Storage Automated Diagnostic Environment User's Guide

Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054 U.S.A.
650-960-1300

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Contents

Preface

The *Storage Automated Diagnostic Environment User's Guide* describes how to use the Storage Automated Diagnostic Environment graphical user interface (GUI) to collect data about the condition of various storage devices. In addition, this guide describes the tests that provide diagnostics for the following Sun products:

- Sun StorEdge™ T3 and T3+ arrays
- Sun StorEdge A5000 and A5200 array
- Sun StorEdge A3500FC array
- Sun StorEdge network FC switch-8 and switch-16 switches
- Brocade Silkworm switches
- Fibre Channel tape
- Virtualization engine

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

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 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 utilities, which enable the user to manage the components for the Sun StorEdge 3900 and 6900 series 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 might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

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

Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 2 in the *User's Guide.* These are called *class* options. 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 Documentation

Product	Title	Part Number
Sun StorEdge T3 and T3+ arrays	• *Sun StorEdge T3 and T3+ Array Start Here*	816-0772-10
	• *Sun StorEdge T3 and T3+ Array Installation, Operation, and Service Manual*	816-0773-10 816-0776-10
	• *Sun StorEdge T3 and T3+ Array Administrator's Guide*	816-0777-10
	• *Sun StorEdge T3 and T3+ Array Configuration Guide*	816-0778-10
	• *Sun StorEdge T3 and T3+ Array Site Preparation Guide*	816-0779-10
	• *Sun StorEdge T3 and T3+ Field Service Manual*	816-0781-12
	• *Sun StorEdge T3 and T3+ Array Release Notes*	
Sun StorEdge PCI FC-100 host adapter	• *Sun StorEdge PCI FC-100 Host Adapter Installation Manual*	805-3682-10
Sun StorEdge SBus FC-100 host adapter board	• *Sun StorEdge SBus FC-100 Host Adapter Installation and Service Manual*	802-7572-11
Sun StorEdge PCI Dual Fibre Channel host adapter board	• *Sun StorEdge PCI Dual Fibre Channel Host Adapter Product Notes*	806-5857-10
	• *Sun StorEdge PCI Dual Fibre Channel Host Adapter Installation Guide*	806-5600-10
Sun StorEdge A5000 array	• *Sun StorEdge A5000 User's Guide*	806-1946-10
	• *Sun StorEdge A5000 Release Notes*	806-1947-10
	• *Sun StorEdge A5000 Product Notes*	805-1018-13
	• *Sun StorEdge A5000 Configuration Guide*	805-0264-15
	• *Sun StorEdge A5000 Installation and Documentation Guide*	805-1903-15
Sun StorEdge A3500 / A3500FC array	• *Sun StorEdge A3500/A3500FC Configuration Guide*	805-4981-13
	• *Sun StorEdge A3500/A3500FC Controller Module Guide*	805-4980-11
	• *Sun StorEdge A3500/A3500FC Task Map*	805-4982-11
Sun StorEdge network FC switch-8 and switch-16	• *Sun StorEdge Network FC Switch-8 and Switch-16 Installation and Configuration Guide*	806-6922-10
	• *Sun StorEdge Network FC Switch-8 and Switch-16 Field Troubleshooting Guide*	816-0252-10
	• *Sun StorEdge Network FC Switch-8 and Switch-16 Release Notes*	816-0842-10

Product	Title	Part Number
RAID Manager 6.22	• *RAID Manager 6.22 User's Guide* • *RAID Manager 6.22 Release Notes*	806-0478-10 806-3721-10
Solaris	• *Solaris Handbook for Sun Peripherals*	806-2210-10
Sun StorEdge 3900 and 6900 Series	• Sun StorEdge 3900 and 6900 Series Reference Manual • Sun StorEdge 3900 and 6900 Series Site Preparation Guide • Sun StorEdge 3900 and 6900 Regulatory and Safety Compliance Manual • Sun StorEdge 3900 and 6900 Series Hardware Installation and Service Manual • Sun StorEdge 3900 and 6900 Series Release Notes	816-3245-10 816-3242-10 816-3243-10 816-3244-10 816-3247-10

▼ To Access Online Sun Documentation

A broad selection of Sun system documentation is located at:

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

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

`http://docs.sun.com`

Brocade Documentation

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

- *Brocade Silkworm® 2400 Hardware Reference Manual*
- *Brocade Silkworm® 2800 Hardware Reference Manual*
- *Brocade Fabric OS™ Hardware Reference Manual*
- *Brocade Fabric OS™ Release Notes*
- *Brocade QuickLoop User's Guide*
- *Brocade WebTools User's Guide*
- *Brocade Zoning User's Guide*
- *Sun StorEdge SAN Release 2.0 Installation, and Configuration Guide, part number 806-6922-10***
- *Sun StorEdge SAN Release 2.0 Release Notes, part number 806-6924-10***

** The Sun StorEdge switch documents are referenced for overall configuration guidelines and Operating System level and patch revision information.

▼ To Access Brocade documentation

The URL for the Brocade site is 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. **Click the Partner Login link.**
3. **Enter the Login: Sun. Enter the password: silkworm.**

Sun Welcomes Your Comments

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`docfeedback@sun.com`

Please include the part number (*816-3142-10*) of the document in the subject line of your email.

CHAPTER 1

Overview

What is the Storage Automated Diagnostic Environment?

The Storage Automated Diagnostic Environment is a host-based 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 offers the following features:

- A common web-based user interface for device monitoring and diagnostics
- Distributed test invocation by means of lists or topology
- Topology grouping for multi-level hosts and components
- Alternate master support for redundancy
- Revision checking
- Support for the service processor and virtualization engine components of Sun StorEdge 3900 and 6900 series offerings
- Remote notification through SRS, SRS / NetConnect, RSS, HTTP, NSM, and SMTP Providers, or email
- Support for storage area networks (SANs)

Changes from Previous Release

TABLE 1-1 and TABLE 1-2 list the changes from the previous release of Network Storage Agent 2.1.

TABLE 1-1 Storage Automated Diagnostic Environment Additions

Features	Function
Diagnostic graph view	Graphical topology view of devices for testing
Diagnostic list view	Device listing with ability to invoke tests
Diagnostic invocation	Test invocation modules
Diagnostic output view	Test status and output
Diagnostic archive view	Archive for test status/output
Storage Automated Diagnostic Environment Link test	Link test for isolation of passive devices
Test Process Manager	Distributed test manager
Discover Sun StorEdge 3900 and 6900 Series	Discovery of Sun StorEdge 3900 and 6900 series
Topology	Topology comparison
Revision checking	Distributed revision checking for patches and device firmware
Sun StorEdge T3 and T3+ array out-of-band tests	Sun StorEdge T3 and T3+ array `t3volverify`(1M) and `t3ofdg`(1M) tests
Revision checking	Revision checking, configuration checking, and device testing
NetConnect update	Update for NetConnect Provider
Grouping in graph view	Grouping in graph view to create rack views
Alternate master	Alternate master for redundant control and monitoring
Virtualization Engine support	Instrumentation, health, and diagnostics for the virtualization engine.
Sun StorEdge 3900 and 6900 Series Configuration Utilities	Configure, modify, restore, and verify Sun StorEdge 3900 and 6900 Series components.
Event Grid	Shows all the actionable and non-actionable events the Storage Automated Diagnostic Environment generates.
Out-of-band topology	Topology merging options
Brocade	Support for Brocade Silkworm switches in a SAN environment

Products Not Supported

Products not supported with the Storage Automated Diagnostic Environment include the following:

- Sun StorEdge A2 array and Sun StorEdge D2 disk array
- Sun StorEdge Internal Fibre Channel Disk
- Sun Fire 880 FC-AL Disk
- Sun StorEdge A1000 array

How the Storage Automated Diagnostic Environment 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 Storage Automated Diagnostic Environment. 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 Storage Automated Diagnostic Environment 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 Storage Automated Diagnostic Environment 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.

Monitoring Devices Using the Storage Automated Diagnostic Environment

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

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

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.

Information Deltas

In general, information events are divided into two categories:

- **Delta:** Information events in this category are never sent in their entirety; only changes are sent. This category includes device configuration, device state, and system configuration events.
- **Nondelta:** This category includes message log events, device statistics, and other information events. These events are never compared with previous values because there are too many changes to track. Therefore, the events in a nondelta category are sent in their entirety. Often, events in this category follow a transmission schedule; for example, device statistics for a Sun StorEdge T3 and T3+ array could be reported every seven days.

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

Storage Automated Diagnostic Environment Functions

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

1. Sends the information, by way of a discovery event, to the system administrator and / or the Network Storage Command Center (NSCC) 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, plus other events for other preconfigured devices, that may be generated by health monitors.

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2. Reads the proper `/var/adm/messages` files, finds relevant entries, and reports them as events through the local email notification mechanism, if configured.
3. Connects to Sun StorEdge T3 and T3+ array storage devices directly through in-band data paths and out-of-band management paths.
4. 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.
5. Reads threshold information and reports errors when the frequency threshold reaches predefined levels.

Storage Automated Diagnostic Environment Agent Functionality

The Storage Automated Diagnostic Environment remotely monitors Sun network storage devices. The Storage Automated Diagnostic Environment can monitor host message files for errors, or connect directly through the "in-band" data path or "out-of-band" management path of Sun StorEdge devices, in order to obtain status information about each device being monitored.

To facilitate monitoring of this environment, the Storage Automated Diagnostic Environment can be configured as a set of distributed agents, in a master/slave relationship, spread across a series of servers. A single agent is given the role of master and acts as the collection point for events originating in the other slave agents. The master provides the web server interface.

You can use the Storage Automated Diagnostic Environment to monitor the following types of Sun storage products:

- Sun StorEdge T3 and T3+ arrays
- Sun StorEdge A5000 and A5200 arrays
- Sun StorEdge A3500FC arrays
- Sun StorEdge network FC switch-8 and switch-16 switches
- Brocade Silkworm switches
- Virtualization engines
- Fibre Channel tape
- Sun StorEdge 3900 and 6900 Series Solutions

Storage Automated Diagnostic Environment Diagnostic Functionality

Diagnostic 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 Storage Automated Diagnostic Environment user interface.

The following tests are described in Chapter 5, “Diagnostics.”

- Sun StorEdge A3500FC Array Test (`a3500fctest`)
- Sun StorEdge A5000 Array Enclosure Test (`a5ksestest`)
- Sun StorEdge A5000 Array Test (`a5ktest`)
- Sun StorEdge FC Tape Test (`fctapetest`)
- Sun StorEdge PCI FC-100 Host Adapter Board Test (`ifptest`)
- Sun StorEdge PCI Dual Fibre Channel Host Adapter Board Test (`qlctest`)
- Sun StorEdge SBus FC-100 Host Adapter Board Test (`socaltest`)
- Sun StorEdge network FC switch-8 and switch-16 Switch Test (`switchtest`)
- Sun StorEdge T3 and T3+ array Tests (`t3ofdg`, `t3test`, `t3volverify`)
- Virtualization Engine Tests (`vediag`, `veluntest`)
- Brocade Silkworm Test (`brocadetest`)

From the Storage Automated Diagnostic Environment user interface, you can select tests from the topology or from a list view. When the tests execute, the Storage Automated Diagnostic Environment initiates the test on the proper host. You can retrieve test results by using the Test Manager selection from the GUI.

Tasks You Can Perform Using the Storage Automated Diagnostic Environment

Through the Storage Automated Diagnostic Environment GUI, you can perform the tasks that appear in TABLE 1-2.

TABLE 1-2 Functions of the Storage Automated Diagnostic Environment

Task	Function
Maintain host information	• Supports the maintenance of host-specific information such as host name, location, and IP address. • Enables you to manually add a new slave or an alternate master • Tests the availability of the Storage Automated Diagnostic Environment on each host using the Ping Slaves function. • Enables you to push slave configuration to the corresponding slaves.
Add or update the master configuration	Supports the maintenance of customer information and master configuration information, including: • Customer name, contract number, and location information • Default local message files • Device category selection • Monitoring frequency
Discover devices	Requests that the Storage Automated Diagnostic Environment probe the environments for the desired device types
Maintain devices	Supports the maintenance of device-specific information.
Set up local email and pager notification	Enables local notification information: : • Enable 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. • Enables events to be automatically translated from their internal encoded format to a human-readable format
Set up a Provider	Relays events generated by health monitors.
Control agent activity	Temporarily stops the Storage Automated Diagnostic Environment from running on a selected host.
View instrumentation reports	Reviews all FRU-level information details of a selected device and its access components.
Create Topology snapshot	Creates and updates the topology view from the host.

TABLE 1-2 Functions of the Storage Automated Diagnostic Environment

Create Topology history	Displays archived topology information of the selected host or previously-configured multiple hosts.
Verify the health of a SAN and display topology drawings of the Fibre Channel connections.	Collects counter information based on error messages and telemetry information. This information is used in the topology drawing to indicate link failures.
Monitor devices, SANs and logs	Displays the most recent system errors saved by the Storage Automated Diagnostic Environment.
Adjust the system functions	• Enables you to change time-out settings • Enables you to display system errors • Enables you to erase device cache • Enables you to manually run the Storage Automated Diagnostic Environment • Enables you to display thresholds • Enables you to configure email addresses • Enables you to change passwords
Run Diagnostic tests from the GUI window.	• Enables you to access diagnostic test from a topology view • Enables you to access diagnostic test 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.
Run Diagnostic tests from a command line	Enables you to run diagnostic tests by specifying all test options in the form of command-line arguments
Manage Sun StorEdge 3900 and 6900 series components	Enables you to review, configure, display, and manage the Sun StorEdge 3900 and 6900 series components (Sun StorEdge T3 and T3+ array, Sun StorEdge network FC switch-8 and switch-16 switches, and virtualization engine for the Sun StorEdge 6900 series solutions).

CHAPTER 2

Installing and Starting SUNWstade

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

Installation Checklist

Use this checklist to install the Storage Automated Diagnostic Environment.

	Step	Action
☐	1	1. Insert the Storage Automated Diagnostic Environment 2.0 CD in the CD-ROM drive. 2. Mount the CD-ROM. 3. Type: # **cd /cdrom/cdrom0/product/packages**
☐	2	Install the `SUNWstade` package by selecting it during the package add: # **`pkgadd -d .`**
☐	3	After the package is completely and successfully installed, run the agent installation script. Refer to “To Run the ras_install Script” on page 22.
☐	4	To install patch **112580-01** and **112580-02**: 1. Insert the Storage Automated Diagnostic Environment 2.0 CD in the CD-ROM drive. 2. Mount the CD-ROM. 3. Type: # **cd /cdrom/cdrom0/product/patches**
☐	5	Use the patchadd command to add the patches: # **patchadd 112580-01** # **patchadd 112580-02**
☐	6	Configure the Sun StorEdge T3 and T3+ Array and the Host. Refer to Chapter 7, “Utilities.”
☐	7	Access the GUI on the host where the master was installed. Use the server name and port 7654 from a browser to set up the rest of the configuration: `http://<master-server.domain>:7654`
☐	8	Log in to the Storage Automated Diagnostic Environment: • Login: `ras` • Default password: `agent`
☐	9	Set the site information parameters. Note that fields with an asterisk (*) are mandatory. Refer to Chapter 3, “Maintenance.”
☐	10	Using Device Discovery, request the Storage Automated Diagnostic Environment to probe the environments for the desired device types. Refer to Chapter 3, “Maintenance.”

☐	11	Customize the generation of email using the General Maintenance: Email Notification: Add Notification functionality. Refer to Chapter 3, “Maintenance.”
☐	12	Send a test email and a short message to verify the master instance of the Storage Automated Diagnostic Environment’s mailing capability.
☐	13	Verify the component’s revision using the Diagnose: Tools: Revision Check functionality. Refer to Chapter 5, “Diagnostics.”
☐	14	Create a topology snapshot using the Maintenance: Topology Maintenance functionality. Refer to Chapter 3, “Maintenance.”
☐	15	Push the configuration. This is done to ensure that all instances of the master agent are synchronized with every device the Storage Automated Diagnostic Environment is monitoring, or to update the slaves, if applicable. Refer to Chapter 3, “Maintenance.”
☐	16	Review the configuration to ensure that the Storage Automated Diagnostic Environment is not missing required configuration information necessary for proper monitoring. Refer to Chapter 3, “Maintenance.”
☐	17	Create a Snapshot Topology and merge topologies, if applicable. Refer to Chapter 3, “Maintenance.”

Host Requirements

The SUNWstade package is installed on a host in the `/opt/SUNWstade` directory. Servers running in the Solaris operating environment and Sun StorEdge devices are supported. Install SUNWstade on a host that satisfies these conditions:

- The host has access to `/var/adm/messages` files, where device logs are sent.
- The host has access to the T3 and T3+ array message log, to which Sun StorEdge T3 and T3+ array device logs are sent. The name of the file appears on the Sun StorEdge T3 and T3+ array message log configuration screen for each host.
- The host has access to the Sun StorEdge T3 and T3+ arrays and/or the Sun StorEdge network FC switch-8 and switch-16 switches over TCP/IP.
- For SAN datapath monitoring, the host has access to the data path of the devices being monitored.
- The master host can run a browser to complete and maintain the monitored configuration.
- The service processor (which is defined as a *Solaris server host*) connects to Sun storage devices "out-of-band" through Ethernet.
- The host must have the `SUNWsan` package installed, along with the latest 111413-*xx* `luxadm` patch.

If the host satisfies only some of these conditions, you can install the agent on multiple hosts and configure the agents to complement each other. Note, however, that SUNWstade is not a relocatable package.

Example Configurations

- The Sun StorEdge T3 and T3+ Array has an "in-band" datapath attachment to one host but logs its messages to another management host.
- In a multipath environment, more than one host has access to the same device(s).

Installing SUNWstade

This section contains the following subsections:

Installation Notes

- After the package has been completely installed, execute the program `/opt/SUNWstade/bin/ras_install` to install the SUNWstade service and `cron`. Refer to "To Run the ras_install Script" on page 22.
- When installing a new version of, or a patch to, the Storage Automated Diagnostic Environment, stop the agents before installing the update (refer to "To Start or Stop Agent(s)" on page 63). Then, run `ras_install` after installing the update.
- After installing SUNWstade, set the environment variables PATH and MANPATH to include SUNWstade directories `/opt/SUNWstade/bin` and `/opt/SUNWstade/man`. Refer to "To Set the Environment Variables" on page 21.

▼ To Install SUNWstade

- **Use the `pkgadd(1M)` command and answer the prompts as shown in** CODE EXAMPLE 2-1**.**

CODE EXAMPLE 2-1 Sample Installation

```
# pkgadd -d .

The following packages are available:
  1  SUNWstade Storage Automated Diagnostic Environment (sparc) 2.0

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]: 1

  (various copright notices)

Do you accept the terms?  [yes,no,view,?] yes
  Installation end.

Using </opt/SUNWstade> as the package base directory.

## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

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

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

Installing Storage Automated Diagnostic Environment as <SUNWstade>
## Installing part 1 of 1.

/opt/SUNWstade/CHANGES
/opt/SUNWstade/INSTALL
/opt/SUNWstade/README
/opt/SUNWstade/Scripts/Solutions/bin/t3 raid4
/opt/SUNWstade/Scripts/Solutions/bin/t3 raid5
/opt/SUNWstade/Scripts/Solutions/config
/opt/SUNWstade/StarterKit/TAPEAgent.pm
/opt/SUNWstade/StarterKit/WHATAgent.pm
/opt/SUNWstade/System/.#ST_Tests.1.16
/opt/SUNWstade/System/.#ST_Tests.1.4
/opt/SUNWstade/System/DeviceState.map
/opt/SUNWstade/System/DocSequence
...
```

(Continued on following page)

```
...
/opt/SUNWstade/snmp/mibs/IPV6-ICMP-MIB.txt
/opt/SUNWstade/snmp/mibs/IPV6-MIB.txt
/opt/SUNWstade/snmp/mibs/IPV6-TC-txt
/opt/SUNWstade/snmp/mibs/IPV6-TCP-MIB.txt
/opt/SUNWstade/snmp/mibs/IPV6-UDP-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-COMMUNITY-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-FRAMEWORK-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-MPD-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-NOTIFICATION-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-PROXY-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-TARGET-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-USER-BASED-SM-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMP-VIEW-BASED-ACM-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMPv2-CONF.txt
/opt/SUNWstade/snmp/mibs/SNMPv2-MIB.txt
/opt/SUNWstade/snmp/mibs/SNMPv2-SMI.txt
/opt/SUNWstade/snmp/mibs/SNMPv2-TC.txt
/opt/SUNWstade/snmp/mibs/SNMPv2-TM.txt
/opt/SUNWstade/snmp/mibs/t300.mib
/opt/SUNWstade/snmp/mibs/v2_2FA.mib
/opt/SUNWstade/snmp/mibs/v2_2FE.mib
/opt/SUNWstade/snmp/mibs/v2_2SW.txt
[ verifying class <none> ]
## Executing postinstall script.
libsnmp found!
 -----------------------------------------------------
 After the package is completely installed,
 execute the program '/opt/SUNWstade/bin/ras_install'
 to install the rasagent inet service and cron.
-----------------------------------------------------
If you choose not to use cron this time, re-run
ras_install later to establish a cron entry.
 -----------------------------------------------------
# /opt/SUNWstade/bin/ras_install

   **** Installing Storage Automated Diagnostic Environment and crons ****

? Are you installing a Master or a Slave? (Enter M=master or S=slave):M
(Default = M) *** Master Install ***

This script will now add the Storage Automated Diagnostic Environment service to the inetd
config file. When this script ends, go to the master agent IP-address, port 7654 with a
browser to complete the Storage Automated Diagnostic Environment configuration.

...
```

(Continued on following page)

```
...
/etc/services is now updated.
- The inetd.conf entry for rashttp is already in /etc/inetd.conf.

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

  ** Storage Automated Diagnostic Environment cron is now installed.

- Resetting the inetd services to see the new rashttp service.
- Testing access to Storage Automated Diagnostic Environment webserver, (this will timeout
in 20 secs) ...

Storage Automated Diagnostic Environment installed properly!

  To complete the Storage Automated Diagnostic Environment configuration, point your
browser to http://<hostname>:7654. Use the browser only after the Storage Automated
Diagnostic Environment has been installed on all master and slave hosts.
#
```

▼ To Verify the Installation

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

```
# pkginfo -l SUNWstade
```

▼ To Install a Patch

4. **Download the latest Storage Automated Diagnostic Environment patch xxxxxx-xx from Sunsolve to a temporary workspace.**

5. **As superuser, use the `patchadd` (1M) command and answer the prompts as shown in** CODE EXAMPLE 2-2**.**

CODE EXAMPLE 2-2 Patch Installation

```
# cd /tmp

# uncompress xxxxxx-xx.tar.Z
# tar xvf xxxxxx-xx.tar
# cd xxxxxx-xx

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

Sun StorEdge 3900 and 6900 Series Configuration

The Sun StorEdge 3900 and 6900 Series solutions must have the file `/var/opt/SUNWstade/DATA/Solution.golden` created on the Service Processor before the Storage Automated Diagnostic Environment GUI is launched. This task is performed by Manufacturing (OPS) at the factory.

Manufacturing must run `/opt/SUNWstade/bin/config_solutions` while building the cabinet at the factory. This creates the `/var/opt/SUNWstade/DATA/Solution.golden` file, which is used as a baseline, shown in FIGURE 2-1.

Sun StorEdge 3900 and 6900 Series Upgrades

After any upgrade or component change (including model number upgrades), you must again execute `/opt/SUNWstade/bin/config_solution` on the Service Processor, which enables proper discovery of the Sun StorEdge 3900 and 6900 Series Solutions. Anytime the `/opt/SUNWstade/bin/config_solution` file is executed, the Storage Automated Diagnostic Environment Master must rediscover this cabinet using instructions given from the Discovery menu, Solution option. Refer to “Device Discovery” on page 43 for more information on Discovery.

FIGURE 2-1 and FIGURE 2-2 show an example `Solution.golden` file and Solution Golden Snapshot.

```
$ config_solution -m 6910

sp0:
v1a: -> found VE (v1a / 90.0.0.20 / 2900006022004188)
v1b: -> found VE (v1b / 90.0.0.21 / 2900006022004193)
sw1a: -> found Switch (90.0.0.30 / 100000c0dd00b1f4)
sw1b: -> found Switch (90.0.0.31 / 100000c0dd0057aa)
sw2a: -> found Switch (90.0.0.32 / 100000c0dd008467)
sw2b: -> found Switch (90.0.0.33 / 100000c0dd00b170)
t3b0: -> found T3 (90.0.0.40 / 50020f230000a2a6/50020f230000a0d0/
slr-mi.370-3990-02-e-f2.041638)
t3b1: -> found T3 (90.0.0.41 / 50020f23000068cc/50020f2300004331/
slr-mi.370-3990-01-e-f0.026828)
t3b2: -> Warning: cannot ping 90.0.0.42
t3b3: -> Warning: cannot ping 90.0.0.43
t3be0: -> Warning: cannot ping 90.0.0.50
t3be1: -> Warning: cannot ping 90.0.0.51
t3be2: -> Warning: cannot ping 90.0.0.52
t3be3: -> Warning: cannot ping 90.0.0.53
t3be4: -> Warning: cannot ping 90.0.0.54
-----------------------------------
      Configuration Summary
-----------------------------------
|  Model : 6910, Requested = 6910
|  Switch: 4 * 8 ports
|        : sw1a, sw1b, sw2a, sw2b,
|  T3s   : 2
|        : t3b0, t3b1,
|  VEs   : 2
|        : v1a, v1b,
-----------------------------------
NO ERRORS FOUND!
Snapshot /var/opt/SUNWstade/DATA/Solution.golden saved!
Done.
```

FIGURE 2-1 Example Solution.golden file

```
#Solution Golden Snapshot
created=2002-02-08 00:32:40
created2=Fri Feb  8 00:32:40 MST 2002

model=6910

[device1]
type=ve
class=switch.ve
ip=90.0.0.20
ipno=90.0.0.20
name=diag244-v1a
wwn=2900006022004188
login=v1
initiator=I00001

[device2]
type=ve
class=switch.ve
ip=90.0.0.21
ipno=90.0.0.21
name=diag244-v1b
wwn=2900006022004193
login=v1
initiator=I00002


... <snip>


[device8]
type=t3
class=storage.t3
ip=90.0.0.41
ipno=90.0.0.41
name=diag244-t3b1
wwn=50020f23000068cc
wwn2=50020f2300004331
key=slr-mi.370-3990-01-e-f0.026828
ctrl_model=375-0084-02-JJ11
```

FIGURE 2-2 Solution.golden Snapshot

Starting the Storage Automated Diagnostic Environment

Once you have successfully installed the Storage Automated Diagnostic Environment, but before you start it, there are several tasks you must perform. These tasks include setting the environment variables, editing the .conf file, and manually running ras_install, and are explained in the following subsections.

▼ To Set the Environment Variables

After installing the Storage Automated Diagnostic Environment, you must set the environment variables `PATH` and `MANPATH` to include the Storage Automated Diagnostic Environment directories `/opt/SUNWstade/bin` and `/opt/SUNWstade/man`.

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

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

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

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

▼ To Edit the .conf Files

Typically, if you are using NIS, NIS+, or DNS, you can prevent potential problems with `ras_install` and the `inetd` services by editing the `/etc/nsswitch.conf` file, prior to running the `ras_install` script.

1. **While in the `nsswitch.conf` file in the `/etc` directory, reorder the entries for hosts and protocols to be `files nis`.**

   Depending on the complexity of your network setup, consider removing the `[NOTFOUND=RETURN]` message before the word `files` for all other entries.

2. **Update the `/etc/hosts` file to include valid entries for *each system* with which the Storage Automated Diagnostic Environment will communicate. This includes proper aliases as well.**

   For example, although `10.0.0.10 msp0` is acceptable with standard Ethernet systems, you can change one entry or all of the host entries, by updating the `/etc/hosts` file, to `10.0.0.10 msp0.domain.name.com msp0`.

Note – Use the `/etc/resolv.conf` file to find where `ras_install` is locating the domain name. You can determine if the domainname is an issue by reading the error messages or by looking in the `rasagent.conf` "hostname" field.

▼ To Run the `ras_install` Script

You must run `ras_install` manually upon completing the `pkgadd -d .`

Execute `ras_install` anytime after the initial execution and setup when you need to modify the `cron` or when you need to change the Master or Slave title of a Host agent.

▼ To Start the Storage Automated Diagnostic Environment Services

1. **Run ras_install.**

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

2. **Type M (master) to the following question:**

```
**** Installing the Storage Automated Diagnostic Environment Server and
Crons ****

? Are you installing a Master or a Slave Agent?
(Enter M=master or S=slave):M
```

Note – M = master is the default.

The `ras_install` script sets up the host as a master, establishes a Storage Automated Diagnostic Environment entry in `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.

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

3. **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` 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
```

The `cron` starts the `rasagent` program every five minutes. You can adjust the monitoring frequency if necessary, and periodically enable or disable the `cron` in order to execute the `rasagent` program.

Installing Distributed Agents (Slaves)

When a server satisfies all or only some of the host requirements to monitor specific storage devices, you can optionally install the Storage Automated Diagnostic Environment on multiple servers.

When you distribute the Storage Automated Diagnostic Environment over several systems, configure only one system to communicate with the providers. This way, the secondary agents send their findings to the primary host in the form of messages through the HTTP service activated on port 7654.

