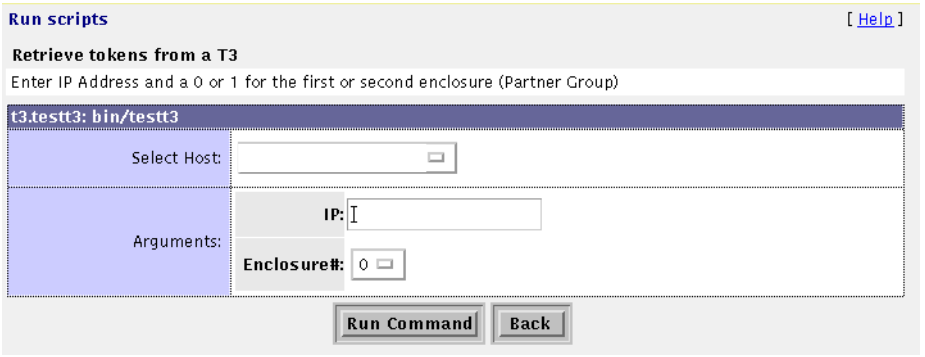



**FIGURE 3-38** Script List Example—Retrieve Tokens from a Sun StorEdge T3, T3+, or 6120 Array

## ▼ To Change the Root Password

Use the Password Maintenance window to change the security password for the Storage Automated Diagnostic Environment GUI. The *default* login and password after initial installation is `ras/agent` (all lowercase)

1. **Click Root password in the System Utilities window.**

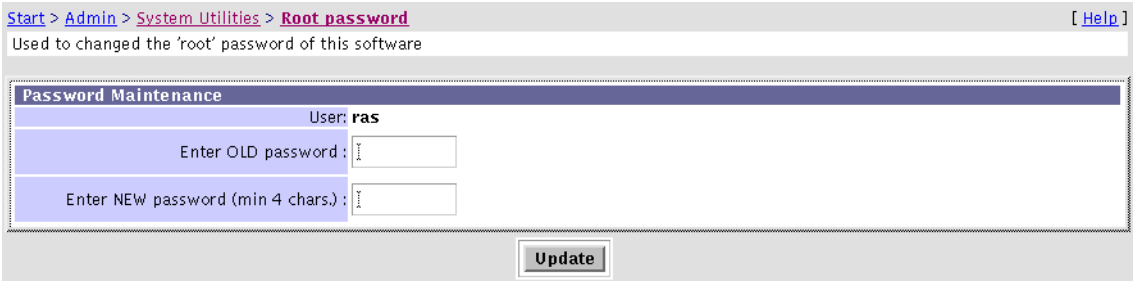



**FIGURE 3-39** Change Password Window

2. **Enter the old password.**
3. **Enter a new password, with a minimum of four characters.**
4. **Click Update.**

   The security password is changed.

# ▼ To Update User Roles

The Storage Automated Diagnostic Environment administrator can assign permission privileges for the categories listed in TABLE 3-10. In addition to assigning privileges, the administrator can add a new user, maintain passwords, update or remove existing users, and set the browser window.

1. **Click Login/Roles in the System Utilities window.**

   The Login / Roles window is displayed.

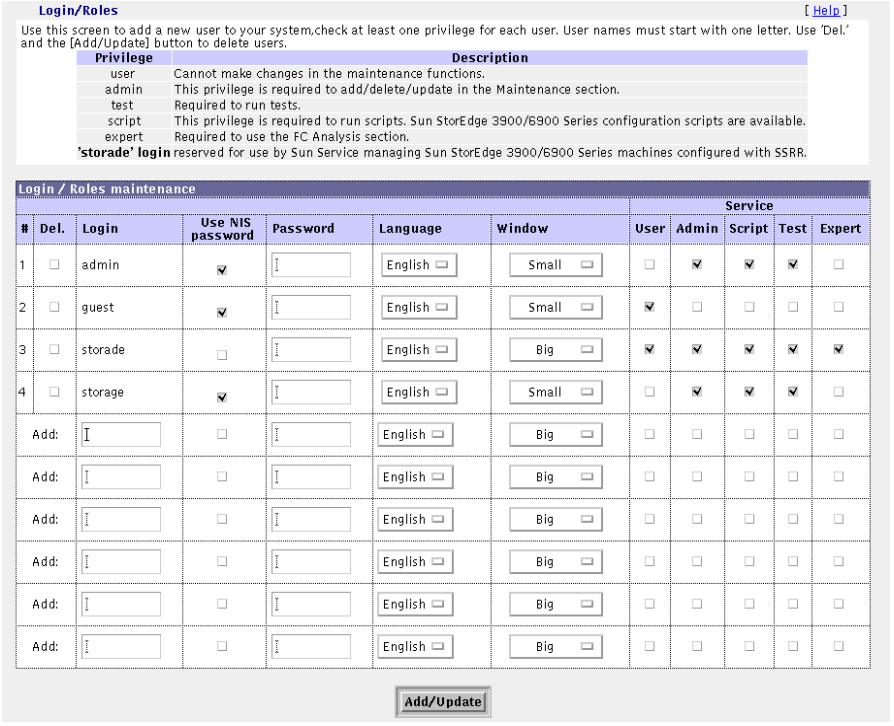



**FIGURE 3-40** Login / Roles Window

2. **Add a user name and assign one or more service roles to the user. Roles are defined in** TABLE 3-10**.**

**TABLE 3-10** Update User Roles

| Privilege | Description |
|---|---|
| user | The user does not have privileges for making changes in the maintenance functions. |
| admin | This privilege is required for adding, deleting, or updating information in the Maintenance section. |
| test | This privilege is required for running tests. |
| script | This privilege is required for running scripts. Currently, Sun StorEdge 3900 and 6900 Series configuration scripts are available. |
| expert | This privilege is required for using the Fibre Channel Counter Analysis section. |
| storade | Reserved for use by Sun service engineers who are trained to manage Sun StorEdge 6320 or 6320SL systems that have been configured with the Sun StorEdge Remote Response service. |

3. **Type a password, which is encrypted, or select the Use NIS password check box.**

4. **Select an option from the Window pull-down menu.**

   Big—displays three frames: the left frame window, the top window (with tracking links), and the main topic window.

   Small—displays three frames, as with the Big Screen selection, but the frames are smaller.

   No Frame—displays the top window (with tracking links) and the main topic window only.

   Accessible—displays the top window (with tracking links) and the main topic window, as with No Frames, but enables the user to use keystroke combinations to perform tasks instead of using the mouse.

   **Note –** The browser does not support Topology if the Accessible option is selected.

   If you want to use the Topology functionality, select Big Screen, Small Screen, or No Frames.

5. **Click Add/Update.**

### ▼ To Remove a User

- **Delete the encrypted password and click Add/Update.**

## ▼ To Clear the Login Window

The Clear Login screen enables you to clear a current user and log in again as another user without having to exit the browser.

1. **Click Clear Login in the System Utilities window.**

   A Netscape:Password pop-up window is displayed.

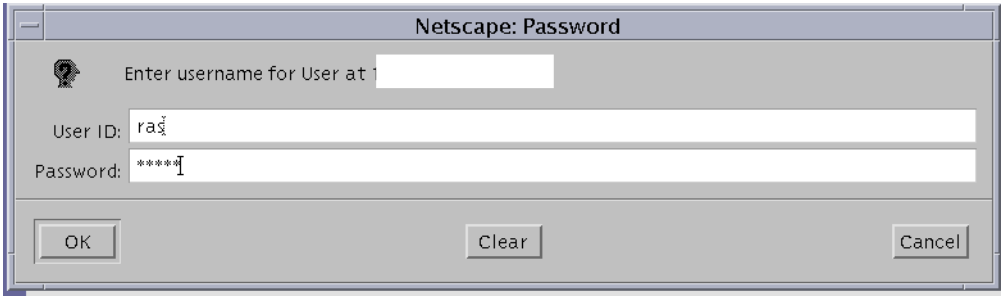



**FIGURE 3-41** Clear Login

2. **Type in a new User ID and password.**

   **a. Click Clear to clear the fields and start over.**

   **b. Click OK to log in again as another user.**

   The Storage Automated Diagnostic Environment main window is displayed.

# Using the Application Launcher

The Application Launcher, shown in FIGURE 3-42, enables users to store URL bookmarks in the Storage Automated Diagnostic Environment on a device-by-device basis. Use the Application Launcher to launch management interfaces directly from the software, without having to open a new browser window and type the URL of the program directly.

## ▼ To Launch an External Web-Based Application

1. **Click App. Launcher in the System Utilities window.**

   The Application Launcher window is displayed

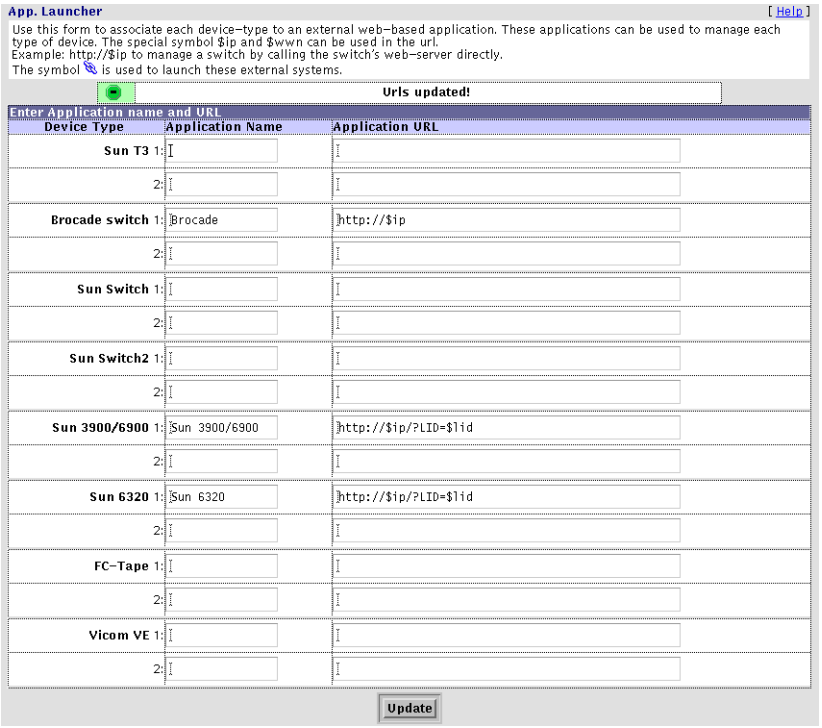



**FIGURE 3-42** Application Launcher

2. **Type a meaningful name of the application package in the Application Name text box.**

3. **Type the application URL that will launch the application in the Application URL text box.**

4. **Click Update.**

   The software updates and stores the application's URLs.

CHAPTER 4

# Monitoring

This chapter describes the following monitoring functions you can perform using the Storage Automated Diagnostic Environment:


- "Monitoring Devices" on page 76
- "Monitoring Topology" on page 85
- "Monitoring Logs" on page 91
- "Monitoring Utilities" on page 99


**Note –** The terms *event*, *alert*, and *alarm* are often mistakenly used interchangeably. The terms are defined as follows:

- An *event* is a notification that contains information about something that happened on a device. There are many types of events, and each type describes a separate occurrence.
- An *alert* is a subtype of an event that requires user intervention. The term *actionable event* often describes an alert.
- An *alarm* is a warning of an existing or approaching alert.

# Monitoring Devices

You can use the Monitor Devices window to review all FRU-level information and to access the components of a selected device.

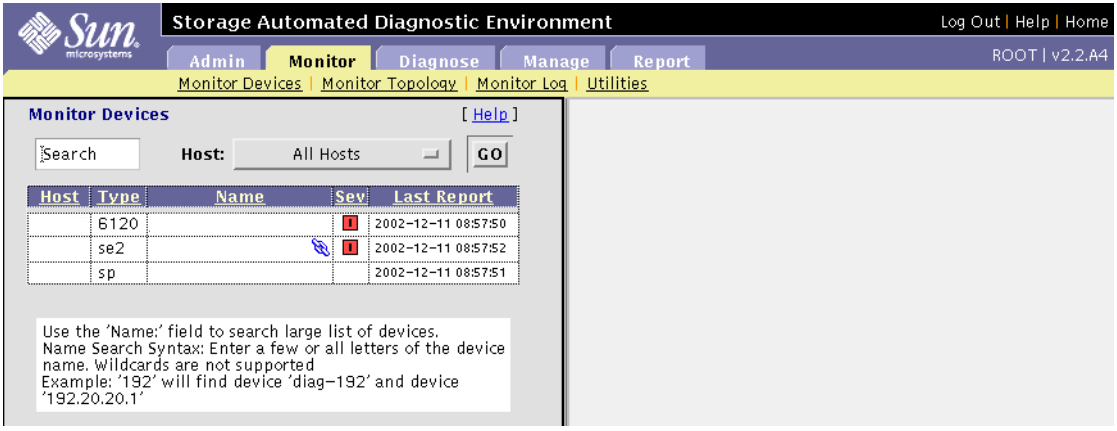



**FIGURE 4-1** Monitor Devices Window

Instrumentation agents are very different from one another because they are specialized modules designed to probe a specific type of device. Each instrumentation agent produces reports and, when available, reads new entries into the logs accessed by the `/var/adm/messages` function.

## ▼ To Access the Monitor Page

- **Click the Monitor tab on the Storage Automated Diagnostic Environment main window.**

  The Monitor tab is divided into four sections: Monitor Devices, Monitor Topology, Monitor Log, and Utilities, as shown in FIGURE 4-2.

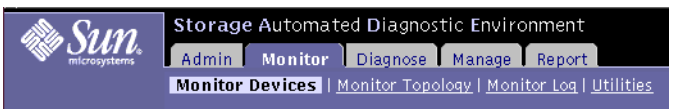



**FIGURE 4-2** Monitor Sections

## ▼ To View Device Reports

- **Click the Monitor Devices link in the Monitor main window.**

  The Monitor Devices window is displayed, which contains:

  - A list of all monitored devices
  - The severity column, which shows current errors and warnings on a selected device.

## ▼ To Access the Alerts Window

- **Drag your mouse over a severity button and click the left mouse button. The Alerts summary is displayed.**

## ▼ To Narrow the List of Devices

1. **Enter at least a portion of the device name or IP address to display specific devices.**

   For example, if you enter “192,” the search returns both “diag-192” and device “192.xx.xx.x.”

2. **Click a device from the Name column to view a list of all the device’s components.**

   A summary of the device is displayed, as shown in FIGURE 4-3.

---

**Note –** You can also access the content of the Monitor Devices Report window, using the Topology view, by clicking an icon with the right mouse button and then clicking Report.

---

3. **Click on a component's corresponding Summary, Health, Log, Report, or Graph link.**

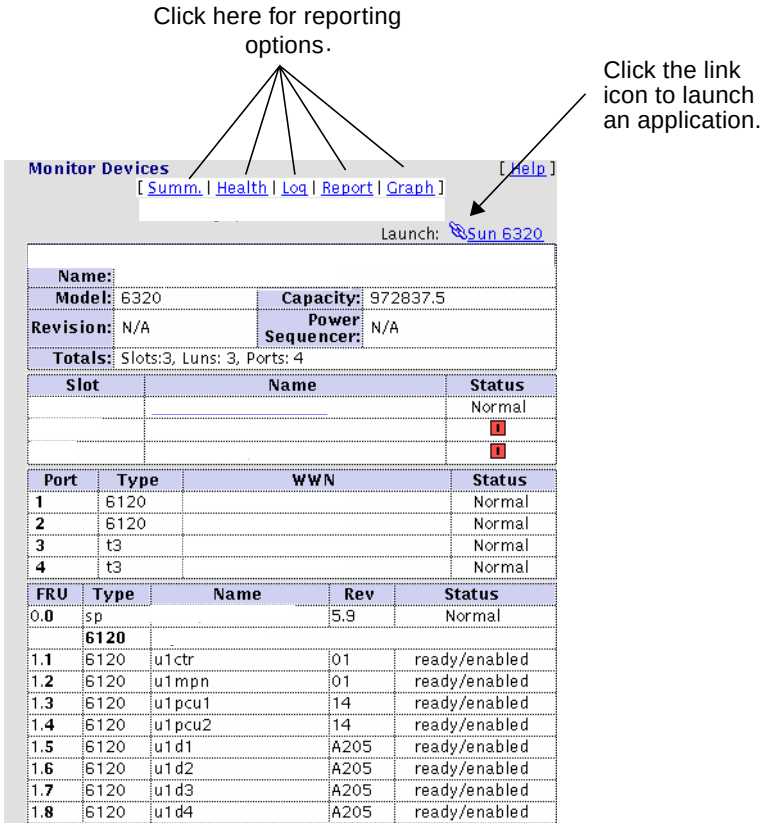



**FIGURE 4-3** Monitor Devices Report Options Window

# Monitoring Options

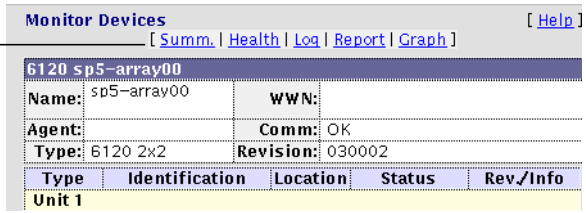
Options from the Monitor Devices Report window include:

- Summary Report describes the selected device.
- Health shows any problem with the selected device.
- Log shows all events generated against the selected device.
- Report shows, in detail, all monitored attributes for the selected device.
- Graph displays a summary of the component.

## ▼ To View a Summary Report

- **Click the Summ link from the Monitor Devices window.**

Click the Summ link to view a summary report.




The Summary Report page is displayed.

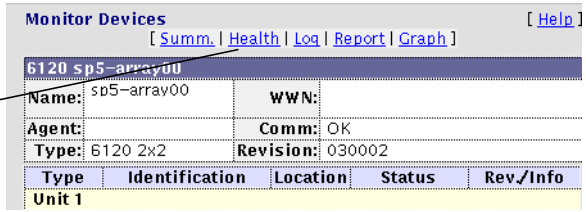
The Summary Report page provides detailed information about the selected device. For example, information about the Sun StorEdge 6120 array includes the following:

- Product information—array name, monitoring host name, WWN number, and communication status
- Array type (for example, disk, controller, midplane, loop, port, volume)
- Array identifier
- Array status (for example, ready-enabled, fault-enabled, online, normal, mounted)
- Revision number and additional information

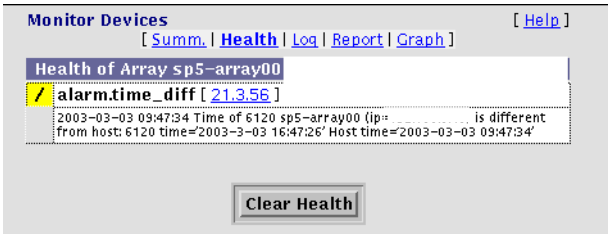
## ▼ To View or Delete a Health Report

1. **Click the Health link from the Monitor Devices window.**

Click the Health link to view a Health report.




A summary of the health of every FRU for the device is displayed, along with its severity level.

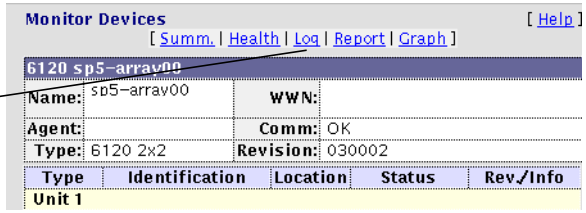



2. **If you want to delete the Health Summary, click Clear Health.**

## ▼ To View an Event Log Report

1. **To access the Event Log Report, click the Log link from the Monitor Devices menu.**

Click the Log link to view a Event Log Report.




The Event Log Report is displayed.

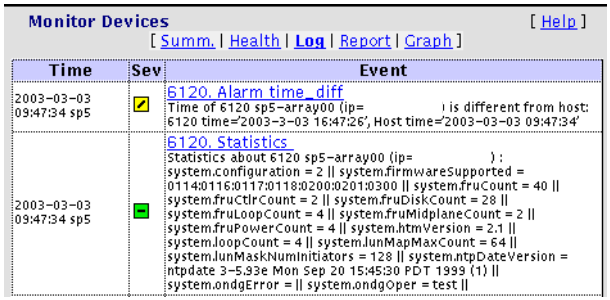


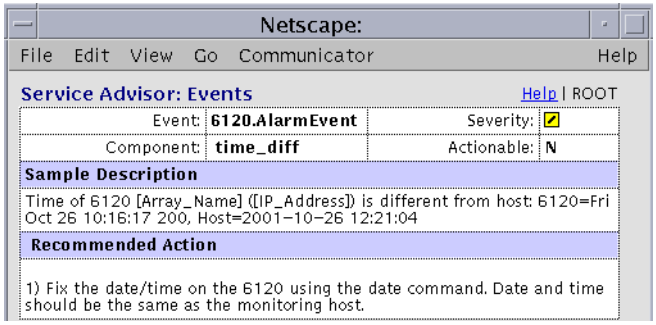

**FIGURE 4-4** Event Log Report

The Event Log contains the following information.

- Date and time the event occurred
- Severity icon

2. **You can scan your mouse over the severity icon to find the numerical value associated with each severity level:**
   - 0 = Green
   - 1 = Yellow (warning)
   - 2 = Red (error)
   - 3 = Down (component is down)
   - Event
   - Description of the event
3. **Click the Event's link to access the Event Grid.**

   The device's Service Advisor:Events window is displayed.

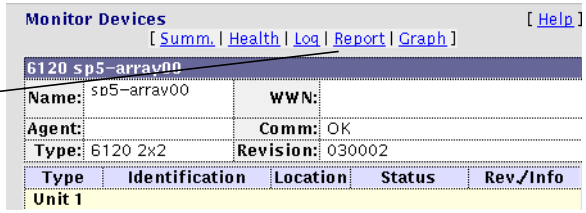


The Event Grid, also known as the *Service Advisor* shows all the actionable and nonactionable events the Storage Automated Diagnostic Environment generates. For more information, see “Service Advisor” on page 166.

## ▼ To View a Device Report Summary

The Device Report Detail window provides detailed information about a selected device and its components. The information is nested for easy navigation.

Click the Report link to view a Device Report Summary.




1. **Click the Report link from the Monitor Devices window.**

The Device Report summary window is displayed.

Topics for the Sun StorEdge 6120 array are listed as follows:.

- Controller (+)
- Disk (+)
- ID
- Info
- Location
- Loopcard (+)
- LUN
- Midplane (+)
- Port (+)
- Power (+)
- Slice
- Sys
- System
- Unit
- Volume (+)

2. **Click the plus (+) icon that corresponds to the component for which you want detailed information.**

   The subtopics for that component are displayed.

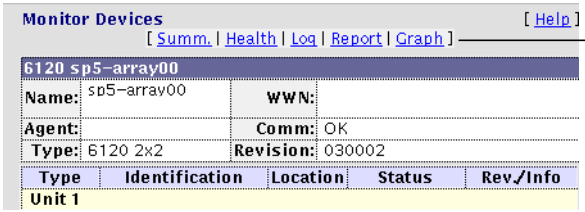
3. **Click the link on the subtopic.**

   The details for the subtopic are displayed in a second window, below the main menu. Details for the controller are shown below as an example.

| 6120:0x301.5016338.400470 controller | |
|---|---|
| count | = 2 |
| u1ctr.fruCtlrCacheSize | = 1023.87 |
| u1ctr.fruCtlrConsoleBaud | = 9600 |
| u1ctr.fruCtlrCpuDesc | = PowerPC 75x |
| u1ctr.fruCtlrCtState | = online |
| u1ctr.fruCtlrIsExpendable | = yes |
| u1ctr.fruCtlrMdate | = Sun Dec 22 20:25:22 GMT 2002 |
| u1ctr.fruCtlrPartnerId | = u2ctr |
| u1ctr.fruCtlrRole | = master |
| u1ctr.fruCtlrTemp | = 32 |
| u1ctr.fruDiskOpStatus | = 2 |
| u1ctr.fruId | = u1ctr |
| u1ctr.fruModel | = 5405559 |
| u1ctr.fruRevision | = 01 |
| u1ctr.fruSerialNo | = 000092 |
| u1ctr.fruState | = enabled |
| u1ctr.fruStatus | = ready |
| u1ctr.fruType | = controllerCard |
| u1ctr.fruVendor | = 0x301 |
| u1ctr.statusTime | = |

## ▼ To View a Graph Summary

1. **Click the Graph link from the Monitor Devices window.**




Click the Graph link to view a Graph summary.