Prerequisites

To install a slave agent, you must know the IP address of the host to be configured as the master agent. If you have not yet installed the master agent, abort installation of the slave agent and install the Storage Automated Diagnostic Environment on the host to be configured as the master.

▼ To Set Up a Slave

1. **Run `ras_install` and type S (slave) in response to the following question:**

```
**** Installing the Storage Automated Diagnostic Environment Server and
Crons ****

? Are you installing a Master or a Slave Agent?
(Enter M=master or S=slave): S
```

2. **Enter the IP address of the master agent.**

Note – If this instance of the slave was previously configured with a master, the IP address or name of that master host is the default selection.

The Storage Automated Diagnostic Environment then verifies that the master host is reachable.

Upgrading or Removing SUNWstade

This section contains the following subsections:

▼ To Upgrade the Storage Automated Diagnostic Environment Package

1. **Remove the initial installation using the following command:**

```
# pkgrm SUNWstade
```

Removing the initial installation does not erase the previous configuration information. The cache and topology information of each device is also retained to maintain a consistent, historical view of the Sun StorEdge devices.

2. **Reinstall the package using the following command:**

```
# pkgadd -d .
```

3. **Run `ras_install` to enable the `cron` and to configure the agent as master or slave. Upgrade the Master first.**

▼ To Remove the SUNWstade Package

1. **Remove the initial installation using the following command:**

```
# pkgrm SUNWstade
```

2. **To completely remove the package for a clean install, remove the following directories once the `pkgrm` command has completed its run:**

```
# rm -f /var/opt/SUNWstade
# rm -f /opt/SUNWstade
```

The Storage Automated Diagnostic Environment Configuration File

The Storage Automated Diagnostic Environment configuration information is located in the file `/opt/SUNWstade/DATA/rasagent.conf`. Information such as site location, hosts, devices, and local notifications that you enter into the Storage Automated Diagnostic Environment graphical user interface (GUI) is stored in this file. The file remains on the system between upgrades so that previously-entered configuration information is not lost.

```
GSV_ACRONYM=SADE
GSV_DESC=Storage Automated Diagnostic Environment
GSV_NAME=Storage Automated Diagnostic Environment
GSV_PKG=SUNWstade
GSV_PKGDIR=SUNWstade
GSV_PORT=7654
active=N
admin_email=yourself@yoursite
categories=a5k|host|san|switch|t3|topo|
contract=87654321
cust_no=12345678
customer=Sun Microsystems
email=rasagent@nscc.central.sun.com
fc_frequency=0
frequency=10
gui_bandwidth=H
host_adapter=S
hostname=bradster.central.sun.com
local_event_log=Y
log_months=
logfile=/var/adm/messages
mailer=/usr/bin/mail
max_event_file_size=2

...
```

```
...

[device11]
active=Y
class=storage.t3
datahost=
host=crash3.central.sun.com
hostIpno=172.20.104.3
ip=172.20.104.9
ipno=172.20.104.9
key=. .
name=t3-104-9
type=t3
wwn=50020f2300000945
wwn2=50020f2300000dfe

[notification1]
device=*
email=brad.derolf@sun.com
event=*
priority=*
type=Email
```

Starting SUNWstade

Once 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 Storage Automated Diagnostic Environment functions. To maintain and tune the Storage Automated Diagnostic Environment, point the browser to the host with the master instance of Storage Automated Diagnostic Environment.

The following sections explain how to use the GUI functionality.

▼ To Start the Storage Automated Diagnostic Environment

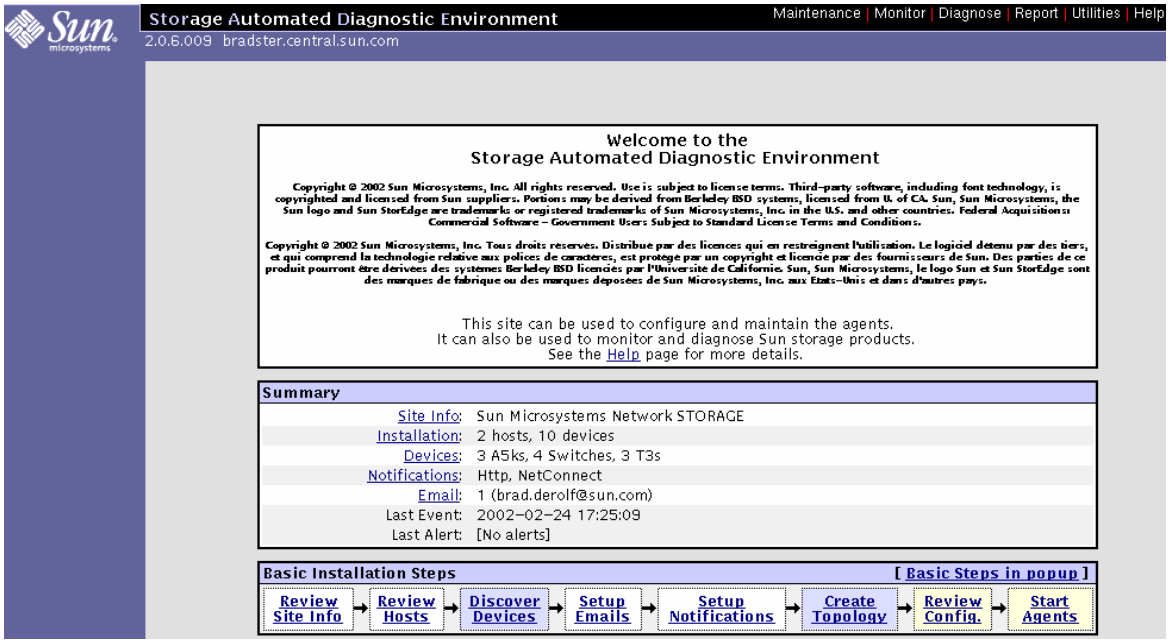
1. **Open a web browser and go to `http://hostname:7654`**

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

2. **Log in to the Storage Automated Diagnostic Environment by typing:**

   - Login: `ras`
   - Default password: `agent`

   The Storage Automated Diagnostic Environment administration page is displayed.



The Master Configuration window opens automatically the first time you initiate the GUI. The Master Configuration window can also appear if there are empty mandatory fields, which can occur after an upgrade.

Note – The Storage Automated Diagnostic Environment is always accessed on port 7654 of the *host* configured as the *master agent*. All of the agents communicate with one another through this port to synchronize their configurations.

Product Abbreviations

TABLE 2-1 contains a list of the trademarked Sun product names and the abbreviations used in the Storage Automated Diagnostic Environment.

TABLE 2-1 Product Names and Abbreviations

Trademarked Sun Product Name	Abbreviation
Sun StorEdge A5000 array	Sun A5000
Sun StorEdge A3500FC array	Sun A3500FC
Sun StorEdge T3 and T3+ array	Sun T3
FC-Tape	FC-Tape
Sun StorEdge network FC switch-8 and switch-16 switch	Sun Switch
Virtualization Engine	VE
Sun StorEdge 3900 and 6900 series	Sun 3900/6900

For readability purposes, some Sun products are referred to within the Storage Automated Diagnostic Environment GUI with the abbreviated name.

CHAPTER 3

Maintaining the Storage Automated Diagnostic Environment

The Maintenance chapter includes all the functions that are necessary for setting up the Storage Automated Diagnostic Environment for the first time or to make changes, as necessary, to ensure proper monitoring, notification, and diagnosis.

▼ To Access the Maintenance Window

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

   Maintenance is divided into two sections: General Maintenance and Topology Maintenance, as shown in FIGURE 3-1.

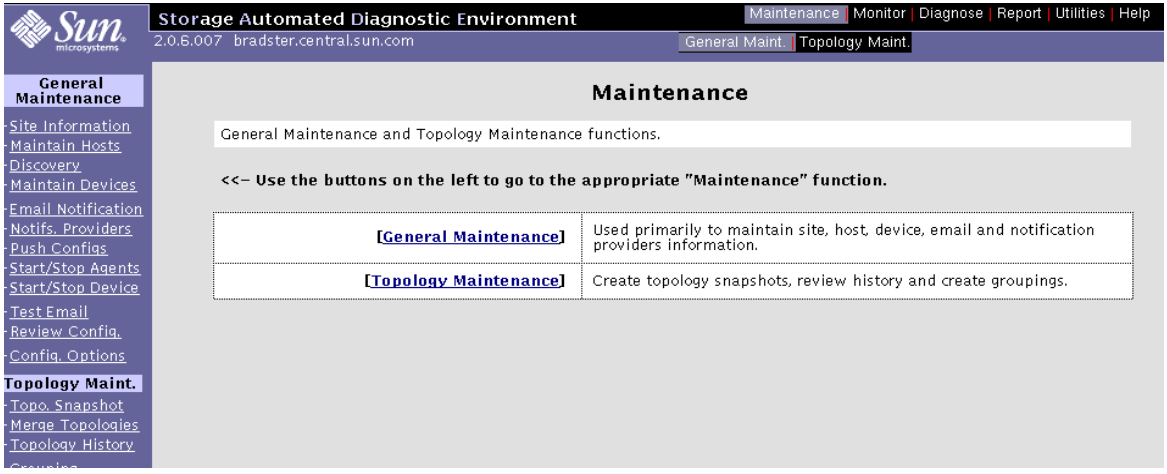


FIGURE 3-1 Maintenance Window

To configure the Storage Automated Diagnostic Environment, use the General Maintenance functions and the information found in TABLE 3-1.

Maintenance

Administration of all the Storage Automated Diagnostic Environment instances can be done from one centralized web GUI. This interface is always accessed on **port 7654** of the **host** configured with the **Master** Agent. All the agents communicate with one another through this same port to sync their configurations.

For these and all functions, additional information can be found in the Help section.

<<– Use the buttons on the left to go to the appropriate "Maintenance" function.

[Site Information]	Used to enter site information: address, contact name etc..
[Maintain Hosts]	Used to configure the selected hosts' instance of Storage Automated Diagnostic Environment to point to log files, device categories and execution frequency.
[Discovery]	Can be used to automatically and/or manually find devices physically attached to the host system or are accessible on the ethernet network.
[Maintain Devices]	Maintain information about specific devices (for both Masters and Slaves) that were manually or automatically discovered in a previous session and are configured to be monitored.
[Email Notification]	Optionally used to customize the generation of local only emails to the system admin or to other administrators and/or service personnel. Local notification does not affect the main transmission functions of the Storage Automated Diagnostic Environment Agent.
[Providers]	This selection determines the means by which the Storage Automated Diagnostic Environment Agent will relay events generated by the Health Monitors.
[Push Configs]	Has the same function as the *Push Slave Configs* in Maintain Hosts. Basically this will sync all slaves with the current configuration. There is no confirmation.
[Start/Stop Agent]	Can be used to temporarily stop the Storage Automated Diagnostic Environment Agent from executing for a selected host. In cases where maintenance is being done on a device, this function will aid in preventing false error Alert events.
[Start/Stop Devices]	Allows for deactivating notifications on a device–by–device basis.
[Test Email]	Generate a canned email message to an email address(es) entered in the field supplied in the window. Multiple addresses can be entered delimitted by either a comma or a space.
[Review Config]	Execute a query on the configuration and report the results and make available pointers to areas that require review.
[Config Options]	General configuration options

Note – Once you have configured the Storage Automated Diagnostic Environment Master and Slave hosts, you should use the Maintenance section only to update email notifications or to update the monitored devices.

TABLE 3-1 Maintenance Functions

Function	Description
Maintain Hosts	Ensures proper tracking of the RAS information for the devices being monitored.
Discovery	Enables the Storage Automated Diagnostic Environment to probe the in-band data paths of the Sun StorEdge A5000 arrays, Sun StorEdge A3500FC arrays, and Fibre Channel tape, as well as the out-of-band management paths for the Sun StorEdge T3 and T3+ arrays, the Sun StorEdge network FC switch-8 and switch-16 switches, and the Brocade Silkworm switches. **Note:** Agents on hosts with a T3 and T3+ message log file will automatically find only Sun StorEdge T3 and T3+ arrays that have made entries in that log file.
Maintain Devices	Enables the Storage Automated Diagnostic Environment to manually add devices or delete 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. This option can be fully customized to streamline notifications; for example, in addition to specifying email addresses, you can specify pager numbers.
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.
Push Configs	If you select this option, an update will occur, even when there is no information to be updated.
Start/Stop Agent	Enables the Storage Automated Diagnostic Environment to start or stop agents from executing. For a Slave agent, this disables monitoring of only those devices that the agent has been configured to monitor. If the Master agent is turned off, the Slaves continue to run. But, if any events occur, the configurations are not pushed to the Storage Automated Diagnostic Environment until the Master agent is restarted.

TABLE 3-1 Maintenance Functions

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. 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 in the Email Notification step.
Review Config	Enables the Storage Automated Diagnostic Environment to verify all settings and display instructions for those that have been missed or for those that should be double-checked.
Config Options	Returns the proper options, depending on the location and status of the device. Use this window to update existing configuration options.

General Maintenance

This following sections discuss the general maintenance functions that you can perform using the Storage Automated Diagnostic Environment:

▼ To Maintain Site Information

- **From the General Maintenance window, select Site Information. The fields on this page must be completed before you proceed. The fields with an asterisk (*) are mandatory.**

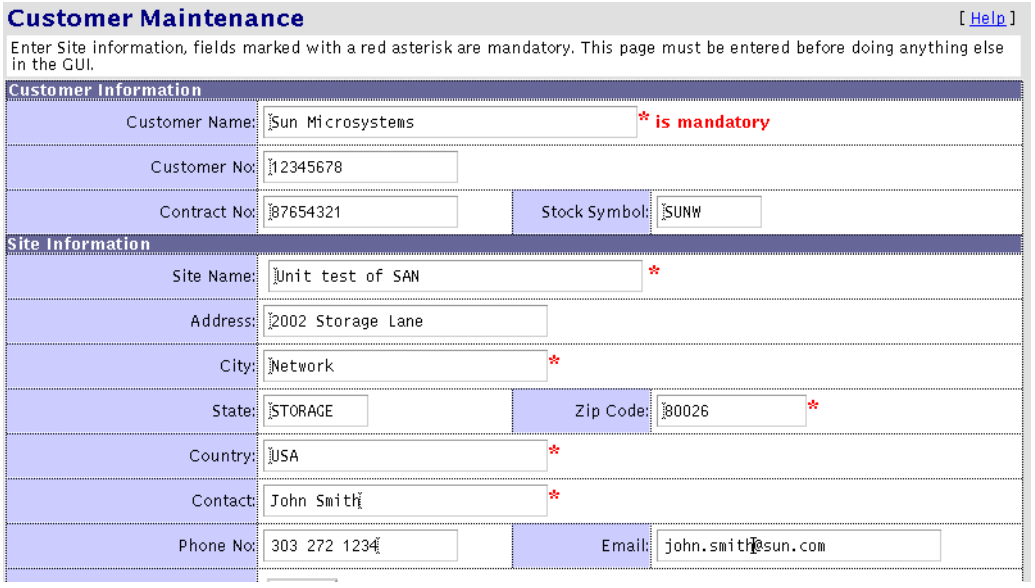


TABLE 3-3 describes the fields on the the Storage Automated Diagnostic Environment Maintain Site Information window.

Field	Action
Customer Name	Type your customer name.
Customer No.	Type your company's customer number.
Contract No.	Type your company's contract number.
Stock Ticket	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 Maintain Hosts

When the Storage Automated Diagnostic Environment package is installed on a host, it registers with the Master agent and an entry is added to this page.

The Maintain Host section contains the following subsections:

- "To Update the Master Configuration" on page 38
- "To Add a New Slave" on page 40
- "To Push Slave Configs" on page 43
- "Device Discovery" on page 43
- "To Set Up Sun StorEdge T3 and T3+ Array Message Monitoring" on page 46

Note – For this automatic registration to work, you must first install and run the Master agent. (A 'Y' will appear in the Active field of the Maintain Hosts window.) Once all hosts are installed, you can access this page to change the configuration of each host.

---

1. **Click the Maintenance link on the Storage Automated Diagnostic Environment main window.**
2. **Click the Maintain Hosts link on the Maintenance menu.**

The Maintain Hosts window is displayed.

TABLE 3-2 describes the fields on the Storage Automated Diagnostic Environment Maintain Hosts screen. The functionality is described in more detail in the following subsections.

TABLE 3-2 Maintain Hosts Button Descriptions

Button	Function
Add a new Slave	Use when the Storage Automated Diagnostic Environment Agent does not automatically register. This can occur if a previously installed instance is temporarily deleted from the configuration. Note that the Slave is not active if manually added.
Ping Slaves	Verify that the Storage Automated Diagnostic Environment at each Host is up and running. The Storage Automated Diagnostic Environment pings the Slaves and requests each Slave's HostID to verify that the Host is up and that the Storage Automated Diagnostic Environment service is available.
Push Slave Configs	Once all Slaves have been updated, you can push the new configurations by using this button. Each instance of the Storage Automated Diagnostic Environment has identical copies of the configuration file, but the administration of the Storage Automated Diagnostic Environment Slaves is done from the Master.

▼ To Update the Master Configuration

- **From the Maintain Hosts window, click an existing Host Name link and update the fields as required.**

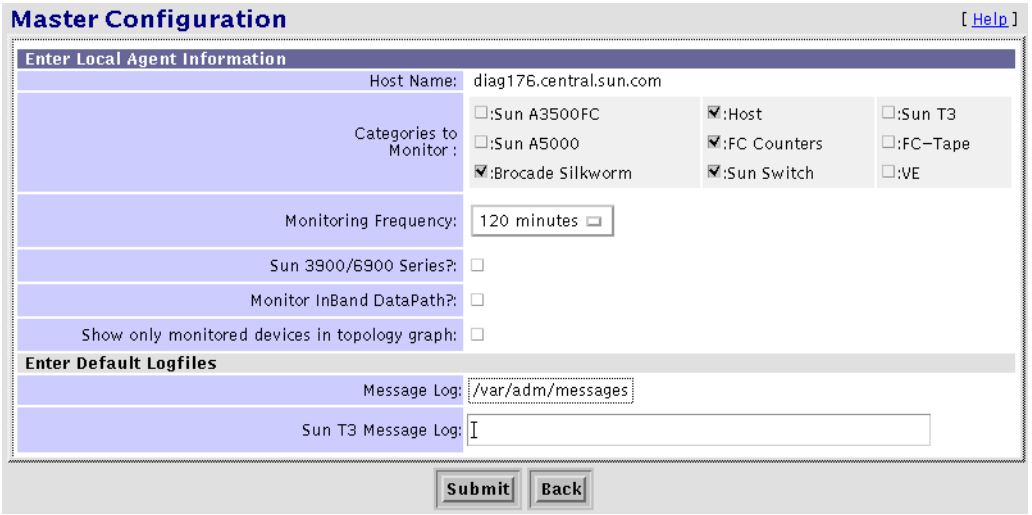


TABLE 3-3 describes the fields on the the Storage Automated Diagnostic Environment Master Configuration window that you can update.

TABLE 3-3 Master Configuration Update Fields

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. Categories from which to choose include: • Sun StorEdge A3500FC array • Sun StorEdge A5000 array • Host • FC Counters • Sun StorEdge network FC switch-8 and switch-16 switches • Brocade Silkworm switches • Sun StorEdge T3 and T3+ array • Fibre Channel Tape • Topology • Virtualization Engine
Monitoring Frequency	Select a variable between 5 and 120 minutes. This frequency variable affects how often the Storage Automated Diagnostic Environment executes. 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.
Sun StorEdge 3900 and 6900 series	Select the Sun StorEdge 3900 and 6900 series checkbox if you are installing the the Storage Automated Diagnostic Environment on the service processor of a Sun StorEdge 3900 or 6900 Series solution.
Monitor InBand Data Path	Select this checkbox to enable monitoring of the in-band data path.
Show Only Monitored Devices in Topology	Select this checkbox to show only the devices in the Monitor Devices menu. With this feature, once a device is manually deleted, it will not show in the Topology.
Message Log	The path for the message log (for example, `/var/adm/messages`), which displays the history of status messages.
Sun StorEdge T3 and T3+ array Message Log	Type the path for the host's Sun StorEdge T3 and T3+ array Message Log. The path should be to where the T3 logs are being sent. This field is used to tell the Storage Automated Discovery Environment where to look for the log files; it does not alter the location to where the Sun StorEdge T3 and T3+ array actually sends the log files. **Note:** You can check and verify the path by looking at the `/etc/syslog.conf` on the host.

▼ To Add a New Slave

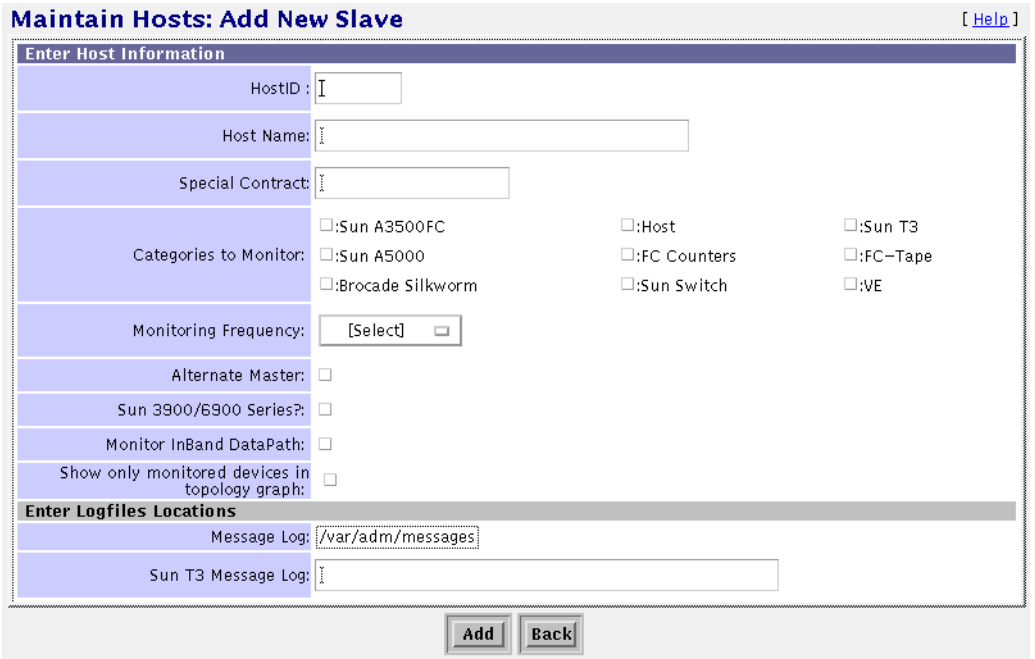
If an agent does not automatically register, you can add a new Slave manually.

To access the Maintain Hosts: Add New Slave window:

1. **Click the Maintenance link on the the Storage Automated Diagnostic Environment window.**
2. **Click the Maintain Hosts link on the Maintenance menu.**
3. **Click the Add a new Slave button.**

The Maintain Hosts: Add New Slave window is displayed.

Note – The Categories to Monitor choices indicate Sun Microsystems network storage devices that are supported with *this instance* of the Storage Automated Diagnostic Environment.



4. **Complete the fields using the descriptions shown in** TABLE 3-4**.**
5. **Click Add to add the new host.**

Caution – If the system you are adding as a Slave is currently a Master, the following message is displayed:

```
WARNING: System is currently configured as a Master. Please use
the Push Slave Configs section to change this system to a Slave.
```

6. **To automatically update the Slave's configurations and to verify that all Slaves agree with the Master configurations, click Push Slave Configs from the Maintenance menu.**

Notes:

- Enter an 8-digit HostID in the `/usr/sbin/hostid` directory. The Storage Automated Diagnostic Environment will not add a new Slave without it.

  If you do not know the HostID, you can enter a dummy number and later correct it. Note, however, that the HostID cannot match any other previously accepted HostID.

  The Host you add as a Slave must be accessible over the Ethernet from the Master and must, at a minimum, be able to respond to a ping.

- If you manually enter a Slave Host and no instance of the Storage Automated Diagnostic Environment is installed on that host, you must also manually enter the HostID for that Slave Host.

  Otherwise, the Categories to Monitor field will not have any devices selected and the Storage Automated Diagnostic Environment will not be active.

  The Active state will depend on the Slave configuration file (`rasagent.conf.push`) in the `/var/opt/SUNWstade/DATA` directory, and will also depend on whether the Active flag is set. If there is simply no Slave configuration file (for example, if the Host is a Master), the Active state will be set to OFF.

TABLE 3-4 describes the fields on the Maintain Hosts: Add New Slave window.

TABLE 3-4 Maintain Hosts: Add New Slave Fields

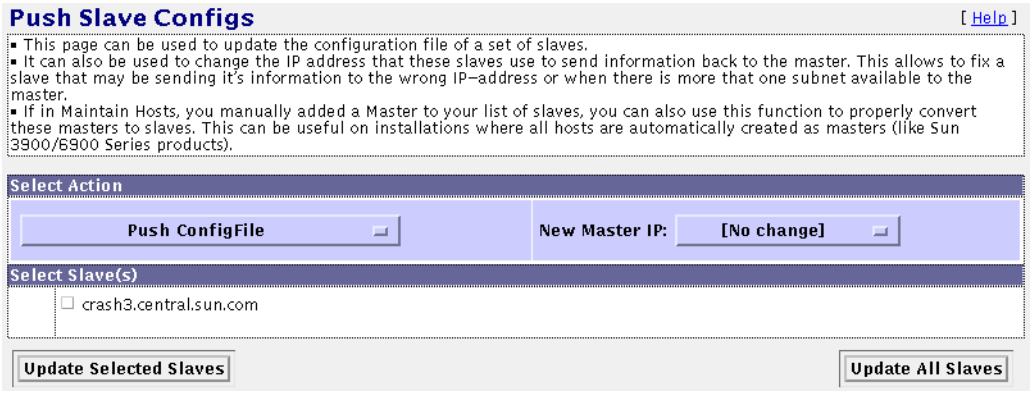
Field	Required Input
HostID	Type the 8-digit alphanumeric HostID, which is the same as the system ID (for example, `123x45y6`) in the `/usr/sbin/hostid` directory. You can use the `hostid` command on the Host to obtain a valid HostID. If the HostID is not available, you can enter a dummy number and later correct it. Note, however, that the HostID cannot match any other previously accepted HostID.
Host Name	Type the name of the Host (`hostname.domain`).
Categories to Monitor	Choose the device the Storage Automated Diagnostic Environment will monitor. The Categories to Monitor choices indicate Sun Microsystems Network Storage devices that are supported with *this instance* of the Storage Automated Diagnostic Environment.
Monitoring Frequency	Select a variable between 5 and 120 minutes. This frequency variable affects how frequently the Storage Automated Diagnostic Environment executes. The default is 5 minutes. **Note:** The `cron` continues to run every 5 minutes, but it checks this frequency setting before loading any modules.
Alternate Master	The Alternate Master checkbox will be enabled the first time you add a new Slave. For the Slave to be an alternate Master, you must disable this checkbox.
Sun StorEdge 3900 and 6900 series	Enable the Sun StorEdge 3900 and 6900 series button if the device or devices the Storage Automated Diagnostic Environment will monitor are part of a Sun StorEdge 3900 or 6900 series solution.
Message Log	The path for the message log (the default is `/var/adm/messages`), which displays the history of the status messages.
Sun StorEdge T3 and T3+ array Message Log	Type the path for the host's Sun StorEdge T3 and T3+ array Message Log. The path should be to where the Sun StorEdge T3 and T3+ array logs are being sent. This field is used to tell the Storage Automated Discovery Environment where to look for the log files; it does not alter the location to where the Sun StorEdge Sun StorEdge T3 and T3+ array actually sends the log files. **Note:** You can check and verify the path by looking at the `/etc/syslog.conf` on the host.
Monitor In-Band Data Path	Enable this button if you want to view devices on the topology of a Host that are accessible in-band by that host.

▼ To Push Slave Configs

1. **From the Maintain Hosts window, click Push Slave Configs.**

   The Push Slave Configs window is displayed.

2. **From the Action pulldown menu, select Change Master to Slave.**



3. **From the New Master IP pulldown menu, select the IP of the Master that will control the new Slave.**

4. **Click Update Selected Slaves.**

Device Discovery

You can request the Storage Automated Diagnostic Environment to probe the environments for the device types shown on the Device Discovery window. The Storage Automated Diagnostic Environment discovers storage devices in two ways:

- Merged host-centric discovery views
- Storage-centric topology

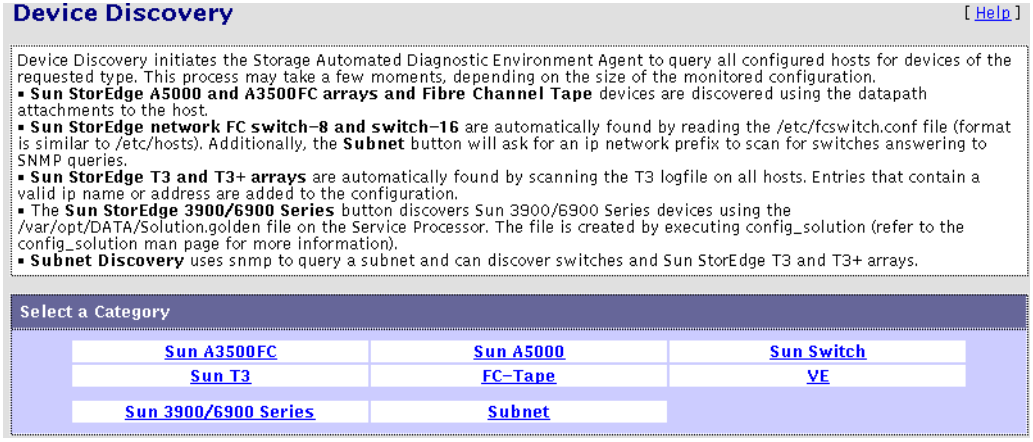
Note – A subnet discovery mechanism discovers Sun StorEdge T3 and T3+ array storage, virtualization devices, and switch devices for a particular subnet. For Sun StorEdge 3900 and 6900 series solutions, the Host's file validates the discovery results.