The status of the component is displayed in graphical format, as shown in FIGURE 4-5.

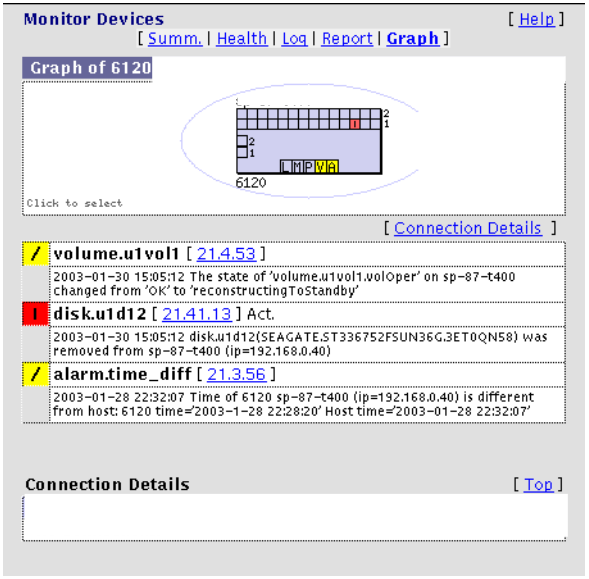



**FIGURE 4-5** Monitor Devices Graph Summary and Component Alerts Listt

# Monitoring Topology

This section discusses Topology monitoring functions you can perform using the Storage Automated Diagnostic Environment.

---

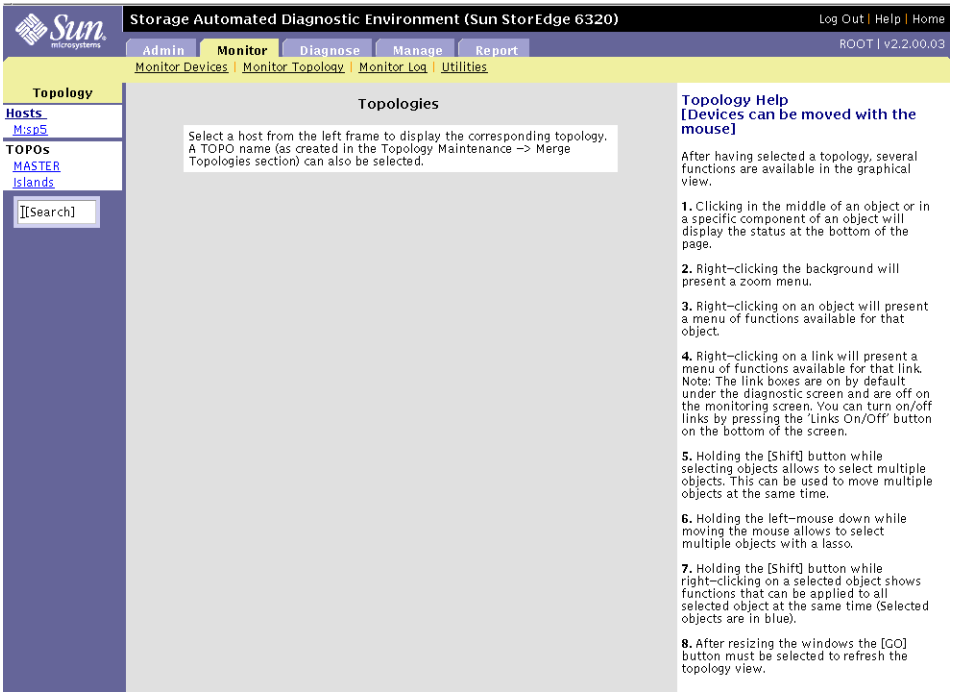
**Note –** The browser does not support Topology if the *No Frames + Accessible* option, described in “Configuration Options” on page 55, is selected.

---

## ▼ To Access the Monitor Topology Page

1. **Click the Monitor link on the Storage Automated Diagnostic Environment main window.**
2. **Click the Monitor Topology link.**

   A blank Topology window is displayed.



**Note –** To view a topology, you must first do the following:

1. **Execute the command** `/opt/SUNWstade/sysbin/config_solution` **to create the topology, find the devices, and run the agents.**
2. **After device discovery, create a Topology snapshot. For information, see "To Create a Topology Snapshot" on page 60.**

## ▼ To Display a Topology

1. **Select Monitor Topology from the Monitor tab.**
2. **Select and click an individual host or a merged topology from the Topology list in the left column.**

   The list displays all host topologies that include that device, as shown in the following example.

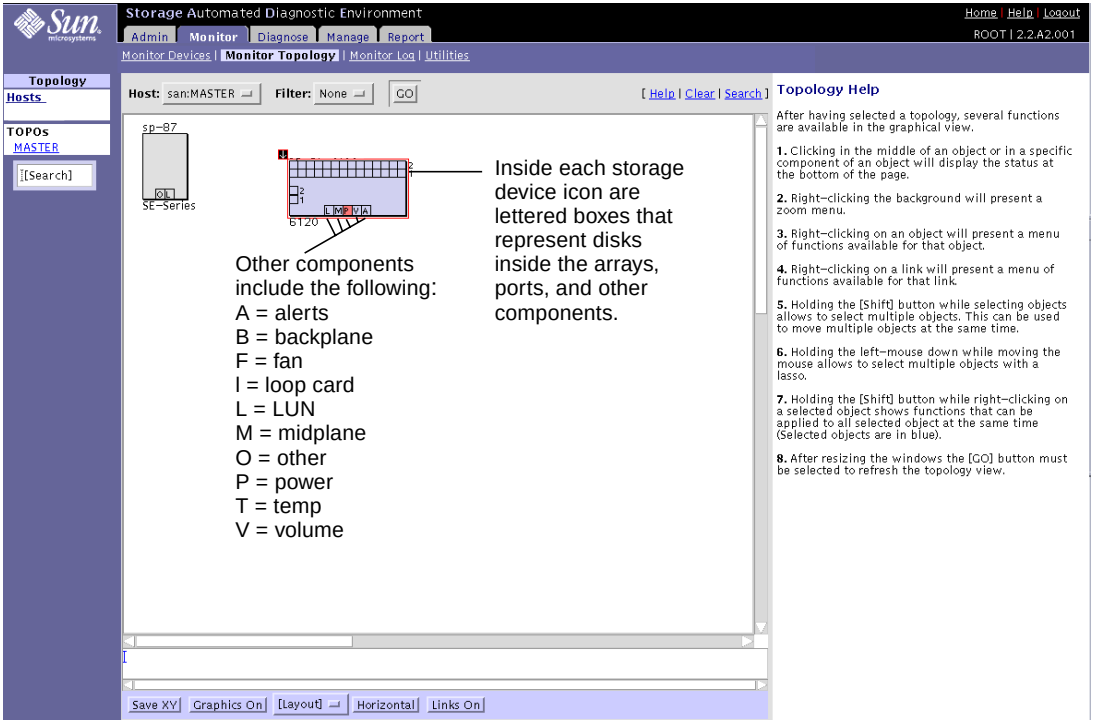



**FIGURE 4-6** Topology Example

The Storage Automated Diagnostic Environment supports the Sun StorEdge 3900 and 6900 series and Sun StorEdge 6320 or 6320SL systems. Inside each storage device icon shown in the Topology are boxes that represent:

- Disks inside the arrays
- Ports
- Other components

  "Other" components include the following:

  - A=Alerts
  - B = Backplane
  - F = Fan
  - K = Links
  - l = loop card (on Sun StorEdge 6120 array)
  - L = Lun
  - M = Midplane
  - N = Network Terminal Concentrator (NTC)
  - O = Other
  - P = Power
  - T = Temp
  - V = Volume

Links that are labeled *mpxio* in the Topology could indicate one of the following:

- If a RED "mpxio" label is displayed in the Topology, a Sun StorEdge Traffic Manager failover has occurred on this path.
- If a GREEN "mpxio" label is displayed in the Topology, a Sun StorEdge Traffic Manager failover has occurred on this path, but was later corrected.

# Using Topology Features

Use the procedures explained in TABLE 4-1to maximize the usefulness of the topology.

**TABLE 4-1** Topology Features

| Feature | Action |
|---|---|
| Narrow the size of the topology | Select a device from the Filter pull down menu and click GO. |
| Resize the window | After you adjust the screen, click GO. |
| Isolate a faulty enclosure component<br>**Note:** Some enclosures might have two power supplies but only one P box. In this case, the P box will turn red or yellow if *either* power supply is faulty. | Right click the enclosure, then right click on the report.<br>An Alert log will display all alerts for the enclosure's components separately. |
| Save the topology layout | Click Save XY on the footer bar. |
| View actual graphics of the devices vs. conceptual (line) drawings of them | Click the Graphics On button on the footer bar. |
| Change the layout of the topology from default to Sun StorEdge 3900 or 6900 series Solutions cabinet | Click the Layout button on the footer bar. |
| Change the view from horizontal to vertical | Click the Horizontal button on the footer bar. |
| Show connections between devices | Click the Links On/Off toggle button.<br>After the links are displayed, right click the link to display link errors, or to run the Link Test. |
| Rearrange the topology, | Right click a device, hold it, and move the device or multiple devices to the position of your choice.<br>After the topology is rearranged, click Save XY. |

## Topology Symbols

You might see red, yellow, or down-arrow symbols in the topology. The symbols indicate the following.

| Symbol | Severity |
|---|---|
|  | Red—Critical (error). |
|  | Yellow—Alert (warning). |
|  | Down—The device is down. |

# Clearing Alerts

## ▼ To Clear Green Alerts

- **Select the Clear link in the Topology view.**

  All green links are removed from the Topology.

## ▼ To Clear Yellow or Red Alerts

**Note –** Yellow or red links must be removed manually, and only when you are certain the faults have been corrected.

1. **Right-click a device that has one or more yellow or red alerts.**
2. **From the menu, select Alerts.**

   A list of all alerts is displayed.
3. **Click Delete Alerts to clear all alerts for the device.**

**Caution –** Red and yellow alerts are removed from the topology, even if the condition that caused the alert(s) still exists.

4. **To clear the red and yellow alerts for a link, right-click the link and select Display Error in the menu. Click Clear Link Errors in the description of the alerts.**

# Monitoring Logs

This section discusses the following log-monitoring functions you can perform using Storage Automated Diagnostic Environment:


- "Viewing the Log Window" on page 91
- "Viewing Messages on a Host" on page 92
- "To View an Event Log for a Host" on page 93
- "To View Alert Logs" on page 96
- "To Display Agent Errors" on page 98


## Viewing the Log Window

The Log window is a valuable tool that enables you to collect messages and information related to events, alerts, and errors. Once aggregated, you can use the log information for root cause analysis and troubleshooting.

### ▼ To Access the Log Window

1. **Click the Monitor link on Storage Automated Diagnostic Environment main window.**
2. **Click the Monitor Log link.**

   The Log window is displayed.

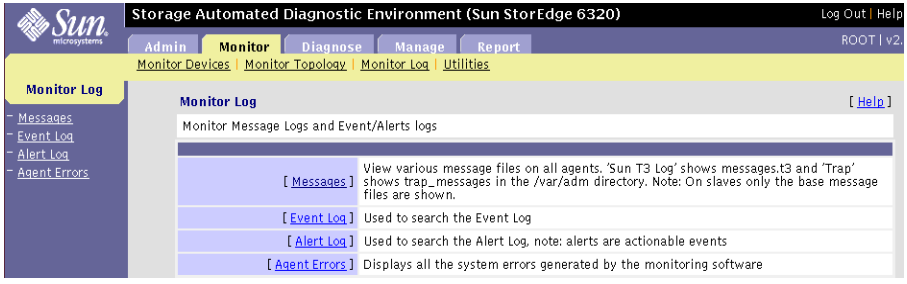



**FIGURE 4-7** Monitor Logs Window

# Viewing Messages on a Host

You can review the content of the `/var/adm/messages` log files and `/var/adm/messages.t3` message log files from a host. Log entries are displayed in reverse chronological order; the most recent entries are shown first.

---

**Note –** The software must be functioning properly on each host for the `/var/adm/messages` or the `/var/adm/messages.t3` log file to display the entries correctly.

---

## ▼ To Access the Messages Window

1. **From the Monitor Log menu, select Messages.**

   The Messages window is displayed.

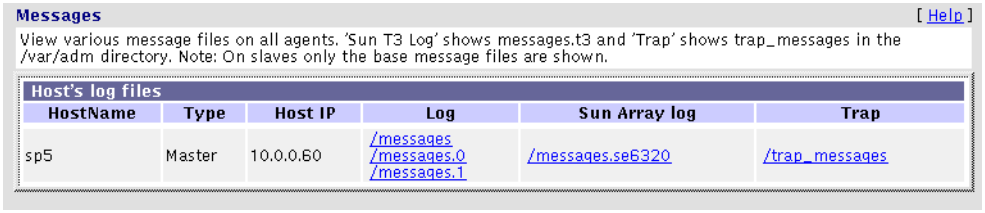



**FIGURE 4-8** /var/adm/messages Window

2. **Select a host from the HostName column and click the corresponding `/messages` or `/messages.se6320` link.**

   A list of `/var/adm/messages` on the local host is displayed.

## ▼ To View an Event Log for a Host

1. **From the Monitor Log menu, select Event Log.**

   The Event Log is displayed.

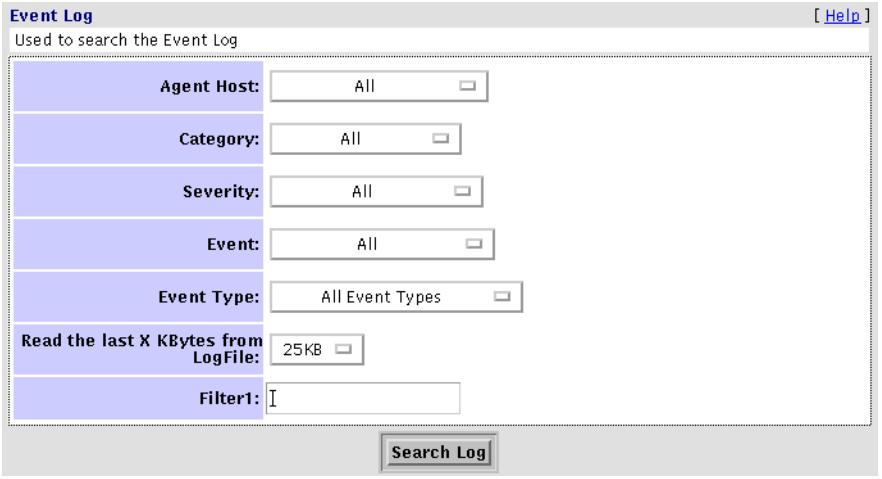



**FIGURE 4-9** Event Logs Window

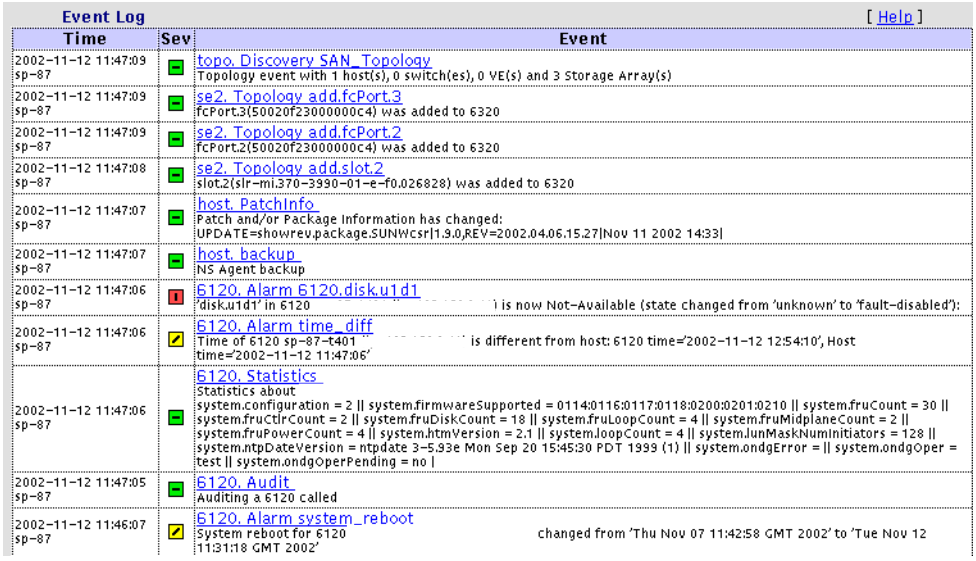
2. **Customize the event log report by using any of the information in** TABLE 4-2**.**

**TABLE 4-2** Event Log Options

| Field | Description |
|---|---|
| Agent Host | |
| Category | All is the default.<br>The device types supported by the current Storage Automated Diagnostic Environment version are displayed in the pull-down menu |
| Severity | Options include All (the default), System Down, Critical (Error), Alert (Warning), and Caution (Information). |
| Event | All is the default.<br>The event types supported by the current Storage Automated Diagnostic Environment version are displayed in the pull-down menu. |
| Event Type | Options include All Event Types (the default), System Component Events, and System Events. |
| Read the last X Kbytes from LogFile | Options include 25KB (the default), 50 KB, 75KB, 100KB. |
| Filter1 | Type the IP address for which you want to view the Event Log into the Filter1 text box. |

**3. Click Search Log to produce a customized Event Log.**

The corresponding event log window is displayed.



Event Log [ Help ]

| Time | Sev | Event |
|---|---|---|
| 2002-11-12 11:47:09 sp-87 | | topo. Discovery SAN_Topology<br>Topology event with 1 host(s), 0 switch(es), 0 VE(s) and 3 Storage Array(s) |
| 2002-11-12 11:47:09 sp-87 | | se2. Topology add.fcPort.3<br>fcPort.3(50020f23000000c4) was added to 6320 |
| 2002-11-12 11:47:09 sp-87 | | se2. Topology add.fcPort.2<br>fcPort.2(50020f23000000c4) was added to 6320 |
| 2002-11-12 11:47:08 sp-87 | | se2. Topology add.slot.2<br>slot.2(slr-mi.370-3990-01-e-f0.026828) was added to 6320 |
| 2002-11-12 11:47:07 sp-87 | | host. PatchInfo<br>Patch and/or Package Information has changed:<br>UPDATE=showrev.package.SUNWcsr\|1.9.0,REV=2002.04.06.15.27\|Nov 11 2002 14:33\| |
| 2002-11-12 11:47:07 sp-87 | | host. backup<br>NS Agent backup |
| 2002-11-12 11:47:06 sp-87 | | 6120. Alarm 6120.disk.u1d1<br>'disk.u1d1' in 6120 ... is now Not-Available (state changed from 'unknown' to 'fault-disabled'): |
| 2002-11-12 11:47:06 sp-87 | | 6120. Alarm time_diff<br>Time of 6120 sp-87-t401 ... is different from host: 6120 time='2002-11-12 12:54:10', Host time='2002-11-12 11:47:06' |
| 2002-11-12 11:47:06 sp-87 | | 6120. Statistics<br>Statistics about<br>system.configuration = 2 \|\| system.firmwareSupported = 0114:0116:0117:0118:0200:0201:0210 \|\| system.fruCount = 30 \|\| system.fruCtlrCount = 2 \|\| system.fruDiskCount = 18 \|\| system.fruLoopCount = 4 \|\| system.fruMidplaneCount = 2 \|\| system.fruPowerCount = 4 \|\| system.htmVersion = 2.1 \|\| system.loopCount = 4 \|\| system.lunMaskNumInitiators = 128 \|\| system.ntpDateVersion = ntpdate 3-5.93e Mon Sep 20 15:45:30 PDT 1999 (1) \|\| system.ondgError = \|\| system.ondgOper = test \|\| system.ondgOperPending = no \| |
| 2002-11-12 11:47:05 sp-87 | | 6120. Audit<br>Auditing a 6120 called |
| 2002-11-12 11:46:07 sp-87 | | 6120. Alarm system_reboot<br>System reboot for 6120 ... changed from 'Thu Nov 07 11:42:58 GMT 2002' to 'Tue Nov 12 11:31:18 GMT 2002' |

**FIGURE 4-10** Example of Event Log Messages on Local Host

## ▼ To View Alert Logs

1. **From the Monitor Log menu, select Alert Log.**

   Alerts are actionable events. The Alert log is considerably shorter than the Event Log.

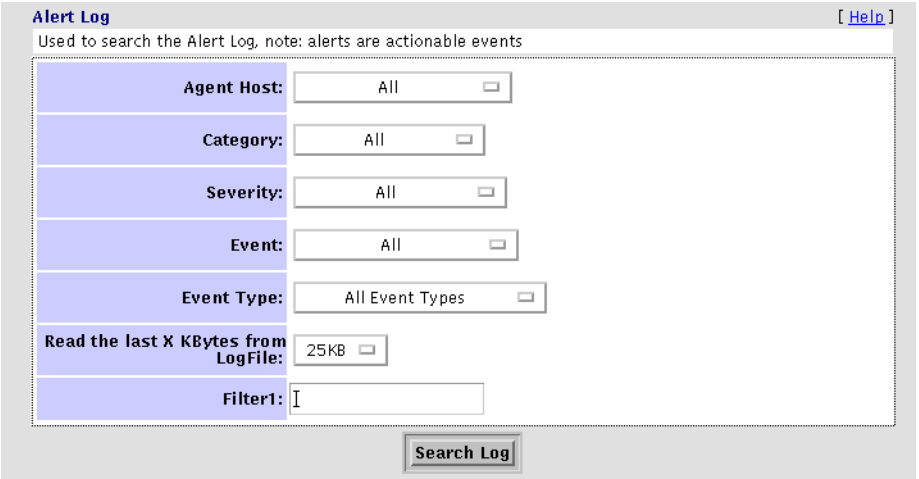



**FIGURE 4-11** Alert Logs Window

2. **Customize the alert log report by using any of the information in** TABLE 4-3**.**

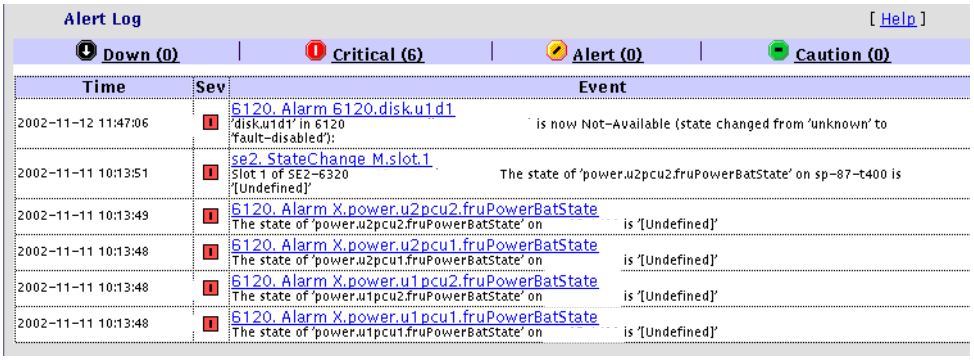
**TABLE 4-3** Alert Log Options

| Field | Description |
|---|---|
| Agent Host | |
| Category | All is the default.<br>The device types supported by the current Storage Automated Diagnostic Environment version are displayed in the pull-down menu |
| Severity | Options include All (the default), System Down, Critical (Error), Alert (Warning), and Caution (Information). |
| Event | All is the default. |
| Event Type | Options include All Event Types (the default), System Component Events, and System Events. |
| Read the last X Kbytes from LogFile | Options include 25KB (the default), 50 KB, 75KB, 100KB. |
| Filter1 | Type the IP address for which you want to view the Event Log into the Filter1 text box. |

3. **Click Search Log to produce a customized Alert Log.**

**Note –** The intent of this log is not to view the content of the Alert, but rather to view the list of Alert types that have been generated. You can obtain the actual content by scanning through the appropriate message logs or through the email that was sent for each notification.

The corresponding alert log window is displayed.




## ▼ To Display Agent Errors

The Storage Automated Diagnostic Environment System Errors window displays system errors that have occurred on a given host.

1. **Click Agent Errors in the Monitor Log window.**

   The Agent Errors window is displayed.

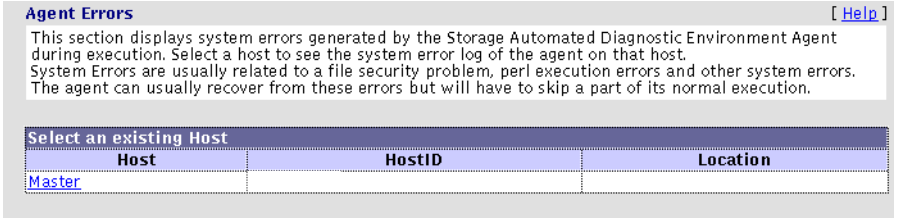



**FIGURE 4-12** Display Agent Errors Window

2. **Select an existing host.**

   The corresponding Error Logfiles window is displayed.

# Monitoring Utilities

This section discusses the Clear Device Health options, which you specify from the Monitoring Utilities window.

## ▼ To Access the Monitoring Utilities Window

- **From the Monitor window, click Utilities.**

The Monitor Utilities window is displayed.

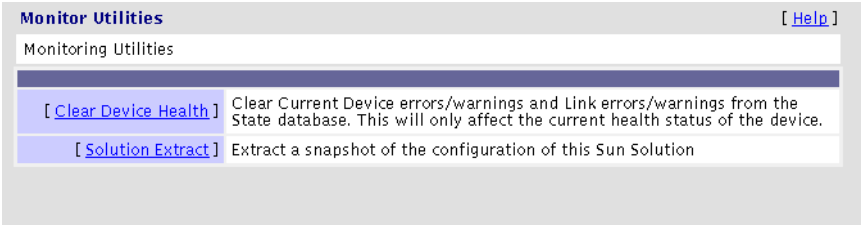



**FIGURE 4-13** Monitor Utilities Window

The Clear Device Health function enables you to clear current device errors and warnings and link errors and warnings from the State database.

## ▼ To Clear the Health Status of a Device

1. **Click the Clear Device Health link from the Monitor Utilities menu.**

   The Clear Device Health window, which shows the component's current state, is displayed.

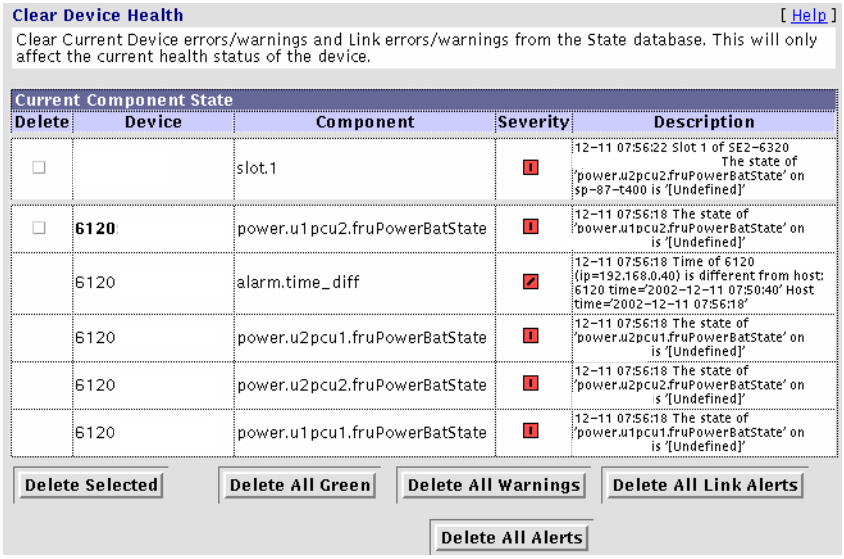



**FIGURE 4-14** Clear Device Health Window

2. **Select the device component and click its corresponding Delete button. Scroll down to the bottom of the window and click one of the deletion options.**


**FIGURE 4-15** Clear Device Health Options

## ▼ To Create a Solution Snapshot

The Solution Extract command creates a tar file that contains a snapshot of the Sun StorEdge 6320 series solution configuration. The file includes events, logfiles, configuration logs, and commands. See FIGURE 4-17 for an example Solution Extract Log.

1. **Click Solution Extract from the Monitor Utilities menu.**

   The Solution Extract window is displayed, shown in FIGURE 4-16.

2. **Enter an optional Sun StorEdge 6120 array password. This password applies to all Sun StorEdge 6120 arrays in the rack.**

3. **Click Start Extract.**

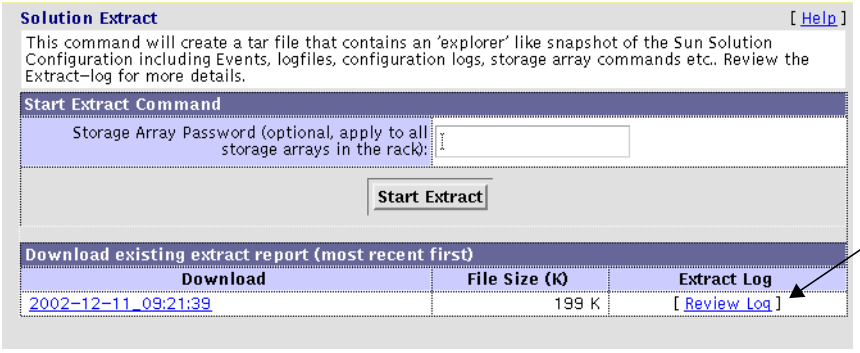



**FIGURE 4-16** Solution Extract Window

---

**Note –** The Extract Report takes several minutes to run. For a detailed summary of events and logs, click the Review Log link.

---

4. **To download an existing Solution Extract Log (like the Extract Logfile shown in** FIGURE 4-17**), click the Review Log link.**

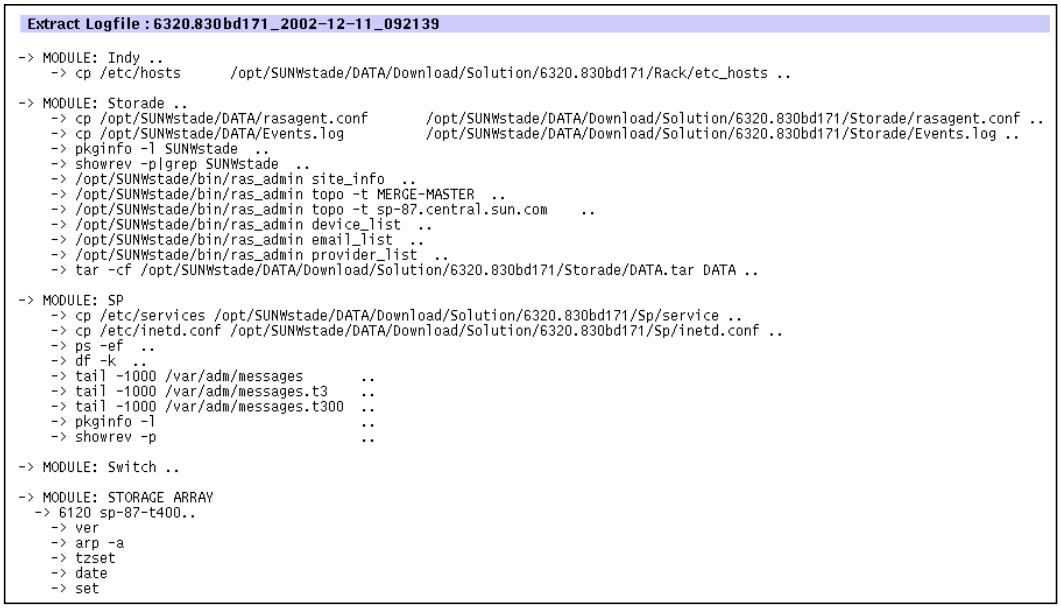



**FIGURE 4-17** Solution Extract Log Window

CHAPTER 5

# Diagnostics

This chapter provides an overview of the diagnostic tests available from the Storage Automated Diagnostic Environment GUI and the command line interface. In addition, this chapter covers test options, requirements, and rules.

This chapter includes the following sections:


- "Diagnostics Test Rules" on page 103
- "Selecting a User Interface" on page 104
- "Running Diagnostic Tests From the Command Line" on page 105
- "Running Diagnostic Tests From the GUI Window" on page 106
- "Test Manager" on page 112
- "Storage Automated Diagnostic Environment Tests" on page 115


## Diagnostics Test Rules

Certain tests have limitations and cannot be run with other tests. The following rules exist with Storage Automated Diagnostic Environment diagnostic tests:

- All tests are offline tests that can be used to verify and replace FRUs.
- All devices and paths must be quiesced prior to invocation of diagnostic tests.
- `switchtest` can run only on one port on a single switch instance at a time.
- `linktest` cannot be run with other tests, and can only be run using Test from Topology. You cannot run `linktest` using Test from List.
- The Link Test enables FRU isolation for Fibre Channel devices. You can invoke the Link Test from the Topology view by selecting the link.
- In-band tests can be run from the Test from Topology view with no restrictions.

- An out-of-band test (for example, `6120ofdg` or `switch2test`) can be run from the Test from Topology view under the following conditions:
  - It is run from the monitoring host view, or
  - It is run from the merged topology view.

---

**Note –** Any attempts to ignore or circumvent diagnostic test rules will cause pop-up warnings to display.

---

# Selecting a User Interface

You can run the Storage Automated Diagnostic Environment tests either from the Storage Automated Diagnostic Environment graphical user interface (GUI) or from the command line.

TABLE 5-1 describes the basic differences between the user interfaces.

**TABLE 5-1** Storage Automated Diagnostic Environment Diagnostics User Interfaces

| Interfaces | Description |
|---|---|
| GUI window | You can select tests and test options inside the Storage Automated Diagnostic Environment GUI's Topology section in one of two ways:<br>• While in the Topology view, point to a device or host and click the right mouse button.<br>• Select a test from the Test from List window. |
| Command line | You run each test individually from a shell tool command line. All diagnostics are located in `/opt/SUNWstade/Diags/bin`. See the man pages for more details.<br><br>**Note:** You must log in to the appropriate host or slave for testing. |

# Running Diagnostic Tests From the Command Line

In some cases it is more convenient to run a single Sun StorEdge diagnostic test from the command line rather than through a Storage Automated Diagnostic Environment interface.

When running a test from the command line, you must specify all test options in the form of command-line arguments. Standard arguments are common to most tests. See TABLE 5-2 for details.

The standard syntax for most tests is as follows :

```
% testname [-uvf][-o test-specific-arguments]
```

TABLE 5-2 describes the standard command-line arguments.

**TABLE 5-2** Standard Command-Line Arguments

| Argument | Description |
|---|---|
| `-u` | Displays command-line Usage information. |
| `-v` | Runs the test in Verbose mode and displays messages with more detailed information about the testing process. The default is False. |
| `-f` | Runs the test in full Functional test mode. This mode assumes that the test has complete control of the device being tested. The default is False. |
| `-o` | Indicates that the Options and arguments that follow are test-specific. |

**Note –** All options must be listed in a quoted list following the standard `-o` argument. The options must be separated by a pipe ( | ); for example:

```
command_name -o “dev_path | ...”
```

# Running Diagnostic Tests From the GUI Window

If you run the diagnostic test using the Storage Automated Diagnostic Environment, you can easily access test configuration, control, and results, using the buttons in the dialog boxes. In addition, you can use the GUI to perform the following tasks.

- Enables you to access diagnostic tests from a topology view.
- Enables you to access diagnostic tests from a list.
- Enables you to adjust the default settings for selected diagnostic tests.
- Enables you to review, delete, or archive diagnostic tests.
- Enables you to review the results of old tests.

The diagnostic tests are designed to test the target FRU and to operate on an in-band or out-of-band data path. The Storage Automated Diagnostic Environment scheduler dispatches the test to be run on the appropriate server (host).

## ▼ To Access the Diagnostic Tests

1. **Click the Diagnose tab in the Storage Automated Diagnostic Environment main window.**

   The Diagnose menu is displayed.

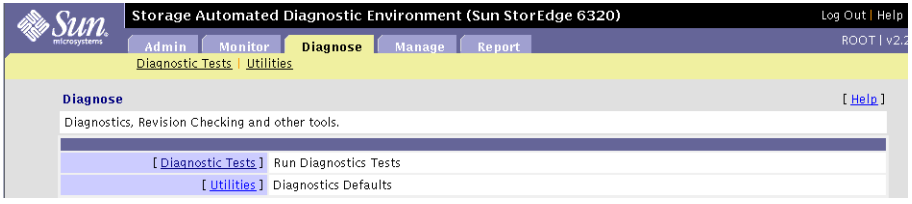



**FIGURE 5-1** Diagnose window

2. **Click the Diagnostic Tests link in the Diagnose window.**

The Diagnostic Tests window is displayed.

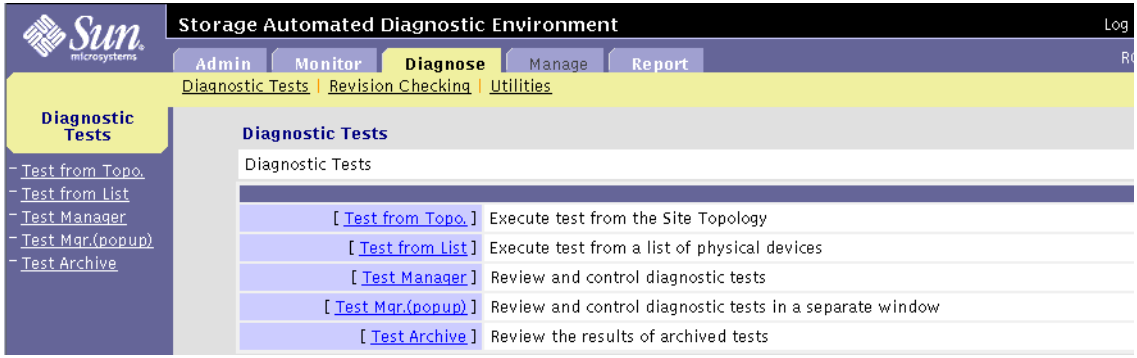



**FIGURE 5-2** Diagnostic Tests window

With *two exceptions*, you can run Storage Automated Diagnostic Environment diagnostic tests from either Test from List or Test from Topology.

- You can invoke the Link Test by right-clicking the box in the link displayed in the topology. You cannot invoke the Link Test functionality using Test from List.
- Unconnected HBAs (HBAs that are not connected to any device) can only be tested using the Test from List option.

# Running a Test from Topology

The Storage Automated Diagnostic Environment's implementation of diagnostic tests verifies the operation of all the user-selected components. The Graph view shows the physical topology of a system or merged system. Using the Topology view, you can select specific subtests and test options.

---

**Note –** The monitoring status of devices and links appears both in the Test from Topology view and in the Test from List menu.

---

## ▼ To Test from Topology

1. **Click the Test from Topology link.**

   The Test from Topology window is displayed.

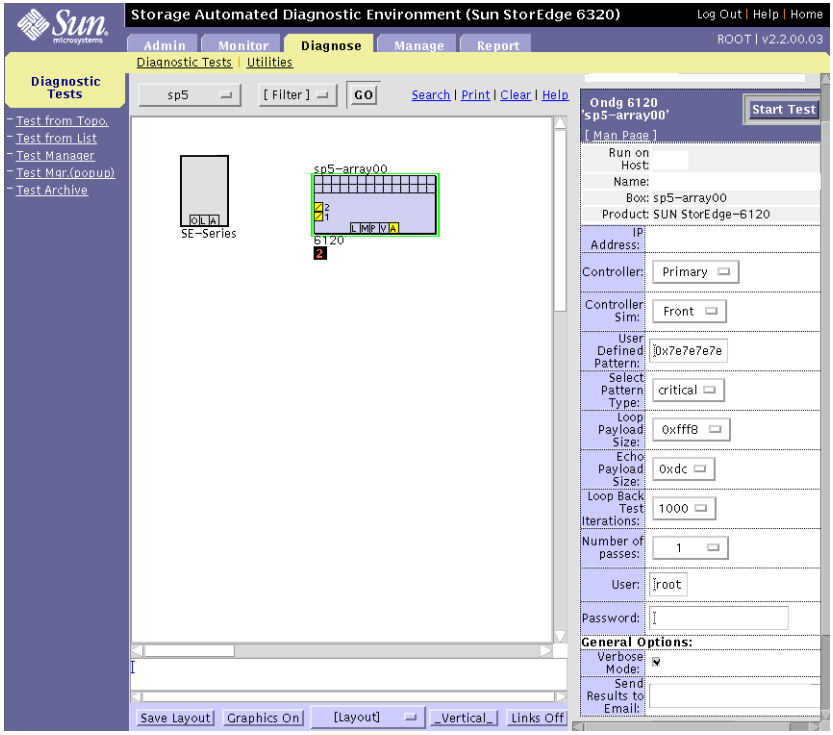



**FIGURE 5-3** Test from Topology window

2. **Using the right mouse button, select the device.**

   A list of test options appears.

3. **With the left mouse button, select the test you want to run on the device.**

   The applicable test is displayed in the right pane.

4. **Select the Clear link in the Topology view to remove all the green alert icons from the topology. The red and yellow alert icons remain in the topology until all faults have been corrected.**

---

**Note –** If a red “mpxio” label is displayed in the Topology, a Sun StorEdge Traffic Manager failover has been discovered on this path.

If a green “mpxio” label is displayed in the Topology, a Sun StorEdge Traffic Manager failover has occurred on this path, but was later corrected.

---

While a test is running, the Test Manager pop-up window appears and reports the status of the test. See “Test Manager” on page 112 for more information.

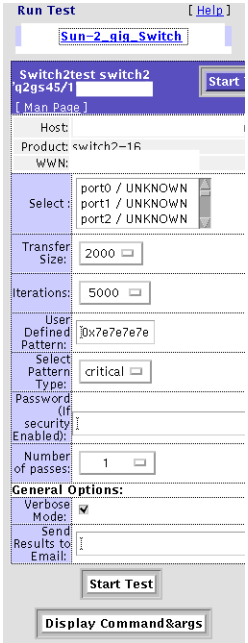

**FIGURE 5-4** Status of Test Running in Test Manager

After the test has completed its run, an email message is sent to the specified email recipient.

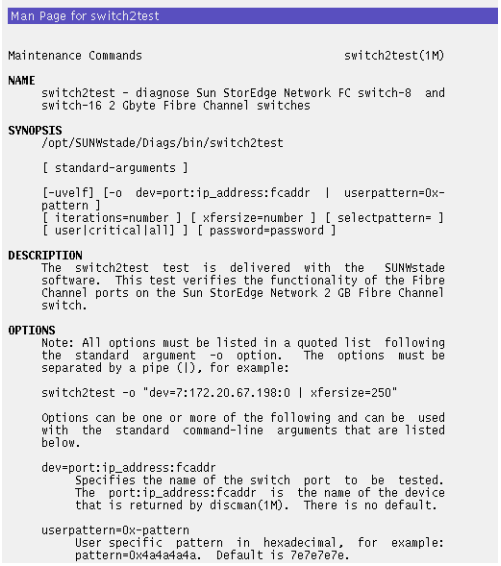
## ▼ To View a Test's Man Page

- **Click the man page link on the device's GUI test.**

Click here to access the test's man page.




The test's man page is displayed.



Man Page for switch2test

```
Maintenance Commands                                  switch2test(1M)

NAME
     switch2test - diagnose Sun StorEdge Network FC switch-8  and
     switch-16 2 Gbyte Fibre Channel switches

SYNOPSIS
     /opt/SUNWstade/Diags/bin/switch2test

     [ standard-arguments ]

     [-uvelf] [-o  dev=port:ip_address:fcaddr  |  userpattern=0x-
     pattern ]
     [ iterations=number ] [ xfersize=number ] [ selectpattern= ]
     [ user|critical|all] ] [ password=password ]

DESCRIPTION
     The  switch2test  test  is  delivered  with  the   SUNWstade
     software.  This test verifies the functionality of the Fibre
     Channel ports on the Sun StorEdge Network 2 GB Fibre Channel
     switch.

OPTIONS
     Note: All options must be listed in a quoted list  following
     the  standard  argument  -o  option.   The  options  must be
     separated by a pipe (|), for example:

     switch2test -o "dev=7:172.20.67.198:0 | xfersize=250"

     Options can be one or more of the following and can be  used
     with  the  standard  command-line  arguments that are listed
     below.

     dev=port:ip_address:fcaddr
          Specifies the name of the switch  port  to  be  tested.
          The  port:ip_address:fcaddr  is  the name of the device
          that is returned by discman(1M).  There is no default.

     userpattern=0x-pattern
          User specific  pattern  in  hexadecimal,  for  example:
          pattern=0x4a4a4a4a.  Default is 7e7e7e7e.
```

# Running a Test From List

Storage Automated Diagnostic Environment's implementation of diagnostic tests verifies the operation of all the user-selected components. Tests are selected from a list of physical devices.

The Test from List view shows the devices and their associated tests. This list also includes warnings and errors reported by the monitoring agents. In addition, Test from List displays all available host / HBA tests and not just the connected ports, as the Test from Topology view displays.

Using Test from List you can do the following:

- Sort by host, device type, test type, and device status.
- Select options for a specific device, select multiple devices, or select all devices.
- Specify the number of passes each test will run.

## ▼ To Invoke the Test Option Pane for a Particular Device

1. **From the Test from List window, select the diagnostic test that you want.**

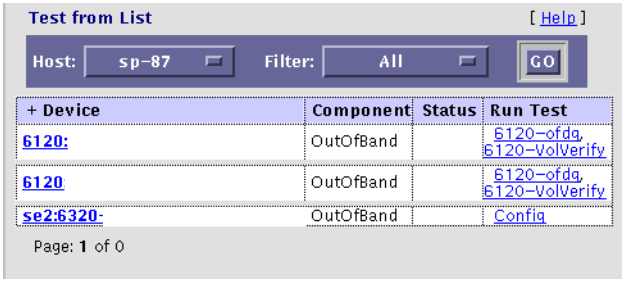



**FIGURE 5-5** Test from List window

2. **Select a host from the host pull-down menu.**
3. **From the Filter pull-down menu, select a specific device, multiple devices, or click All to display all devices.**
4. **Click GO.**

   A list that is customized to your criteria is displayed.

5. **Select the test name link in the Run Test column to run diagnostics.**

   The appropriate test window is displayed in the right frame

# Test Manager

The Storage Automated Diagnostic Environment's integration with diagnostic tests implements the Test Manager to track and control the progress of the user-selected tests. The Test Output view enables you to view test output for active and completed tests in the Test Monitor view.

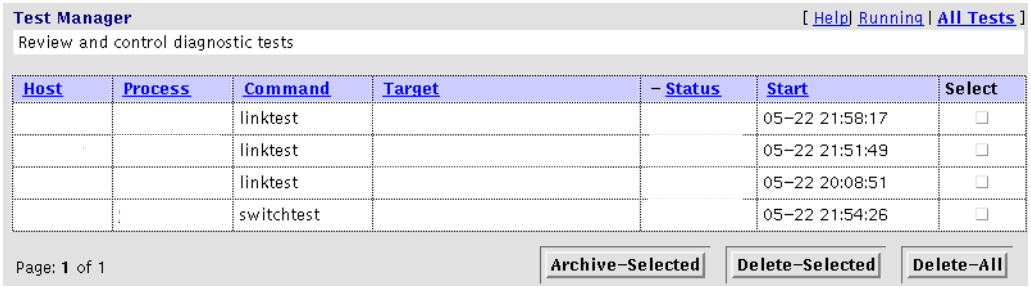



**FIGURE 5-6** Test Manager window

The Storage Automated Diagnostic Environment runs the device tests in a distributed manner. The master calls the proper host to begin tests.

---

**Note –** To sort in Test Manager, click on the header for any column and the list sorts the entries in that column. A plus ("+") indicator signifies that this is the current sort.

---

For test processes, the status (displayed in the Test Manager Status column) can be one of the following:

- Running—User intervention is required for the test to continue. *User intervention* may involve answering a question or replacing the cables or the gigabit interface converters (GBICs).
- Done OK—The test ran successfully with no errors.
- Done Error—The test failed and no longer continues to run.
- Done Aborted—The user manually stopped the test before it had finished running.