▼ To Access the Device Discovery Window

1. **Click the Maintenance link on the the Storage Automated Diagnostic Environment window.**

2. **Click the Discovery link on the Maintenance menu.**

   The Device Discovery window is displayed.



- The Storage Automated Diagnostic Environment discovers the Sun StorEdge A5000 arrays and Sun StorEdge A3500FC RAID controllers on the data paths of the Host to which they are physically attached.
- The Storage Automated Diagnostic Environment discovers the Sun StorEdge network FC switch-8 and switch-16 switch devices by means of `fc_addr` and by parsing the IP address from the `/etc/fcswitch.conf` file.
- The Storage Automated Diagnostic Environment discovers the Sun StorEdge Sun StorEdge T3 and T3+ arrays by filtering the Sun StorEdge T3 and T3+ array message log file (pre-configured in the Host configuration window) for valid Sun StorEdge T3 and T3+ array IP addresses.

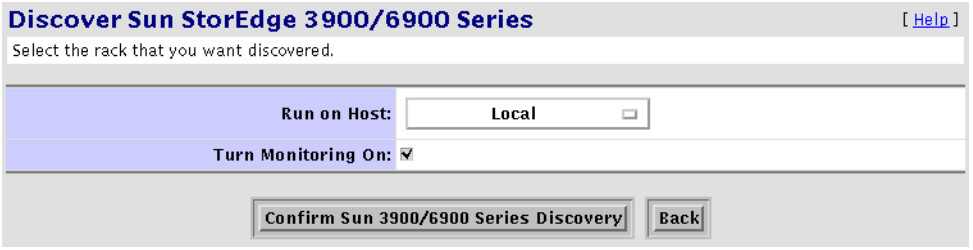
Note – As long as there are valid Sun StorEdge T3 and T3+ array entries in this log file, the *auto-discovery* will find them and add them. You can avoid adding older, unwanted Sun StorEdge T3 and T3+ arrays by rolling over the log file, much the same way the system log rolls over. Reference the scripts `/usr/lib/newsyslog` and `/etc/cron.d/logchecker`.

- In a cascaded switch-configured SAN, *only* the switch with the Host attachment (that is, the local switch) needs to be in the `/etc/fcswitch.conf` file. The Storage Automated Diagnostic Environment will discover the cascaded switch when the first switch is discovered.

▼ To Discover a Sun StorEdge 3900 or 6900 Series Cabinet

Sun StorEdge 3900 series storage systems for direct attach storage (DAS) environments and Sun StorEdge 6900 series storage systems for storage area network (SAN) environments are complete, preconfigured storage solutions. End users have only restricted accessibility to the internal components of the subsystems, but they do have full utilization of its storage functionality.

Use the Solution button on the Device Discovery window to instruct the Storage Automated Diagnostic Environment to query for a Sun StorEdge 3900 or 6900 series cabinet. This function uses the local `/etc/hosts` file for discovery on the service processor.



1. **Select the Host from the Run on Host pull-down menu.**
2. **Enable the Turn Monitoring On checkbox.**
3. **Click Confirm Sun StorEdge 3900 and 6900 series Discovery.**

Note – The Storage Automated Diagnostic Environment employs a direct Ethernet connection (out-of-band) to the Sun StorEdge T3 and T3+ arrays, virtualization engines, Sun StorEdge network FC switch-8 and switch-16 switch devices, and Brocade Silkworm switch devices.

You must manually add the Brocade Silkworms (refer to “To Manually Add a Device” on page 48), or search the LAN for a Brocade Silkworm device and then manually delete the device. Refer to “To Search the LAN for Sun StorEdge Devices Using the Subnet Button” on page 46 and “To Delete a Device” on page 52 for more information.

▼ To Search the LAN for Sun StorEdge Devices Using the Subnet Button

Use the Subnet button to search the LAN for Sun StorEdge network FC switch-8 and switch-16 switch devices, Brocade Silkworm devices, and Sun StorEdge T3 and T3+ arrays.

1. **Enter the IP address of the subnet you want searched.**
2. **Enter the Subnet prefix for the search.**

   The Subnet functionality will search the subnet for valid devices.

   The search results are sent back to the Master agent. The Master agent moves the recently discovered, valid devices that were previously in the subnet, into the main configuration file.

▼ To Set Up Sun StorEdge T3 and T3+ Array Message Monitoring

In order for the Storage Automated Diagnostic Environment software package to monitor messages from a Sun StorEdge T3 or T3+ array, you must mirror the Sun StorEdge T3 or T3+ array's `/syslog` to a Host with the Storage Automated Diagnostic Environment installed and configured to monitor Sun StorEdge T3 and T3+ arrays.

1. **Refer to the *Sun StorEdge T3 and T3+ Disk Array Installation, Operation, and Service Manual* for procedures on how to set up the Sun StorEdge T3 and T3+ array and the Host to forward `/syslog` messages.**
2. **Refer to the section "To Maintain Hosts" on page 36 to configure each Host with the name given to the Sun StorEdge T3 and T3+ array message log file.**

▼ To Maintain Devices

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

The Maintain Devices section is divided into the following subsections:

- "To Manually Add a Device" on page 48
- "To Update a Device" on page 51
- "To Delete a Device" on page 52
- "Renaming a Device" on page 52

Be aware of the host's access method when making decisions about which devices the Storage Automated Diagnostic Environment will monitor:

TABLE 3-5 Device Configuration

Device Monitoring Method	Inband or Out-of-Band?
Monitor *Sun StorEdge A3500-FC arrays* from a Host that has an attachment through the Fibre Channel cables and can run the Sun StorEdge RAID Manager commands.	Inband
Monitor *Sun StorEdge A5000 arrays* from the Host that has an attachment through the Fibre Channel cables.	Inband
Monitor the *Sun StorEdge network FC switch-8 and switch-16 switches* on any Host on the subnet, because the probing is done over the network.	Out-of-Band
Monitor the *Brocade Silkworm switches* on any host on the subnet, because the probing is done over the network.	Out-of-Band
Monitor *Sun StorEdge T3 and T3+ arrays* from the Host that has access to the Sun StorEdge T3 and T3+ array message log file and has an Ethernet connection on the subnet.	Inband and Out-of-Band
Monitor *Fibre Channel tape devices* from the Host that has an attachment through the Fibre Channel cables.	Inband
Monitor *Sun StorEdge 3900 and 6900 series cabinets* from the service processor, which has Ethernet connection to the Sun StorEdge T3 and T3+ array, the Sun StorEdge network FC switch-8 and switch-16 switches, and the virtualization engine.	Out-of-Band

Note – The Primary Host column lists the registered Host that does the actual probing of the device.

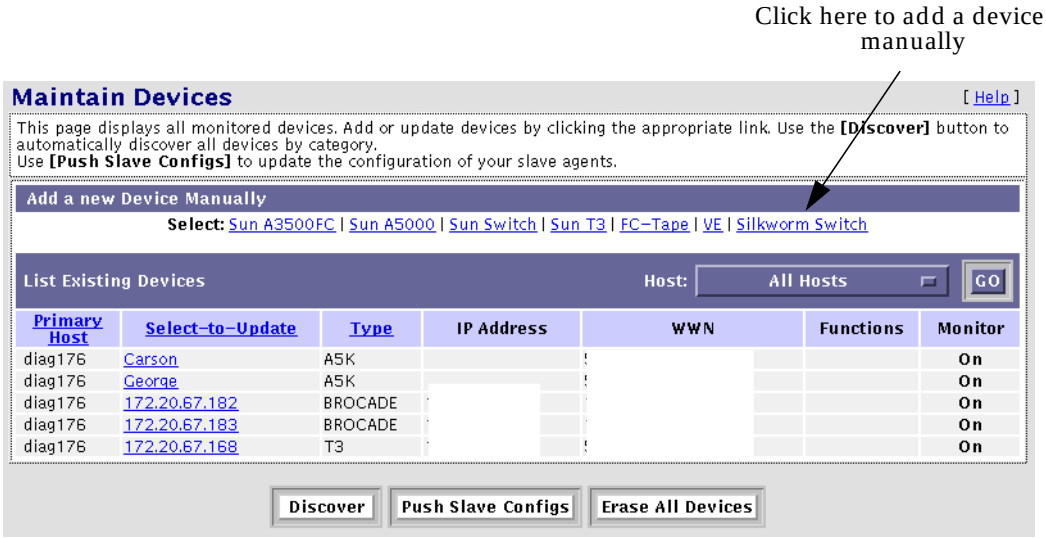
The buttons indicate Sun network storage devices that are supported with this instance of the Storage Automated Diagnostic Environment.

- You can discover Sun StorEdge A5000 arrays and Sun StorEdge A3500FC arrays using the Device Discovery function, which is accessible from the Discovery page or through the Maintain Devices window. See “Device Discovery” on page 43.

▼ To Manually Add a Device

1. **Click the Maintenance link on the the Storage Automated Diagnostic Environment main window.**
2. **Click the Maintain Devices link on the General Maintenance menu.**

   The Maintain Devices window is displayed.



3. **From the Add a new Device Manually section of the Maintain Devices window, select the type of device you want to add to the Storage Automated Diagnostic Environment.**

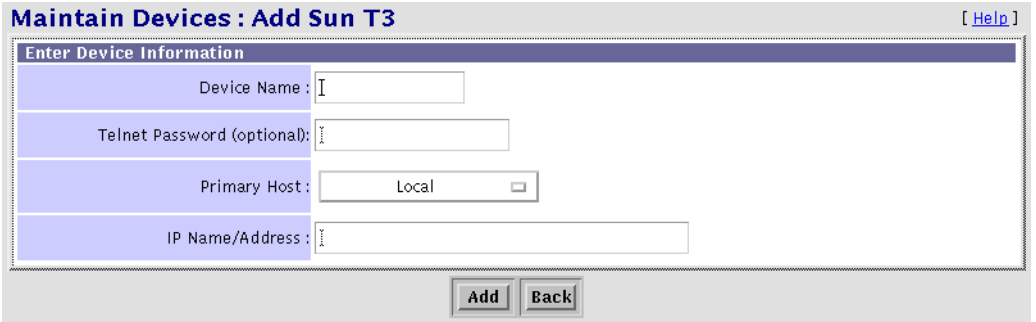


FIGURE 3-2 Adding a Sun StorEdge T3 and T3+ array manually

Complete the required fields using the descriptions shown in TABLE 3-6.

TABLE 3-6 Maintain Devices: Add a new Device Manually

Device	Required Input
Sun StorEdge A3500FC array	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	• Enter the serial number for the device.
	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
Sun StorEdge A5000 array	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
Sun StorEdge network FC switch-8 and switch-16 switches	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
	• Type the IP address that identifies the Host to the network.

TABLE 3-6 Maintain Devices: Add a new Device Manually

Device	Required Input
Brocade Silkworm switches	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
	• Type the IP address that identifies the Host to the network.
Sun StorEdge T3 and T3+ Array	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	• Type the optional telnet password, which enables the Storage Automated Diagnostic Environment to log into the Sun StorEdge T3 and T3+ array device. Note that the user is not authorized to *change* an existing Sun StorEdge T3 and T3+ array password.
	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
	• Type the IP address that identifies the Host to the network.
FC Tape	• Type the *device name* the Storage Automated Diagnostic Environment will use to identify the device.
	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
Virtualization Engine	• Select the Storage Automated Diagnostic Environment's *primary host* that will perform the actual monitoring of the device. **Note:** The default is the Host that automatically discovered the device.
	• Enable the Turn Monitoring On button.

Note – To obtain the device name for the Sun StorEdge A3500FC array, use the RM6 command `drvutil -l` *devName,* where *devName* is derived from the command `/usr/lib/osa/bin/lad`.

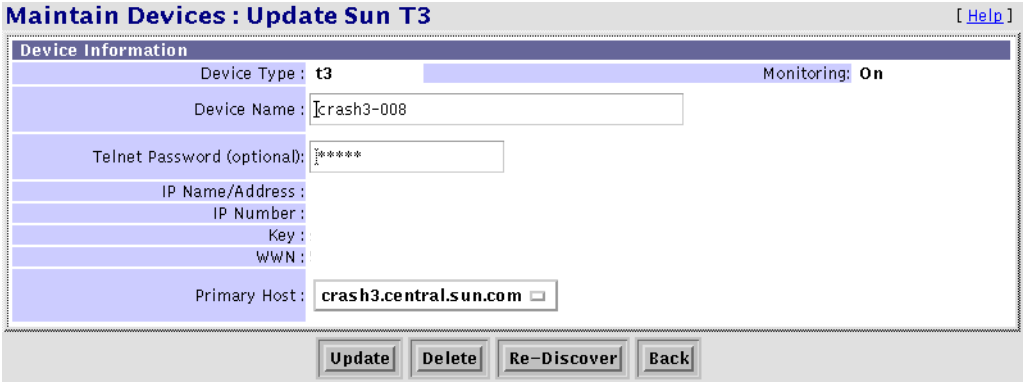
4. **Once your list is complete, click Push Slave Configs.**

   The Push Slave Configs functionality is required to update a Slave's configurations after you have added or updated one or more devices. Refer to "To Push Slave Configs" on page 43 for more information.

▼ To Update a Device

1. **From the Maintain Devices window, select the device you want to update from the name link under List Existing Devices.**
2. **Once you have corrected the necessary fields, click Update.**

Note – After you have added a device or updated a device, refresh the system by clicking Re-Discover.



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 (for example, if you change the chassis ID of a switch), you must *delete* that device using the functionality found in “To Delete a Device” on page 52.

The Storage Automated Diagnostic Environment displays a message stating that the previous device has been removed. The Storage Automated Diagnostic Environment topology will not, however, display the deleted device until you manually add and discover the device using the functionality found in “To Maintain Devices” on page 47.

▼ To Delete a Device

You can delete a device once the device has been removed from the site or if device monitoring is no longer needed.

Note – You can delete a Slave, but the only way to delete the Master is to remove the package, which is described in “To Remove the SUNWstade Package” on page 26.

---

1. **Click the Maintenance link on the Storage Automated Diagnostic Environment main window.**
2. **Click the Maintain Devices link on the Maintenance menu.**

   The Maintain Devices window is displayed.
3. **From the Maintain Devices window, select the device you want to delete from the Existing Devices list.**

   The Maintain Hosts: Update Host window is displayed.
4. **Click Delete.**

   Deleting a device from the configuration does not remove the access to the device instrumentation in the cache immediately. This will, however, be cleared the next time the agent runs. State information for that device is also maintained until the agent’s next run. Therefore, a 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 once again execute the Storage Automated Diagnostic Environment.

Renaming a 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, however, display the renamed device until you rediscover the device.

You can avoid this problem by manually adding the world wide name (WWN) into the Storage Automated Diagnostic Environment configuration file, which is located in the file `/var/opt/SUNWstade/DATA/rasagent.conf`.

Note – Unless you remove the SUNWstade directory or do a clean `ras_install`, 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 emails 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 T3 and T3+ arrays, you can create a specialized notification for this instance only.

This section is divided into the following subsections:

▼ To Set Up Local Email and Pager Notifications

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 provider.

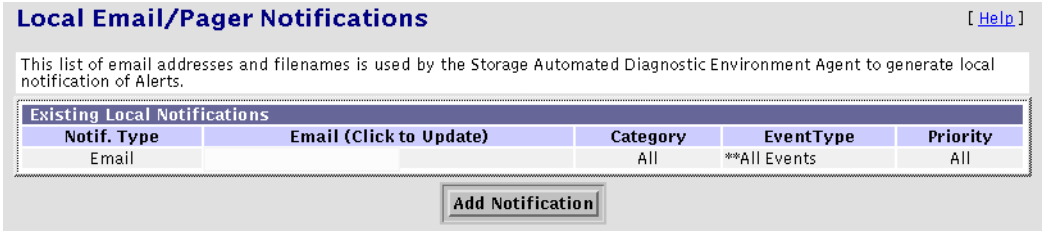


FIGURE 3-3 Local Email/Pager Notifications window

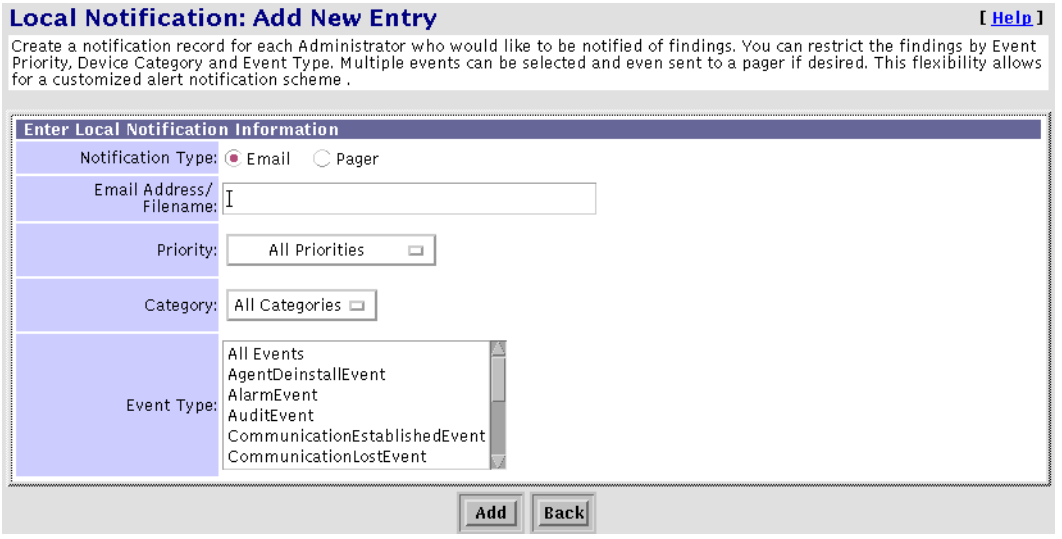
You can customize the following local notification information:

- Notification type
- Email address
- Category
- Event Type
- Priority

Note – The local email/pager notifications feature, shown in FIGURE 3-3, is optional and does not affect the main transmission functions of the Storage Automated Diagnostic Environment. The Master instance of the Storage Automated Diagnostic Environment is the only instance generating emails based on local notifications. Slave instances of the Storage Automated Diagnostic Environment send their alerts to the Master, which filters them and forwards them to the providers, if selected, and to local system administrators, if configured.

1. **Click an email link to update or delete an existing email address.**
2. **Click the Add Notification button to add new email addresses to the notification list.**

   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 (configured as Master) directly to local system administrators at the customer's site by email.



Note – Email may not be sent if the system is not properly configured to send mail to the recipient. This is primarily evident in service processor environments where the service processors are on a subnet and there is no gateway to the intended recipient. Please refer to the *Sun StorEdge 3900 and 6900 series Installation and Service Manual*, pn 816-3244-10 for more information.

▼ To Send a Customizable Subset of the Event-Driven Messages From the Host

1. **Enter one or more email addresses into the Email Address/Filename textbox.**
2. **For each address, choose from**:
   - The Priority list:

     0 = normal (green)—information only. This is the lowest priority.

     1 = warning (yellow)

     2 = error (red)

     3 = down (red)—the system is down. The is the highest priority.
   - The Category list—Select from the current suite of storage products that are monitored by the Storage Automated Diagnostic Environment.
   - The Event Type list—select from a list of event types, categorized by device type.
3. **Click Add.**

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

Using Providers

The Storage Automated Diagnostic Environment supports six providers: HTTP, NSM, NetConnect, SRS, SNMP Traps, and RSS. A provider's main function is to relay events generated by health monitors. The providers do this either by pulling the events from the Persistent Data Manager (PDM) or by registering them with the PDM for a certain type of event.

This section discusses the following provider function and providers:

▼ To Access the Notification Provider Maintenance Window

1. **Click the Maintenance link in the Storage Automated Diagnostic Environment main window.**
2. **Click the Providers link on the Maintenance menu.**

   The Notification Provider Maintenance window is displayed.

▼ To Set Up Providers

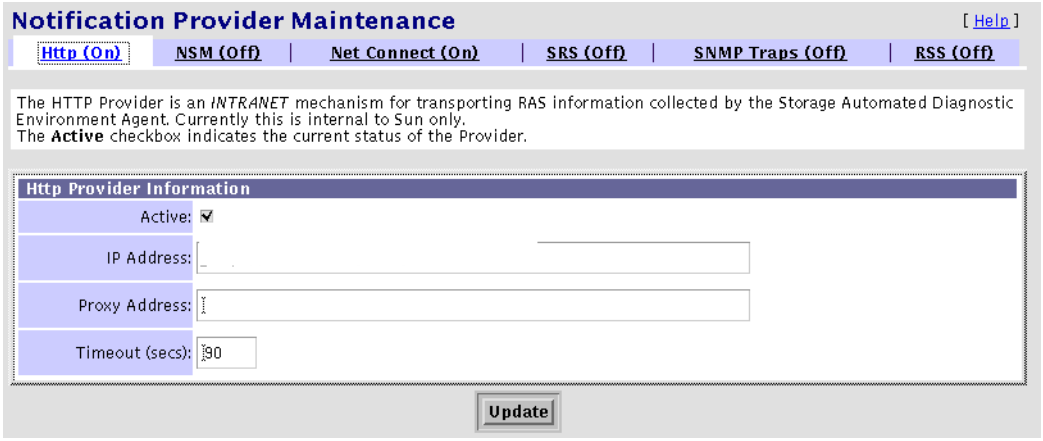
The Storage Automated Diagnostic Environment supports six providers. To set up one of these providers, complete the required fields shown in TABLE 3-7.

TABLE 3-7 Storage Automated Diagnostic Environment Providers

Provider	Required Action
HTTP	• Enable the Active checkbox. • Type the IP address that identifies the Host to the network. • Type the Proxy address. • Specify, in seconds, the duration of time before timeout is to occur.
NSM	• Enable the Active checkbox. • Type the IP address that identifies the Host to the network. • Type an optional timeout duration (in seconds). The default is 90 seconds. • Specify in which format you would like the information transmitted: Internal or XML.
NetConnect	• Enable the Active checkbox. • Type the maximum size, in Kbytes, of RAS information that the the Storage Automated Diagnostic Environment agent will collect and transport.
SRS	• Enable the Active checkbox. • Type the IP address of the SRS console. • Type an optional second IP address. A second IP address is allowed if events need to be sent to a second notification provider, which must also accept the SRS XML format.
SNMP Traps	• Enable the Active checkbox. • Type the IP name and address that identifies the Host to the network. You can provide information for up to five IP addresses. • Specify the port number. Default is 162. • Specify the minimum alert level: Warnings, Error, or Down.
RSS	• Enable the Active checkbox. • Select or deselect Use Proxy. The Proxy can be used when the modem is not set up.

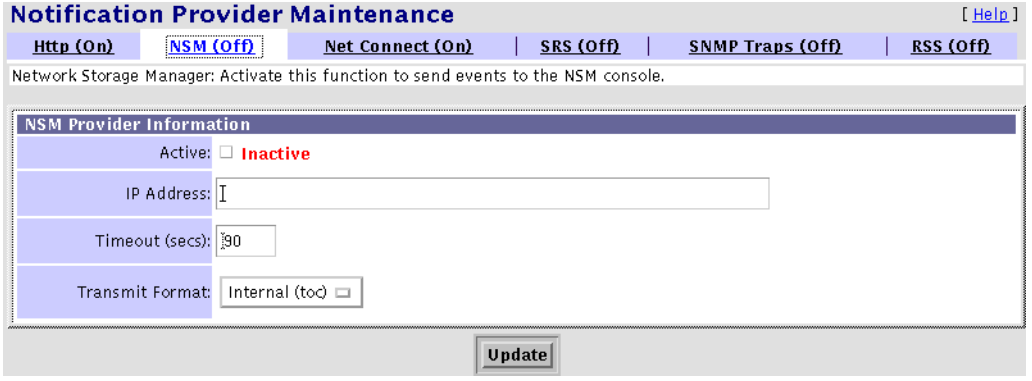
HTTP Provider

The HTTP Provider sends HTTP calls to an HTTP server and transfers CIM data in the appropriate format. This is an Intranet mechanism for transporting RAS information collected by the Storage Automated Diagnostic Environment Agent and is currently internal to Sun only.



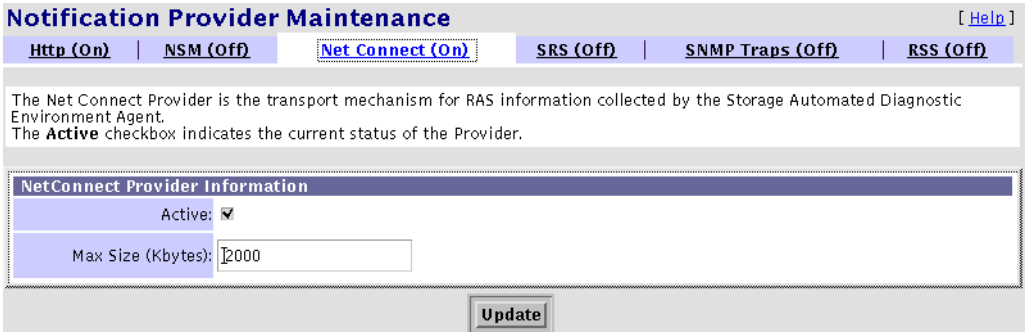
NSM Provider

The Network Storage Manager (NSM) provider sends Storage Automated Diagnostic Environment events to the NSM console.



NetConnect Provider

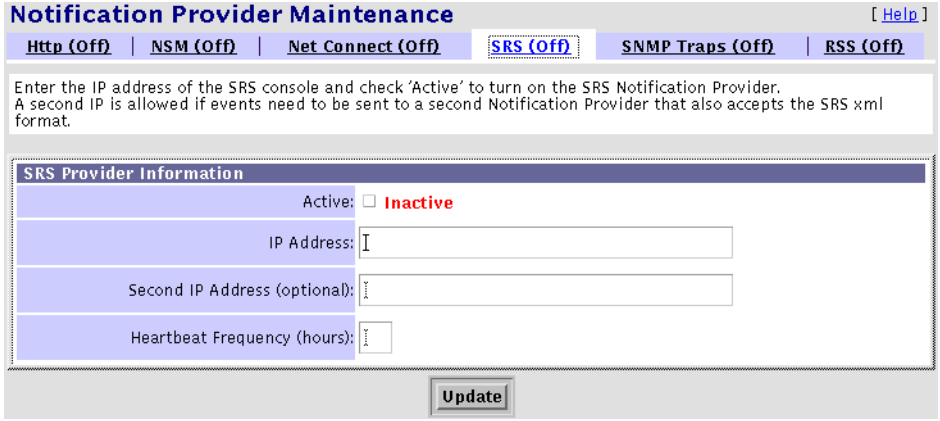
The NetConnect Provider is a common information model (CIM) provider, which is an independent program. It requests information from the PDM, converts the information to the appropriate format, and relays it to NetConnect.



Note – The Host with the Master agent must be the same Host that is configured as the relay in a NetConnect Provider configuration.

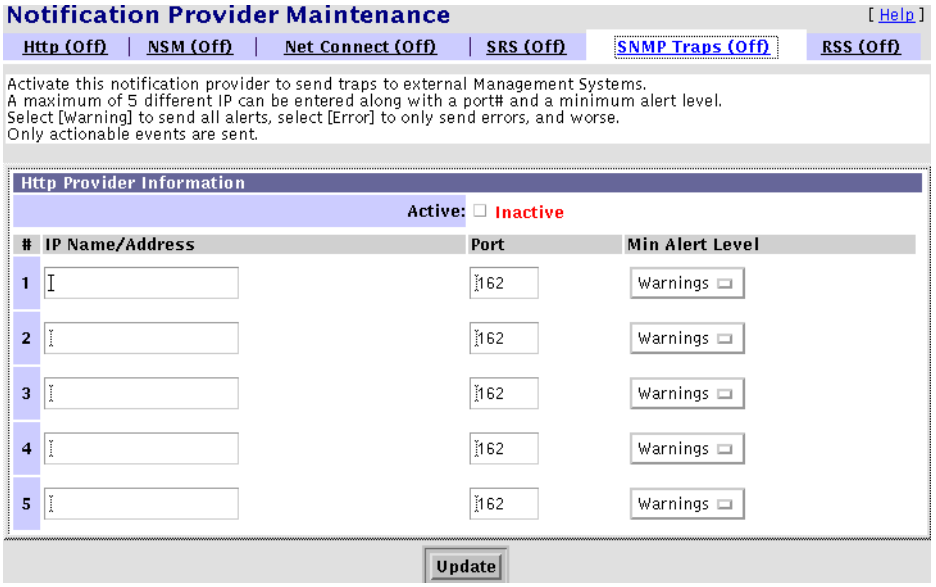
SRS Provider

The Sun Remote Services (SRS) Provider enables a second IP address, in case the events need to be sent to a second notification provider that also accepts the SRS xml format.



SNMP Traps

The SNMP Traps Provider enables the Storage Automated Diagnostic Environment to send traps for all actionable events that occur during monitoring, to external management systems.



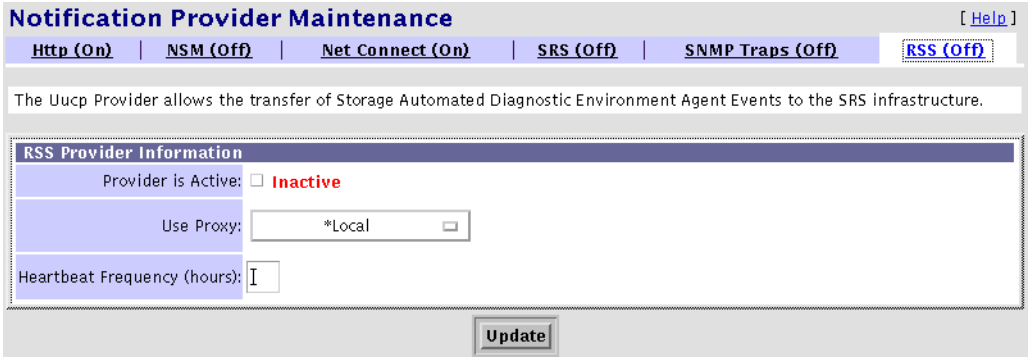
When an alert occurs, it is sent to the SNMP transport as an SNMP trap. An SNMP trap listener can use the `StorAgent.mib SNMP MIB` file, which is included in the SUNWstade package to decode these alerts.

The alerts contain the following information:

1. Storage Automated Diagnostic Environment Agent location
2. Storage Automated Diagnostic Environment device to which alert pertains
3. Alert level
4. Message content

RSS Provider

The Remote Support Service (RSS) Provider uses modem technology with the UNIX-to-UNIX Communication Protocol (UUCP). RSS software is required on the Host and is intended to access the modem. It must be configured accordingly.



The RSS software is delivered with the Service Processor software bundle. The intended audience for this software and for this provider are those customers who have purchased a remote support service offering and are supplying phone lines to make use of the modem phone home capability.

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

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

Push Configs

You will be prompted to push configurations whenever you change a configuration. Refer to “To Review the Configuration” on page 65 for a list of settings that you might have missed or you need to double-check.

Note – The Push Configs functionality, detailed in the section “To Push Slave Configs” on page 43, is very important. It synchronizes all Slave instances under a Master instance with the instances of the Master to ensure proper monitoring and notification.

▼ To Start or Stop Agent(s)

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*.

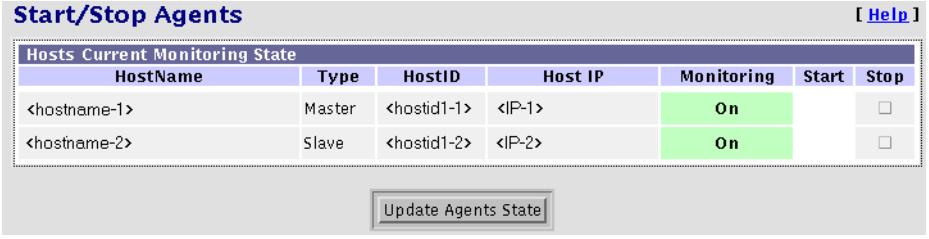
The subsections associated with controlling agent activity are as follows:

- "To Access the Start/Stop Agents Window" on page 62
- "To Deactivate Monitoring on a Device-by-Device Basis" on page 63

▼ To Access the Start/Stop Agents Window

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

   The Start/Stop Agents window is displayed.



Using the Start/Stop Agent(s) function to avoid creating email notifications on false errors works only if you are monitoring a *single* device type and all of the devices are monitored simultaneously, as in an upgrade.

To control email notifications for specific devices, refer to "To Deactivate Monitoring on a Device-by-Device Basis" on page 63.

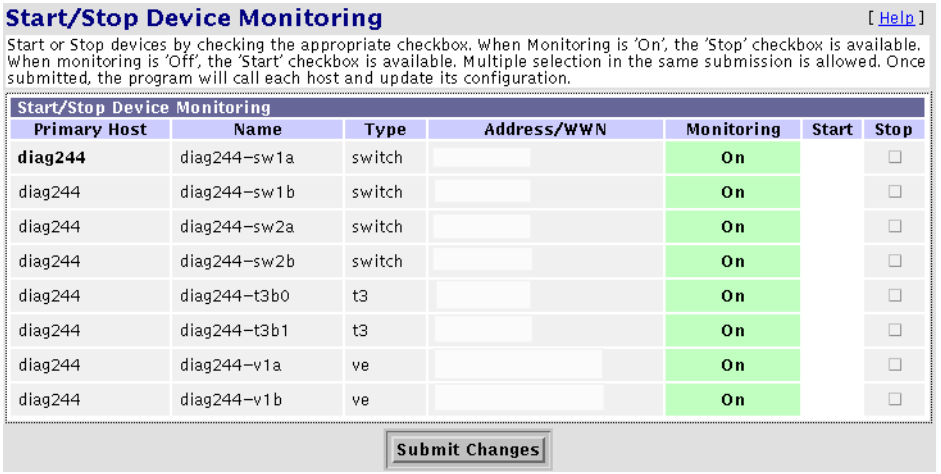
▼ To Deactivate Monitoring on a Device-by-Device Basis

To access the Start / Stop Device Monitoring window:

1. **Click the Maintenance link on the Storage Automated Diagnostic Environment main window.**

2. **Click the Start/Stop Devices link from the Maintenance menu.**

   The Start / Stop Device Monitoring window is displayed.



Start/Stop Device Monitoring [Help]

Start or Stop devices by checking the appropriate checkbox. When Monitoring is 'On', the 'Stop' checkbox is available. When monitoring is 'Off', the 'Start' checkbox is available. Multiple selection in the same submission is allowed. Once submitted, the program will call each host and update its configuration.

Start/Stop Device Monitoring

Primary Host	Name	Type	Address/WWN	Monitoring	Start	Stop
diag244	diag244-sw1a	switch		On		☐
diag244	diag244-sw1b	switch		On		☐
diag244	diag244-sw2a	switch		On		☐
diag244	diag244-sw2b	switch		On		☐
diag244	diag244-t3b0	t3		On		☐
diag244	diag244-t3b1	t3		On		☐
diag244	diag244-v1a	ve		On		☐
diag244	diag244-v1b	ve		On		☐

Submit Changes

3. **To start or stop devices, check the appropriate checkbox.**
   - When Monitoring is *on*, the “Stop” checkbox is available.
   - When Monitoring is *off*, the “Start” checkbox is available.

4. **Click Submit Changes.**

   The Storage Automated Diagnostic Environment must update the configuration files on all the Slave hosts configured with this Master. To accomplish this, use the Push Configs function on the Maintenance menu.

5. **If the device is being tested or if faults are being injected into the device intentionally, you can temporarily stop the local notifications for a specific device by using the Start/Stop Device Monitoring window.**

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

▼ To Send Test Email

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

▼ To Access the Test Email Window

1. **Click the Maintenance link in the Storage Automated Diagnostic Environment main window.**
2. **Click the Test Email link on the Maintenance menu.**

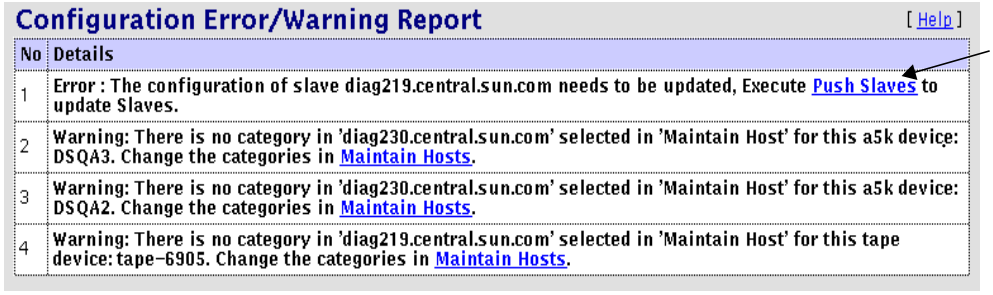
   The Test Email window is displayed.
3. **Type your email address into the Email Address textbox.**
4. **Type a brief comment into the Message textbox.**

   If you leave the Message text box blank, the test email contains a default message with the words *Test Message* in the subject line.

Note – If you place a carriage return in the Message field, you cannot enter text. To restart, click in the Message textbox and enter text.

▼ To Review the Configuration

1. **Once you have completed your configuration and you want to verify all settings, select the Review Configuration link on the Maintenance menu.**
2. **If necessary, follow the displayed instructions for settings that you might have missed or for those that you need to double-check.**



Configuration Error/Warning Report [Help]

No	Details
1	Error : The configuration of slave diag219.central.sun.com needs to be updated, Execute Push Slaves to update Slaves.
2	Warning: There is no category in 'diag230.central.sun.com' selected in 'Maintain Host' for this a5k device: DSQA3. Change the categories in Maintain Hosts.
3	Warning: There is no category in 'diag230.central.sun.com' selected in 'Maintain Host' for this a5k device: DSQA2. Change the categories in Maintain Hosts.
4	Warning: There is no category in 'diag219.central.sun.com' selected in 'Maintain Host' for this tape device: tape-6905. Change the categories in Maintain Hosts.

▼ To Change Configuration Options

The Configuration Options window, shown below, returns the options depending on the location and status of the storage device. Use the information in TABLE 3-8 to update existing configuration options.

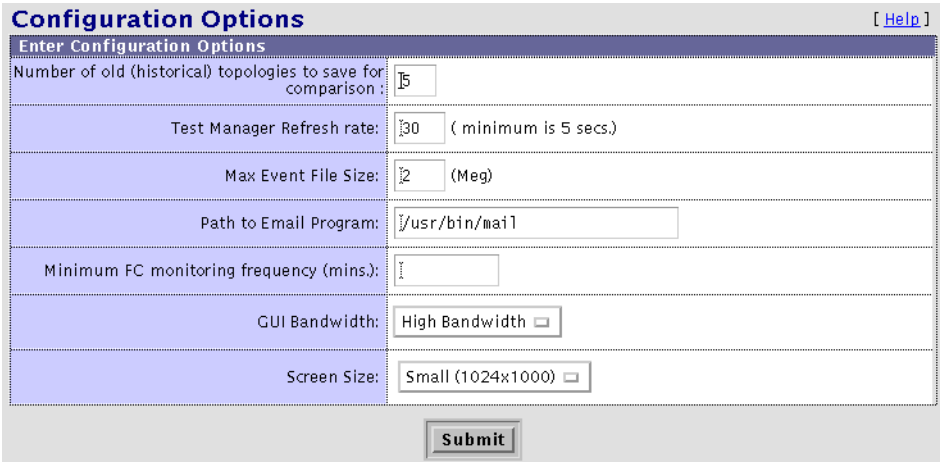


TABLE 3-8 Configuration Options

Configuration Option	Description
Number of old (historical) topologies to save for comparison	Type the number of topologies to save in Topology History for comparison.
Test Manager Refresh Rate	Specify the window refresh (re-load) rate, in seconds, for test output.
Max Event File Size	Specify, in megabytes, the maximum event file size. Used to limit data packet size to notification providers.
Path to Email Program	Use this field to change the local email program.
Minimum FC monitoring frequency (in minutes)	Use to configure FC counter monitoring rate (in minutes).
GUI Bandwidth	Specify the bandwidth for low and high speed local area network (LAN). The default is Low Bandwidth.
Screen Size	Use to configure the default GUI screen size.

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 HBAs, switch ports, storage controllers, and disks, along with more specialized components such as fans, batteries, power, and volumes.

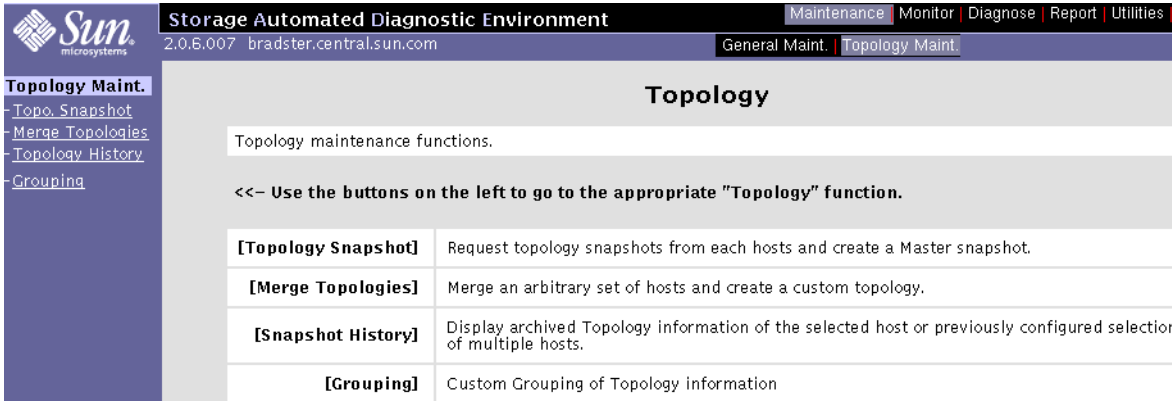
SAN agents collect counter information based on error messages and telemetry information. This information is then used in the topology drawing to indicate link failures.

This section includes the following SAN maintenance functions that you can perform using the Storage Automated Diagnostic Environment:

▼ To Access the Topology Window

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

   Maintenance is divided into two sections: General Maintenance and Topology Maintenance.



Note – In order to see a topology, you must first execute the `ras_install` command to start the Storage Automated Diagnostic Environment services.

▼ To Create a Topology Snapshot

Use this function to create and update the topology view from the Host or to review error details. When the individual Host topologies are updated, the merged topology views are also updated.

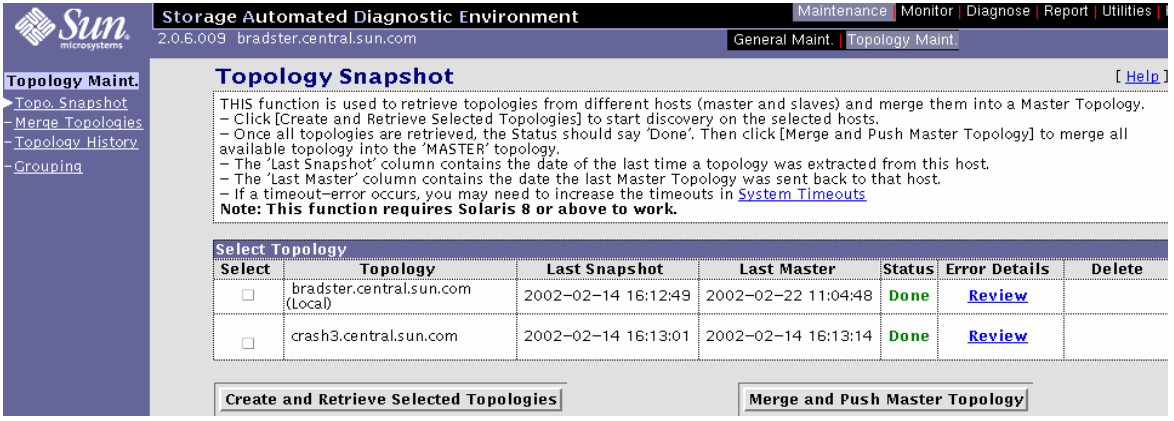
Note – This function requires Solaris 8 or later.

To view topologies in the Monitoring and Diagnostic windows, you must first create a snapshot.

Before you create a Topology snapshot, make sure there are no failed over Sun StorEdge T3 or T3+ array paths. If there are failed over Sun StorEdge T3 or T3+ array paths, the Topology view will not show the paths correctly.

1. **From the Topology Maintenance window, select Snapshot History.**

   The Topology Snapshot window is displayed.



2. **Retrieve the selected Master or Slave topology.**

3. **Once the individual Host snapshots have been retrieved, click Merge and Push Master Topology to synchronize the Master and Slaves.**

Note – Once the topology has been created, verify the Topology view.

▼ To Merge Topologies

A Master configuration topology includes the Master and all Slaves and is automatically generated.

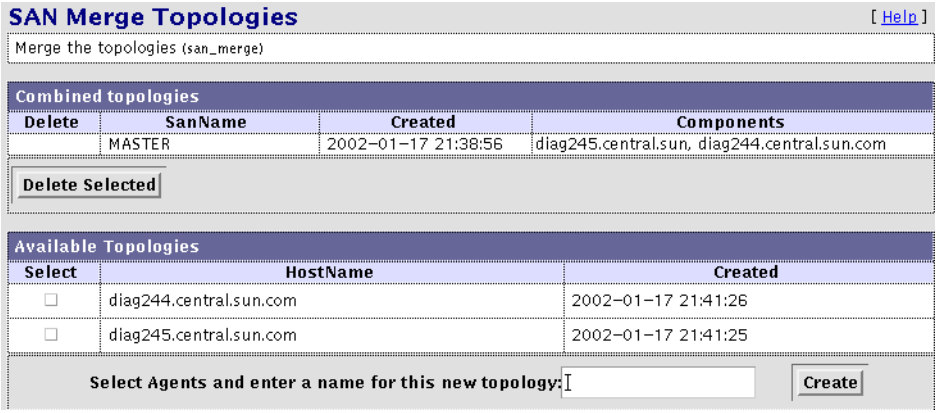
1. **From the Topology Maintenance window, select Merge Topologies.**

   The SAN Merge Topologies window is displayed.

2. **To create a combined (merged) topology, select two or more topologies and enable the corresponding Select checkboxes.**

3. **Enter a unique name for the merged topology. Click Create.**

   By merging topologies, multiple Host topology drawings are combined into a single Topology view.



4. **To delete a merged topology, select the topology from the Combined topologies section and click Delete Selected.**

Note – Topologies can be updated only by creating a new Topology snapshot, which overwrites the old snapshot.

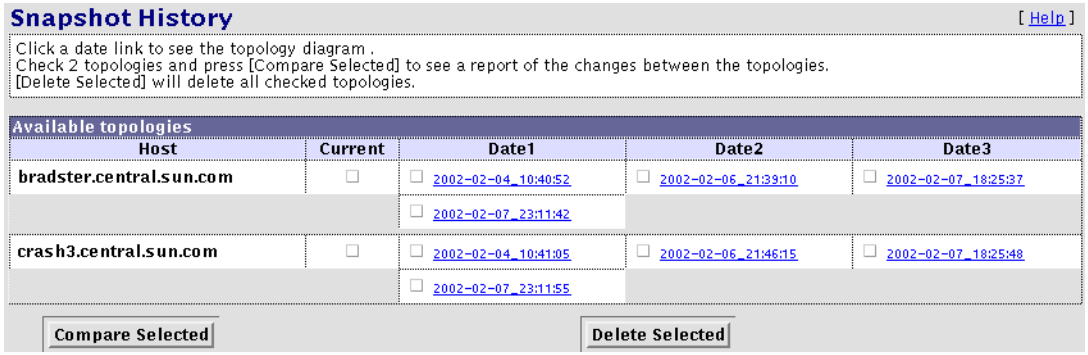
Merged topologies automatically incorporate new snapshots.

If you wish to delete a merged topology, use the SAN Merge Topologies functionality, not the Snapshot History functionality.

▼ To Display Topology History

With this 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, select Topology History.**



2. **To see a summary of the changes between two topologies, select two Hosts and enable the corresponding Current checkbox, then click Compare Selected. The Host must have at least two topologies to use the Compare Selected feature.**

3. **To delete a topology, select one or more Hosts and enable the corresponding Current checkbox, then click Delete Selected.**

4. **To view a previously stored Topology snapshot, double click the date link from the Date1, Date2, or Date3 columns. The oldest snapshot is displayed first.**

5. **To compare or delete previously stored Topology snapshots, click the corresponding checkbox on the Date1, Date2, or Date3 columns.**

   a. **To compare two or more previously stored snapshots, click Compare Selected.**

   b. **To delete one or more previously stored snapshots, click Delete Selected.**

Grouping

The Storage Automated Diagnostic Environment Topology Grouping function enables you to display multilevel topologies and to aggregate a large number of devices in a single view.

This section discusses the following functions that are associated with Topology grouping:

▼ To Create and Maintain Groups

1. **In the Grouping window, create a group name.**

   To create a new group name, you must specify a hostname or merged topology name, a group code, and a description. The name and code are arbitrary, but should be chosen to accurately reflect the top level. An example of this might be a campus name (Campus1 with a code of Building 1).

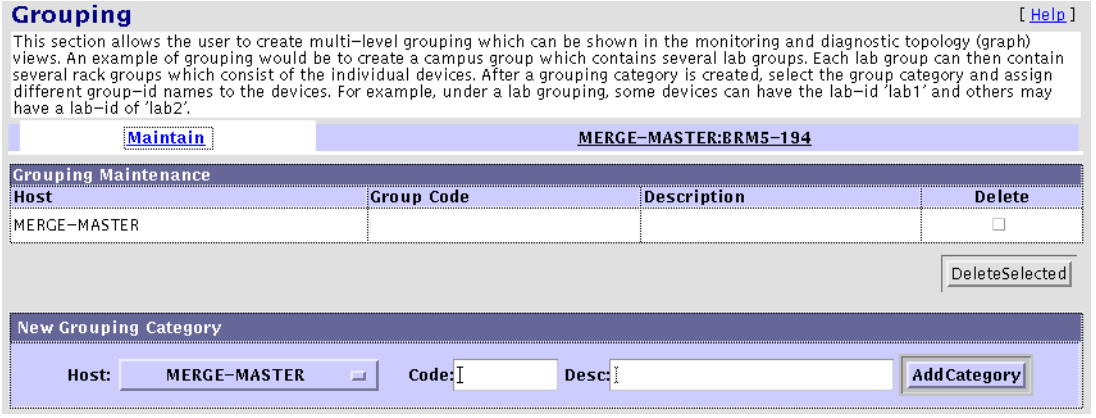


FIGURE 3-4 Storage Automated Diagnostic Environment Grouping window

2. **Click Add Category to add the group name.**

3. **Click the Merge Master link to create the new group.**

The Group Detail window is displayed, showing a list of all the devices contained in the Host or merged topology you chose, shown in FIGURE 3-5.

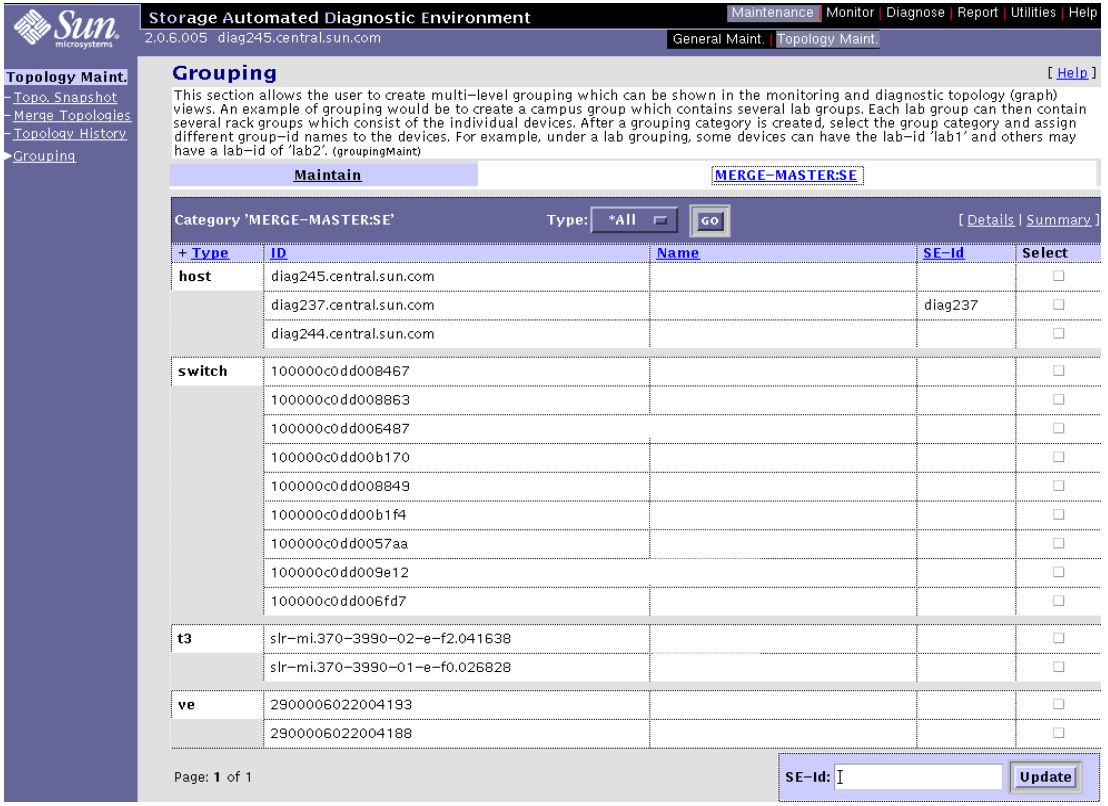


FIGURE 3-5 Group Detail window

▼ To Add Devices to a Particular Group

1. **Select the device's checkbox and select an ID for the group.**

   The Group ID enables multiple instances of similar objects. An example of this is rack1, rack2, rack3, and so on.

   You can also create subgroups by using the '.' notation in the Group-ID field. By using names such as lab1.rack1 and lab1.rack2, you create a lab1 group that contains two separate rack groups. The '.' notation enables multilevel grouping.

2. **To access the Group Summary window, select the Summary link.**

   This menu enables you to select the color and type of group icon that you want displayed. From this window, you can also add a description, which will appear next to the icon in the topology view.

3. **To delete a component from a group, clear the Description field of the component you want to delete, and click UpdateIDs.**

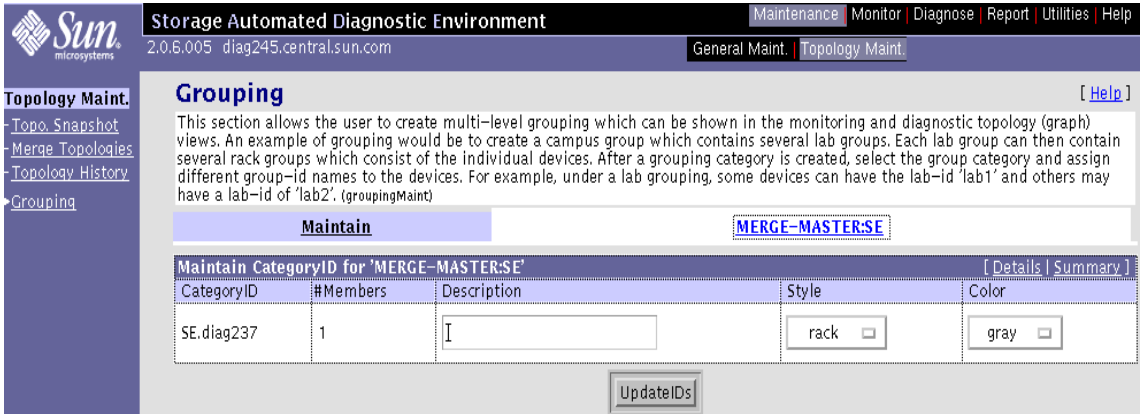


FIGURE 3-6 Grouping Summary window

CHAPTER 4

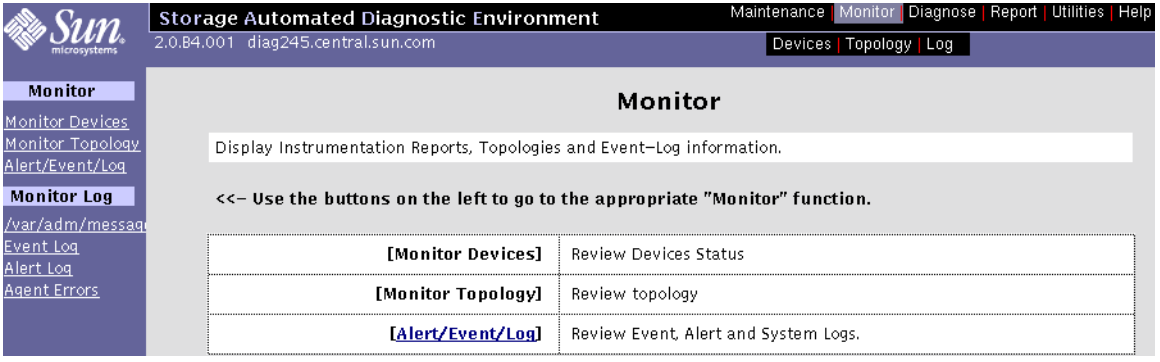
Monitoring

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

▼ To Access the Monitor Page

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

  The Monitor window is displayed.