---

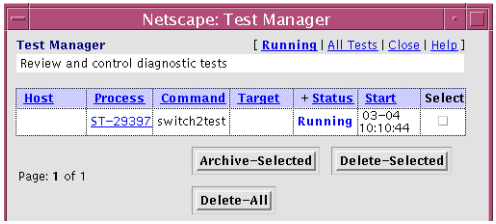
**Note –** There is a system time-out associated with the Waiting state. If you want to change the default settings for scheduled time-outs, See "System Timeouts" on page 87.

---

## ▼ To Archive Tests

Storage Automated Diagnostic Environment's implementation of diagnostic tests enables you to archive and view diagnostic logs saved by the Test Manager.

1. **Click the Select check box for the test from the Test Manager window.**




2. **Click the Archive Selected check box.**

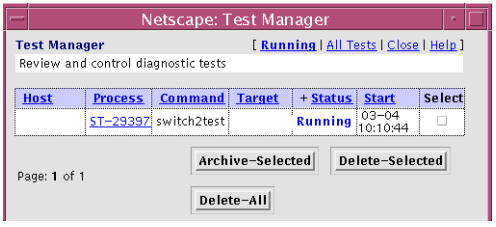
   A pop-up window is displayed with the message, "Are you sure you want to archive selected tests?"

3. **Click OK.**

   Test Manager archives the selected test.

## ▼ To Delete Tests

1. **Click the Select check box for the test from the Test Manager window.**




2. **Click the Delete Selected check box.**

   A pop-up window is displayed with the message, "Are you sure you want to delete selected tests?"

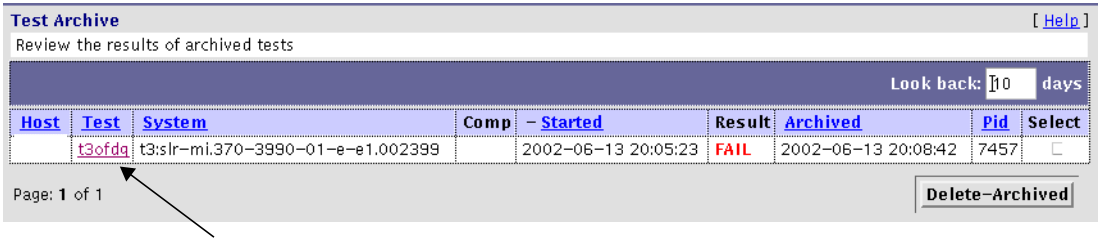
3. **Click OK.**

   Test Manager deletes the selected test.

## ▼ To View a List of Archived Tests

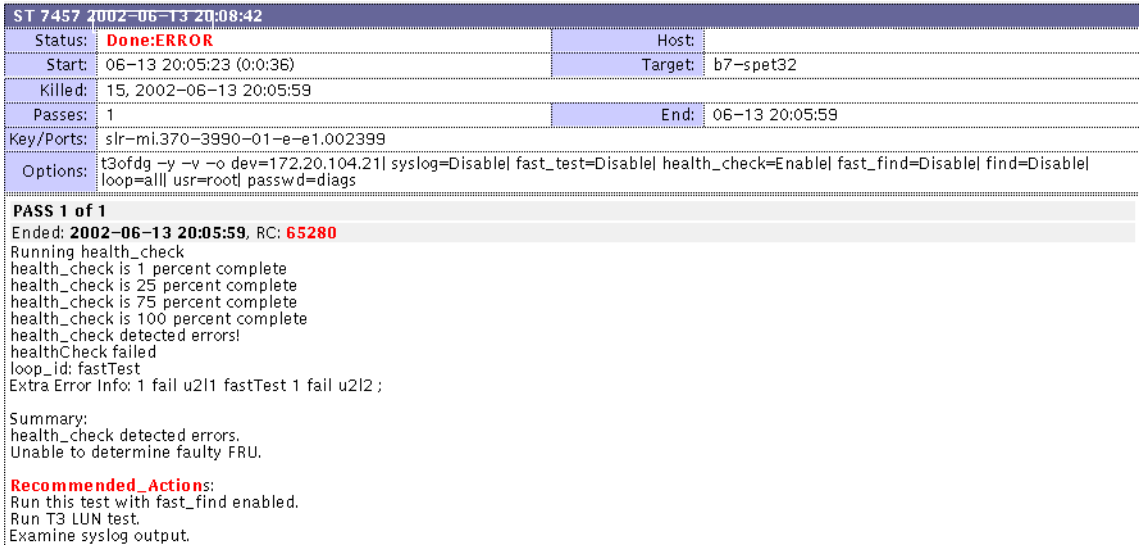
- **Click the Test Archive link from the Diagnostic Tests menu.**

.The Test Archive window is displayed.




Use the Test Archive functionality to view tests that have previously run on a host, or to delete an archived test.

A summary of the test is displayed, along with recommended actions you can take to run a more successful test.




---

**Note –** Test Manager offers the same functionality as Test Archive.

---

# Storage Automated Diagnostic Environment Tests

This section describes the tests that are available from the Diagnose section of the Storage Automated Diagnostic Environment GUI.

Test options exist for each individual test.

---

**Note –** The Set Test Defaults options screen enables you to change the default options for the following diagnostic tests:

---


- "Brocade Silkworm Test (`brocadetest`)" on page 116
- "Fibre Channel Link Diagnostic (`linktest`)" on page 118
- "Sun StorEdge 6320 System Test (`se2test`)" on page 122
- "Sun StorEdge 6320 System Test (`se_configcheck`)" on page 124
- "Sun StorEdge Network FC Switch-8 and Switch-16 Switch Test (`switchtest`)" on page 125
- "Sun StorEdge Network 2 Gbit Fibre Channel Switch Test (`switch2test`)" on page 127
- "Sun StorEdge T3 and T3+ Array Test (`t3ofdg`)" on page 129
- "Sun StorEdge T3 and T3+ Array Test (`t3volverify`)" on page 131
- "Sun StorEdge 6120 Array Echo Test (`6120loop`)" on page 134
- "Sun StorEdge 6120 Array Test (`6120volverify`)" on page 137
- "Virtualization Engine Diagnostic Test (`vediag`)" on page 140

# Brocade Silkworm Test (brocadetest)

The brocadetest(1M) test is used to diagnose Brocade switch devices. The brocadetest process also provides command line access to Brocade Silkworm switch diagnostics. Brocadetest supports testing on all Brocade Silkworm switches that have network access from the testing host.

Brocadetest runs the port diagnostic on connected switch ports. While brocadetest is running, the port statistics are monitored for errors.

The brocadetest(1M) options are shown in TABLE 5-3.

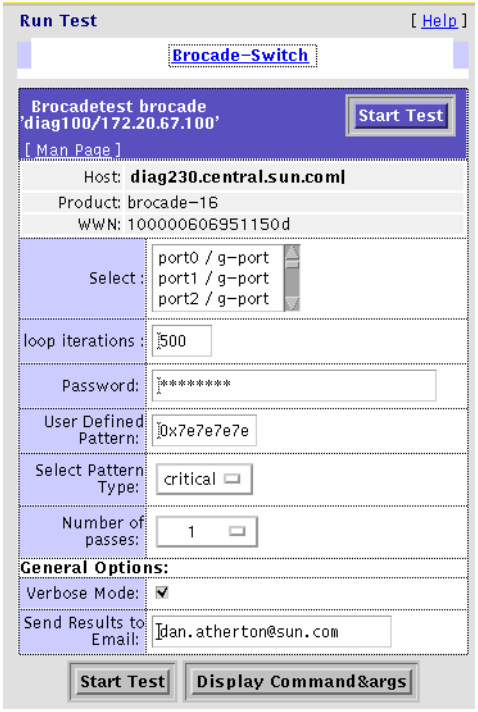



**FIGURE 5-7** brocadetest Test Options Dialog Box

---

**Note –** The brocadetest(1M) uses a telnet session from which to run the diagnostics. In order for the diagnostics to run correctly, no users can have a telnet session open to the switch while the diagnostics are running. If there is a telnet session open, the brocadetest will fail, indicating that another user may be logged into the switch.

---

## `brocadetest` (1M) Test Options

TABLE 5-3 describes the test mode options for the `brocadetest` test.

**TABLE 5-3** `brocadetest` Test Options

| Option | Description |
|---|---|
| Loop iterations | Specifies the number of iterations the port test should run, between 0 and 1,000,000. |
| Password | Specifies the password used by the admin user of the switch. There is no default value and this a required field. |
| User Defined Pattern | Specifies the default pattern, in hexadecimal format, to be used for the port test. You can also enter the hexadecimal pattern to run for the test. |
| Select Pattern Type | Gives the user the choice of running the one user pattern, critical patterns (10 of the most critical patterns), or all patterns (a complete list of test patterns). |
| Number of passes | Specifies the number of times the test will run. The default is 1. |

# Fibre Channel Link Diagnostic (`linktest`)

`linktest`, delivered with the Storage Automated Diagnostic Environment software, verifies the functionality of passive Fibre Channel components in a SAN or DAS environment. `linktest` provides failing FRU isolation for devices that have external loopback tests.

---

**Note –** `linktest` is available only from the Storage Automated Diagnostic Environment GUI, Test from Topology view.

`linktest` is *not* available through the command line interface (CLI) or from the Storage Automated Diagnostic Environment GUI, Test from List view.

---

## linktest Options

TABLE 5-4 describes the `linktest` Test Options dialog box.

**TABLE 5-4** `linktest` Options

| Item | Description |
|---|---|
| Pattern Type | Choices of pattern to run include user \| critical \| all<br><br>**critical** is the I/O pattern causing device failure<br>**all** is a complete list of patterns<br>**critical** is the default pattern |
| User Pattern | User-specified pattern in hexadecimal format.<br>For example, pattern=`0x4a4a4a4a`. |
| Verbose | Runs the test in Verbose mode and displays messages with more detailed information about the testing process. The default is off. |
| Email | Enter email addresses to where the test results need to be sent, for example, email=`email@address.com`. An entry in Send Results to Email from the Default Options screen sends the results of all tests. To send results to email recipients on an individual test, access that test's Default Option screen. |

## ▼ To Invoke `linktest`

Run `linktest` if you detect a bad or intermittent link, either by way of an alert or by visually detecting a red link on the topology graph.

1. **Click the Test from Topology link.**

The Test from Topology window is displayed.

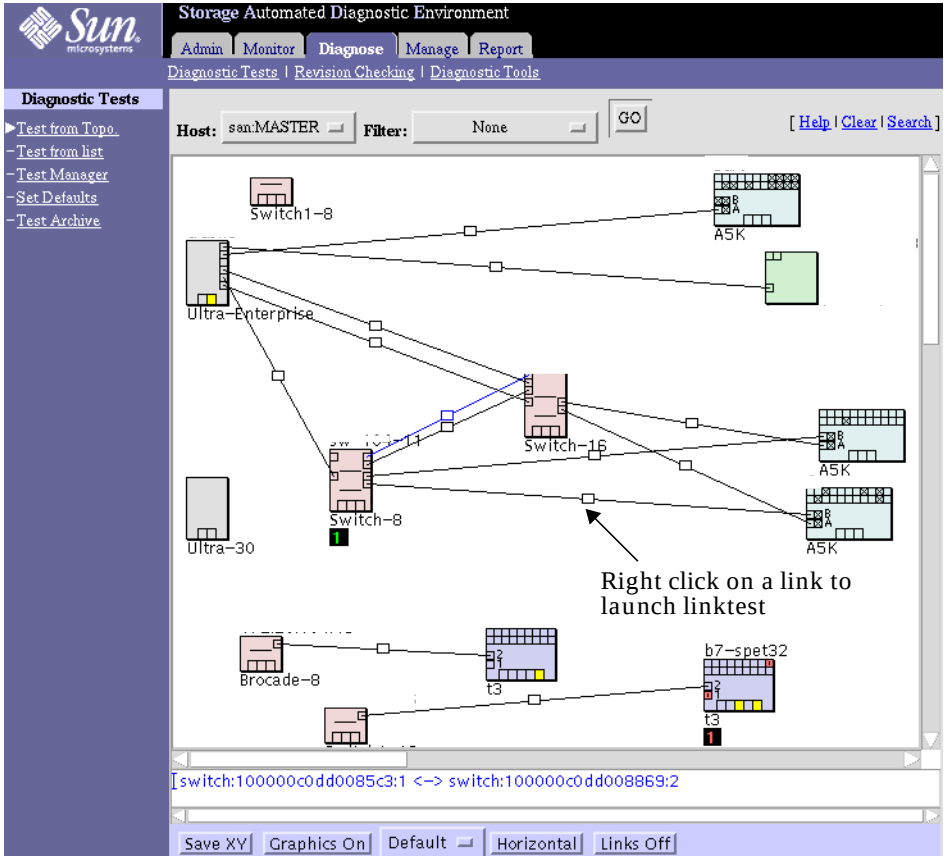



**FIGURE 5-8** `linktest` from Test from Topology

2. **Right-click on the defective or intermittent link displayed in the topology.**

**FIGURE 5-9** Test from Topology linktest

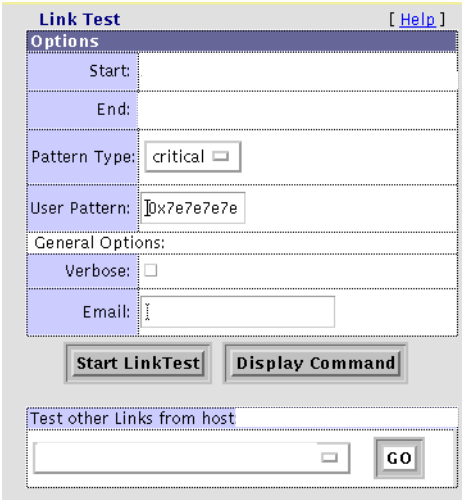



**FIGURE 5-10** `linktest` Test Options Dialog Box

After starting `linktest`, Test Manager guides you through FRU isolation.

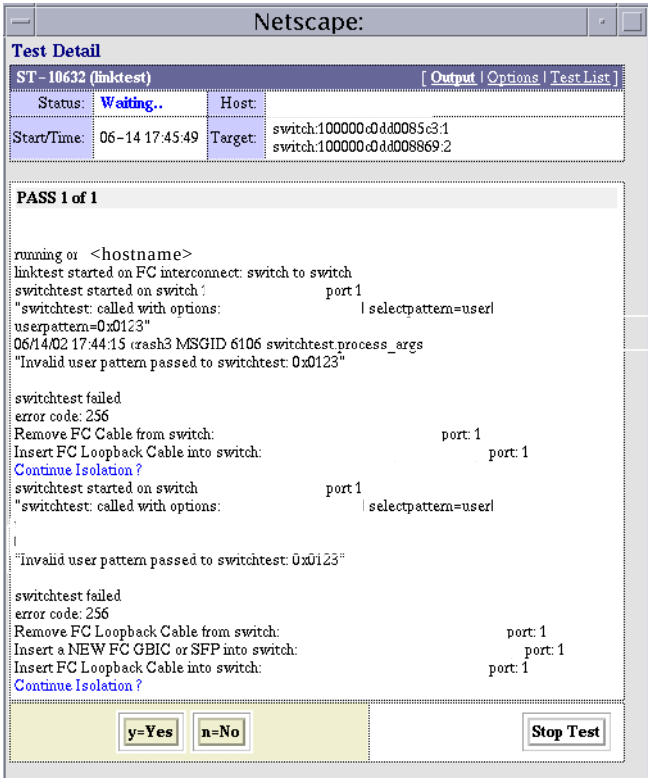



**FIGURE 5-11** `linktest` Test Detail

# Sun StorEdge 6320 System Test (se2test)

The se2test(1M) test aids the validation and fault isolation of the Sun StorEdge 6320 series system components.

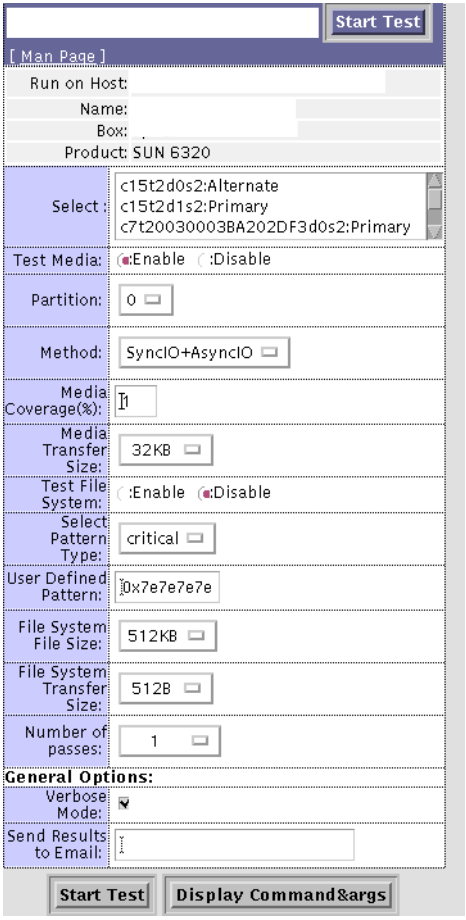



**FIGURE 5-12** se2test Test Options Dialog Box

TABLE 5-5 describes the `se2test` Test Options.

**TABLE 5-5** `se2test` Options

| Option | Description |
|---|---|
| Test Media | Enables or disables the Media subtest |
| Partition | The partition for the Media subtest. If a partition is mounted, its mount point is appended after the partition number, such as `1(/usr)`, where `1` is the partition number and `/usr` is the mount point. |
| Test Method | Enables or disables the Test Method (SyncIO and AsyncIO) |
| Media Coverage (%) | Tests all or part of a partition (in percentages) |
| Media Transfer Size | The transfer size of the Media subtest |
| Test File System | Enables or disables the File System subtest |
| User Defined Pattern | Specifies the default pattern, in hexadecimal format, to be used for the port test. You can also enter the hexadecimal pattern to run for the test. |
| Select Pattern Type | Gives the user the choice of running the one user pattern, critical patterns (10 of the most critical patterns), or all patterns (a complete list of test patterns) |
| File System File Size | Creates two files, half the size of what is specified |
| File System Transfer Size | The transfer size of the File System subtest |
| Number of Passes | Specifies the number of times the test will run. The default is 1. |

# Sun StorEdge 6320 System Test (se_configcheck)

The se_configcheck(1M) test checks the status of the Sun StorEdge 6320 system configuration. There are no options for the se_configcheck(1M) test.


**FIGURE 5-13** se_configcheck(1M) Test Dialog Box

# Sun StorEdge Network FC Switch-8 and Switch-16 Switch Test (`switchtest`)

The `switchtest`(1M) test is used to diagnose the Sun StorEdge network 1 Gbit FC switch-8 and switch-16 switches. The `switchtest` process also provides command-line access to switch diagnostics. `switchtest` supports testing on local and remote switches.

`switchtest` runs the port diagnostic on connected switch ports. While `switchtest` is running, the port statistics are monitored for errors.

The `switchtest` options are shown in TABLE 5-6.

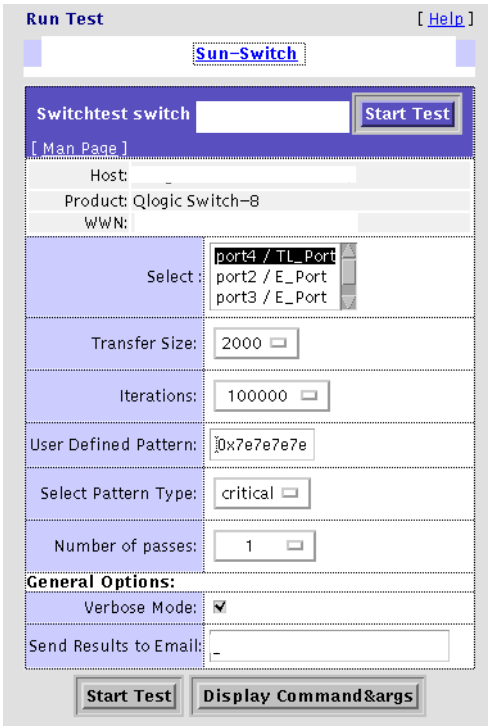



**FIGURE 5-14** `switchtest` Test Options Dialog Box

## `switchtest` Test Options

TABLE 5-6 describes the test mode options for the `switchtest` test.

**TABLE 5-6** `switchtest` Test Options

| Option | Description |
|---|---|
| Transfer Size | Specifies the transfer count for the port test, between 200 and 2000 |
| Iterations | Specifies the number of iterations the port test will run, between 0 and 1,000,000. |
| User Defined Pattern | Specifies the default pattern, in hexadecimal format, to be used for the port test. You can also enter the hexadecimal pattern to run for the test. |
| Select Pattern Type | Gives the user the choice of running the one user pattern, critical patterns (10 of the most critical patterns), or all patterns (a complete list of test patterns) |

# Sun StorEdge Network 2 Gbit Fibre Channel Switch Test (`switch2test`)

The `switch2test`(1M) test is used to diagnose the Sun StorEdge Network 1 Gbit and 2 Gbit Fibre Channel switches. The `switch2test` process also provides command-line access to switch diagnostics. `switch2test` supports testing on local and remote switches.

`switch2test` runs the port diagnostic on connected switch ports. While `switch2test` is running, the port statistics are monitored for errors.

The `switch2test` options are shown in TABLE 5-7.

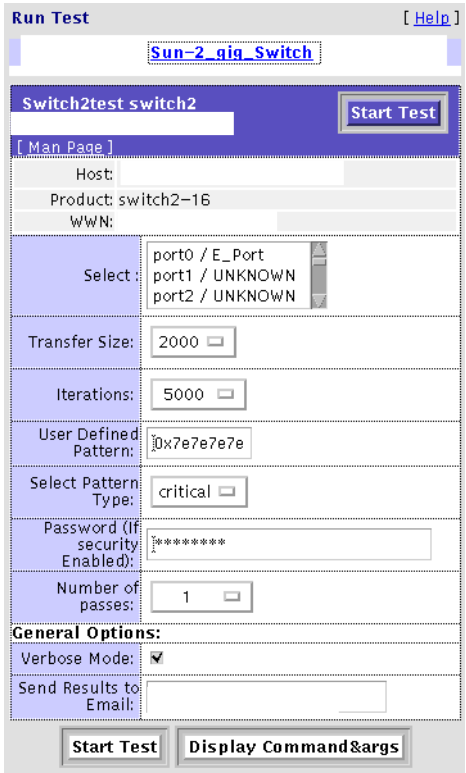



**FIGURE 5-15** `switch2test` Test Options Dialog Box

## `switch2test` Test Options

TABLE 5-7 describes the test mode options for the `switch2test` test.

**TABLE 5-7** `switch2test` Test Options

| Option | Description |
|---|---|
| Transfer Size | Specifies the transfer count for the port test, between 200 and 2000 |
| Iterations | Specifies the number of iterations the port test will run, between 0 and 1,000,000. |
| User Defined Pattern | Specifies the default pattern, in hexadecimal format, to be used for the port test. You can also enter the hexadecimal pattern to run for the test. |
| Select Pattern Type | Gives the user the choice of running the one user pattern, critical patterns (10 of the most critical patterns), or all patterns (a complete list of test patterns) |
| Password | A password is required for the Sun StorEdge Network 2 Gbit Fibre Channel switches. |
| Number of Passes | Specifies the number of times the test will run. The default is 1. |

# Sun StorEdge T3 and T3+ Array Test (t3ofdg)

The t3ofdg(1M) test runs the internal diagnostics of the Sun StorEdge T3 and T3+ array.

Before you run the t3ofdg(1M) test, you must first do the following:

- Run the Storage Automated Diagnostic Environment manually by following the procedures explained in “Running the ras_install Script” on page 8.
- Generate a report for the device against which you are running the test (for example, Sun StorEdge T3 and T3+ arrays).

If the number of existing volumes do not match, an error message is displayed.