Monitoring Devices

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

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 View Instrumentation Reports

1. **Click the Monitor Devices link on the Monitor main window.**

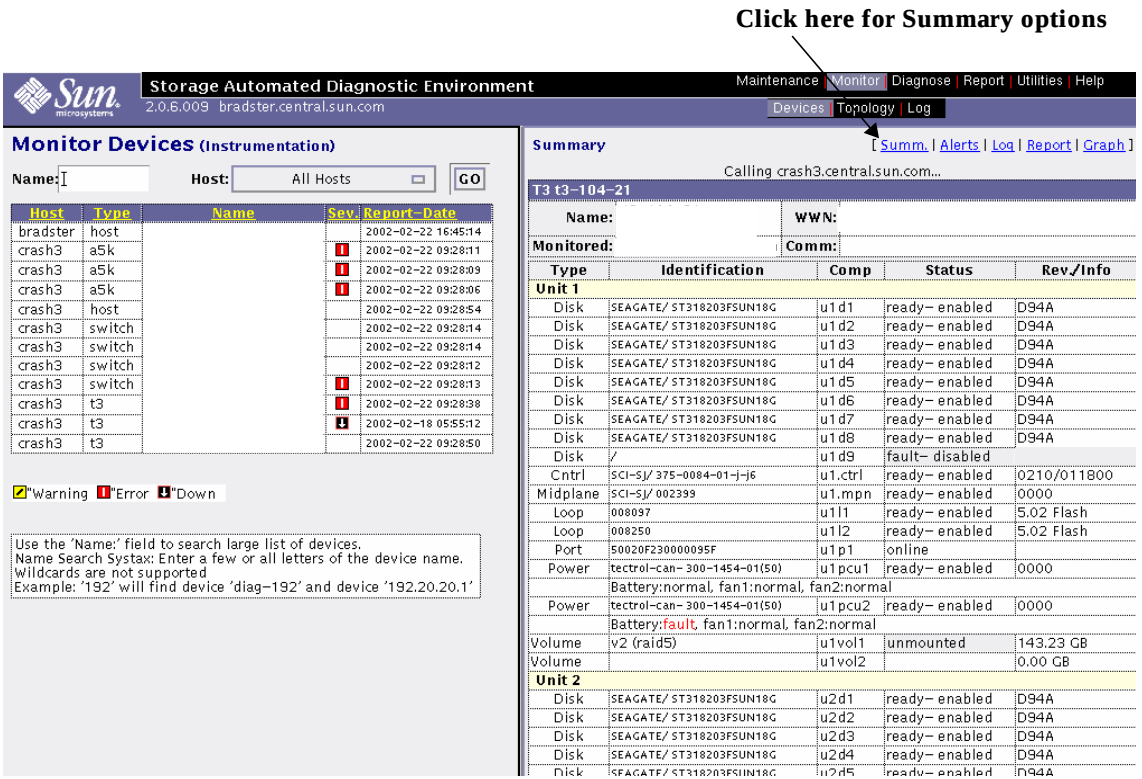


FIGURE 4-1 Monitor Devices (Instrumentation) window

2. **Enter at least a portion of the device name to display specific devices.**

3. **Choose a host from the Host pull-down menu and click GO.**

   A list of devices for that host appears.

4. **Click on a device from the Name column to view a list of all of the device's components.**

5. **Click on a component's corresponding Alerts, Log, Report, or Graph link, found in the right frame.**

   Information that is available from the Monitor Devices (Instrumentation) window follows:

Left Frame

- A list of all monitored devices
- The severity column, which shows current errors and warnings on a selected device. To access the Alerts page, drag your mouse over a severity button and left click the mouse button. The Alerts summary is displayed in the right frame.
- The report date on which alerts, logs, and summaries will be generated.

Right Frame

- A summary report about the selected device
- An alert state page showing any problem with the selected device
- A log page showing all events generated against the selected device
- A report page showing, in detail, all monitored attributes for the selected device
- A graph summary, displaying a summary of the component in graphical format

---

Note – You can also access the content of the right frame, using the Topology view, by right-clicking an icon and clicking Report.

Graph Summary

When you select Graph from the Monitor Devices window, the status of the component is displayed in graphical format.

Note – The Storage Automated Diagnostic Environment currently displays only the Sun StorEdge T3 array in the graphical view, as in FIGURE 4-2.

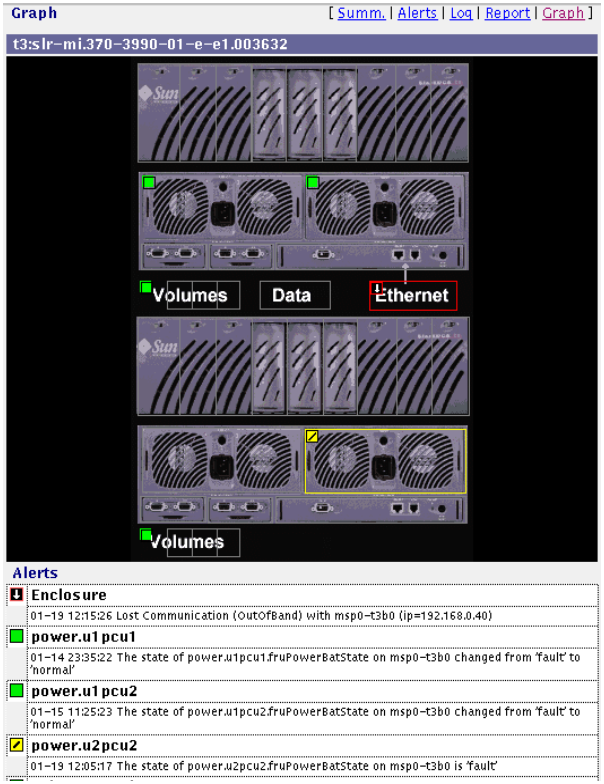


FIGURE 4-2 Sun StorEdge T3 Array Graph Summary and Component Alert List

Devices other than the Sun StorEdge T3 array do not display in graphical format, in which case the following message appears: `No Graph Available`!

The Alerts list, however, does appear with every device.

Monitoring Topology

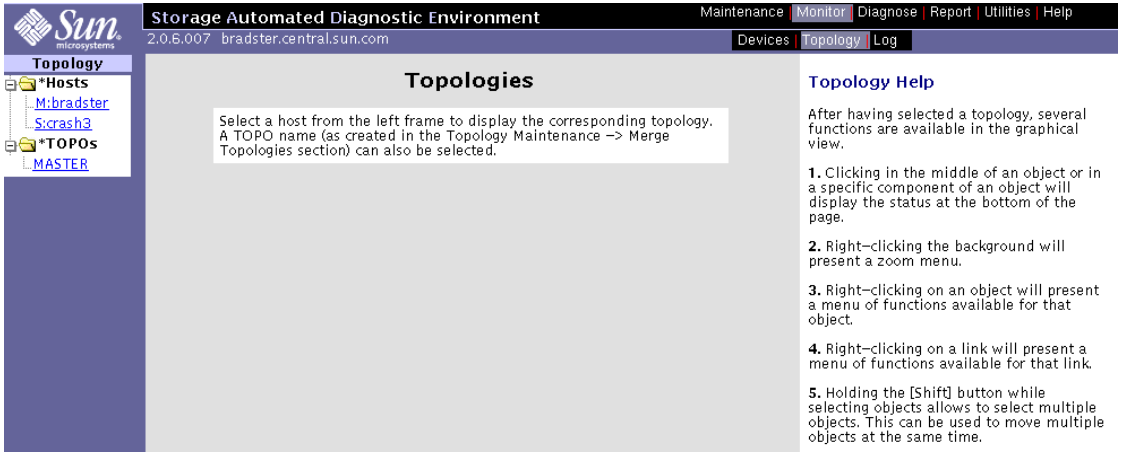
This section discusses Topology monitoring functions you can perform using the Storage Automated Diagnostic Environment.

▼ To Access the Topologies Page

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

   The Topologies window is displayed.

2. **Use the Topology section to display a host-based topology and SAN-based topologies.**



Topologies are created by merging multiple host topologies. Basic host topologies include all devices that can be seen, on the Fibre Channel connection, from that host, including host-centric and direct attached storage (DAS) topologies. These topologies can be merged to construct a SAN-based topology (those created by combining two or more topologies).

When you select a storage device or a merged topology, the index displays all host topologies that include that device.

Note – This function requires Solaris 8 or above.

▼ To Display Host-Based Topology

In order to see a topology, you must first do the following:

1. Execute the `ras_install` command to start the Storage Automated Diagnostic Environment services.
2. After device discovery, create a Topology snapshot. Refer to “To Create a Topology Snapshot” on page 68 for more information.

1. **Select Monitor Topology from the Monitor Menu.**

   The Topology menu appears.

2. **Using your left mouse button, select an individual host or a merged (Master) topology.**

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

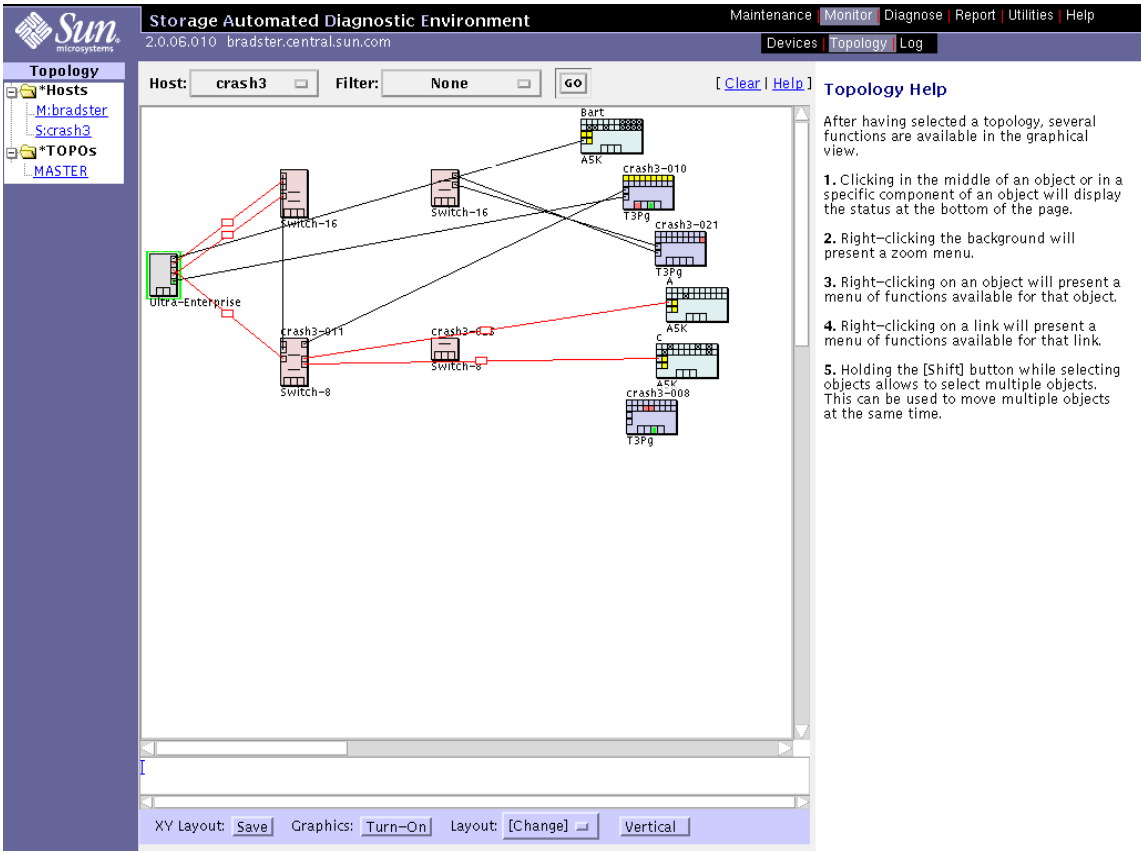


FIGURE 4-3 Sample Topology View

Note – Select the Clear link in the Topology view to accept all errors shown in the Topology. Once you have selected the Clear link, *all errors*, including RED errors in the 'bad' state, are removed from Topology.

Normally, you should not select the Clear link until all faults have been corrected.

Topology Feature Hints

- To narrow the size of the topology, select an address from the Filter pull down menu and click GO.
- To zoom in closer, right click on the screen's white space. You can zoom to 100%, 83%, 66%, or 50% by selecting the value with your left mouse button.
- To isolate a faulty power supply, right click on the enclosure, then right click on the report. An Alert log will display all alerts for the enclosure's power supplies separately.

Note – Some enclosures might have two power supplies but only one P box. In this case, the P box will turn red, yellow, or green if *either* power supply is faulty.

- To save the layout, click the save button next to XY Layout on the footer bar.
- To view actual illustrations of the devices vs. conceptual drawings of them, click the Turn Off button next to Graphics on the footer bar.
- To change the layout of the topology from default to Sun StorEdge 3900 or 6900 series Solutions rack, click [Change] next to Layout on the footer bar.
- To change the view from Horizontal to Vertical, click the Horizontal button on the footer bar.

Topology Help

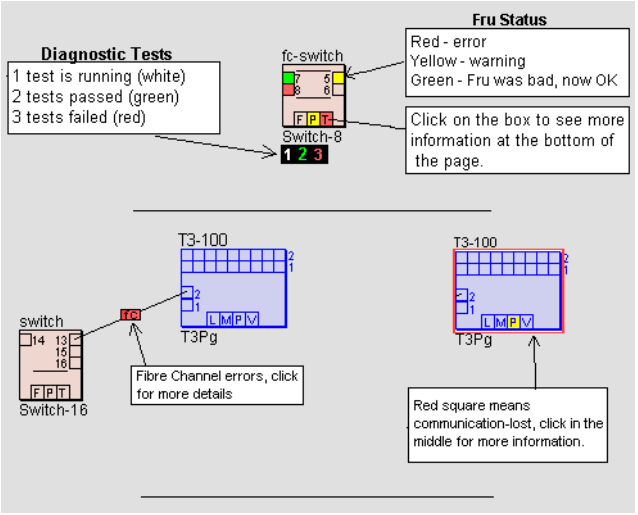


FIGURE 4-4 Topology Help

The icons shown in FIGURE 4-3 and FIGURE 4-4 symbolize the various storage devices that Storage Automated Diagnostic Environment monitors. Inside each storage device icon are boxes that represent:

- Disks inside the arrays
- Ports
- Other components

The “other” category includes a variable set of boxes that represent components of the enclosures that are monitored. See TABLE 4-1 for a description of ‘other’ components

TABLE 4-1 "Other" Components

Storage Device	'Other' Components Monitored
Sun StorEdge T3 and T3+ array	L=LUN, M=Midplane, P=Power, V=Volume
Sun StorEdge network FC switch-8 and switch-16 switch	F=Fan, P=Power, T=Temp
Sun StorEdge A5000 array	F=Fan, B=Backplane, P=Power
Sun StorEdge A3500FC array	L=LUN, B=Battery
Virtualization Engine	L=LUN
Host	O=Other, L=LUN

Note – 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 been discovered on this path.

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

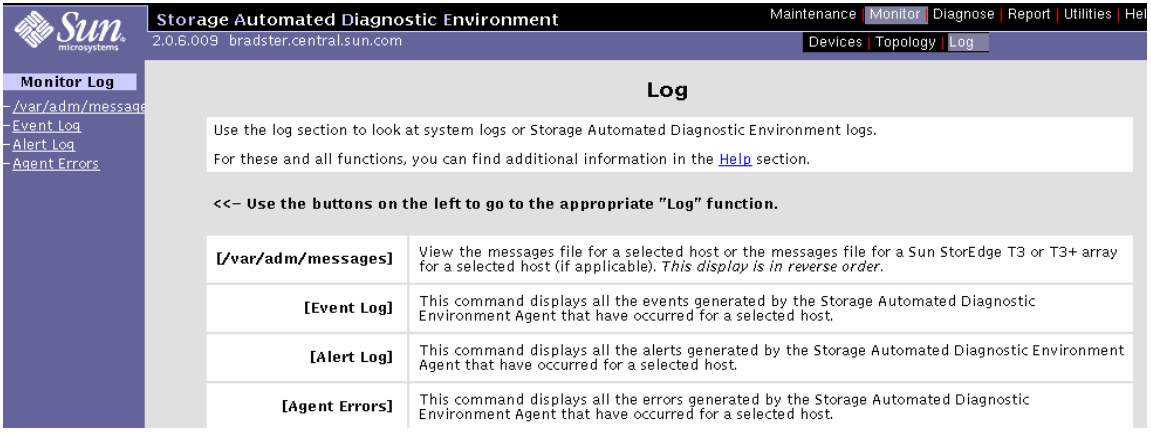
Monitoring Logs

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

▼ To Access the Log Page

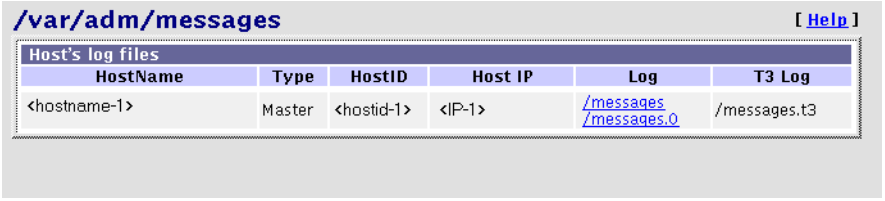
1. **Click the Monitor link on Storage Automated Diagnostic Environment main window.**
2. **Click the Log link.**

   The Log window is displayed.



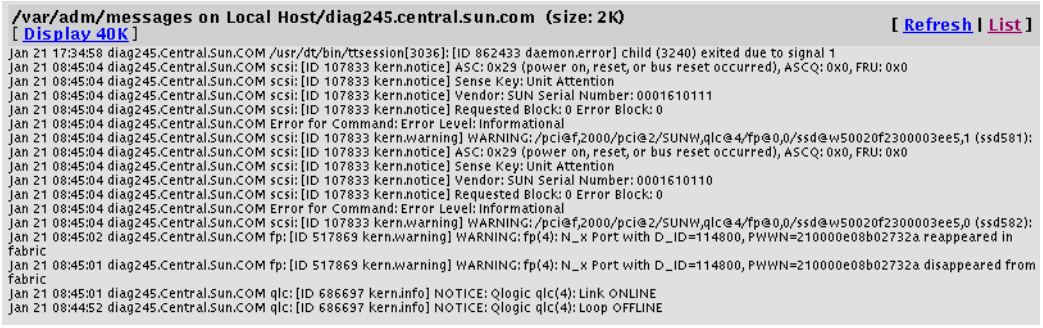
▼ To Review the Most Recent Entries on a Host

You can review the content of the `/var/adm/messages` and T3 and T3+ message log files from a host. Log entries are displayed from the end of the file going back; the most recent entries are shown first. The Storage Automated Diagnostic Environment must be functioning properly on each host for the `/var/adm/messages` function to work.



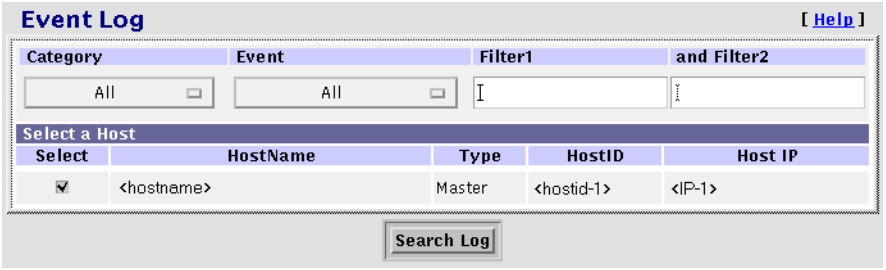
- **Choose a host from the HostName column and click the corresponding /messages link.**

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



▼ To View an Event Log for a Host

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



2. **To search for events on a given device type, choose the device from the Category pull-down menu.**

   All is the default.

   Pull-down menu options include Sun StorEdge T3 array Events, Sun StorEdge T3 array Message Events, Sun StorEdge A5000 array, Sun StorEdge A3500FC array, Sun StorEdge network FC switch-8 and switch-16 switch, Virtualization Engine, FC Tape, Agent, Message Events, Host Events, and Topology Events.

3. **Choose an Event from the Event pull-down menu.**

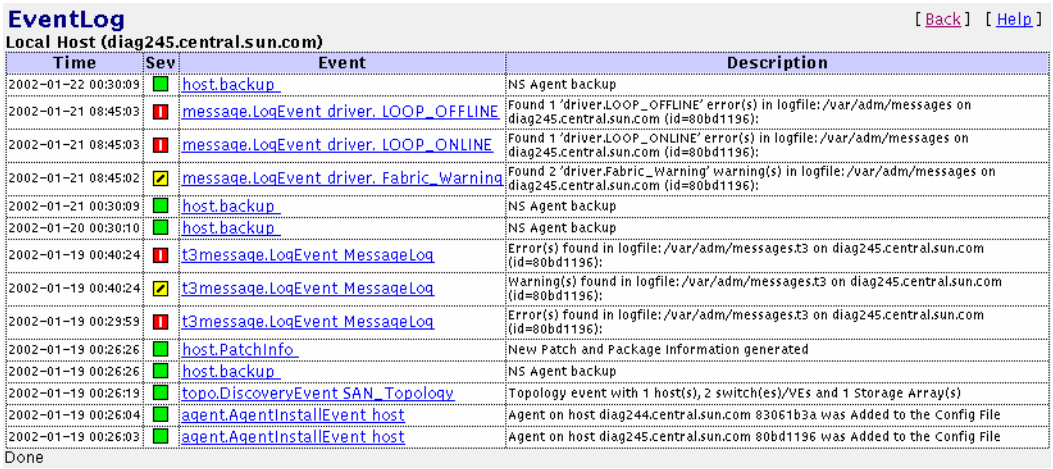
   All is the default.

   Pull-down menu options include Communication Events, Discovery, Alarm Event, Removal Event, Diagnostic Test, Topology Event, Audit Event, State Change Event, Agent Event, Backup Event, Patch Event, Link Event, Location Change Event, and Statistical Event.

4. **To narrow the size of the Event Log, type the IP address for which you want to view the Event Log into the Filter1 and/or Filter2 text box.**

5. **Select one or more HostNames and click Search Log.**

The corresponding event log window is displayed.



EventLog

[Back] [Help]

Local Host (diag245.central.sun.com)

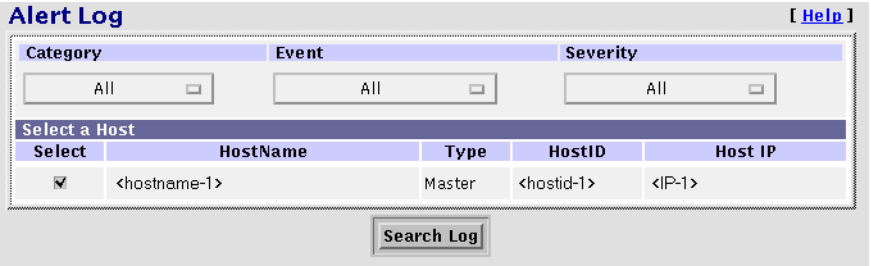
Time	Sev	Event	Description
2002-01-22 00:30:09		host.backup	NS Agent backup
2002-01-21 08:45:03		message.LogEvent driver. LOOP_OFFLINE	Found 1 'driver.LOOP_OFFLINE' error(s) in logfile: /var/adm/messages on diag245.central.sun.com (id=80bd1196):
2002-01-21 08:45:03		message.LogEvent driver. LOOP_ONLINE	Found 1 'driver.LOOP_ONLINE' error(s) in logfile: /var/adm/messages on diag245.central.sun.com (id=80bd1196):
2002-01-21 08:45:02		message.LogEvent driver. Fabric_Warning	Found 2 'driver.Fabric_Warning' warning(s) in logfile: /var/adm/messages on diag245.central.sun.com (id=80bd1196):
2002-01-21 00:30:09		host.backup	NS Agent backup
2002-01-20 00:30:10		host.backup	NS Agent backup
2002-01-19 00:40:24		t3message.LogEvent MessageLog	Error(s) found in logfile: /var/adm/messages.t3 on diag245.central.sun.com (id=80bd1196):
2002-01-19 00:40:24		t3message.LogEvent MessageLog	Warning(s) found in logfile: /var/adm/messages.t3 on diag245.central.sun.com (id=80bd1196):
2002-01-19 00:29:59		t3message.LogEvent MessageLog	Error(s) found in logfile: /var/adm/messages.t3 on diag245.central.sun.com (id=80bd1196):
2002-01-19 00:26:26		host.PatchInfo	New Patch and Package Information generated
2002-01-19 00:26:26		host.backup	NS Agent backup
2002-01-19 00:26:19		topo.DiscoveryEvent SAN_Topology	Topology event with 1 host(s), 2 switch(es)/VEs and 1 Storage Array(s)
2002-01-19 00:26:04		agent.AgentInstallEvent host	Agent on host diag244.central.sun.com 83061b3a was Added to the Config File
2002-01-19 00:26:03		agent.AgentInstallEvent host	Agent on host diag245.central.sun.com 80bd1196 was Added to the Config File

Done

FIGURE 4-5 Example of Event Log Messages on Local Host

▼ To View Alert Logs

1. **From the Monitoring Log window, select Alert Log.**



2. **Customize the report by using the following pull-down menus:**

   - Category—All is the default.

     The device types supported by the current Storage Automated Diagnostic Environment Agent version are displayed in the pull-down menu.

   - Event—All is the default.

     The Event types supported by the current Storage Automated Diagnostic Environment Agent version are displayed in the pull-down menu.

   - Severity—All is the default.

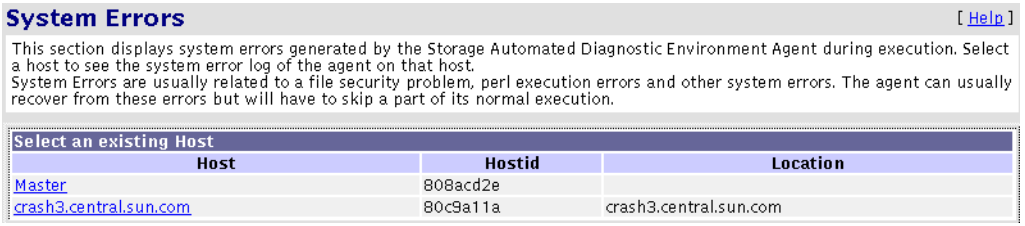
     Options that are displayed in the pull-down menu include System Down, Critical (Error), Alert (Warning), and Caution (Information).

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.

▼ To Display Agent Errors

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

1. **To access the Storage Automated Diagnostic Environment System Errors window, click Agent Errors on the Monitor Log window.**



2. **Select an existing host.**

The corresponding Storage Automated Diagnostic Environment Agent Error Logfiles window is displayed.

CHAPTER 5

Diagnostics

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 Interface Differences

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: • While in the Topology view, point to a device or Host and click the right mouse button. • Select a test from the Test from List window.
Command line	You run each test individually from a shell tool command line. Each test description in this book contains the corresponding command-line syntax. **Note:** You must log into the appropriate Host or Slave for testing.

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. All devices and paths must be quiesced prior to invocation of diagnostic tests.
- `a5ksestest` cannot be run concurrently with the `qlctest` or the `socaltest`.
- `qlctest` (which tests the Qlogic 2200 HBA) cannot be run concurrently with any child test (while any attached device is running).
- `Switchtest` can only run on one port on a single switch instance at a time.

Note – Any attempts to circumvent diagnostic test rules will cause pop-up warnings to be displayed.

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 all tests. Refer to TABLE 5-2 for details.

The standard syntax for all tests is as follows :

```
% testname [-scruvdtelnf] [-i number] [-w number][-o test-specific-arguments]
```

Standard Command-Line 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:

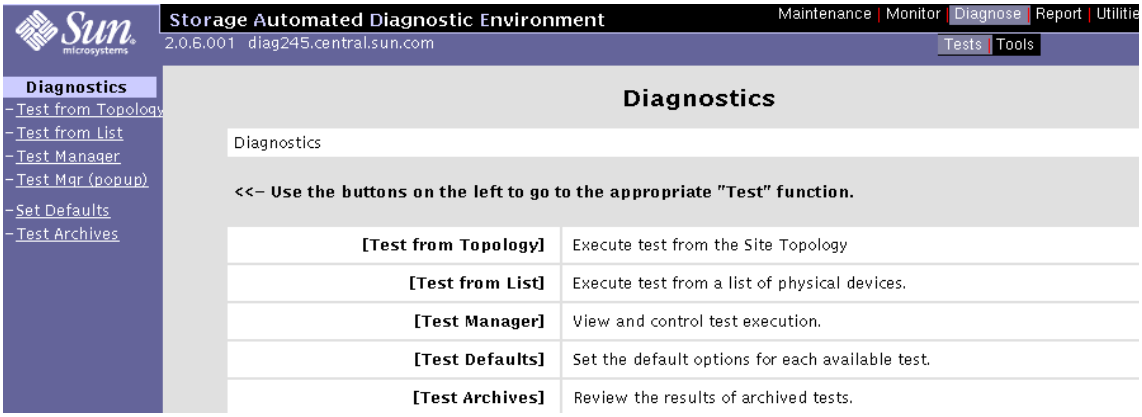
command_name `-o` “dev=*path* | ...”

Running Diagnostic Tests From the GUI Window

If you run the diagnostic test from the Storage Automated Diagnostic Environment main window, you can easily access test configuration, control, and results using the buttons in the dialog boxes. The test parameter options, however, are unique for each test and are illustrated in the individual sections with each test in this chapter.

▼ To Access the Diagnostic Tests

1. **Click the Diagnose link in the Storage Automated Diagnostic Environment main window.**
2. **Click the Test link in the Diagnose page.**



You can run Storage Automated Diagnostic Environment diagnostic tests from the test list or from a topology. The functional tests are designed to test the target FRU and operate on in-band or out-of-band data paths. The Storage Automated Diagnostic Environment will cause the test to be run on the appropriate Host.