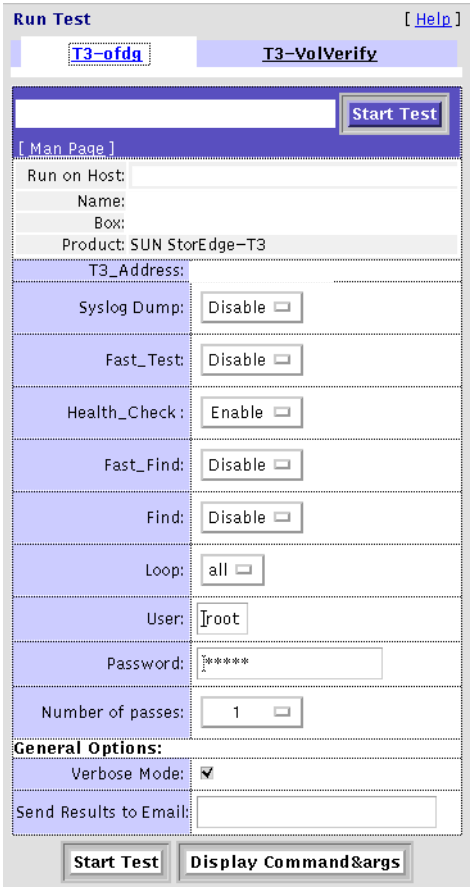



**FIGURE 5-16** t3ofdg Test Options Dialog Box

**Note –** This test requires the user to enter the user ID and password options for the Sun StorEdge T3 or T3+ array that is being tested. Use the Update Device section of “Maintaining Devices” on page 46 to add an optional T3 password.

## `t3ofdg` Test Options

**TABLE 5-8** `t3ofdg` Test Options

| | |
|---|---|
| Syslog Dump | *Enable* will dump all syslog entries that have been added, while the test is running, to the screen.<br>*ofdg* will dump only OFDG lines, added to the syslog, to the screen. The default is *Disable.* |
| Fast_Test | *Fast_Test* performs a fast Go / No Go test of the selected enclosure and loop. It does not attempt to detect bad FRUs. The default is *Enable.* |
| Health_Check | *Health_Check* runs *Fast_Test* multiple times, one time for each loop per unit. The default is *Disable.* |
| Fast_Find | *Fast_Find* can be used to detect bad loop cards, interconnect cables, and controllers. *Fast_Find* does not try to isolate down to a single disk port. Run *Fast_Find* before *Find* to eliminate loop cards, interconnect cables, and controllers as bad FRUs before the midplane or disks are suspended (which are checked using *Find*). The default is *Disable.* |
| Find | *Find* performs an extensive Go / No Go test. If loop failures are detected, it automatically initiates the full-loop-fault-isolation diagnostic. The loop fault diagnostic has the capability to detect and isolate a single disk port but is very time-consuming. The default is *Disable.* |
| Loop | *Loop* specifies which loop to test. *All* tests both loops. The default is *All.* |
| Password | The Sun StorEdge T3+ array telnet password enables the Storage Automated Diagnostic Environment to log into the Sun StorEdge T3+ array device. The password is required.<br>**Note:** The user cannot change an existing Sun StorEdge T3+ array password. |

# Sun StorEdge T3 and T3+ Array Test (`t3volverify`)

The `t3volverify`(1M) test enables array administrators to execute manual parity checks on existing volumes. Parity checking applies only to RAID 1 and RAID 5 volumes. Check data parity using the `t3volverify` test before performing tape backup overwrite cycles, approximately once every 30 days.

Before you run the `t3volverify` test, you must first do the following:

- Run the Storage Automated Diagnostic Environment manually by following the procedures explained in “Running the ras_install Script” on page 8.
- Generate a report for the device against which you are running the test (for example, Sun StorEdge T3 and T3+ arrays).

If the number of existing volumes do not match, an error message will be displayed.

---

**Caution –** Ensure that system health is in optimal condition before running `t3volverify`. For example, make sure that no LUNs are under reconstruction, the status of all disks is zero, and other similar conditions are resolved before performing this procedure.

Refer to the Sun StorEdge T3 and T3+ array documentation, which are listed in Related Documentation of the Preface of this document, for more information.

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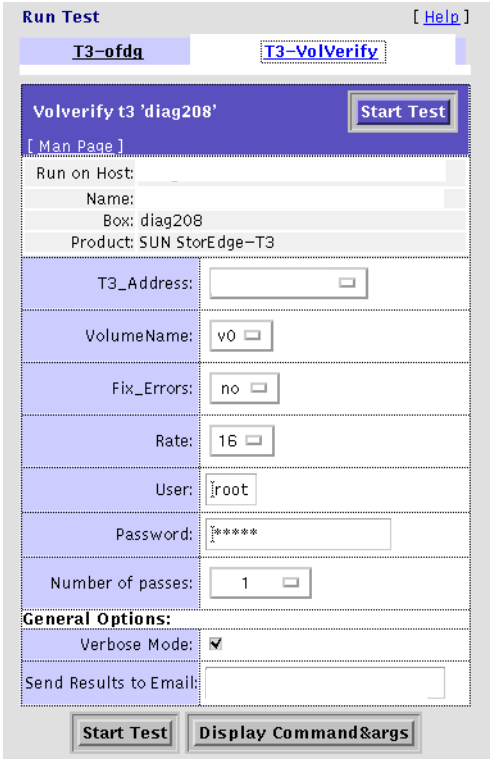



**FIGURE 5-17** `T3volverify` Test Options Dialog Box

## Sun StorEdge T3+ Array Passwords

The `t3volverify` test requires a user id and password for the Sun StorEdge T3+ array that is being tested.

The Storage Automated Diagnostic Environment test will use the user id and password that were set up using the steps in “To Add Information About a Device” on page 46.

If no password exists for the Sun StorEdge T3+ array, you can add a password using “To Update a Device Manually” on page 51.

## `T3volverify` Test Options

**TABLE 5-9** `T3volverify` Test Options

| Option | Description |
|---|---|
| VolumeName | *VolumeName* is the name of the volume to verify. Note that the volume name is a name internal to the array and is not seen by the host. |
| Fix_Errors | The *Fix_Errors* option corrects parity errors on RAID 5 volumes and corrects mirrored data errors on RAID 1 volumes. If *Fix_Errors* is *not* specified, then `t3volverify` will report errors but not correct them.<br><br>If the *Fix_Errors* option is specified and an error is detected, the `t3volverify` command will regenerate parity from the existing data on the volume. |
| Rate | *Rate* refers to the speed at which the t3volverify is run. The verification rate is *n*, where *n* equals any number from 1 to 16. The default rate is 1, which has the minimum performance impact on the data host.<br><br>*16* has the highest performance impact on the data host. |
| Password | The Sun StorEdge T3+ array telnet password enables the Storage Automated Diagnostic Environment to log into the Sun StorEdge T3+ array device. The password is required.<br><br>**Note:** You cannot change an existing Sun StorEdge T3+ array password. If no password exists, however, you can add a password using the information found in “Sun StorEdge T3+ Array Passwords” on page 132. |

# Sun StorEdge 6120 Array Echo Test (`6120loop`)

The `6120loop`(1M) test tests the functions of the Sun StorEdge 6120 array controller. Each controller has three sims (chips) that run the Fibre Channel loops inside and outside the array.

The `6120loop`(1M) options are shown in FIGURE 5-18.

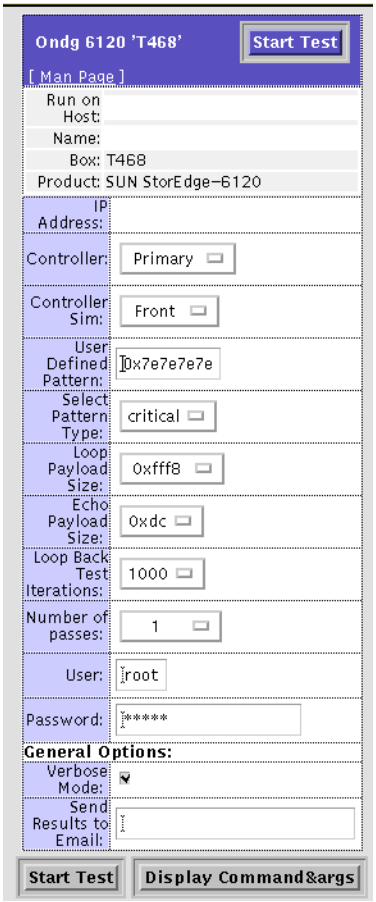



**FIGURE 5-18** `6120loop` Test Options Dialog Box

## 6120loop Test Options

TABLE 5-10 describes the 6120loop Test Options dialog box.

**TABLE 5-10** 6120loop Test Options

| Option | Description |
|---|---|
| IP Address | Specifies the Sun StorEdge 6120 array against which to run the test. |
| Controller | Specifies which controller sim (chip) will run the test. Options include:<br>• Primary—the default.<br>• Alternate—this is not an option if the Sun StorEdge 6120 array is a standalone unit.<br>• All—the test will run on both controllers, if the configuration is a partner group. |
| Controller sim | Specifies which controller sim against which to run the test. Options include:<br>• Front—the default.<br>• Back-A—Run the test on the primary controller<br>• Back-B—Run the test on the alternate controller<br>• All—The test will run on both controllers, if the configuration is a partner group. |
| Pattern Type | Selects which data pattern to loop for the internal 10-bit, internal 1-bit, and external loopback tests. Options include user (user-defined), critical (the default), and all (all pattern types). |
| Loop Payload Size | Specifies the payload size for the 6120_echo test.<br>**Note:** If this test is run on a front end external loop, the attached device must support loopback and the specified payload size. Options range from 16 bytes to 220 bytes. The default is 0xfff8. |
| Echo Payload Size | Specifies the payload size for the 6120_loop test.<br>**Note:** The attached device must support Echo and the specified payload size. Options range from 16 bytes to 65528 bytes. The default is 0xdc. |
| Loop Back Test Iterations | Sets the number of times to loop the internal 10-bit, internal 1-bit, and external loopback tests. The default value is 1000. |

**TABLE 5-10** `6120loop` Test Options *(Continued)*

| Option | Description |
|---|---|
| Number of passes | Specifies the number of times the test will run. The default is 1. Options range from 1 to forever. |
| User | The user login for the Sun StorEdge 6120 array. |
| Password | The Sun StorEdge 6120 array telnet password enables the Storage Automated Diagnostic Environment to log into the Sun StorEdge 6120 array device. The password is required.<br>**Note:** The user cannot change an existing Sun StorEdge 6120 array password. |

**Note –** There is one front-end sim and two back-end sims per controller. The two back-end sims control the two back-end loops. For each sim, you can run the same tests, so most of the options listed in TABLE 5-10 are to specify on which sim the diagnostic tests will run.

Each sim has three loops: an *internal 1-bit loop*, an *internal 10-bit loop*, and an *external loop*. The `6120loop`(1M) test runs on the external loop, and each sim can run the same diagnostics with *one exception*: If the Sun StorEdge 6120 array is attached to a fabric instead of an arbitrated loop, the front-end sim will automatically run an `echo_test` on its external loop.

## *Example of a* `6120loop` *Test*

If the following conditions exist, the test will run the loopback tests on all 12 back-end loops and Echo out the external front-end loop.

- The Sun StorEdge 6120 array is a partner group.
- The partner group is attached to a Fibre Channel switch.
- You specify *All* (both) controllers and *All* Sims.
- You enable the External Loopback Test.

# Sun StorEdge 6120 Array Test (`6120volverify`)

The `6120volverify`(1M) test enables array administrators to execute manual parity checks on existing volumes. Parity checking applies only to RAID 1 and RAID 5 volumes. Check data parity using the `6120volverify` test before performing tape backup overwrite cycles, approximately once every 30 days.

Before you run the `6120volverify` test, you must first do the following:

- Run the Storage Automated Diagnostic Environment manually by following the procedures explained in “When To Run the ras_install Script” on page 17.
- Generate a report for the device against which you are running the test (for example, Sun StorEdge 6120 arrays).

If the number of existing volumes do not match, an error message will be displayed.

---

**Caution –** Ensure that system health is in optimal condition before running `6120volverify`. For example, make sure that no LUNs are under reconstruction, the status of all disks is zero, and other similar conditions are resolved before performing this procedure.

Refer to the Sun StorEdge 6120 array documentation, which are listed in Related Documentation of the Preface of this document, for more information.

---

## Sun StorEdge 6120 Array Passwords

The `6120volverify` test requires a user ID and password for the Sun StorEdge 6120 array that is being tested.

The Storage Automated Diagnostic Environment test will use the user id and password that were set up using the steps in “To Add Information About a Device” on page 46.

If no password exists for the Sun StorEdge 6120 array, you can add a password using “To Update a Device Manually” on page 51.

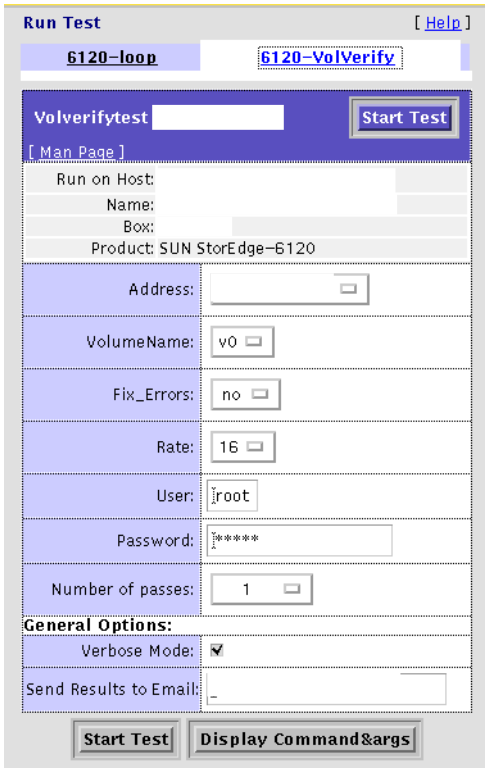



**FIGURE 5-19** `6120volverify` Test Options Dialog Box

## `6120volverify` Test Options

**TABLE 5-11** `6120volverify` Test Options

| Option | Description |
|---|---|
| VolumeName | *VolumeName* is the name of the volume to verify. Note that the volume name is a name internal to the array and is not seen by the host. |
| Fix_Errors | The *Fix_Errors* option corrects parity errors on RAID 5 volumes and corrects mirrored data errors on RAID 1 volumes. If *Fix_Errors* is *not* specified, then `t3volverify` will report errors but not correct them.<br><br>If the *Fix_Errors* option is specified and an error is detected, the `6120volverify` command will regenerate parity from the existing data on the volume. |
| Rate | *Rate* refers to the speed at which the `6120volverify` is run. The verification rate is *n*, where *n* equals any number from 1 to 16. The default rate is 1, which has the minimum performance impact on the data host.<br><br>*16* has the highest performance impact on the data host. |
| Password | The Sun StorEdge 6120 array telnet password enables the Storage Automated Diagnostic Environment to log into the Sun StorEdge 6120 array device. The password is required.<br><br>**Note:** You cannot change an existing Sun StorEdge 6120 array password. If no password exists, however, you can add a password using the information found in “Sun StorEdge T3+ Array Passwords” on page 132. |

# Virtualization Engine Diagnostic Test (vediag)

The vediag(1M) test enables testing of the virtualization engine. TABLE 5-12 describes the test mode options for the vediag test.

Before you run the vediag test, you must first do the following:

- Run the Storage Automated Diagnostic Environment manually by following the procedures explained in “When To Run the ras_install Script” on page 17.
- Generate a report for the device against which you are running the test (for example, the virtualization engines).

If the number of existing volumes do not match, an error message will be displayed.

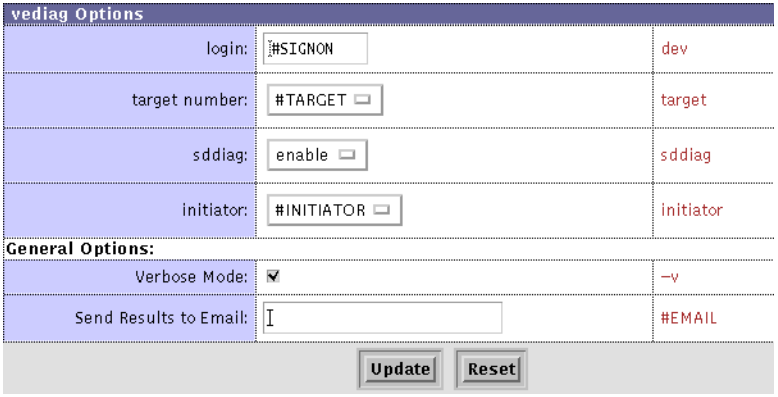



**FIGURE 5-20** vediag Test Options

**TABLE 5-12** vediag Options

| Option | Description |
|---|---|
| target number | Select a target from the target number pull-down menu. The target number enables testing between the virtualization engine and the target device. |
| sddiag | The sddiag test enables testing between the virtualization engine and a target device. The default is disable. |

**Note:** Running the sddiag test disables the in-band path. Verify that the in-band path is not active before you run these tests.

CHAPTER 6

# Configuration Utility

This section discusses the following management functions you can perform using the Storage Automated Diagnostic Environment:


- "To Access the Manage Page" on page 141
- "To Access the Configuration Window" on page 143
- "To Use the Service Manager" on page 144
- "To Access the Solution Utilities Page" on page 146


## ▼ To Access the Manage Page

- **Click the Manage link on the Storage Automated Diagnostic Environment main window.**

  Management is divided into three sections: Configuration, Service, and Utilities, as shown in FIGURE 6-1.

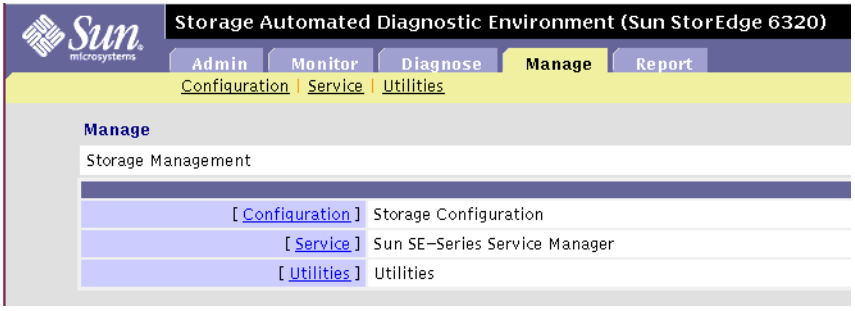



**FIGURE 6-1** Management Sections

Through the Storage Automated Diagnostic Environment GUI, you can perform the tasks that are displayed in TABLE 6-1.

**TABLE 6-1** Storage Automated Diagnostic Environment Management Functions

| Task | Purpose |
|---|---|
| Configure the Sun StorEdge 6320 and 6320SL system. | Launches the Sun StorEdge Configuration Service, for which a username and password are required.<br>If you are not a registered user, please contact the system administrator. |
| Service the Sun StorEdge 6320 and 6320SL System. | The Service Consultant enables you to perform the following service tasks:<br>• Update the `/etc/ethers` file.<br>• Review current inventory or generate and save a new inventory<br>• Maintain revisions<br>• Configure arrays<br>• Upgrade current report<br>• Upgrade historical report<br>• Revision setup using PatchPro |
| Manage Solution Utilities | Enables you to perform configuration and installation tasks such as:<br>• Update Ethers—also available from the Service menu.<br>• Display Inventory—also available from the Service menu (step 1 of Inventory).<br>• Remote telnet—also available from the Configuration menu |

## ▼ To Access the Configuration Window

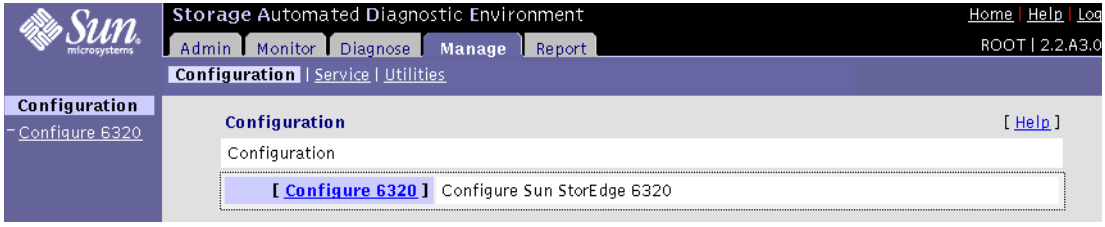
The Storage Automated Diagnostic Environment GUI enables you to access the Sun StorEdge 3900 and 6900 series and the Sun StorEdge 6320 and 6320SL system Configuration Utility. For more information on the Configuration Utility and how to use the options, please refer to the *Sun StorEdge 3900 and 6900 Series Version 1.1 Reference and Service Guide* and the *Sun StorEdge 6320 and 6320 SL System Service and Reference Guide.*

1. **Click the Manage link in the Storage Automated Diagnostic Environment main window.**

   The Sun StorEdge 6320 and 6320 SL series configuration window is displayed.

2. **Click the Configuration link.**

   The Configuration window is displayed.

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**Note –** To utilize the Sun StorEdge 6320 and 6320 SL series configuration functionality, the machine must be registered in the Storage Automated Diagnostic Environment as a Sun StorEdge 6320 and 6320 SL series solution.

---

# Servicing

Use the Service Manager to add new hardware to or update the revision level of the current hardware components of your Sun StorEdge 6320 or 6320SL system.

## ▼ To Use the Service Manager

1. **From the Manage main menu, click Service.**

   The Service Manager window is displayed.

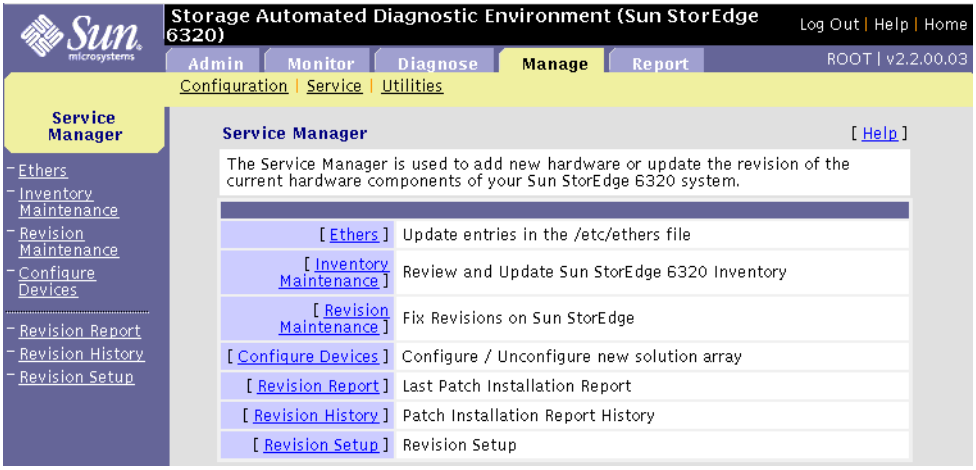



**FIGURE 6-2** Service Manager Window

**2. Complete the fields as required. Service options are described in** TABLE 6-2**.**

**TABLE 6-2** Service Consultant Options

| Configuration Option | Description |
|---|---|
| Ethers | Enables you to enter a Media Access Control (MAC) address that identifies a storage location or device for each IP name/address from the `/etc/hosts` file.<br>• Type a MAC address for each IP address and click **Update Ethers** to update the `/etc/ethers` file.<br>• Erase the MAC address and click **Update Ethers** to delete the entry from the `/etc/ethers` file. |
| Inventory Maintenance | Enables you to manage inventory:<br>1. Current Inventory—Review the inventory, by device type, device name, IP address, vendor/model/serial and revision number, of the current storage system.<br><br>Click Details to display all FRUs for each device.<br>2. Generate New Inventory—Click Generate New Inventory to probe the system and generate a new inventory.<br>3. Save Inventory—Save the newly-generated inventory, which now displays as Current Inventory. |
| Revision Maintenance | Enables you to generate a list of required patches for a storage system and to install these patches on each component of the storage system.<br>**WARNING:**<br>You must ensure the array is redundant prior to performing an array upgrade, or you may experience temporary loss of data availability. Disk drive upgrades require you to quiesce all I/O to the array. |
| Configure Devices | Enables you to select, configure, or unconfigure a single array or multiple arrays. |
| Revision Report | Displays the upgrade report. |
| Revision History | Displays the history of reports and enables you to delete old reports. |
| Revision Setup | Enables you to set up PatchPro information.<br>You can specify the following options: proxy host, proxy port (default is 80), PatchPro Source (CD or PatchPro server), internal patch server (default is `/var/sadm/spool`) and PatchPro timeout setting (in minutes). |

# Solution Utilities

Use the Solutions Utility window to perform configuration and installation tasks for the Sun StorEdge 6320 system.

---

**Note –** The Solution Utilities cannot be used on a Sun StorEdge 3900 and 6900 series solution.

---

## ▼ To Access the Solution Utilities Page

- **From the Manage main menu, click Utilities.**

The Solution Utilities window is displayed.

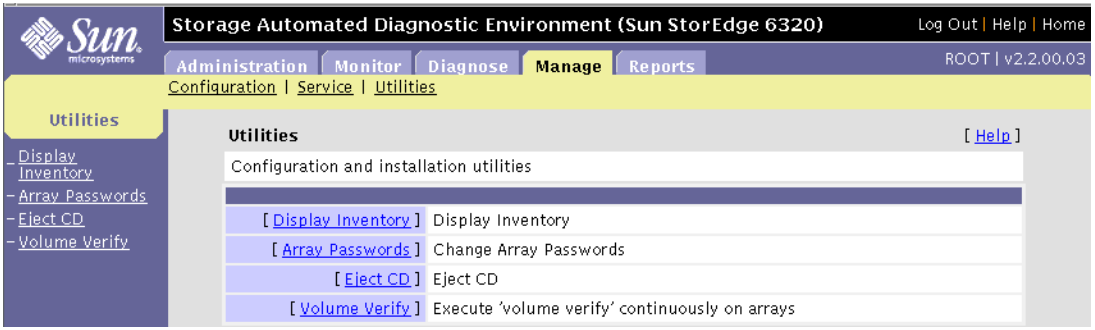



**FIGURE 6-3** Solution Utilities Window

## ▼ To Display Inventory Information

1. **From the Solution Utilities menu, click Display Inventory.**

   The following inventory information is displayed.

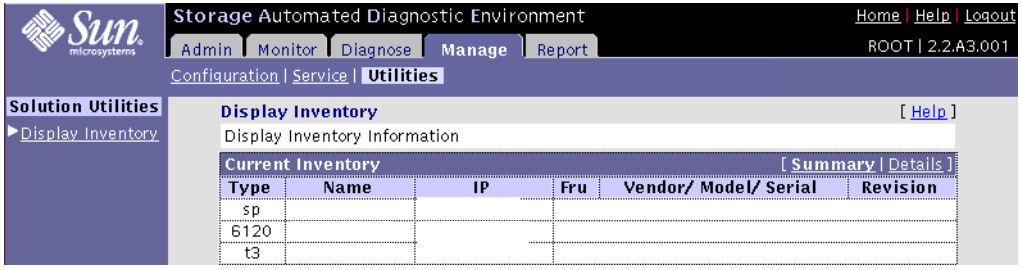



**FIGURE 6-4** Display Inventory Window

2. **Click the Summary or Details link to display detailed information.**

## ▼ To Change Array Passwords

You can use the Array Passwords utility to change the passwords on the internal arrays or to update the password on an array that is being added to the system.

---

**Note –** The system's saved password is stored any time a new password is entered using the manual entry option.

---

1. **From the Solution Utilities menu, click Array Passwords.**

   The Array Passwords window is displayed.

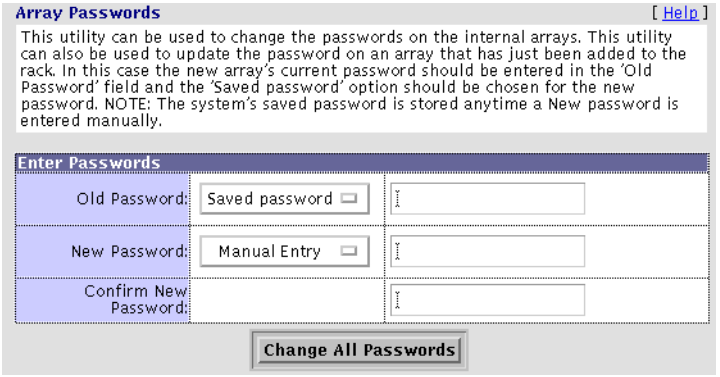



**FIGURE 6-5** Array Passwords Window

2. **If an array is being added, follow these steps:**

   a. **Select Manual Entry from the Old Password pull down menu.**

   b. **Type the array's existing password in the Old Password corresponding text box.**

   c. **Select Saved Password from the New Password pull down menu.**

   d. **Type a new password in the New Password corresponding text box.**

   e. **Confirm the new password by re-typing it into the Confirm New Password text box.**

   f. **Click Change All Passwords.**

---

**Note –** If you select Manual Entry from the Old Password pull down menu, but the text box is left blank, this assumes the array does not initially have a password or that the user does not want a password.

---

## ▼ To Eject the Service Processor CDROM

1. **From the Solution Utilities menu, click Eject CD.**

   The Eject CD button is displayed.

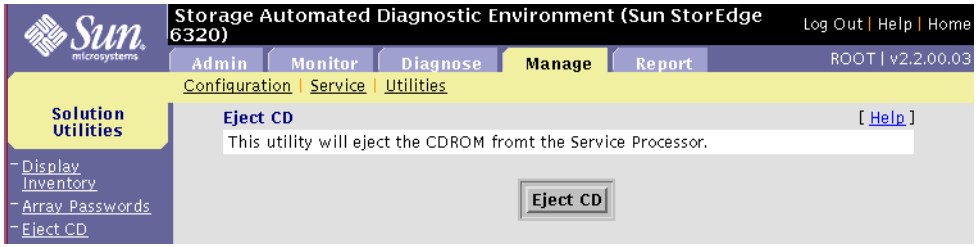



**FIGURE 6-6** Eject CD Window

2. **Click Eject CD.**

## ▼ To Execute `vol_verify`(1M) Continuously on Arrays

The Volume Verify utility keeps track of software, firmware, and hardware errors and reports an event when the number of errors increases.

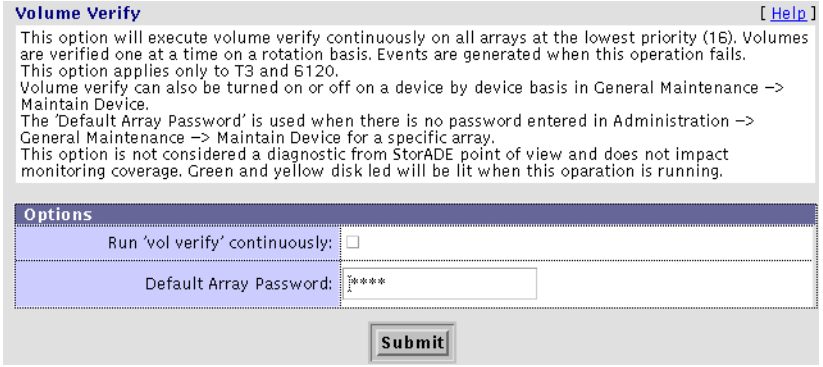
---

**Note –** The Volume Verify utility does not disrupt device monitoring.

---

1. **From the Solution Utilities menu, click Volume Verify.**

   The following Volume Verify window is displayed.




2. **Click the Run 'vol verify' continuously checkbox and click Submit.**

   The Default Array Password is used if no password has been entered.

CHAPTER 7

# Reports

This chapter summarizes system information, including agent statistics and system thresholds, on every device that is currently supported by the Storage Automated Diagnostic Environment. This chapter also displays device-specific report information on the Sun StorEdge network FC switches. In addition, troubleshooting information is presented in the form of a tool called *Service Advisor*, which displays a customizable event grid or event report based on specified criteria.

This chapter includes the following topics:


- "General Reports" on page 150
- "System Reports" on page 159
- "Service Advisor" on page 166

# General Reports

Using the SAN Traffic Report, you can display the status of each port on every switch. Using the FRU reports and Event reports, you can quickly display a summary of the status of your device and further customize the report using the filters provided. The Device Summary report summarizes the information.

This section contains the following topics:


- "Using the Traffic Report" on page 151
- "Displaying FRU Report" on page 152
- "Displaying Event Reports" on page 154
- "Device Health Report" on page 157
- "Device Health Summary Report" on page 157
- "Array Performance Report" on page 158


## ▼ To Access the General Reports Window

1. **Click the Reports link in the Storage Automated Diagnostic Environment main window.**
2. **Click General Reports.**

   The General Reports window is displayed.

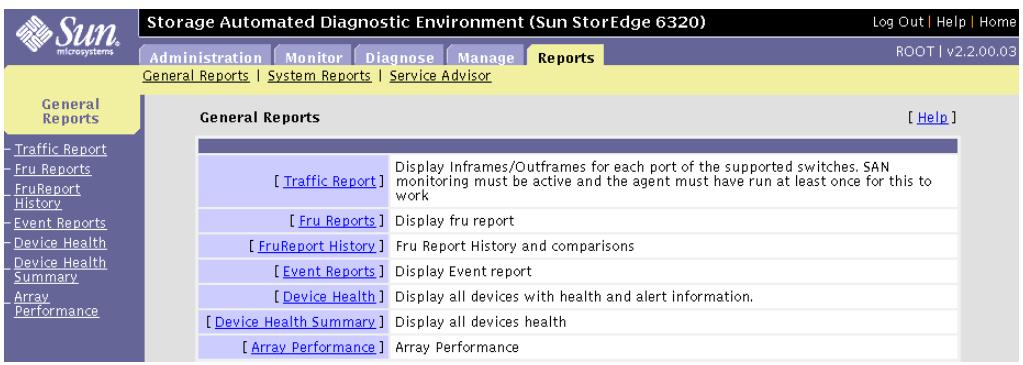



**FIGURE 7-1** General Reports Window

# Using the Traffic Report

Using the SAN Traffic Report, you can display the status of each port on every switch. SAN monitoring must be active and the Storage Automated Diagnostic Environment must have run at least once for port and switch traffic information to display.

## ▼ To Access the Traffic Report

1. **From the Reports main menu, click General Reports.**

   The General Reports window is displayed.

2. **From the General Reports window, click Traffic Report.**

   The Traffic Report topology is displayed.

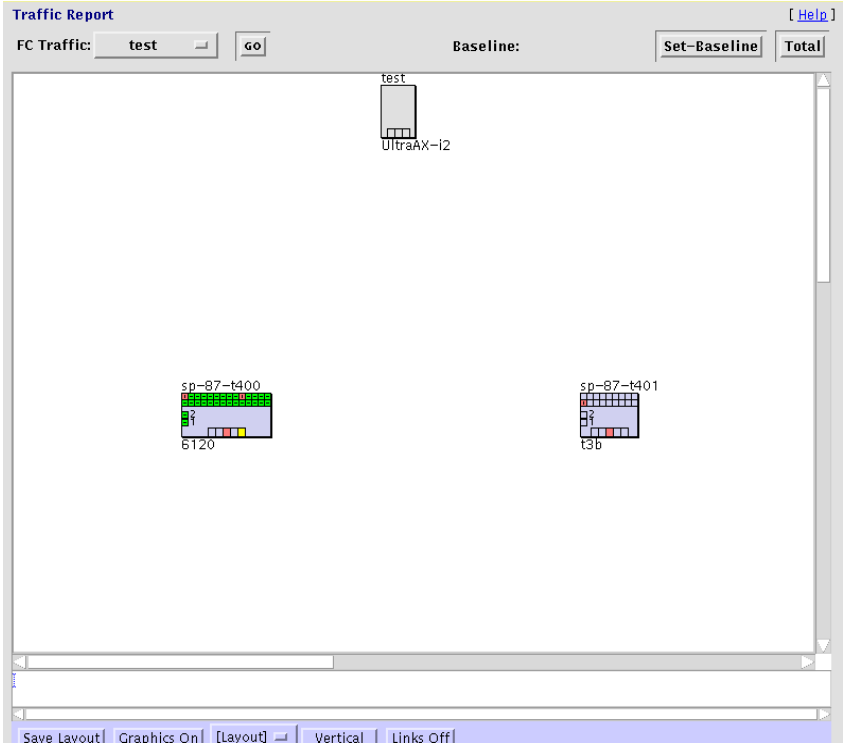



**FIGURE 7-2** Traffic Report

# Displaying FRU Report

Using the FRU report, you can quickly display a summary of the status of your device and further customize the report using the filters provided.

## ▼ To Generate a Customized FRU Report

1. **From the General Reports menu, click FRU Reports.**
2. **Click New Report.**

   A screen like the one shown in FIGURE 7-3 is displayed.

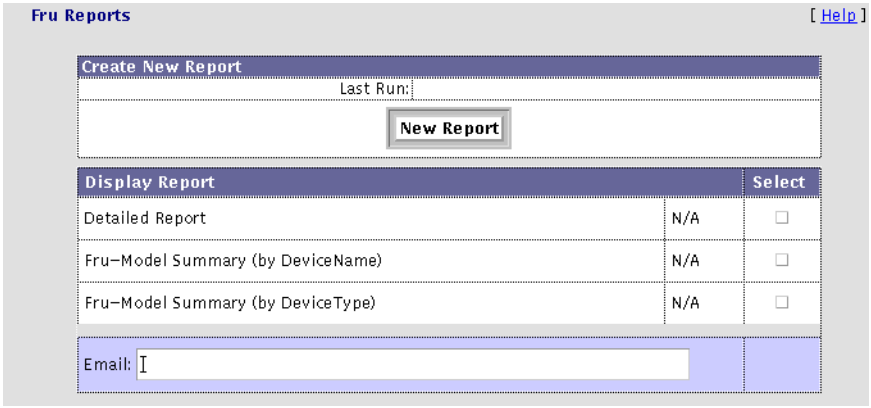



**FIGURE 7-3** FRU Reports

3. **Enter an email address in the Email text field to where the FRU report will be sent.**

4. **Select one report and click Display.**

   - **Detailed Report**—displays a detailed list of FRU identifiers, as shown in TABLE 7-1. From the detailed FRU report, you can filter the FRU report using [device type] and [FRU type] filters.

**TABLE 7-1** Detailed FRU Report Information

| FRU Identifier | Description |
|---|---|
| Name | Host name |
| Device | Device type |
| FruType | Component FRU ( for example, controller, disk, loopcard) |
| Fru | FRU identifier number |
| Vendor | FRU vendor (for example, Seagate for disks) |
| Model | Model number |
| Serial | Serial number |
| Revision | `SUNWstads` package |
| Status | Current device status |

   - **Fru-Model Summary (by DeviceName)**

     Displays the FRU type, vendor name, model number, revision number, and number of FRUs per FRU type for a selected device name.

   - **Fru-Model Summary (by DeviceType)**

     Displays the FRU type, vendor name, model number, revision number, and number of FRUs per FRU type for a selected device (for example, 6120).

# Displaying Event Reports

Using the Event report, you can quickly display a summary of the status of your device and further customize the report using the filters provided.

## ▼ To Generate a Customized Event Report

1. **From the General Reports menu, click Event Reports.**
2. **Click New Report.**

---

**Note –** Click the Actionable Only check box if you want to display only events that are actionable.

---

A window like the one shown in FIGURE 7-3 is displayed.

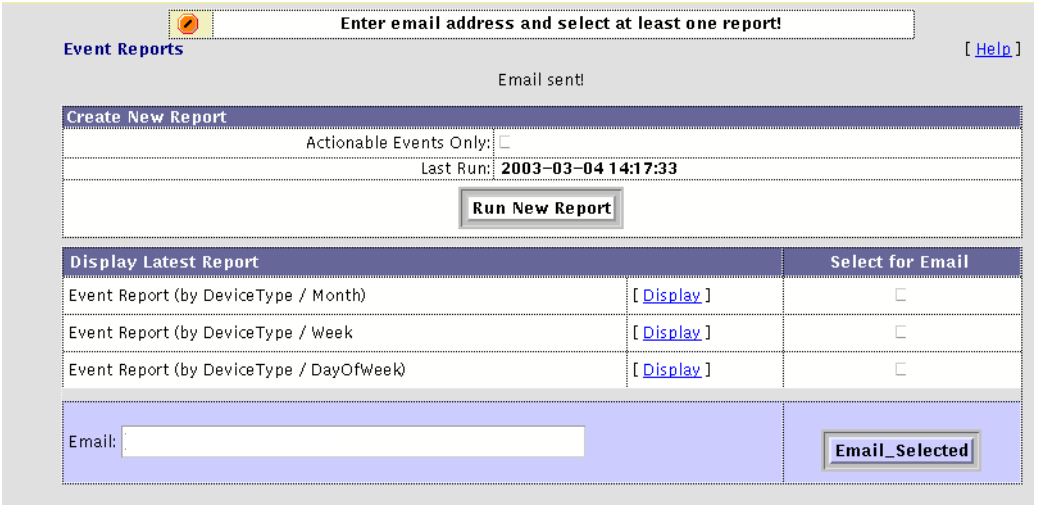
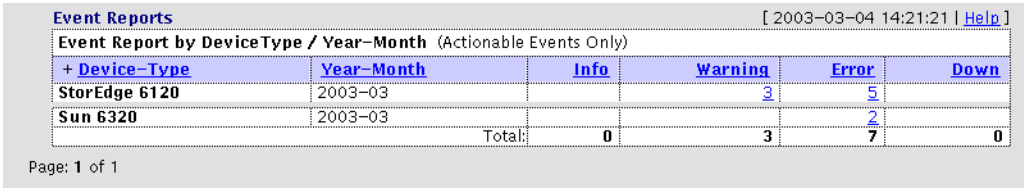



**FIGURE 7-4** Event Reports

3. **Enter an email address in the Email text field to where the Event Report will be sent.**
4. **Click the Display link that corresponds to the event report type you want to display. The event report types follow.**

## *Event Report (by DeviceType / Year Month)*



Event Reports [ 2003-03-04 14:21:21 | Help ]

Event Report by DeviceType / Year-Month (Actionable Events Only)

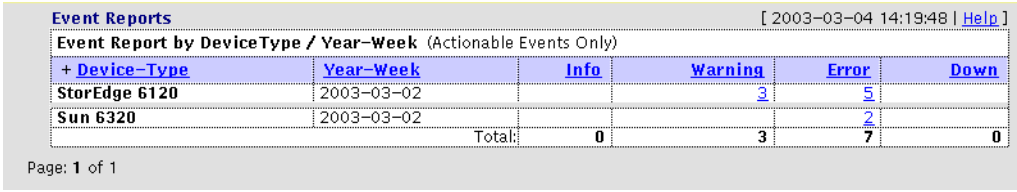
| + Device-Type | Year-Month | Info | Warning | Error | Down |
|---|---|---|---|---|---|
| StorEdge 6120 | 2003-03 | | 3 | 5 | |
| Sun 6320 | 2003-03 | | | 2 | |
| | Total: | 0 | 3 | 7 | 0 |

Page: 1 of 1

Displays a summary of events sorted by:

- Device-Type
- Year-Month (for example, 2002-11)
- Info—Click the number link in the Info column to launch a pop-up window with a summary of information available for that device. The summary includes the date, event type, topic, and description.
- Severity level—Warning, Error, Down—click the number think in a severity column to launch a pop-up window with a summary that particular severity level. The summary includes the date, event type, topic, description, and severity.

## *Event Report (by DeviceType / Year-Week)*



Event Reports [ 2003-03-04 14:19:48 | Help ]

Event Report by DeviceType / Year-Week (Actionable Events Only)

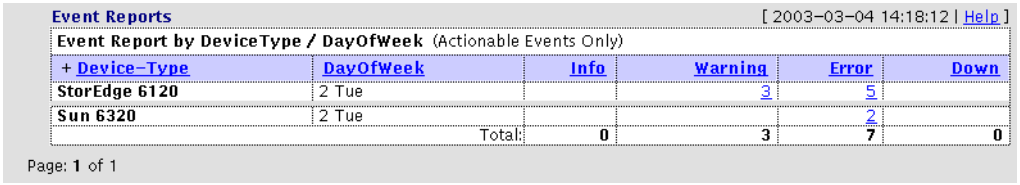
| + Device-Type | Year-Week | Info | Warning | Error | Down |
|---|---|---|---|---|---|
| StorEdge 6120 | 2003-03-02 | | 3 | 5 | |
| Sun 6320 | 2003-03-02 | | | 2 | |
| | Total: | 0 | 3 | 7 | 0 |

Page: 1 of 1

Displays a summary of events sorted by:

- Device-Type
- Year-Week (for example, 2002-11-03)
- Info—Click the number link in the Info column to launch a pop-up window with a summary of information available for that device. The summary includes the date, event type, topic, and description.
- Severity level (Warning, Error, Down)—click the number think in a severity column to launch a pop-up window with a summary that particular severity level. The summary includes the date, event type, topic, description, and severity.

## *Event Report (by DayOfWeek)*



**Event Reports** [ 2003-03-04 14:18:12 | Help ]

**Event Report by DeviceType / DayOfWeek** (Actionable Events Only)

| + Device-Type | DayOfWeek | Info | Warning | Error | Down |
|---|---|---|---|---|---|
| **StorEdge 6120** | 2 Tue | | 3 | 5 | |
| **Sun 6320** | 2 Tue | | | 2 | |
| | Total: | **0** | **3** | **7** | **0** |

Page: **1** of 1

The Event Report by Day of the Week displays a summary of events sorted by:

- Device-Type
- DayOfWeek (for example, 1 Mon)
- Info—Click the number link in the Info column to launch a pop-up window with a summary of information available for that device. The summary includes the date, event type, topic, and description.
- Severity level (Warning, Error, Down)—click the number think in a severity column to launch a pop-up window with a summary that particular severity level. The summary includes the date, event type, topic, description, and severity.

# Device Health Report

The Device Health Summary displays all devices with health and alert information.It summarizes the information from the FRU Report and Event Report.

## ▼ To Generate a Device Health Report

- **From the General Reports menu, click Device Health.**

A screen like the one shown in FIGURE 7-6 is displayed.

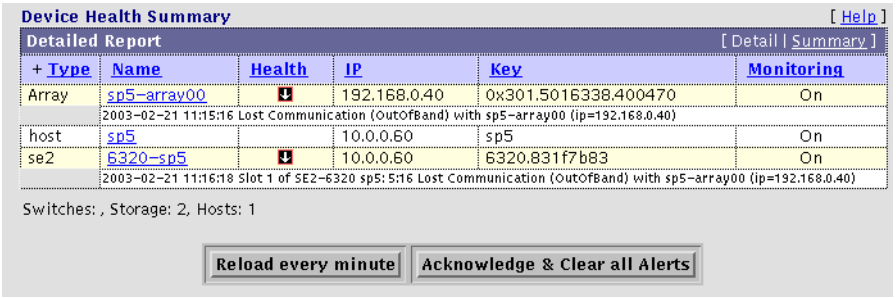



**FIGURE 7-5** Device Health Report

# Device Health Summary Report

## ▼ To Generate a Device Health Summary Report

The Device Report displays the health summary of all monitored devices.

- **From the General Reports menu, click Device Health Summary.**

A screen like the one shown in FIGURE 7-6 is displayed.