Note – You can invoke the Link Test by right-clicking on the link displayed in the topology; however, the Link Test functionality is not available by using the Test from List functionality.

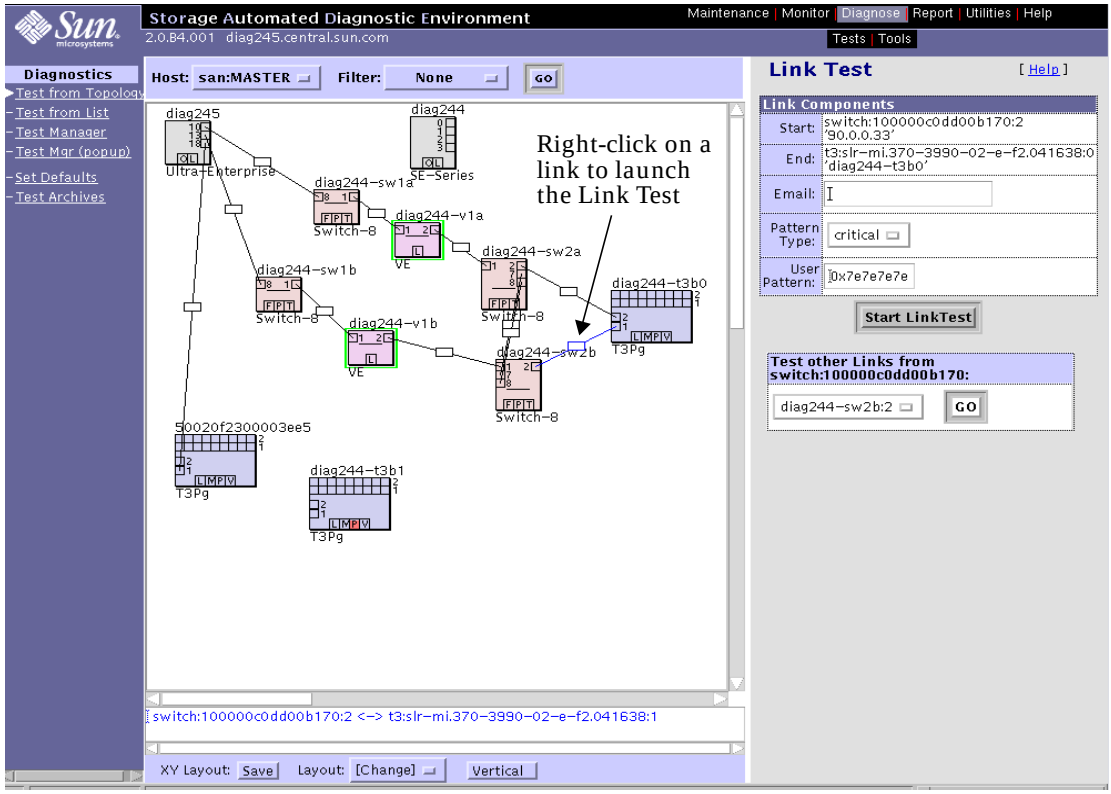


FIGURE 5-1 Link Test

While the Link Test is running, you can access Test Manager to view the status of the test.

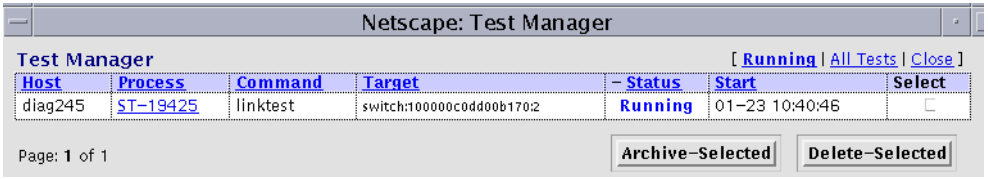


FIGURE 5-2 Link Test Running in Test Manager

Once the test has completed its run, an email message, similar to the following message, will be sent to the Email recipient that was specified in Link Test.

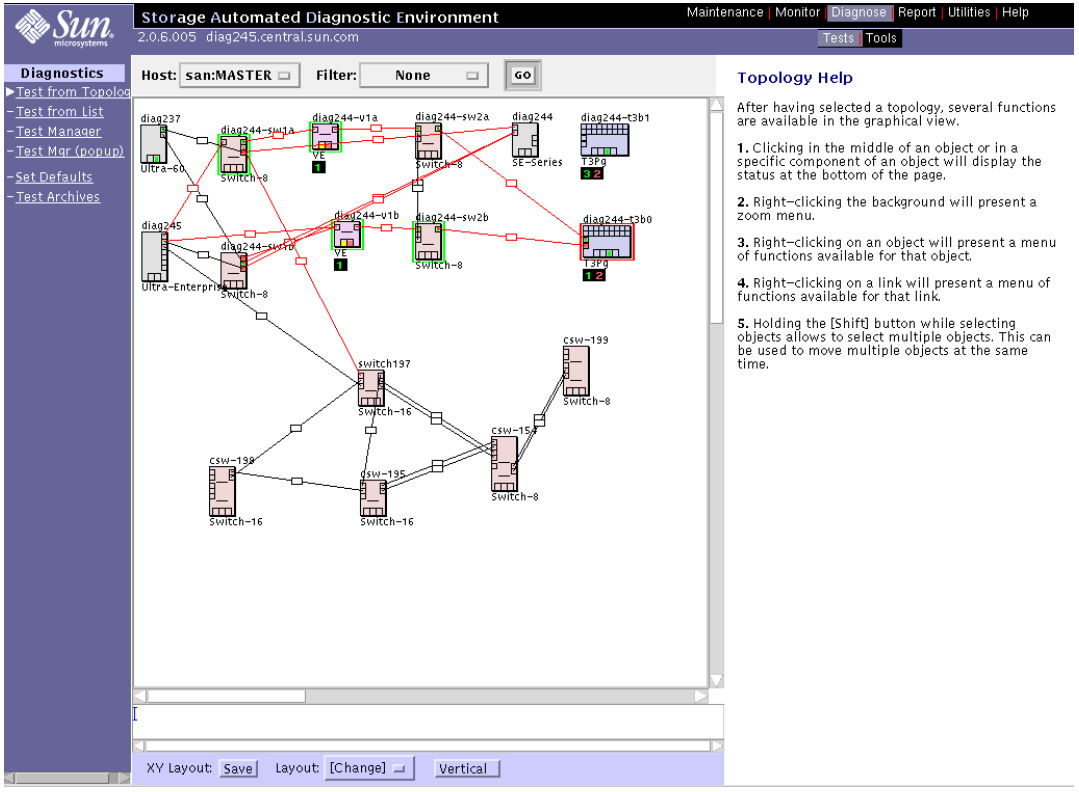
```
Date: Wed, 23 Jan 2002 10:44:49 -0700 (MST)
From: StorageAutomatedDiagnosticEnvironment@diagxxx.Central.Sun.COM
Subject: linktest on diagxxx.central.sun.com
To: undisclosed-recipients:;

Test      : linktest
Host      : diagxxx.central.sun.com
Target    : switch:100000c0dd00b170:2
Status    : PASSED
Device(s) :

#OUTPUT
running on diagxxx.central.sun.com
linktest started on Fibre Channel interconnect: switch to t3
switchtest started on switch 100000c0dd00b170 port 2
Estimated test time 14 minute(s)
switchtest completed successfully

Skipping t3.
Required Fibre Channel loopback test capabilities are not supported by this
device. linktest completed on Fibre Channel interconnect: switch to t3
```

Test from Topology

Storage Automated Diagnostic Environment's implementation of diagnostic tests verify the operation of all the user-selected components. Tests are selected from a graphical view of the system's topology. The Storage Automated Diagnostic Environment Graph view shows the physical topology of a system or merged system. Using the Topology view, you can select specific subtests and test options. The monitoring status of devices and links appears both in the test topology view and in the list view.

▼ To View the Topology

1. **Select a Host from the Host pull-down menu.**
2. **To narrow the size of the topology, select an address from the Filter pull-down menu and click GO.**
3. **To zoom in closer, right click on the screen's white space. You can zoom to 100%, 83%, 66%, or 50% by selecting the value with your left mouse button.**



4. **Using your right mouse button, select the device.**

   A list of test options appears.

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

   The applicable test is displayed in the right pane.

Notes

1. The Storage Automated Diagnostic Environment Link Test enables FRU isolation for Fibre Channel devices. You can invoke the Link Test from the Topology view by selecting the link.
2. In-band tests can be run from the Test from Topology view with no restrictions.
3. An out-of-band test (that is, `t3ofdg`, `t3volverify`, `switchtest`, or `vediag`) can be run from the Test from Topology view under the following conditions:
   - It is run from the monitoring Host view
   - It is run from the merged topology view
4. If you need help understanding the various link colors, icons, or symbols found in the Topology, please refer to "Topology Help" on page 82.
5. To specify email addresses to where test results are sent, use the Set Defaults screen. Refer to "Test Defaults" on page 103.

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. You can sort by Host, device type, test type, and device status. You can select options for a specific device or choose multiple devices or all devices. In addition, you can select the number of passes for each test.

▼ To Invoke the Test Option Pane for a Particular Device

Using the Test from List window shown in FIGURE 5-3, select the diagnostic test.

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

   A list that is customized to your criteria is displayed.

4. **To run diagnostics, select the test name link in the Run Test column.**

   The appropriate test window is displayed in the right frame.

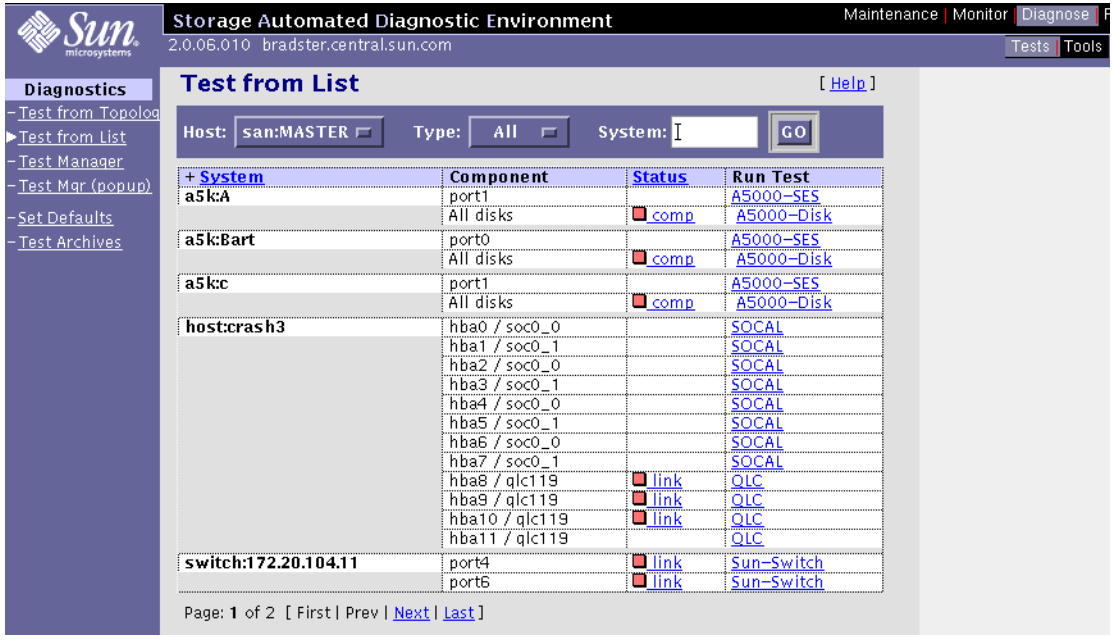


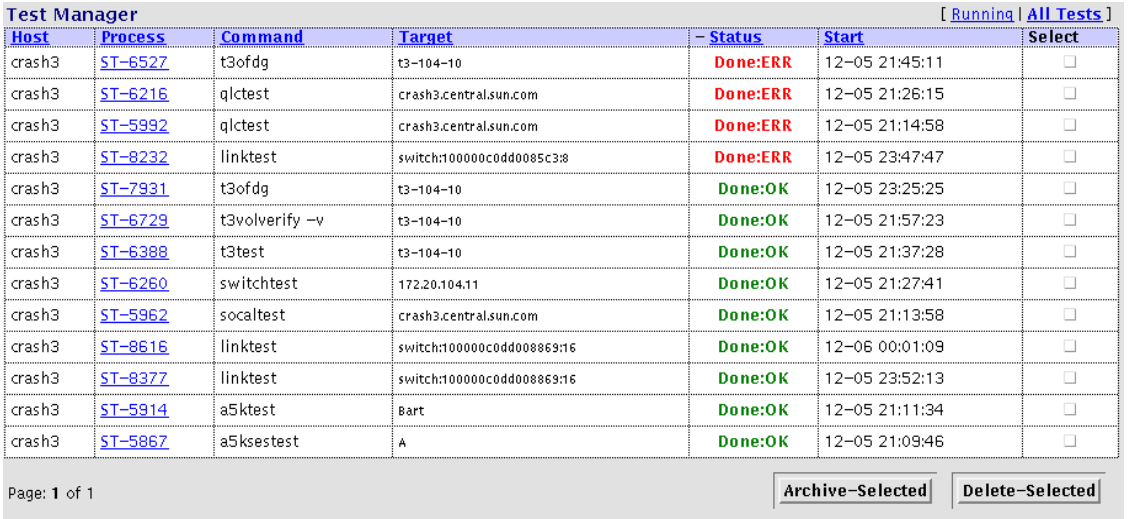
FIGURE 5-3 Test from List window

Test Manager

Storage Automated Diagnostic Environment's integration with diagnostic tests implements Test Manager to track and control the progress of the user-selected tests.

The test output view allows you to view test output for active and completed tests in the test monitor view.

Note – All tests are keyed by the unique process identifier (PID) that Test Manager assigns during test invocation.



Test Manager [Running | All Tests]

Host	Process	Command	Target	– Status	Start	Select
crash3	ST-6527	t3ofdg	t3-104-10	Done:ERR	12-05 21:45:11	☐
crash3	ST-6216	qlctest	crash3.central.sun.com	Done:ERR	12-05 21:26:15	☐
crash3	ST-5992	qlctest	crash3.central.sun.com	Done:ERR	12-05 21:14:58	☐
crash3	ST-8232	linktest	switch:100000c0dd0085c3:8	Done:ERR	12-05 23:47:47	☐
crash3	ST-7931	t3ofdg	t3-104-10	Done:OK	12-05 23:25:25	☐
crash3	ST-6729	t3volverify -v	t3-104-10	Done:OK	12-05 21:57:23	☐
crash3	ST-6388	t3test	t3-104-10	Done:OK	12-05 21:37:28	☐
crash3	ST-6260	switchtest	172.20.104.11	Done:OK	12-05 21:27:41	☐
crash3	ST-5962	socaltest	crash3.central.sun.com	Done:OK	12-05 21:13:58	☐
crash3	ST-8616	linktest	switch:100000c0dd008869:16	Done:OK	12-06 00:01:09	☐
crash3	ST-8377	linktest	switch:100000c0dd008869:16	Done:OK	12-05 23:52:13	☐
crash3	ST-5914	a5ktest	Bart	Done:OK	12-05 21:11:34	☐
crash3	ST-5867	a5ksestest	A	Done:OK	12-05 21:09:46	☐

Page: 1 of 1 Archive-Selected Delete-Selected

Storage Automated Diagnostic Environment runs the device tests in a distributed fashion. The Storage Automated Diagnostic Environment Master calls the proper Slave Host to begin tests.

For test processes, the states can be:

- Waiting—you must answer a question for the process to continue. Click the PID link.
- Done:OK—the process ran with no errors.
- Done:ERR—the process failed but continues to run.
- Done: Aborted

Note – When the link test is in the *Waiting* state, user intervention is required, which may involve replacing the cables or the gigabit interface converters (GBICs).

▼ To Archive or Delete Tests

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

1. **Click the Select checkbox for the test from the Test Manager window.**
2. **Click the Archive-Selected (to archive) or Delete-Selected (to delete) checkbox.**

   The Archived Tests view lists all archived tests and their associated output based on the criteria you specify.

Diagnostic Tests Available in the Storage Automated Diagnostic Environment

Test options exist for each individual test. The Set Test Defaults options screen enables you to change the default options for the following diagnostic tests:

Test Defaults

Storage Automated Diagnostic Environment's implementation of diagnostic tests enables you to set default options to be applied to user-selected tests.

Note – The Verbose Mode option is common to all tests.

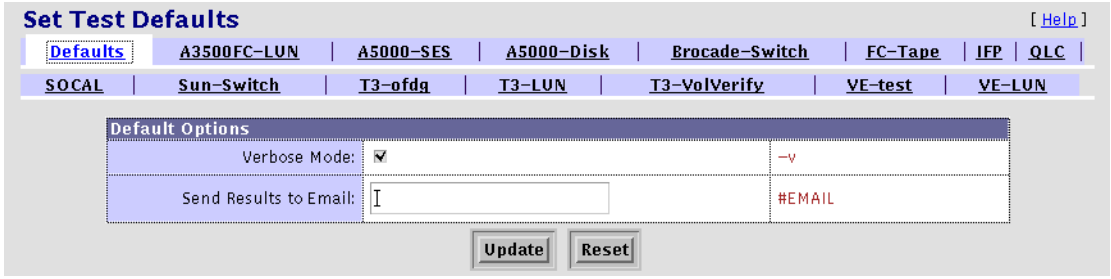


FIGURE 5-4 Storage Automated Diagnostic Environment Diagnostics Set Test Defaults

Default Options

TABLE 5-3 Storage Automated Diagnostic Environment Diagnostic Tests Default Option

Item	Description
Verbose Mode **-v**	Runs the test in verbose mode and displays messages with more detailed information about the testing process. The default is ON.
Send Results to Email	Enter email addresses to where the test results need to be sent. 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.

Note – Email may not be sent if the system is not properly configured to send mail to the recipient. This is primarily evident in service processor environments where the service processors are on a subnet and there is no gateway to the intended recipient. Please refer to the *Sun StorEdge 3900 and 6900 Series Installation and Service Manual* for more information.

Storage Automated Diagnostic Environment Tests

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

Sun StorEdge A3500FC Array Test (`a3500fctest`)

The `a3500fctest`(1M) test verifies the functionality of the Sun StorEdge A3500FC array using four subtests: Media, File System, Asynchronous I/O, and Write/Read Device Buffer, that are described in TABLE 5-4.

TABLE 5-4 `a3500fctest` Subtests

Subtest	Description
Media	Verifies LUN media by reading data from the LUN. The Media subtest treats a LUN as one large chunk of contiguous data.
File System	Verifies the LUN system's integrity. The File System subtest exercises the partition being tested to determine if it is mounted. If the partition is not already mounted or premounted, the test is blocked. The test opens two temporary files (of the size specified on `File System File Size`) and performs a read/write test.
Asynchronous I/O	Uses the asynchronous read/write feature of the Solaris LUN driver to exercise the LUN. In read-only mode, the test sends a maximum of four asynchronous read packets, each with a random size and a random offset, into the selected partition. The test then waits for all outstanding I/O activity to complete before issuing another round of packets. This process continues until the whole area is tested. In read/write mode, one write packet is issued in every four read packets as a spot check of the write operation.
Write/Read Device Buffer	This test verifies the Fibre Channel loop by performing a pattern test. If the Write/Read Device Buffer subtest fails on a particular device, there is a problem with an upstream Fibre Channel component, that might not be on the actual device where the test failed.

Note – An instance of `a3500fctest` is present for each LUN. The File System subtest can be run only if the selected partition is mounted.

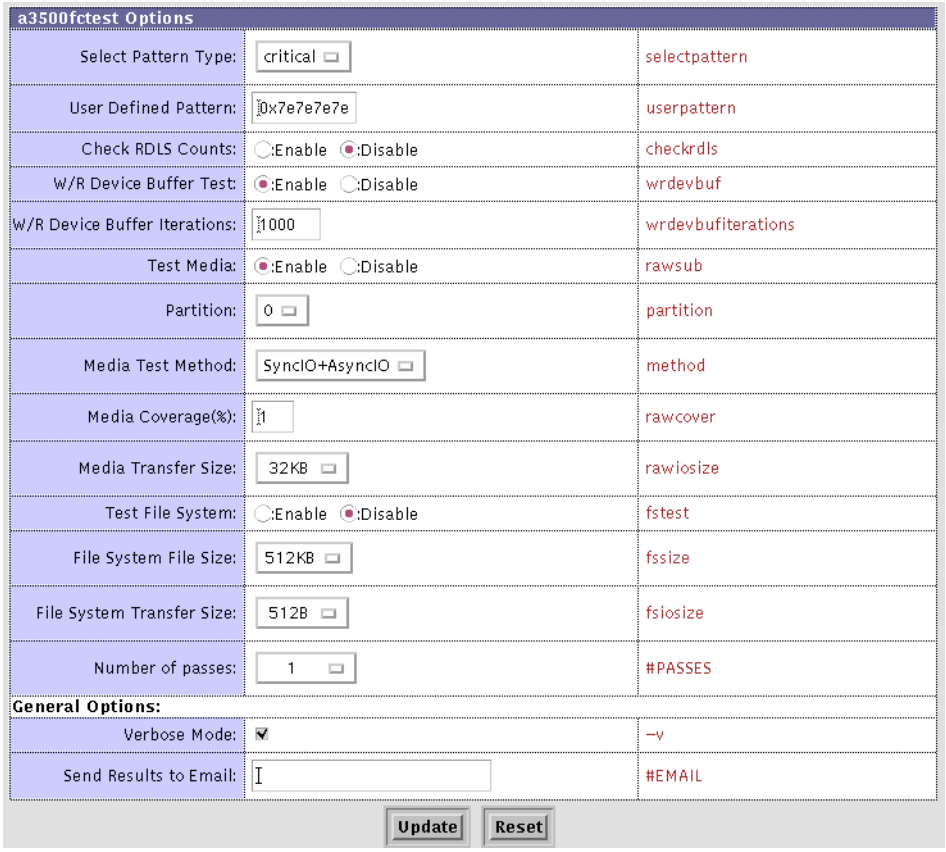


FIGURE 5-5 `a3500fctest` Test Options Dialog Box

a3500fctest Test Options

TABLE 5-5 describes the test options for the a3500fctest test.

TABLE 5-5 a3500fctest Options

Option	Description
Select Pattern Type	Enables you to choose user, critical, or all pattern options
User Defined Pattern	Defines the pattern specified by the user
Check RDLS Counts	Monitors the read link status (RDLS) counts
W/R Device Buffer Test	Enables or disables the write/read actions of the Device Buffer Test **Note:** The Sun StorEdge A3500FC array firmware level must be at 3010360 or greater to support the W/R Device Buffer Test.
W/R Device Buffer Iterations	Specifies the number of times W/R are done to the internal buffer of the Sun StorEdge A3500FC array
Test Media	Enables or disables the Media subtest
Partition	Specifies 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.
Media Test Method	Enables or disables the Media Test Method (SyncIO or AsyncIO)
Media Coverage (%)	Tests all or part of a partition (in percentages)
Media Transfer Size	Specifies the transfer size of the Media subtest
Test File System	Enables or disables the File System subtest
File System File Size	Creates a file twice the size of what is specified
File System Transfer Size	Specifies the transfer size of the File System subtest

Sun StorEdge A5000 and A5200 Array Enclosure Test (a5ksestest)

The a5ksestest(1M) test provides configuration verification, fault isolation, and repair validation of the disks in the Sun StorEdge A5000 array. It tests both Sun StorEdge A5000 14- and 22-slot disk enclosures.

The a5ksestest test detects all Sun StorEdge A5000 arrays that are connected to the HBA and collects relevant configuration information.

Note – The Sun StorEdge A5000 array was formerly known as the Sun Enterprise Network Array™. The a5ksestest test tests both versions of this disk array subsystem.

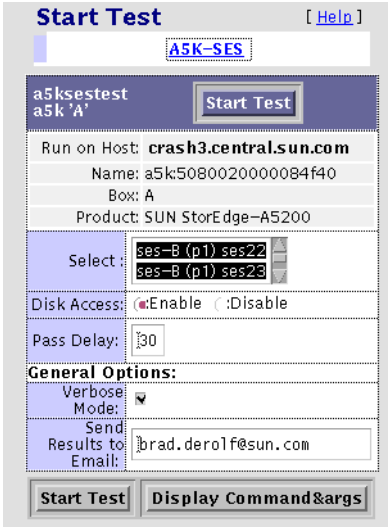


FIGURE 5-6 a5ksestest Test Options Dialog Box

The diagnostic software attaches at least one instance of a5ksestest whenever a Sun StorEdge A5000 SCSI enclosure services (SES) device is found. Normally, two instances occur for each path to a Sun StorEdge A5000 array.

Note – To prevent test failures, do not run the a5ksestest and socaltest tests at the same time.

---

a5ksestest Test Options

TABLE 5-6 describes the test options for the a5ksestest test.

TABLE 5-6 a5ksestest Options

Option	Description
Disk Access	During testing, each disk is accessed through each active connection leading to that disk. The a5ksestest test opens partition 2 on the disk and reads 512 bytes of raw data.
Pass Delay	Specifies the number of seconds between passes. The default is 30 seconds.

Sun StorEdge A5000 and A5200 Array Test (a5ktest)

The a5ktest(1M) test verifies the functionality of the Sun StorEdge A5000 array using five subtests: Media, File System, Asynchronous I/O, Write/Read Device Buffer, and Self Test.

a5ktest Subtests

The a5ktest subtests are listed in TABLE 5-7.

TABLE 5-7 a5ktest Subtests

Subtest	Description
Media	Verifies disk media by reading data from the disk. The Media subtest treats a disk as one large chunk of contiguous data.
File System	Verifies the file system's integrity. The File System subtest exercises the partition being tested to determine if it is mounted. If the partition is not already mounted or pre-mounted, then the test is blocked. The test opens two temporary files (of the size specified on `File System File Size`) and performs a read/write test.
Asynchronous I/O	Uses the asynchronous read feature of the Solaris disk driver to exercise the disk. In read-only mode, the test sends a maximum of four asynchronous read packets, each with a random size and a random offset into the selected partition. The test then waits for all outstanding I/O activity to complete before issuing another round of packets. This process continues until the whole area is tested.
Write/Read Device Buffer	Verifies the Fibre Channel loop by performing a pattern test. If the Write/Read Device Buffer subtest fails on a particular device, there is a problem with an upstream Fibre Channel component that might not be on the actual device where the test failed.
Disk Self Test	Instructs a device to run its internal diagnostics. If the device fails this test, check the error message for a more detailed description of the error.

The a5ktest Test Options dialog box shows all the partitions that are available for testing. The File System subtest can be run only if the selected partition is mounted (described in TABLE 5-7). An instance of a5ktest is present for each disk in a Sun StorEdge A5000 array.

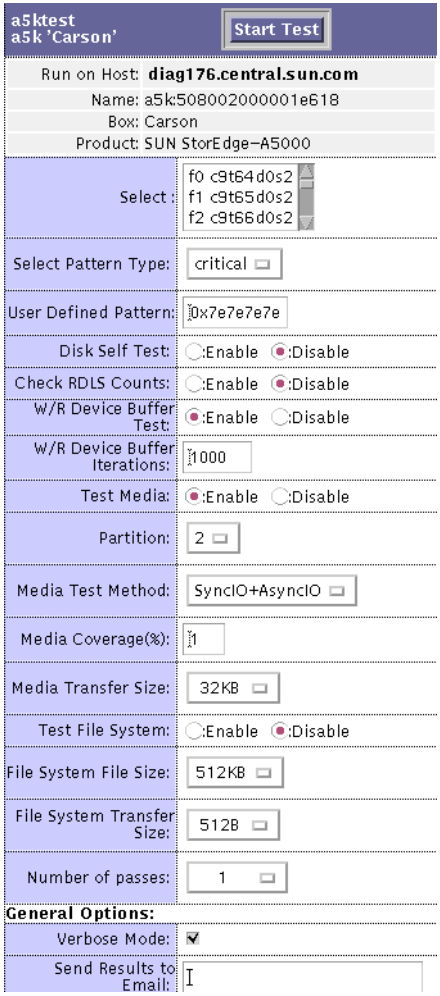


FIGURE 5-7 a5ktest Test Options Dialog Box

Sun StorEdge FC Tape Test (`fctapetest`)

The `fctapetest`(1M) writes a pattern on the tape. `fctapetest` then rewinds the tape and reads and compares the data just written. The `fctapetest` file test writes four files to the tape and then reads them back, comparing the data.

The `fctapetest` diagnostic provides a variety of tests for Sun-supported Fibre Channel tape drives. The `fctapetest` does not test the tape library. It presumes that the user of the diagnostic either uses tape-library management software or manually inserts tapes into the drives.

`fctapetest` Test Requirements

If you have a Sun Fibre Channel tape drive in your system, load a blank writable tape (scratch tape) before you start the diagnostic application.

Caution – If you mount a tape containing valid data, that data will be overwritten by the `fctapetest` diagnostic.