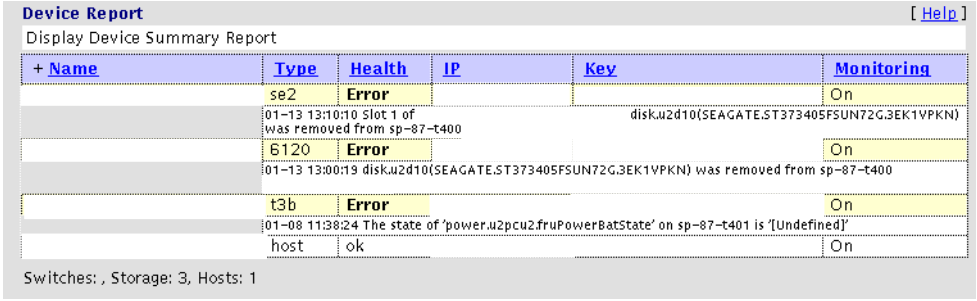


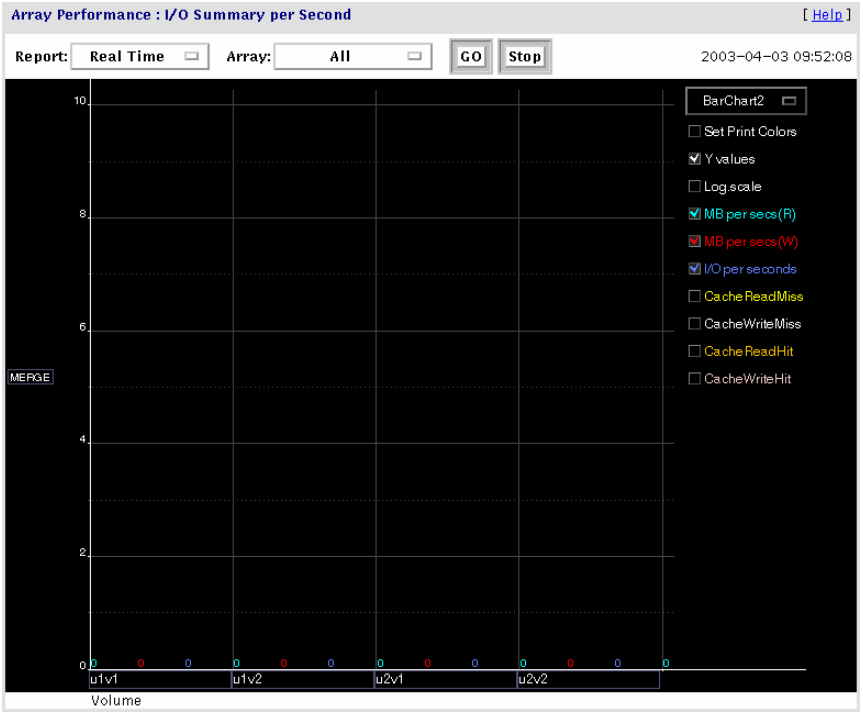

**FIGURE 7-6** Device Health Summary Report

# Array Performance Report

The Array Performance Report tracks and reports the I/O of specified arrays.

## ▼ To Generate an Array Performance Report

1. **From the General Reports menu, click Array Performance.**




The Array Performance Report displays an I/O Summary sorted by:

- I/O Summary Report:
  - I/O Hourly Summary
  - I/O Daily Summary
  - Real Time (I/O that is occurring now)
- Array
  - An individual array
  - Combined arrays

2. **Click GO to generate the customized Array Performance report.**

# System Reports

The System Reports section provides information about agent statistics, thresholds, Fibre Channel counters. In addition, the device policy feature shows all the attributes used for monitoring devices and event severity.

This section contains the following topics:


- "To Access the System Reports Window" on page 160
- "Agent Statistics" on page 160
- "Email/Events Maximums" on page 161
- "Thresholds List" on page 162
- "Switch Data" on page 163
- "Event and Severity Mapping" on page 164

## ▼ To Access the System Reports Window

1. **Click the Reports link in the Storage Automated Diagnostic Environment main window.**
2. **Click System Reports.**

   The System Reports window is displayed

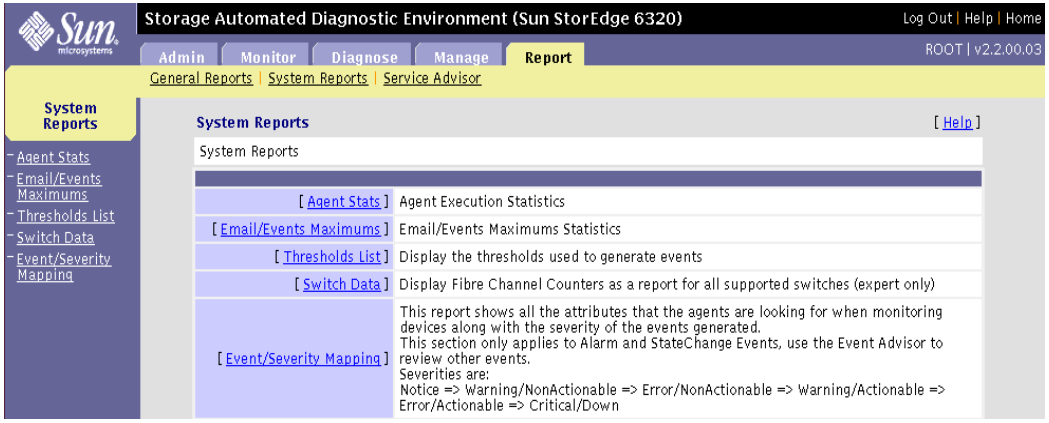



**FIGURE 7-7** System Reports

# Agent Statistics

Using the Agent Stats functionality, you can determine the average time required to run the modules. The information is generated on every run of Storage Automated Diagnostic Environment's host.

## ▼ To Check Storage Automated Diagnostic Environment Statistics

- **Click Agent Stats in the System Reports window.**

  The execution time for each agent, measured in minutes and seconds, is displayed.

Agent Execution time by Host / Module (Mins:Secs)

| Host | 6120 | HOST | MESSAGE | SE | SE2 | SWITCH | T3MESSAGE | Total |
|---|---|---|---|---|---|---|---|---|
| | 00:08 | 00:00 | 00:00 | 00:00 | 00:00 | 00:00 | 00:00 | 00:09 |
| **Average:** | 00:08 | 00:00 | 00:00 | 00:00 | 00:00 | 00:00 | 00:00 | 00:09 |

**FIGURE 7-8** Agent Statistics

# Email/Events Maximums

The Email/Events Maximums page, shown in FIGURE 7-9, displays the database that keeps track of the number of emails and events sent per device or component.

You can adjust the maximum number of email messages sent using the functionality in “Configuration Options” on page 74.

---

**Note –** The maximum number of events cannot be adjusted and is always 8.

---

## ▼ To Display the Number of Email Messages

- **Click Email/Events Maximums in the System Reports menu.**

A window that shows email messages that have reached the specified maximum number is displayed.

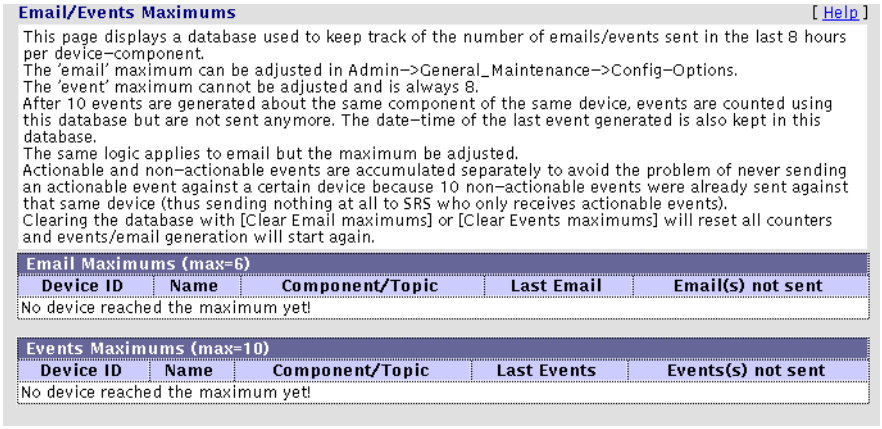



**FIGURE 7-9** Email/Events Maximums

# Thresholds List

The Thresholds window displays the thresholds that are used to monitor entries related to I/O interfaces in the `/var/adm/messages` file.

## ▼ To List Threshold Rules

- **Click Thresholds List in the System Reports window**
  - Frequency is the number of alerts and hours required to generate a new message.
  - Quiet is the quiet time in between messages, which is used to avoid sending too many messages at once.

**Thresholds**

| Name | Frequency | Quiet | Type | Description |
|---|---|---|---|---|
| **driver** | | | | |
| driver.SF_OFFLINE | 10 / 24hours | 1hours | Warning | socal/ifp Offline |
| driver.SF_OFFLALERT | 15 / 24hours | 1hours | Error | socal/ifp Offline |
| driver.SCSI_TRAN_FAILED | 10 / 4hours | 1hours | Warning | SCSI transport failed |
| driver.SCSI_ASC | 10 / 4hours | 1hours | Warning | scsi |
| driver.SCSI_TR_READ | 10 / 4hours | 1hours | Warning | scsi READ |
| driver.SCSI_TR_WRITE | 10 / 4hours | 1hours | Warning | scsi WRITE |
| driver.SSD_WARN | 5 / 24hours | 1hours | Warning | SSD Warning |
| driver.SSD_ALERT | 20 / 24hours | 1hours | Error | SSD Alert |
| driver.PFA | 1 / 24hours | 1hours | Error | Predictive Failure |
| driver.SF_CRC_WARN | 10 / 24hours | 1hours | Warning | CRC Warning |
| driver.SF_CRC_ALERT | 15 / 24hours | 1hours | Error | CRC Alert |
| driver.SFOFFTOWARN | 5 / 24hours | 1hours | Warning | Offline Timeouts |
| driver.SF_DMA_WARN | 1 / 24hours | 1hours | Warning | SF DMA Warning |
| driver.SF_RESET | 10 / 24hours | 1hours | Warning | SF Reset |
| driver.ELS_RETRY | 10 / 24hours | 1hours | Warning | ESL retries |
| driver.SF_RETRY | 10 / 24hours | 1hours | Warning | SF Retries |

**FIGURE 7-10** Thresholds List

# Switch Data

Use the Switch Data functionality to view the values of Fibre Channel counters in a report format.

## ▼ To Review Switch Data

1. **Click Switch Data in the System Reports window**
2. **Select a switch from the Select Switch pull-down menu.**
3. **Click Display.**

   After you have set the Set-Baseline field, the Switch FC Data report displays counter increments and the start time and the duration of the baseline, as shown in the following figure.

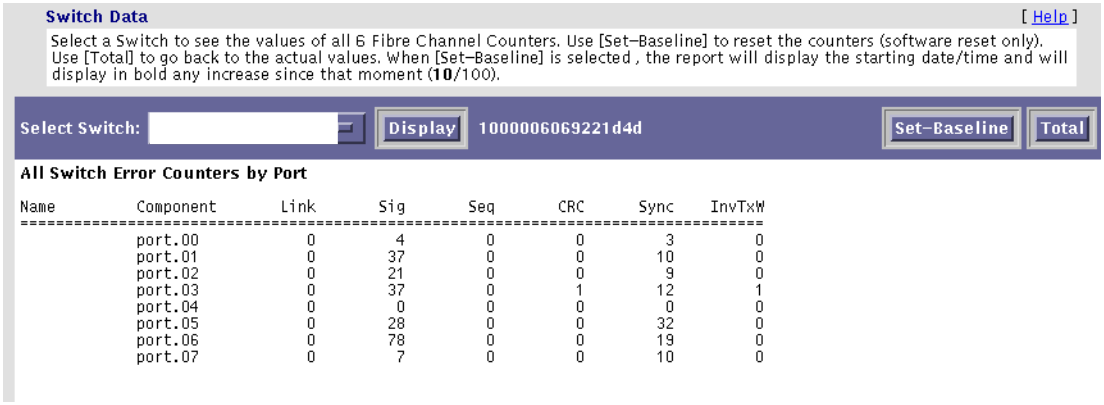



**FIGURE 7-11** Switch Data Report

4. **Click Total to erase the values saved by Set-Baseline and to display the total Fibre Channel counters.**

# Event and Severity Mapping

The Event and Severity Mapping page displays every device attribute the agent looks for when monitoring the devices.

## ▼ To Display the Event/Severity Mapping Report

- **Click the monitored devices to gather event details.**

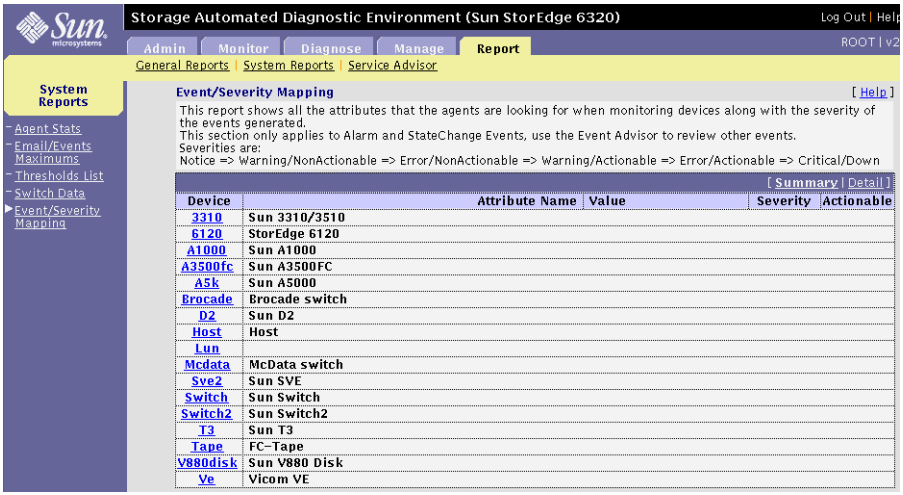
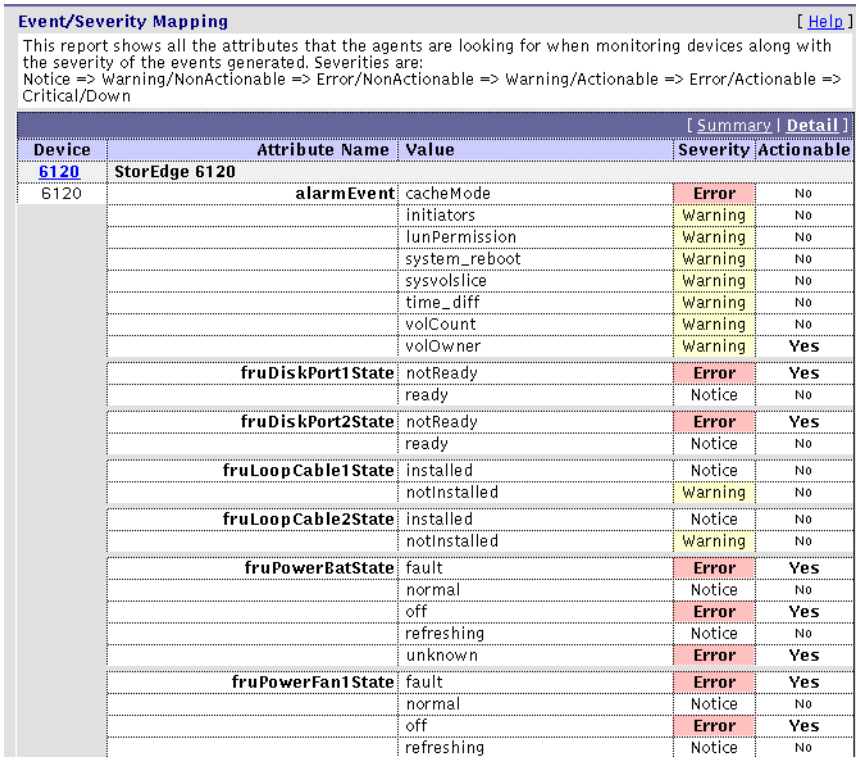



**FIGURE 7-12** Event and Severity Mapping Report

The Event and Severity Mapping Detail Report, shown in FIGURE 7-13, displays the severity of each event and whether or not the event is actionable.



**Event/Severity Mapping** [ Help ]

This report shows all the attributes that the agents are looking for when monitoring devices along with the severity of the events generated. Severities are:
Notice => Warning/NonActionable => Error/NonActionable => Warning/Actionable => Error/Actionable => Critical/Down

[ Summary | **Detail** ]

| Device | Attribute Name | Value | Severity | Actionable |
|---|---|---|---|---|
| 6120 | StorEdge 6120 | | | |
| 6120 | alarmEvent | cacheMode | Error | No |
| | | initiators | Warning | No |
| | | lunPermission | Warning | No |
| | | system_reboot | Warning | No |
| | | sysvolslice | Warning | No |
| | | time_diff | Warning | No |
| | | volCount | Warning | No |
| | | volOwner | Warning | Yes |
| | fruDiskPort1State | notReady | Error | Yes |
| | | ready | Notice | No |
| | fruDiskPort2State | notReady | Error | Yes |
| | | ready | Notice | No |
| | fruLoopCable1State | installed | Notice | No |
| | | notInstalled | Warning | No |
| | fruLoopCable2State | installed | Notice | No |
| | | notInstalled | Warning | No |
| | fruPowerBatState | fault | Error | Yes |
| | | normal | Notice | No |
| | | off | Error | Yes |
| | | refreshing | Notice | No |
| | | unknown | Error | Yes |
| | fruPowerFan1State | fault | Error | Yes |
| | | normal | Notice | No |
| | | off | Error | Yes |
| | | refreshing | Notice | No |

**FIGURE 7-13** Event and Severity Mapping Detail Report

For more detailed information about events and recommended action, refer to “Service Advisor” on page 166.

# Service Advisor

The Service Advisor shows all the actionable and non-actionable events the Storage Automated Diagnostic Environment generates. It lets you customize an event grid by selecting device type, FRU-level components, event type, and the type of output (report, grid, or .pdf format). In all cases, the following information is displayed:

- Category (device type)
- Component (FRU-level)
- Event Type
- Severity Level
  - green—an error has occurred
  - yellow—A serious error has occurred.
  - red—A serious error has occurred that requires your immediate attention.
  - down—A fatal, nonrecoverable error has occurred and the device is offline or unreachable.
- Diagnostic information and recommended action, if applicable.

## ▼ To Access the Service Advisor

- **Click Service Advisor from the Report menu.**

  The Service Advisor window is diplayed.

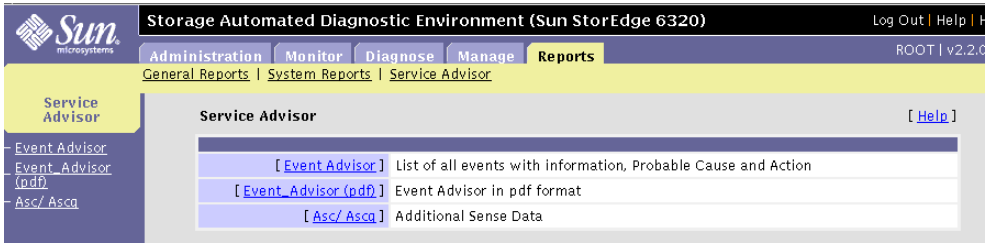



**FIGURE 7-14** Service Advisor Window

## ▼ To Customize an Event Report

1. **From the Service Advisor menu, click Event Advisor.**

   The StorADE 2 Event Advisor window is displayed.

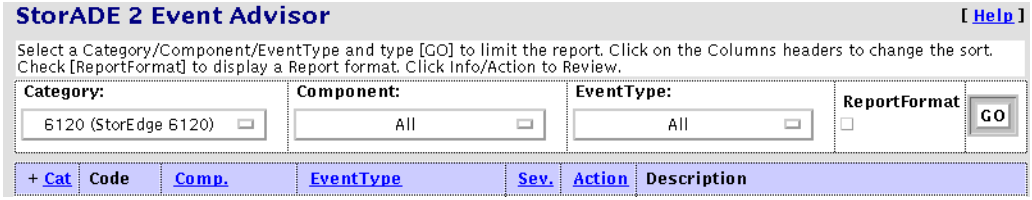



**FIGURE 7-15** Event Advisor

2. **Select a device (for example, a Sun StorEdge 6120 array) from the Category pull-down menu.**

   All devices is the default.

3. **To isolate events, select a component from the Component pull-down menu.**

   Components include diagnostic tests and FRUs (for example, the array battery and the array controller). All components is the default.

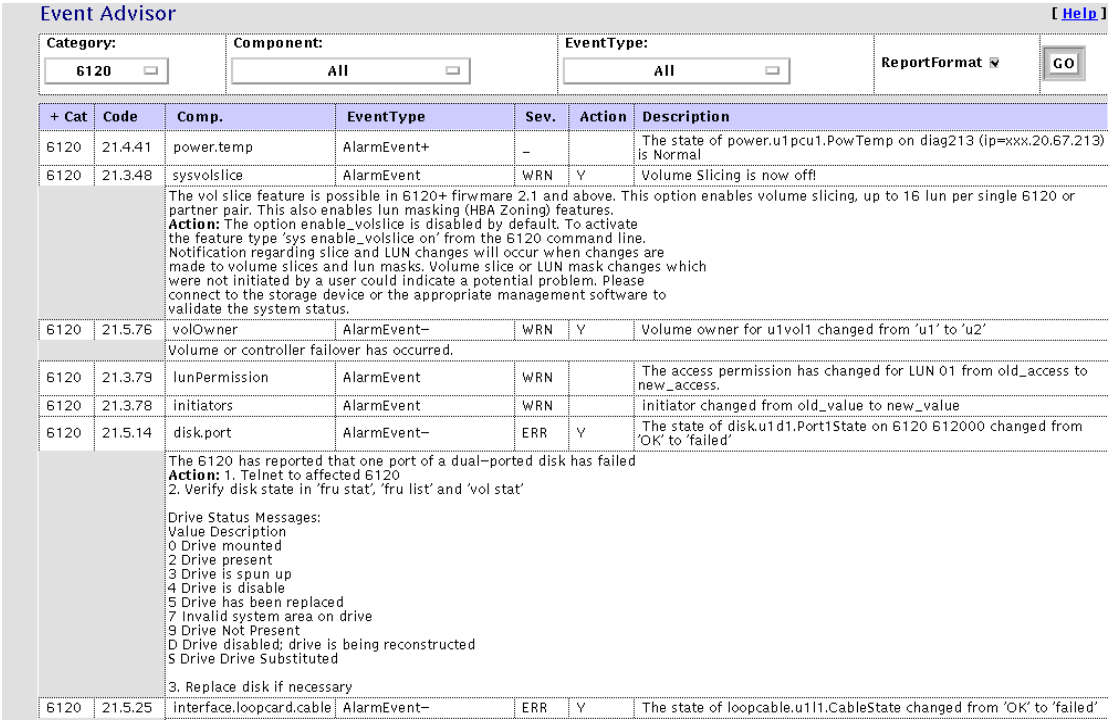
4. **Select an event type to narrow the event list.**

   An *event* is a notification that contains information about something that happened on a device. There are many types of events, and each type describes a separate occurrence. All events is the default.

## ▼ To View Events in a Detailed Report Format

- **Check the ReportFormat box after you have specified the device, component, and event type and click GO.**
  - To see all the details about each event, run the Event Advisor with the ReportFormat checkbox enabled
  - If you do not run the Event Advisor with the ReportFormat checkbox enabled, you must click the [Info / Action] details link, one event at a time. See

An Event Advisor report that is sorted according to the criteria you specified is displayed.



Event Advisor [ Help ]

Category: 6120 | Component: All | EventType: All | ReportFormat | GO

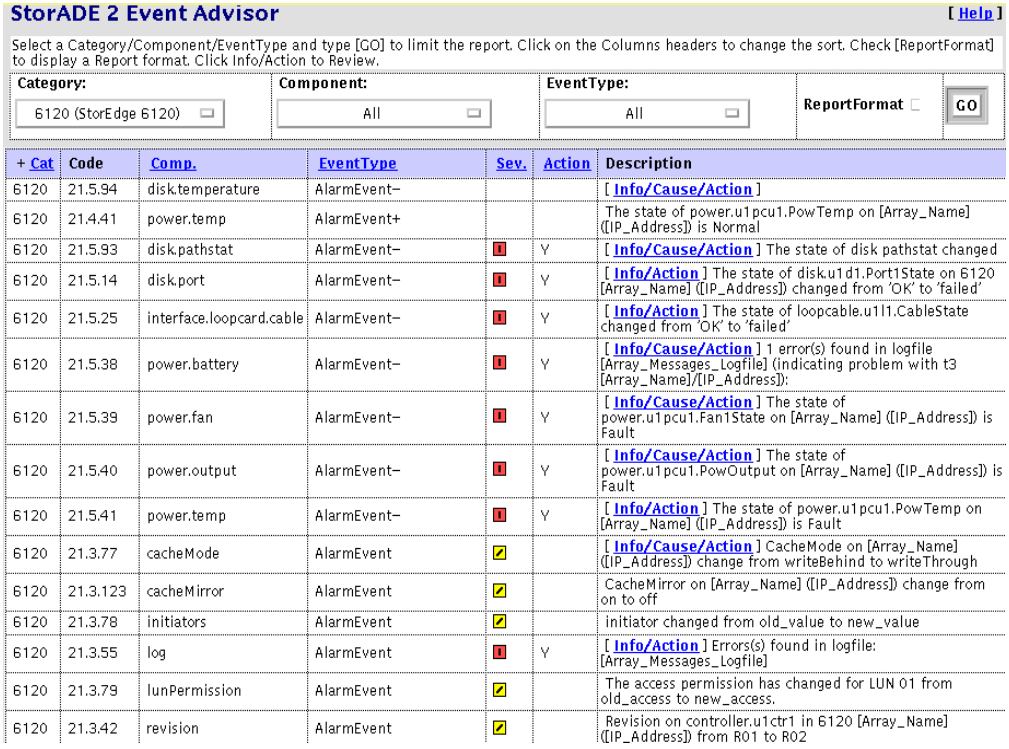
| + Cat | Code | Comp. | EventType | Sev. | Action | Description |
|---|---|---|---|---|---|---|
| 6120 | 21.4.41 | power.temp | AlarmEvent+ | – | | The state of power.u1pcu1.PowTemp on diag213 (ip=xxx.20.67.213) is Normal |
| 6120 | 21.3.48 | sysvolslice | AlarmEvent | WRN | Y | Volume Slicing is now off! |
| | | The vol slice feature is possible in 6120+ firwmare 2.1 and above. This option enables volume slicing, up to 16 lun per single 6120 or partner pair. This also enables lun masking (HBA Zoning) features.<br>**Action:** The option enable_volslice is disabled by default. To activate the feature type 'sys enable_volslice on' from the 6120 command line.<br>Notification regarding slice and LUN changes will occur when changes are made to volume slices and lun masks. Volume slice or LUN mask changes which were not initiated by a user could indicate a potential problem. Please connect to the storage device or the appropriate management software to validate the system status. | | | |
| 6120 | 21.5.76 | volOwner | AlarmEvent– | WRN | Y | Volume owner for u1vol1 changed from 'u1' to 'u2' |
| | | Volume or controller failover has occurred. | | | | |
| 6120 | 21.3.79 | lunPermission | AlarmEvent | WRN | | The access permission has changed for LUN 01 from old_access to new_access. |
| 6120 | 21.3.78 | initiators | AlarmEvent | WRN | | initiator changed from old_value to new_value |
| 6120 | 21.5.14 | disk.port | AlarmEvent– | ERR | Y | The state of disk.u1d1.Port1State on 6120 612000 changed from 'OK' to 'failed' |
| | | The 6120 has reported that one port of a dual–ported disk has failed<br>**Action:** 1. Telnet to affected 6120<br>2. Verify disk state in 'fru stat', 'fru list' and 'vol stat'<br><br>Drive Status Messages:<br>Value Description<br>0 Drive mounted<br>2 Drive present<br>3 Drive is spun up<br>4 Drive is disable<br>5 Drive has been replaced<br>7 Invalid system area on drive<br>9 Drive Not Present<br>D Drive disabled; drive is being reconstructed<br>S Drive Drive Substituted<br><br>3. Replace disk if necessary | | | |
| 6120 | 21.5.25 | interface.loopcard.cable | AlarmEvent– | ERR | Y | The state of loopcable.u1l1.CableState changed from 'OK' to 'failed' |

**FIGURE 7-16** Event Advisor—Customized Report

## ▼ To View Events in a Grid Format

1. **Disable the ReportFormat check box after you have specified the device, component, and event type and click GO.**

   An Event Advisor grid that is sorted according to the criteria you specified is displayed.



**StorADE 2 Event Advisor** [ Help ]

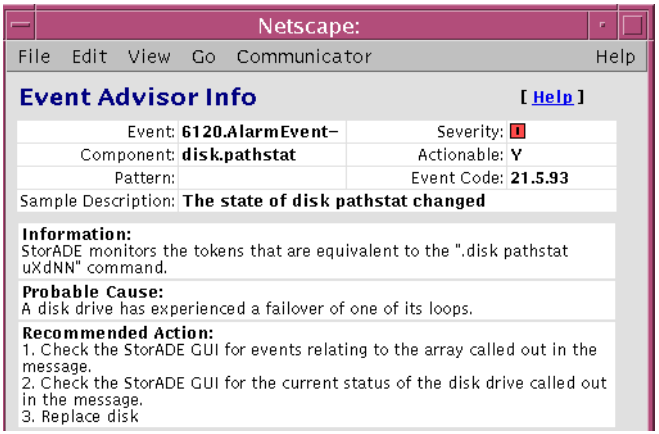
Select a Category/Component/EventType and type [GO] to limit the report. Click on the Columns headers to change the sort. Check [ReportFormat] to display a Report format. Click Info/Action to Review.

Category: 6120 (StorEdge 6120) | Component: All | EventType: All | ReportFormat | GO

| + Cat | Code | Comp. | EventType | Sev. | Action | Description |
|---|---|---|---|---|---|---|
| 6120 | 21.5.94 | disk.temperature | AlarmEvent– | | | [ Info/Cause/Action ] |
| 6120 | 21.4.41 | power.temp | AlarmEvent+ | | | The state of power.u1pcu1.PowTemp on [Array_Name] ([IP_Address]) is Normal |
| 6120 | 21.5.93 | disk.pathstat | AlarmEvent– | | Y | [ Info/Cause/Action ] The state of disk pathstat changed |
| 6120 | 21.5.14 | disk.port | AlarmEvent– | | Y | [ Info/Action ] The state of disk.u1d1.Port1State on 6120 [Array_Name] ([IP_Address]) changed from 'OK' to 'failed' |
| 6120 | 21.5.25 | interface.loopcard.cable | AlarmEvent– | | Y | [ Info/Action ] The state of loopcable.u1l1.CableState changed from 'OK' to 'failed' |
| 6120 | 21.5.38 | power.battery | AlarmEvent– | | Y | [ Info/Cause/Action ] 1 error(s) found in logfile [Array_Messages_Logfile] (indicating problem with t3 [Array_Name]/[IP_Address]): |
| 6120 | 21.5.39 | power.fan | AlarmEvent– | | Y | [ Info/Cause/Action ] The state of power.u1pcu1.Fan1State on [Array_Name] ([IP_Address]) is Fault |
| 6120 | 21.5.40 | power.output | AlarmEvent– | | Y | [ Info/Cause/Action ] The state of power.u1pcu1.PowOutput on [Array_Name] ([IP_Address]) is Fault |
| 6120 | 21.5.41 | power.temp | AlarmEvent– | | Y | [ Info/Action ] The state of power.u1pcu1.PowTemp on [Array_Name] ([IP_Address]) is Fault |
| 6120 | 21.3.77 | cacheMode | AlarmEvent | | | [ Info/Cause/Action ] CacheMode on [Array_Name] ([IP_Address]) change from writeBehind to writeThrough |
| 6120 | 21.3.123 | cacheMirror | AlarmEvent | | | CacheMirror on [Array_Name] ([IP_Address]) change from on to off |
| 6120 | 21.3.78 | initiators | AlarmEvent | | | initiator changed from old_value to new_value |
| 6120 | 21.3.55 | log | AlarmEvent | | Y | [ Info/Action ] Errors(s) found in logfile: [Array_Messages_Logfile] |
| 6120 | 21.3.79 | lunPermission | AlarmEvent | | | The access permission has changed for LUN 01 from old_access to new_access. |
| 6120 | 21.3.42 | revision | AlarmEvent | | | Revision on controller.u1ctr1 in 6120 [Array_Name] ([IP_Address]) from R01 to R02 |

2. **To obtain more information about a component, click its corresponding [Info/Action] link from the Description field.**

   A pop-up menu displays the information for that event and the action recommended for problem resolution.




## ▼ To Print the Event Advisor

The Storage Automated Diagnostic Environment Event Advisor is intended to be used interactively, but it is also printable.

- **From the Service Advisor menu, click Event Advisor (pdf).**

  Acrobat Reader launches the Storage Automated Diagnostic Environment Event Advisor Dictionary in portable data format (pdf).

CHAPTER 8

# Storage Automated Diagnostic Environment Online Help

This chapter explains the online help available from the GUI, and the command-line man pages associated with the Storage Automated Diagnostic Environment.

This chapter contains the following topics:


- "Online Help Topics" on page 171
- "Admin Overview" on page 173
- "Architecture" on page 174
- "Command Line Utilities" on page 177


## Online Help Topics

The Storage Automated Diagnostic Environment software includes a series of HTML pages viewable through a web browser. Each page provides you with information about a specific topic.

### ▼ To Access the Online Help

1. **Click the Help link in the upper right hand corner of the Storage Automated Diagnostic Environment main window.**

The Help Content window is displayed.

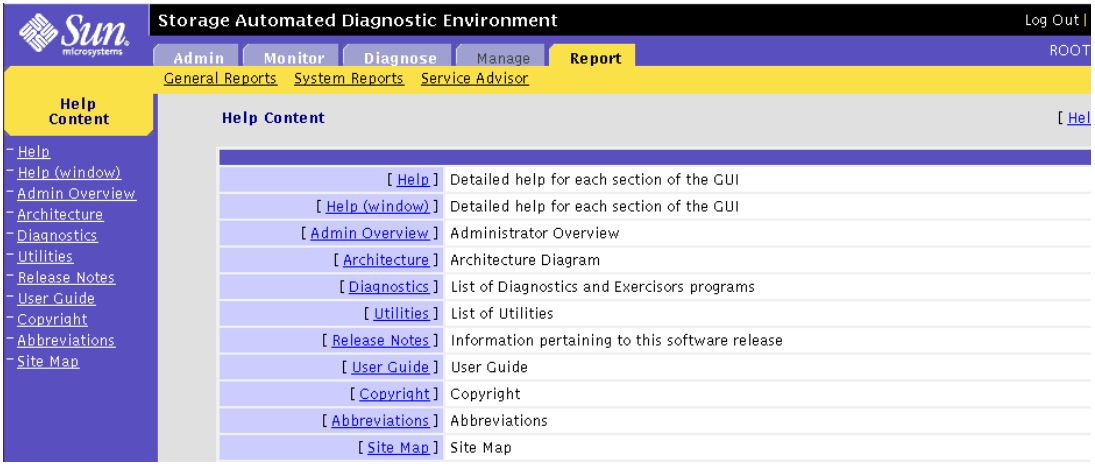



**FIGURE 8-1** Help Content

2. **For online help on Storage Automated Diagnostic Environment's main topics, click the Help link on the Help Content menu.**

   The Help Summary window is displayed.

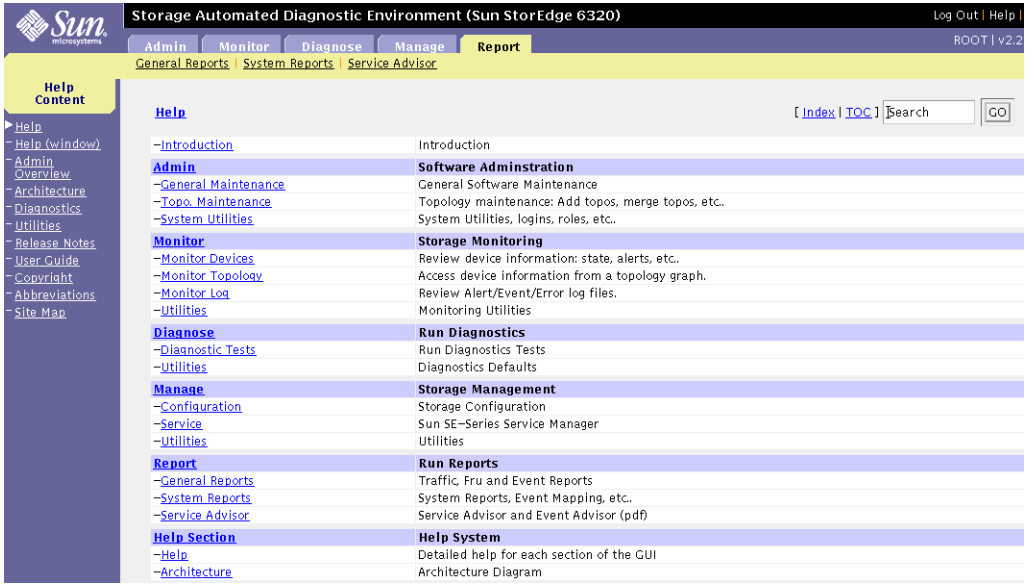



**FIGURE 8-2** Storage Automated Diagnostic Environment GUI Online Help

3. **Click the topic for which you need information from the Help list.**

# Admin Overview

This detailed administration overview provides valuable and comprehensive information about the following:

- The Storage Automated Diagnostic Environment
- The StorADE Installation Life Cycle
- Monitoring Strategy
- Monitoring Cycle
- Event Life Cycle
- Information about the Alternate Master
- Product Footprint
- Security Options
- Information about Sun StorEdge 3900 and 6900 series and 6320 and 6320SL system solutions.
- Notification Providers
- Site Map
- Product Abbreviation List
- Commands used for monitoring
- Certificate Details
- Event List

To Access the Admin Overview

## ▼ To Access the Admin Overview

1. **Click Admin Overview on the Help menu.**

   The Storage Automated Diagnostic Environment 2.x (StorADE) Administration Overview is displayed.

2. **Scroll until you find the information you are interested in learning more about.**

---

**Note –** The Admin Overview is a printable file.

---

# Architecture

The following block diagram represents the product architecture and shows conceptually how information flows through the Storage Automated Diagnostic Environment software.

## ▼ To Access the Architecture Diagram

1. **Click Architecture on the Help menu.**

   The Storage Automated Diagnostic Environment Architecture Diagram is displayed.

2. **For details of the component, move your mouse over the section within the diagram (or see** TABLE 8-1**).**

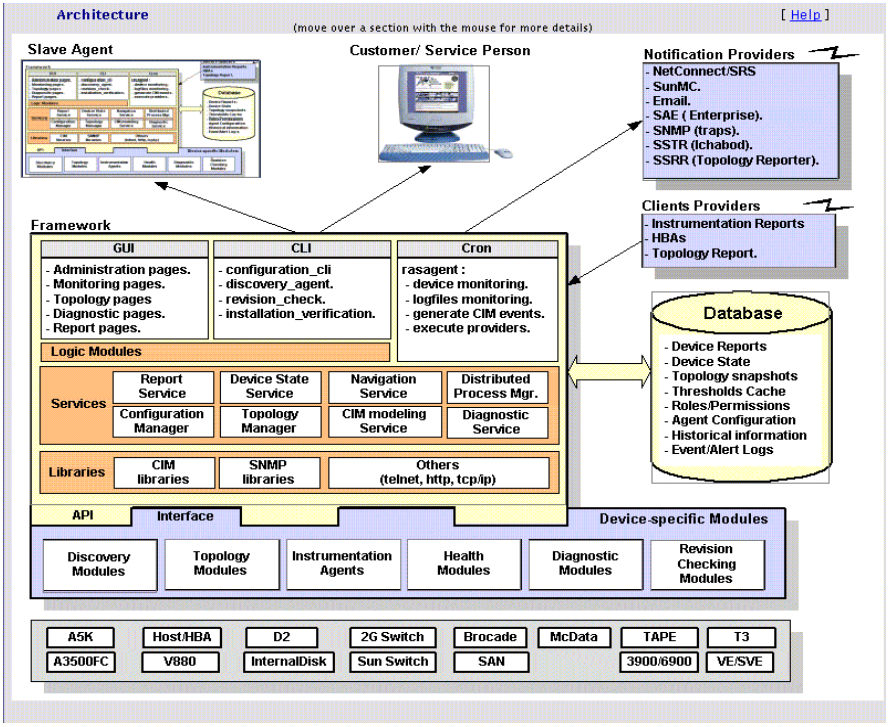



**FIGURE 8-3** Storage Automated Diagnostic Environment Architecture Diagram

**TABLE 8-1** Storage Automated Diagnostic Environment Component Definitions

| Component Name | Component Definition |
|---|---|
| Slave Agent | Each slave agent includes the same functionality as the master agent:<br>• Tests<br>• Instrumentation<br>• Event Generation<br>Slave agents are scheduled from the cron. They generate CIM events that are transmitted to the Master. |
| Notification Providers | • HTTP—Sends HTTP calls to an HTTP server and transfers CIM data in the appropriate format. Internal to Sun only.<br>• SSTR —The SSTR Provider sends events to the Sun StorEdge Enterprise Storage Manager 1.0 Topology Reporter console.<br>• NetConnect—A common information model (CIM) provider that requests information, converts the information to the appropriate format, and relays it to NetConnect.<br>• SRS—The Sun Remote Services (SRS) provider accepts and sends information in xml format.<br>• SNMP Traps—Enables the Storage Automated Diagnostic Environment to send traps for all actionable events that occur during monitoring to external management systems.<br>• SSRR—Uses modem technology with Unix-to-Unix Communication Protocol (UUCP). Sun StorEdge Remote Response (SSRR) software is required on the host and must be configured accordingly.<br>• *Local Provider (Email)*—The local provider can email events to administrators. Events can be filtered per administrator using event-type, severity level, or device-type filters. |
| Browser UI | The user interface (UI) uses HTML browsers. Using the UI, administrators can configure the agents, monitor storage devices, review the topology, execute diagnostic tests, and verify the configuration. |
| Storage Automated Diagnostic Environment Services | The services are the core of the framework. They provide logic and persistence to all agents, monitors, and user interface functions. The services include:<br>• A database of current instrumentation reports<br>• All CIM schemas (.MOF files) required to generate events<br>• The current configuration of all agents<br>• Topology functions<br>• The current state of each storage device<br>• A database of diagnostic processes<br>• Logic and persistence for timers, threshold, transitions, and revision matrix |

**TABLE 8-1** Storage Automated Diagnostic Environment Component Definitions

| | |
|---|---|
| Health Monitors | Health monitors read instrumentation reports and generate CIM events that are stored and sent to Notification providers.<br>Events are generated using a cache database that stores previous reports, timers, and thresholds. |
| Diagnostic Modules | Diagnostic tests can be executed locally or remotely to test different components. |
| Instrumentation Agents | Instrumentation agents probe storage devices and monitor log files to generate detailed reports on the state of each component of the device. Agents are scheduled to execute by crons. Instrumentation reports are stored and compared by the health monitors to generate CIM events. |

# Command Line Utilities

The explanations of the various diagnostic tests and functionality associated with the Storage Automated Diagnostic Environment are available from the command line.

## Diagnostic Test Man Pages

Man pages for the diagnostics tests are defined in TABLE 8-2 and are located in the `/opt/SUNWstade/Diags/bin` directory. Refer to the individual man pages for more detail.

**TABLE 8-2** Storage Automated Diagnostic Environment Diagnostic Commands

| Diagnostic Command | Command Description |
|---|---|
| `brocadetest`(1M) | Tests Brocade switch devices and provides command line access to Brocade switch diagnostics. `brocadetest`(1M) supports testing on all Brocade Silkworm switches that have network access from the testing host. |
| `linktest`(1M) | Verifies the functionality of passive Fibre Channel components in a SAN or DAS environment. Provides failing FRU isolation for devices that have external loopback tests. |
| `t3ofdg`(1M) | Runs the internal diagnostics of the Sun StorEdge T3 and T3+ array. |
| `t3volverify`(1M) | Out-of-band diagnostic for T3 and T3+ LUNs attached through an Ethernet connection. `t3volverify` executes the volume verify function on the selected Sun StorEdge T3 and T3+ arrays. |
| `6120loop`(1M) | Tests the functions of the Sun StorEdge 6120 array controller. |
| `6120volverify`(1M) | Out-of-band diagnostic for 6120 LUNs attached through an Ethernet connection. `6120volverify` executes the volume verify function on the selected Sun StorEdge 6120 array. |
| `se2test(1M)` | Aids the validation and fault isolation of the Sun StorEdge 6320 system components. |
| `se_configcheck` (1M) | Checks the status of the Sun StorEdge 6320 system configuration. |

**TABLE 8-2** Storage Automated Diagnostic Environment Diagnostic Commands

| | |
|---|---|
| `switchtest(1M)` | Diagnoses the Sun StorEdge network 1 Gbit FC switch-8 and switch-16 switches. |
| `switch2test(1M)` | Diagnoses the Sun StorEdge network 1 Gbit and 2 Gbit Fibre Channel switches. |
| `vediag(1M)` | Tests the virtualization engine for the Sun StorEdge 3900 and 6900 series. |

# Storage Automated Diagnostic Environment Agent Man Pages

Man pages for the Storage Automated Diagnostic Environment functions are defined in TABLE 8-3 and are located in the `/opt/SUNWstade/Diags/bin` directory. Refer to the individual man pages for more detail.

**TABLE 8-3** Storage Automated Diagnostic Environment Agent Commands

| Utilities Command | Command Description |
|---|---|
| `checkcron`(1M) | Verifies whether the Storage Automated Diagnostic Environment main program is entered in the `crontab`(1M) file |
| `clearcache`(1M) | Clears the Storage Automated Diagnostic Environment cache files that contain the current report for each device being monitored |
| `disk_inquiry`(1M) | Identifies devices on the data path that are using SCSI commands |
| `rasagent`(1M) | Calls the modules for network storage devices supported by Storage Automated Diagnostic Environment. It is automatically executed by `cron`, or it can be run manually from the command line. |
| `ras_admin`(1M) | Performs common Storage Automated Diagnostic Environment administrative tasks from the command line interface (CLI). |
| `ras_install`(1M) | Sets up the HTTP service and adds a `cron`. It must be run manually upon executing the `pkgadd` command. |
| `ras_revcheck`(1M) | Checks the hardware, software, and firmware revision levels. |
| `sanbox`(1M) | Displays Fibre Channel switch information |
| `testt3`(1M) | Retrieves tokens from a Sun StorEdge T3, T3+, or 6120 array. It verifies whether the IP address used is correct and whether the IP address points to a Sun StorEdge T3, T3+, or 6120 array that can provide tokens. |

# Glossary

**alarm** A message with an attached level of severity.

**alert** A subtype of an event that requires user intervention. The term actionable event often describes an alert.

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

**DAS** Direct Access Storage

**diagnosis** A process to determine the fault cause and corrective action.

**diagnostic** A test to uncover faults.

**DMA** Direct Memory Access. The transfer of data directly into memory without supervision of the processor. The data is passed on the bus directly between the memory and another device.

**domain** On the Internet, a domain is part of a naming hierarchy. An Internet domain consists of a sequence of names (labels) separated by periods (dots). For example, `eng.sun.com`.

In RAS, a domain is a logical partition of system components, including CPUs, memory, and I/O devices. Each domain supports a separate Solaris image.

**Ethernet hub** Hardware used to network computers together. Ethernet hubs serve as a common wiring point, enabling information to flow through one central location to any other computer in the network.

**event** A notification that contains information about something that happened on a device. There are many types of events, and each type describes a separate occurrence.

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

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

**FC-AL** Fibre Channel-Arbitrated Loop. FC-AL is implemented as either a loop or a fabric. A loop can contain up to 126 nodes, accessible through only one or two servers.

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

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

**FRU** field-replaceable unit. An assembly that a manufacturer replaces on failure of an assembly component.

**GBIC** Gigabit Interface Converter. A hot-swappable input/output (I/O) device that plugs into a Gigabit Ethernet port or Fibre Channel.

**HTTP** HyperText Transfer Protocol.

**IP** Internet Protocol.

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

**NSCC** Network Storage Command Center.

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

**RAS** Reliability, availability, and serviceability.

**RDLS** Read Link Status.

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

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

**RSS** Remote Support System. Software delivered with the service processor bundle.

**SAN** storage area network.

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

**SES** SCSI Enclosure Services device. An interface to SCSI enclosure services devices. These devices sense and monitor the physical conditions within an enclosure, as well as enable access to the status reporting and configuration features of the enclosure (such as indicator LEDs on the enclosure).

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

**Storage Service Processor** Sun's rack mountable Netra X1™ server, preconfigured with advanced remote management and monitoring capabilities. The service processor monitors the SAN and provides service and support access for Sun engineers.

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

**UUCP** UNIX-to-UNIX Communication Protocol. UUCP is a protocol that transfers files, news, and mail, and it executes remote commands between UNIX machines.

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