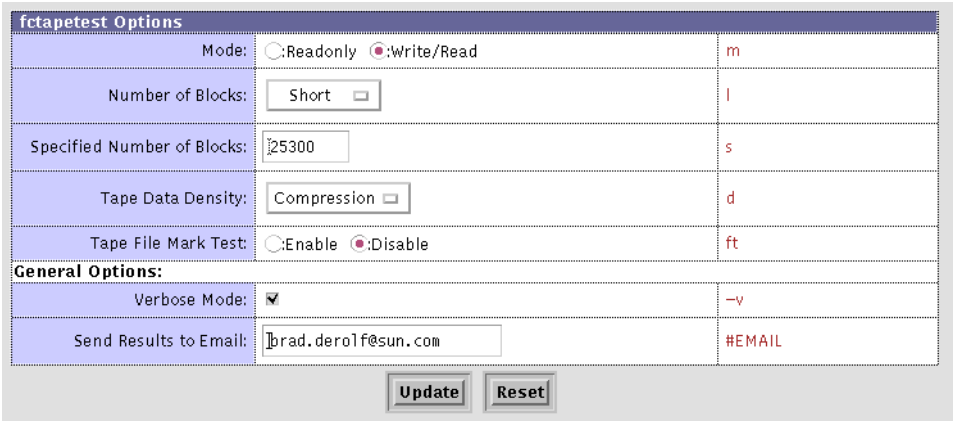


FIGURE 5-8 `fctapetest` Test Options Dialog Box

`fctapetest` Test Options

TABLE 5-8 describes the test options for the `fctapetest` test.

TABLE 5-8 `fctapetest` Options

Option	Description
Mode	If you enable write/read mode, the test first writes to the tape and then reads it back to compare. If you enable read-only mode, the test assumes the tape has already been written and merely reads it. Read-only mode is useful for checking proper head alignment.
Number of Blocks	The amount of the tape to be tested. The choices are: • `EOT`: The default; Tests the entire tape • `Long`: Tests 70,000 blocks of the tape • `Short`: Tests only the first 1000 blocks • `Specified`: Type the number of blocks to be tested in the `number of blocks` field.
Specified Number of Blocks	If you select Specified under the Number of Blocks option, you must type the number of blocks you want to test.
Tape Data Density	If you do not want the `fctapetest` test to run in the compression mode (the default), specify low, for *low* compression.
Tape File Mark Test	Verifies that the tape drive is able to correctly write and navigate file marks on the tape.

Sun StorEdge PCI Fibre Channel-100 Host Adapter Test (`ifptest`)

The `ifptest`(1M) test verifies the functionality of the Sun StorEdge PCI Fibre Channel-100 host adapter, which is a single-loop Fibre Channel card with an on-board Gigabit Interface Converter (GBIC).

The `ifptest` tests the functionality when there are no devices attached to the loop. The driver checks for devices on the Fibre Channel loop. If any devices are detected, the driver blocks any diagnostic commands.

An error message is displayed if the device is attached to storage. If devices are attached to the loop, do not run `ifptest`. Instead, run the `t3test`(1M), `a3500fctest`(1M), `a5ktest`(1M), or `fctapetest`(1M) test on the individual devices.

The `ifptest` test uses the “mailbox” interface to the card, which enables certain firmware operations to be performed that normally would not be available to the application layer.

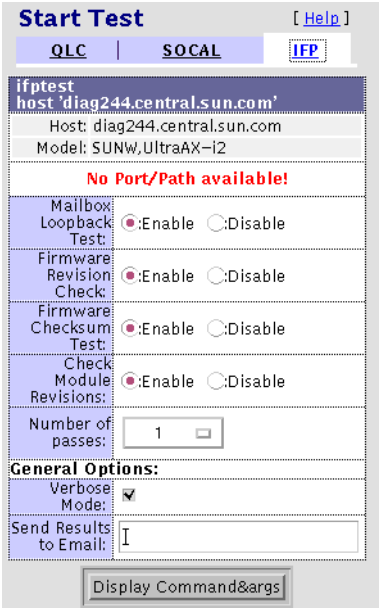


FIGURE 5-9 IFP Test Options Dialog Box

`ifptest` Test Options

TABLE 5-9 describes the `ifptest` Test Options dialog box for different test modes.

TABLE 5-9 `ifptest` Options

Option	Description
Mailbox Loopback Test	Enables or disables the mailbox loopback command. This test writes data patterns into the mailboxes and then reads them back from the output mailboxes and verifies that the data is correct. It is run by default, but it can be disabled.
Firmware Revision Check	Enables or disables the firmware revision check command. This test extracts the firmware revision from the RISC firmware code and verifies it against expected values. It is run by default, but it can be disabled.
Firmware Checksum Test	Enables or disables the firmware checksum command. This command instructs the interface's RISC processor to calculate the current checksum on the microcode and then compare it to the checksum that was loaded in with the microcode. It is run by default, but it can be disabled.
Check Module Revisions	Enables or disables the firmware check module command. This command returns the revision level of several modules on the interface card. Although this test is executed when enabled, the module revision levels are displayed only in verbose mode. It is run by default, but it can be disabled.

Sun StorEdge PCI Dual Fibre Channel Host Adapter Board Test (qlctest)

The qlctest(1M) test tests the functions of the Sun StorEdge PCI dual Fibre Channel host adapter board. The PCI dual fibre board is an HBA that has diagnostic support. This diagnostic test is not scalable.

Note – To run the qlctest when connected to storage, enable the Yes option in the "Test if Connected to Storage" field in the qlctest dialog box, as shown in FIGURE 5-10.

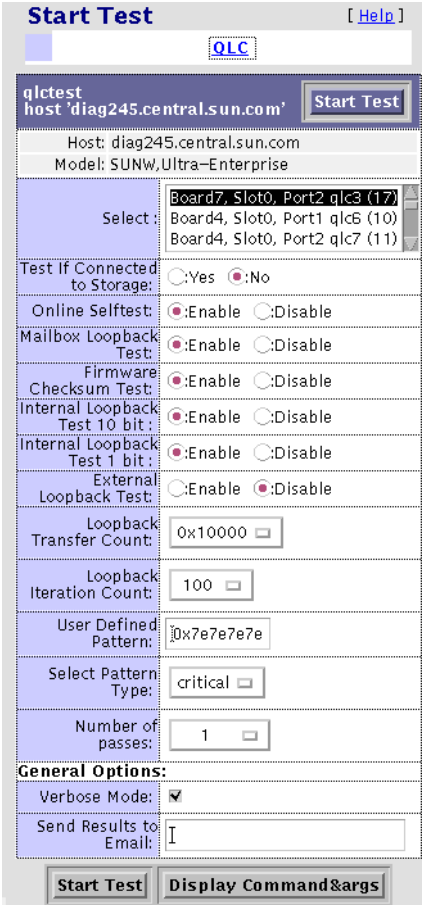


FIGURE 5-10 qlctest Test Options Dialog Box

Note the following:

- Do not run customer applications while running `qlctest`, as the test will take priority over customer data requests. Data cannot be accessed while the `qlctest` test is running.
- Do not run other tests while the `qlctest` test is running. The `qlctest` test might cause other tests to fail.
- Running the `qlctest` test can affect the switch counters along with the operation of the Storage Automated Diagnostic Environment Agent.

TABLE 5-10 describes the `qlctest` Test Options dialog box.

TABLE 5-10 `qlctest` Options

Option	Description
Test If Connected to Storage	Runs `qlctest` while connected to storage
Online Selftest	Evaluates the functionality of ISP hardware by performing the following tests: • Transmit FIFO test • Receive FIFO test • SRAM test • Miscellaneous Register tests It runs by default, but it can be disabled.
Mailbox Loopback Test	Loads a series of registers into the input mailboxes on the card and then reads the output mailboxes and compares the results. Verifies that the system side of the card is operating correctly and that the internal data paths are correct. It runs by default, but it can be disabled.
Firmware Checksum Test	Runs an internal checksum test on the installed firmware. This test verifies that the RISC RAM on the card is fully functional and that the installed firmware is still intact. This test also serves as a quick RAM check of the RISC RAM. It runs by default, but it can be disabled.
Internal Loopback Test 10-bit	Performs an internal loopback test within the host adapter ISP hardware at the 10-bit interface. This test is done with data sourcing from the system memory. You select the desired data pattern, transfer count, and iteration count from the Test Options dialog box. It runs by default, but it can be disabled.
Internal Loopback Test 1-bit	Performs an internal loopback test within the host adapter ISP hardware at the 1-bit interface. This test is done with data sourcing from the system memory. You select the data pattern, transfer count, and iteration count from the Test Options dialog box. It runs by default, but it can be disabled.

TABLE 5-10 `qlctest` Options *(Continued)*

Option *(Continued)*	Description
External Loopback Test	Performs an external loopback test. This test is done with data sourcing from the system memory and going to the system memory. You select the data pattern, transfer count, and iteration count from the Test Options dialog box. This is an intervention test, because a loopback cable from the transceiver to the QLC receiver of the QLC port must be inserted when testing this port by itself. This subtest can also test the entire Fibre Channel loop when the loop is connected to the storage to be tested. It does not run by default, but it can be enabled.
Loopback Transfer Count	Controls the packet size used in the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `0x10000`.
Loopback Iteration Count	Sets the number of times to loop the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `10`.
User Defined Pattern	Uses the user-entered data pattern to loop for the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `0x7e7e7e7e`.
Select Pattern Type	Selects which data pattern to loop for the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `critical`.

Sun StorEdge SBus Fibre Channel-100 Host Adapter Board Test (socaltest)

The socaltest(1M) test aids the validation and fault isolation of the Sun StorEdge SBus Fibre Channel-100 host adapter board. In the case of a faulty board, the test tries to isolate the fault to the card, the GBIC module, or the direct memory access (DMA) between the host adapter card and the Host memory.

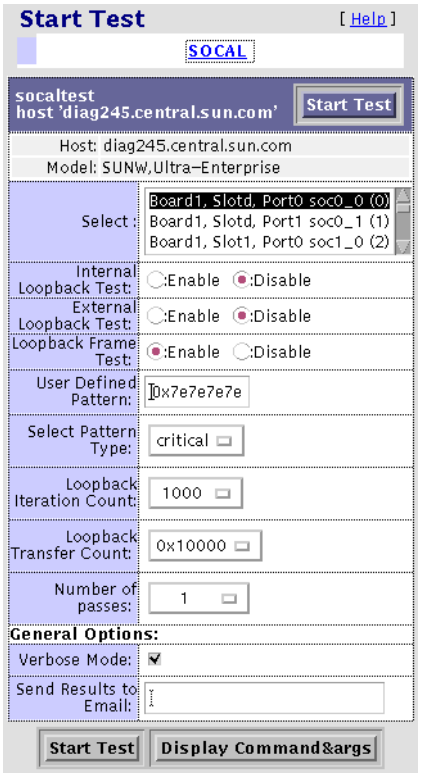


FIGURE 5-11 socaltest Test Options Dialog Box

Note – Do not run socaltest and a5ksestest at the same time. Otherwise, test failures might occur. Do not run socaltest with a high system load.

In addition to the tests described above, the `socaltest` test also tests the basic functions of the SOC+ chip, the on-board XRAM, and the Host control buffer by invoking the appropriate tests implemented in firmware.

Note – You cannot run the Internal or External Loopback tests if the port is connected to a disk array.

TABLE 5-11 describes the `socaltest` Test Options.

TABLE 5-11 `socaltest` Options

Option	Description
Internal Loopback Test (with no storage attached)	Checks the host adapter card and the DMA with the Host system, as follows: 1. A frame is created in the host adapter local memory, sent out through the SOC+ transmitter, and internally looped back to the SOC+ receiver. The received data is compared to the original data. 2. A frame is created in the host adapter local memory, sent out through the SOC+ transmitter, and looped back through the SERDES (serializer-deserializer) chip on the host adapter card. The received data is compared to the original data. 3. A frame is created in the Host main memory, transferred through the DMA to the host adapter transmitter, looped back within the SOC+ chip, and transferred from the receiver to the host main memory through the DMA. The received frame is compared to the original transmitted frame, which tests the host memory to the host adapter DMA path. If the board is not connected to storage, the Internal Loopback test is selected by default. External Loopback and Loopback Frame tests are disabled.
External Loopback Test (with no storage attached)	Verifies the proper functioning of the GBIC module. A frame is created in the host adapter local memory and is sent out and looped back through the external loopback connector attached to the port. If the External Loopback test is run together with the Internal Loopback test, the DMA path is also tested by creating a frame in host main memory, transferring it to the host adapter through the DMA, looping it back through the external loopback connector, and transferring the received frame back to the host main memory by DMA. By default, this is always disabled.
Loopback Frame Test (with storage attached)	Sends out a buffer initialized with the selected pattern and compares it to the looped-back frame. It passes if the two match and fails if they do not. If the board is connected to storage, the Loopback Frame test is selected by default. Internal and External loopback tests are disabled.

TABLE 5-11 `socaltest` Options

Option	Description
User Defined Pattern	User specified pattern in hexadecimal. The default is `0x7e7e7e7e`.
Select Pattern Type	Applies only to Loopback Frame test. `user` uses the pattern entered by `user`. `critical` runs the 10 most critical patterns for fault detection. `all` runs the complete list of hexadecimal patterns for fault detection. The `all` pattern includes the `critical` pattern. The default is `critical`, which applies only to Loopback Frame Pattern.
Loopback Iteration Count	Sets the number of times to loop the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `10`.
Loopback Transfer Count	Controls the packet size used in the internal 10-bit, internal 1-bit, and external loopback tests. The default value is `0x10000`.

In addition to the tests described above, the `socaltest` test also tests the basic functions of the SOC+ chip, the on-board XRAM, and the Host control buffer by invoking the appropriate tests implemented in firmware.

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 FIGURE 5-12.

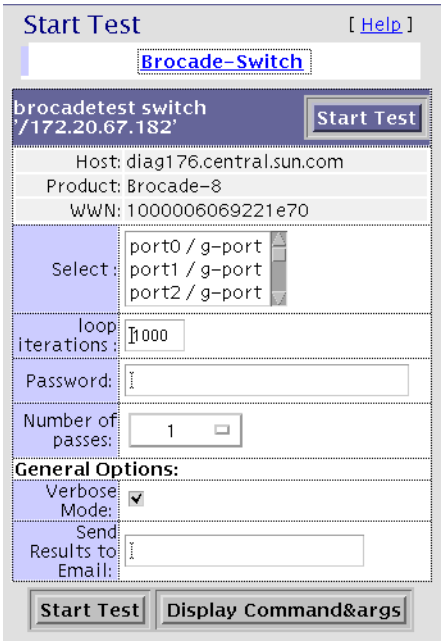


FIGURE 5-12 brocadetest Test Options Dialog Box

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 5-12 describes the test mode options for the `brocadetest` test.

TABLE 5-12 `brocadetest` Test Options

Option	Description
Iterations	Specifies the number of iterations the port test should run, between 0 and 1,000,000.
dev	Specifies the port and IP address of the switch to be tested.
ip	Specifies the IP address of the switch to be tested.
port	Specifies the port of the switch to be tested.
password	Specifies the password used by the admin user of the switch. There is no default value.

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

The `switchtest`(1M) test is used to diagnose the Sun StorEdge network 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 FIGURE 5-13.

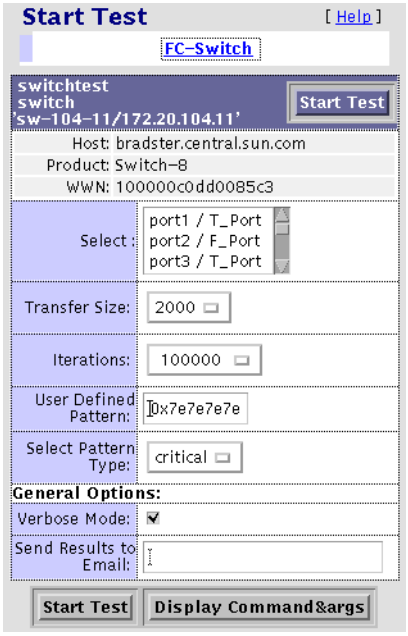


FIGURE 5-13 `switchtest` Test Options Dialog Box

`switchtest` Test Options

TABLE 5-13 describes the test mode options for the `switchtest` test.

TABLE 5-13 `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 should 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 T3 and T3+ Array Test (`t3ofdg`)

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

Note – Before you run the `t3ofdg` test, you must first 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.

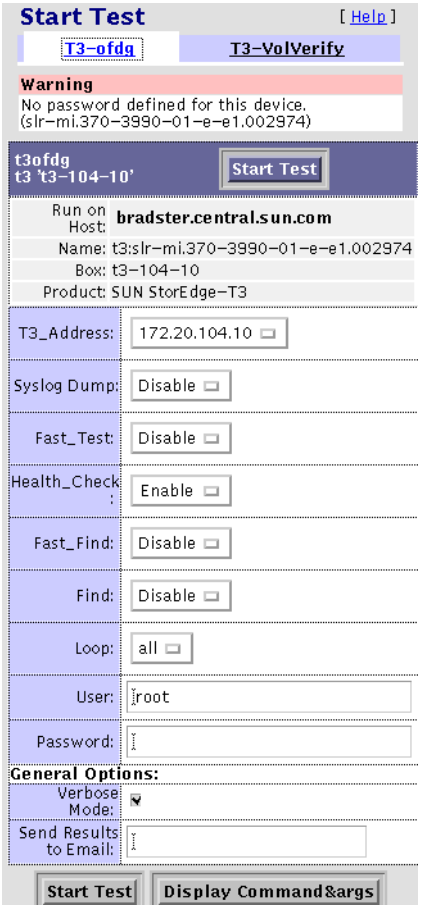


FIGURE 5-14 `t3ofdg` Test Options Dialog Box

Note – This test requires the user to enter the user ID and password options, which are the user ID and password for the Sun StorEdge T3 or T3+ array that is being tested.

`t3ofdg` Test Options

TABLE 5-14 `t3ofdg` Test Options

Syslog Dump	*Enable* will dump all syslog entries that have been added, while the test is running, to the screen. *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.*

Sun StorEdge T3 and T3+ Array Test (`t3test`)

The `t3test`(1M) test verifies the functionality of Sun StorEdge T3 and T3+ array logical unit numbers (LUNs) using three subtests: Media, File System, and Asynchronous I/O.

The file system subtest can be run only if the selected partition is mounted. An instance of the `t3test` test is present for each LUN.

`t3test` Subtests

TABLE 5-15 describes the `t3test` subtests.

TABLE 5-15 `t3test` Subtests

Subtest	Description
Media	Verifies LUN media by reading data from the LUN. The Media subtest treats a LUN as one large chunk of contiguous data.
File System	Verifies the LUN system's integrity. The File System subtest exercises the partition being tested to determine if it is mounted. If the partition is not already mounted or premounted, the test is blocked. The test opens two temporary files (of the size specified on `File System File Size`) and performs a read/write test.
Asynchronous I/O	Uses the asynchronous read/write feature of the Solaris LUN driver to exercise the LUN. In read-only mode, the test sends a maximum of four asynchronous read packets, each with a random size and a random offset into the selected partition. The test then waits for all outstanding I/O activity to complete before issuing another round of packets. This process continues until the whole area is tested. In read/write mode, one write packet is issued in every four read packets as a spot check of the write operation.

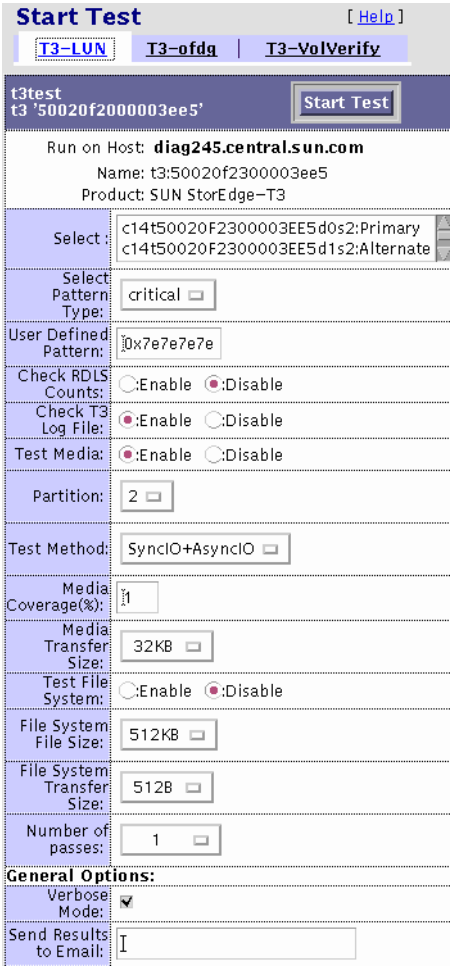


FIGURE 5-15 `t3test` Test Options Dialog Box

Caution – Before using the diagnostics package to monitor messages from a Sun StorEdge T3 or T3+ array, you must set up the array to mirror its `/syslog` messages to the Host that is running the diagnostics package. The array messages may be mirrored to the `/var/adm/messages.t3` file on the Host.

`t3test` Test Options

TABLE 5-16 describes the test mode options for the `t3test` test.

TABLE 5-16 `t3test` Options

Option	Description
Select Pattern Type	Selects which pattern to run. You will choose the `user`, `critical pattern`, or `all` patterns.
User Defined Pattern	User defined test pattern
Check RDLS Counts	Monitors the read link status (RDLS) counts
Check T3 Log File	Scans Sun StorEdge T3 and T3+ array log file for errors during test
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
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

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 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.

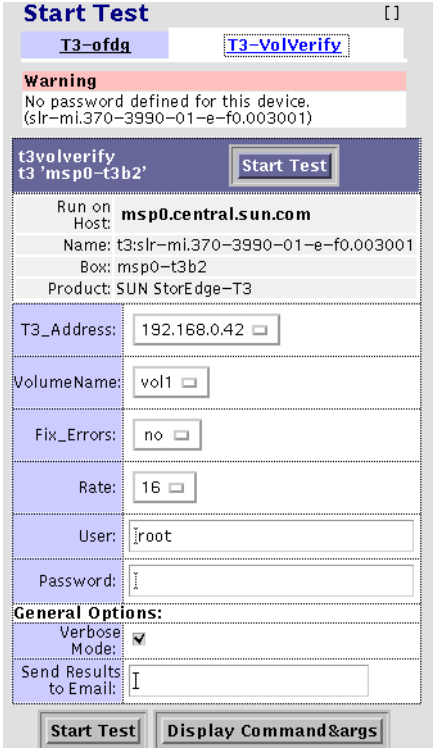


FIGURE 5-16 `t3volverify` Test Options Dialog Box

Note – This test requires the user to enter the user id and password options, which are the user id and password for the Sun StorEdge T3 and 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 Maintain Devices -- > Add T3 window.

`t3volverify` Test Options

TABLE 5-17 `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. 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. *16* has the highest performance impact on the Data Host.

Virtualization Engine Diagnostic Test (vediag)

The vediag(1M) test enables testing of the virtualization engine. TABLE 5-17 describes the test mode options for the vediag test.

Note – Before you run the vediag test, you must first 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 5-17 vediag Test Options

TABLE 5-18 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.
sudiag	The `sudiag` test checks internal components of the virtualization engine. The default is Enable. **Warning: This option reboots the virtualization engine.**
sddiag	The `sddiag` test enables testing between the virtualization engine and a target device. The default is disable.

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

Sun StorEdge VELUN Test (veluntest)

In a Sun StorEdge 3900 and 6900 Series Solution configuration, the veluntest(1M) replaces the t3test (1M). Valid LUNs must exist for the veluntest(1M) test to run.

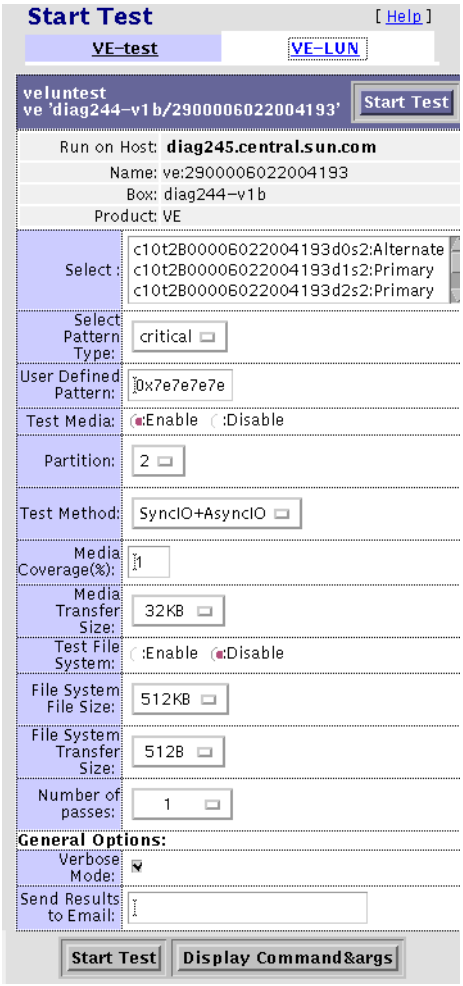


FIGURE 5-18 veluntest Test Options

`veluntest` Test Options

TABLE 5-19 describes the test options for the `veluntest` test.

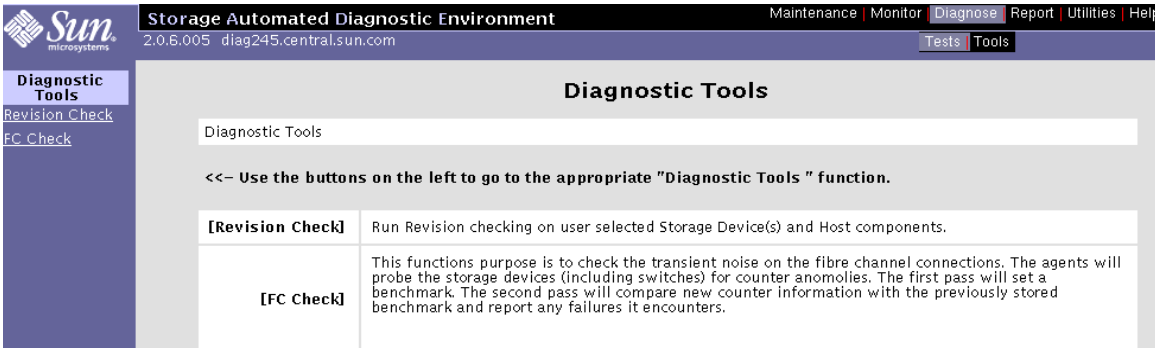
TABLE 5-19 `veluntest` Options

Option	Description
Select Pattern Type	Selects which pattern to run. You will choose the `user`, `critical` pattern, or `all` patterns.
User Defined Pattern	User defined test pattern.
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 Media Test Methods (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
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.

Storage Automated Diagnostic Environment Tools

▼ To Access the Storage Automated Diagnostic Environment Diagnostics Tools

1. **Click the Diagnose link on the Storage Automated Diagnostic Environment main window.**
2. **Click the Tools link on the Diagnose page.**



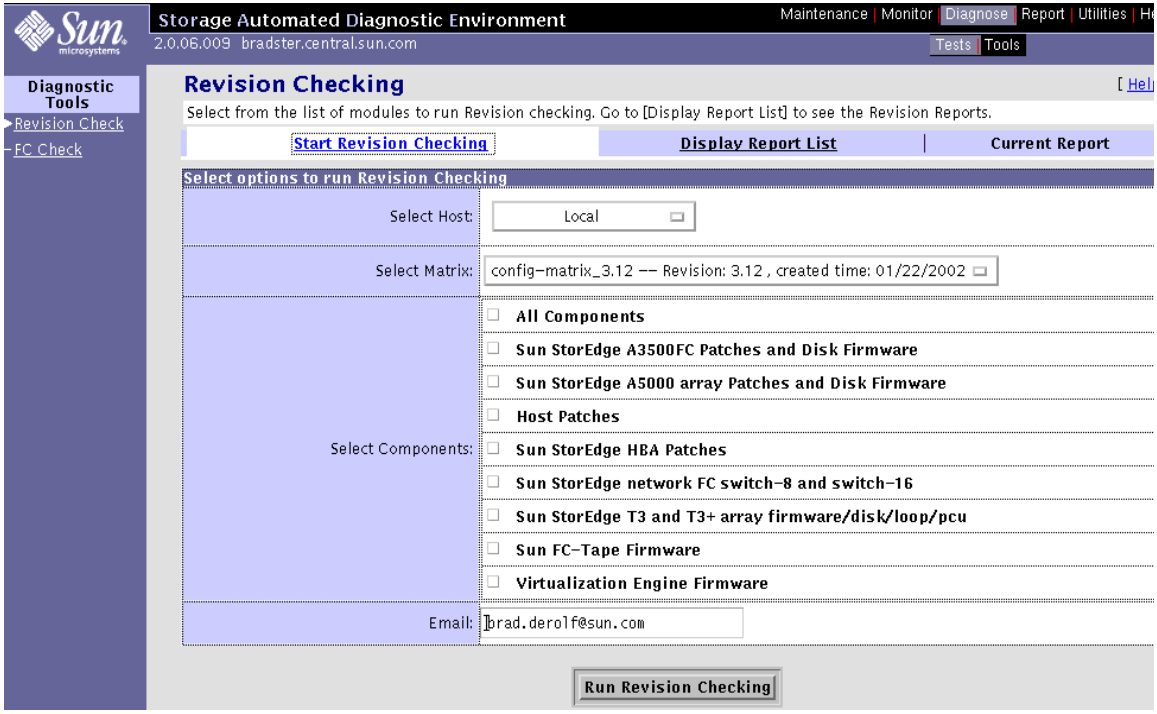
Revision Checking

Storage Automated Diagnostic Environment's implementation of Revision Checking checks the software, hardware, and firmware revisions of all user-selected components.

Revision checking is based on an updatable matrix, which is generated using the PatchPro database. The matrix provides distributed revision checking across the system. Solaris versions and component firmware versions are verified against the matrix.

▼ To Run Revision Checking Report

1. **Click Start Revision Checking.**
2. **Select a Host from the pulldown menu.**
3. **Select a device associated with the Host from the list of modules.**
4. **In the Email textbox, type an email address or addresses to where Revision Checking results will be sent.**
5. **Click Run Revision Checking.**



▼ To View the Revision Checking Report

1. **Click Display Report List.**
2. **Select a Host from the pulldown menu.**
3. **Select a device associated with the Host from the list of modules.**
4. **In the Email textbox, type an email address or addresses to where Revision Checking Report will be sent.**
5. **Click Run Revision Checking.**

Fibre Channel Counters Check

Use the Fibre Channel Counters Check functionality to perform a quick check of the system's transient noise. Run the Fibre Channel Counters Check only on an idle system.

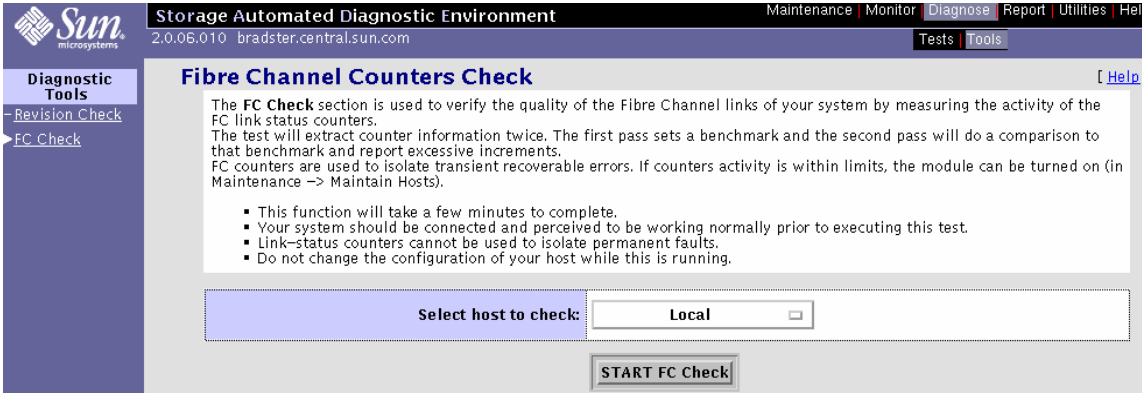
The Fibre Channel Counters Check functionality verifies the health of physical Fibre Channel links by extracting and comparing link status information from all attached storage devices and switches and then displaying error counters.

Fibre Channel Counters Check retrieves the fibre channel Read Link Status counter information from the available devices. This counter information is stored while the Fibre Channel Check program begins the second pass. The second pass begins two minutes after the first pass completes its run. The results of both passes are then compared and changes are displayed in the resulting table.

Note – Fibre Channel Check does not validate connections. Use this functionality only to test for transient noise on the physical Fibre Channel connectors and components. If a system exhibits excessive transient noise, it should be checked for proper cable connections. Diagnostics should then be run on the suspect components.

▼ To Check Fibre Channel Counters

- **To run the Fibre Channel Counters check, select a Host from the Select host to check pull-down menu and click START FC Check.**



CHAPTER 6

Reports

The Reports section summarizes system information, including agent statistics and system thresholds, on every device that is currently supported by the Storage Automated Diagnostic Environment.

This section also displays device-specific report information on the Sun StorEdge network FC switch-8 and switch-16 switches.

▼ To Access the Reports Page

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

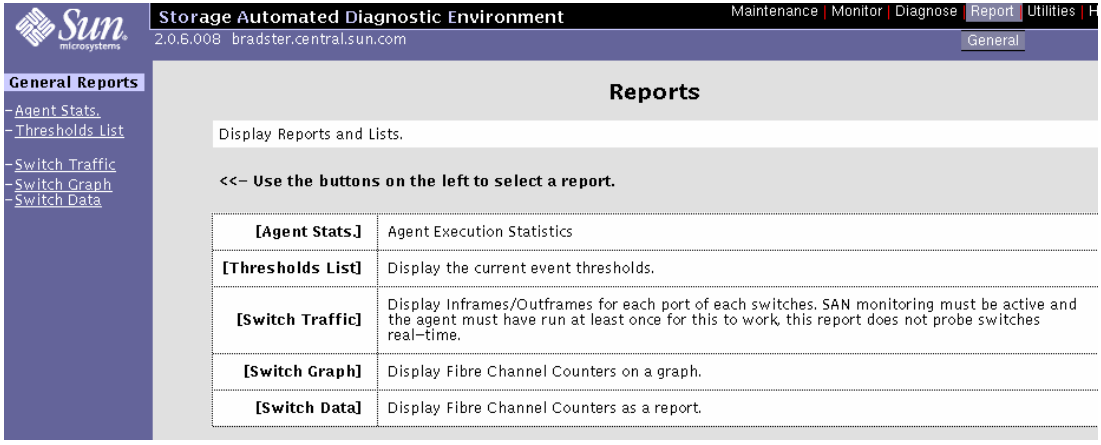


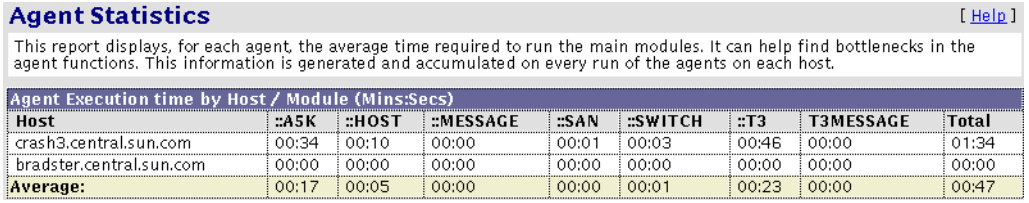
FIGURE 6-1 Reports window

Agent Statistics

Using the Agent Statistics 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

1. **Click Agent Stats in the Reports window.**



Agent Statistics [Help]

This report displays, for each agent, the average time required to run the main modules. It can help find bottlenecks in the agent functions. This information is generated and accumulated on every run of the agents on each host.

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

Host	::A5K	::HOST	::MESSAGE	::SAN	::SWITCH	::T3	T3MESSAGE	Total
crash3.central.sun.com	00:34	00:10	00:00	00:01	00:03	00:46	00:00	01:34
bradster.central.sun.com	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Average:	00:17	00:05	00:00	00:00	00:01	00:23	00:00	00:47

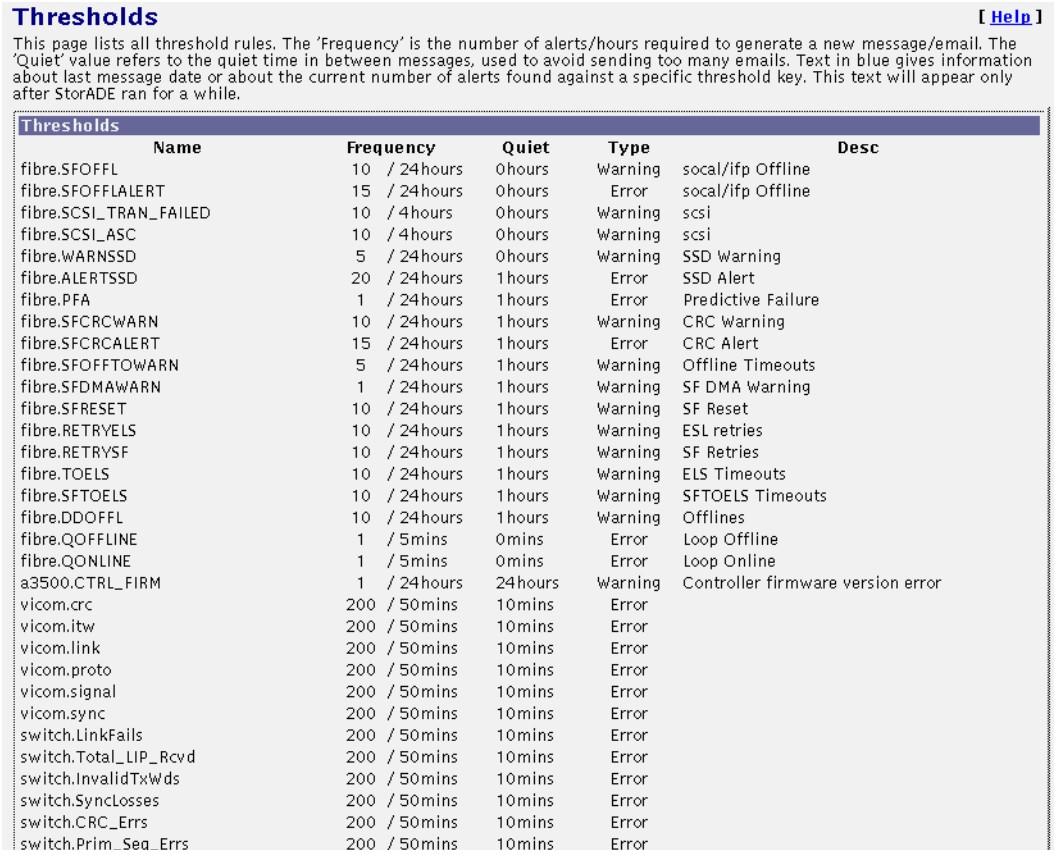
2. **Click an existing host.**

   The execution time for that host, measured in minutes and seconds, is displayed.

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.

- 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 [Help]

This page lists all threshold rules. The 'Frequency' is the number of alerts/hours required to generate a new message/email. The 'Quiet' value refers to the quiet time in between messages, used to avoid sending too many emails. Text in blue gives information about last message date or about the current number of alerts found against a specific threshold key. This text will appear only after StorADE ran for a while.

Thresholds

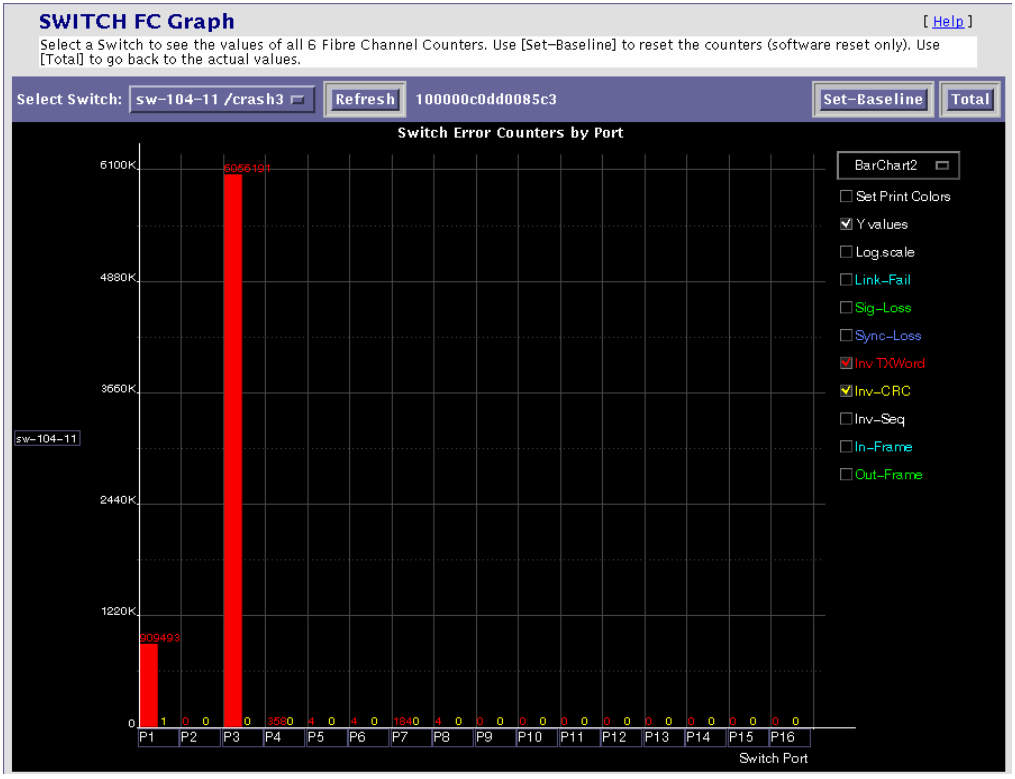
Name	Frequency	Quiet	Type	Desc
fibre.SFOFFL	10 / 24hours	0hours	Warning	socal/ifp Offline
fibre.SFOFFLALERT	15 / 24hours	0hours	Error	socal/ifp Offline
fibre.SCSI_TRAN_FAILED	10 / 4hours	0hours	Warning	scsi
fibre.SCSI_ASC	10 / 4hours	0hours	Warning	scsi
fibre.WARNSSD	5 / 24hours	0hours	Warning	SSD Warning
fibre.ALERTSSD	20 / 24hours	1hours	Error	SSD Alert
fibre.PFA	1 / 24hours	1hours	Error	Predictive Failure
fibre.SFCRCWARN	10 / 24hours	1hours	Warning	CRC Warning
fibre.SFCRCALERT	15 / 24hours	1hours	Error	CRC Alert
fibre.SFOFFTOWARN	5 / 24hours	1hours	Warning	Offline Timeouts
fibre.SFDMAWARN	1 / 24hours	1hours	Warning	SF DMA Warning
fibre.SFRESET	10 / 24hours	1hours	Warning	SF Reset
fibre.RETRYELS	10 / 24hours	1hours	Warning	ESL retries
fibre.RETRYSF	10 / 24hours	1hours	Warning	SF Retries
fibre.TOELS	10 / 24hours	1hours	Warning	ELS Timeouts
fibre.SFTOELS	10 / 24hours	1hours	Warning	SFTOELS Timeouts
fibre.DDOFFL	10 / 24hours	1hours	Warning	Offlines
fibre.QOFFLINE	1 / 5mins	0mins	Error	Loop Offline
fibre.QONLINE	1 / 5mins	0mins	Error	Loop Online
a3500.CTRL_FIRM	1 / 24hours	24hours	Warning	Controller firmware version error
vicom.crc	200 / 50mins	10mins	Error	
vicom.itw	200 / 50mins	10mins	Error	
vicom.link	200 / 50mins	10mins	Error	
vicom.proto	200 / 50mins	10mins	Error	
vicom.signal	200 / 50mins	10mins	Error	
vicom.sync	200 / 50mins	10mins	Error	
switch.LinkFails	200 / 50mins	10mins	Error	
switch.Total_LIP_Rcvd	200 / 50mins	10mins	Error	
switch.InvalidTxWds	200 / 50mins	10mins	Error	
switch.SyncLosses	200 / 50mins	10mins	Error	
switch.CRC_Errs	200 / 50mins	10mins	Error	
switch.Prim_Seq_Errs	200 / 50mins	10mins	Error	

Switch Traffic

Use the Switch Traffic functionality to display inframes and outframes for each port of each switch. SAN monitoring must be active and the Storage Automated Diagnostic Environment must have run at least once for this functionality to work properly.

Switch FC Graph

Use the Switch FC Graph functionality to view the values of Fibre Channel counters in graph format.



1. **Click Set-Baseline to reset all counters by saving them and displaying only the delta between the new values and the saved values.**

   After you have set the Set-Baseline field, the graph report only displays counter increments. The report also displays the start time and the duration of the baseline.

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

Switch FC Data

Use the Switch FC Data functionality to view the values of Fibre Channel counters.

1. **Select a Switch from the FC Counters for Switch pull-down menu to see the values of all six Fibre Channel counters.**

   After you have set the Set-Baseline field, the Switch FC Data report will display counter increments and the start time and the duration of the baseline, as shown in FIGURE 6-2.

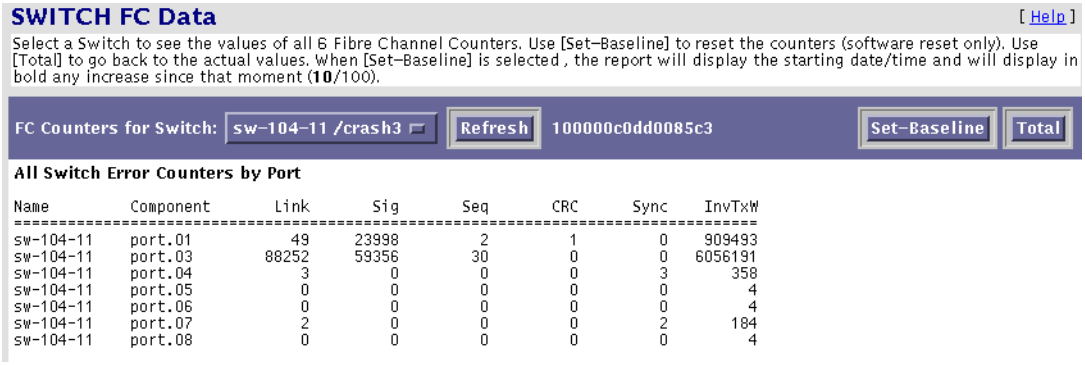


FIGURE 6-2 Switch FC Data Report

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

CHAPTER 7

Utilities

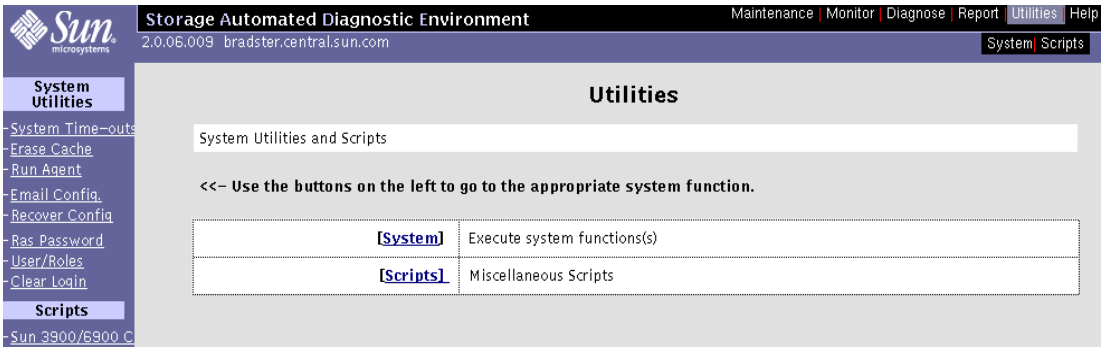
The Utilities section contains optional tools you can use for Storage Automated Diagnostic Environment administration.

System Utilities

The sections that follow explain how to perform the administrative tasks.

▼ To Access the System Utilities Page

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



2. **Click the System link.**

   The System window is displayed.

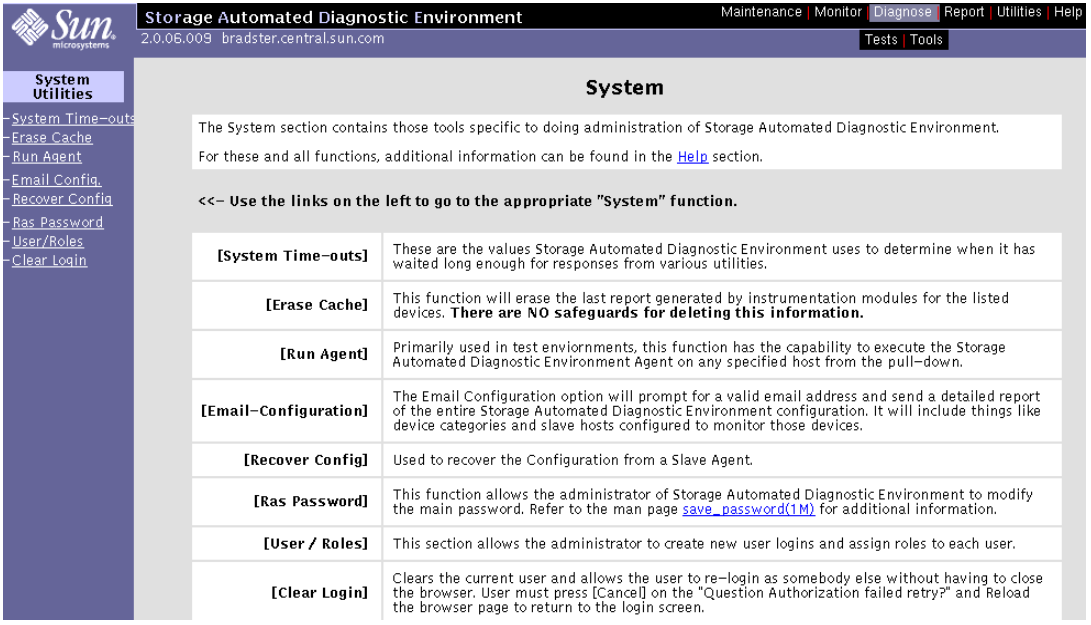


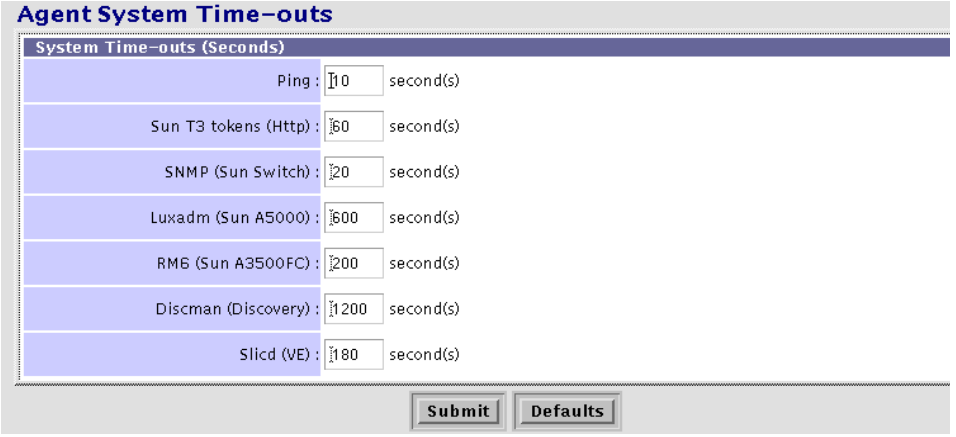
FIGURE 7-1 System Utilities window

System Time-Outs

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

▼ To Change System Time-Out Settings

1. **Click System Time-outs in the System window.**



2. **Change the default settings for scheduled time-outs and click Submit.**
3. **To return to the default settings, click Defaults.**

Erase 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 discovery events.

▼ To Erase a Device's Cache

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. **Click the device's corresponding Delete checkbox to erase the device's cache.**

   The device is removed from the list.

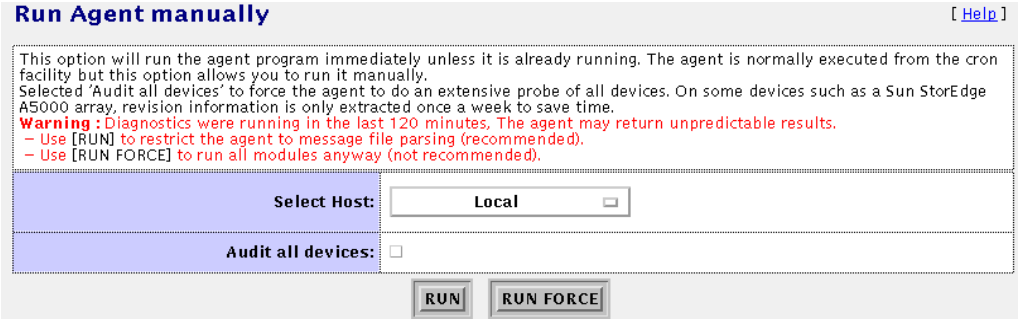
Caution – There are no safeguard messages for this function. Once you have selected a device, the instrumentation report for that device is immediately erased.

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 will continue to be monitored.

Run Agent

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

▼ To Run the Agent Manually



1. **Select a host from the Select Host pull-down menu and click RUN.**

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

Audit All Devices

On some devices, such as the Sun StorEdge A5000 device, the Storage Automated Diagnostic Environment automatically extracts revision information once a week.

If you click Audit All Devices, you manually force the Storage Automated Diagnostic Environment to run an extensive probe of all devices, rather than having to wait until the next scheduled run.

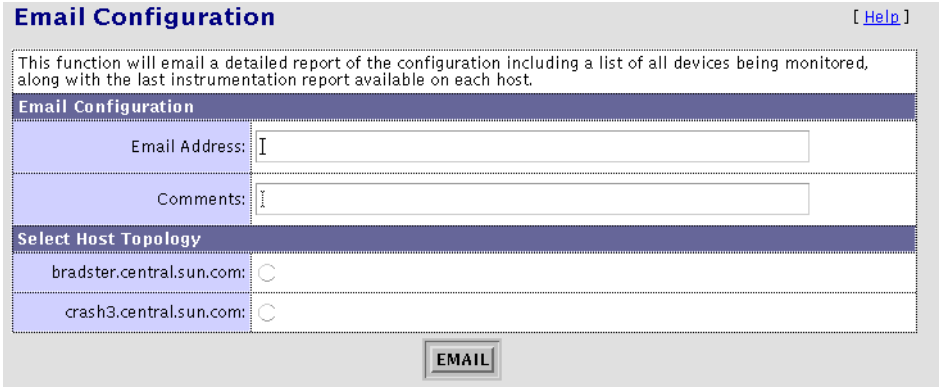
Email Configuration

▼ To Email Configuration Information

You can forward a detailed report of the Storage Automated Diagnostic Environment configuration by means of email that includes a list of all devices being monitored and the last instrumentation report available for each host. You can also forward topology information.

Email might not be sent if the system is not properly configured to send mail to the recipient. This is primarily evident in service processor environments where the service processors are on a subnet and there is no gateway to the intended recipient. Refer to the *Sun StorEdge 3900 and 6900 Series Hardware Installation and Service Manual* for more information.

1. **Click Email-Configuration in the System window.**

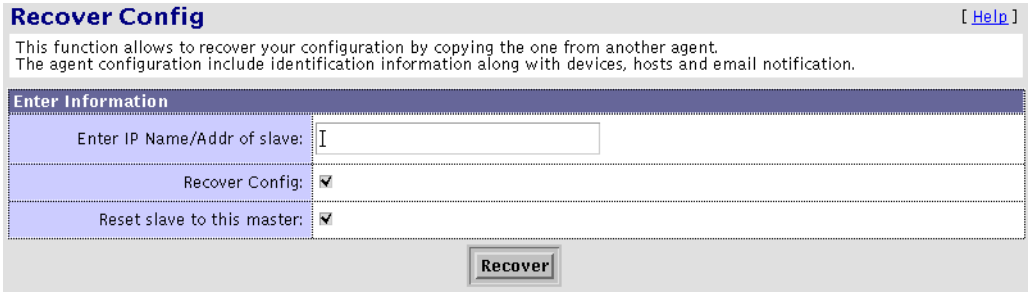


2. **Type an email address into the Email Address text box and click EMAIL.**

Note – The Email Configuration function enables Sun personnel to view customer information. Note, however, that in order to view the topology in an emailed configuration report, the browser must have access to Sun's Internal Wide Area Network (SWAN).

Recover Configuration

The Recover Configuration function enables you to recover the configuration from the Alternate Master. The configuration includes identification information, along with device, host, and email notification information.



Once the system has completed running, a message displays confirming recovery of the configuration file. A message is also sent to the email address specified in the Configuration file.

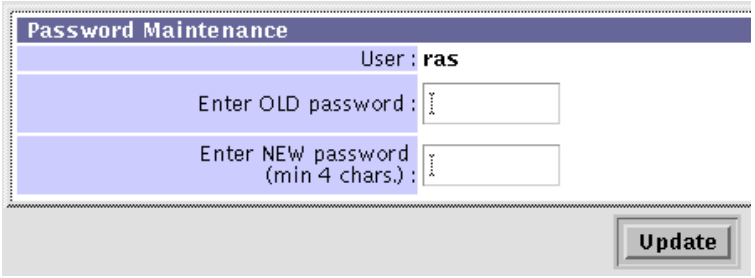
Recovered the Config file from diag176.central.sun.com

```
_name=host1
 active=N
 admin_email=yourself@yoursite
 categories=a5k
 contract=
 cust_no=1
 customer=christian
 email=rasagent@nscc.central.sun.com
 frequency=10
 host_adapter=S
 hostid=80b43b26
 hostname=diag245.central.sun.com
 last_push=10-04 22:42:26
 local_event_log=Y
 log_months=
 logfile=/var/adm/messages
 mailer=/usr/bin/mail
 max_event_file_size=4
 ping=
 pro.http.ip=http://system:2000/nscc30/InsertService
 pro.http.timeout=90
 pro.netconnect.active=N
 pro.netconnect.maxsize=2000
 pro.srs.active=N
 pro.srs.ip=192.9.228.81
 pro.srs.ip2=
 production=Y
```

Password Maintenance

Use the Password Maintenance window to change the security password for the Storage Automated Diagnostic Environment GUI.

- **Click Ras password in the System window.**



▼ To Change the Security Password

1. **You must know the current password. If you do not know the current password, use the `save_password`(1M) utility to create a new password.**

Note – The default login and password after initial installation are `ras/agent` (all lowercase).

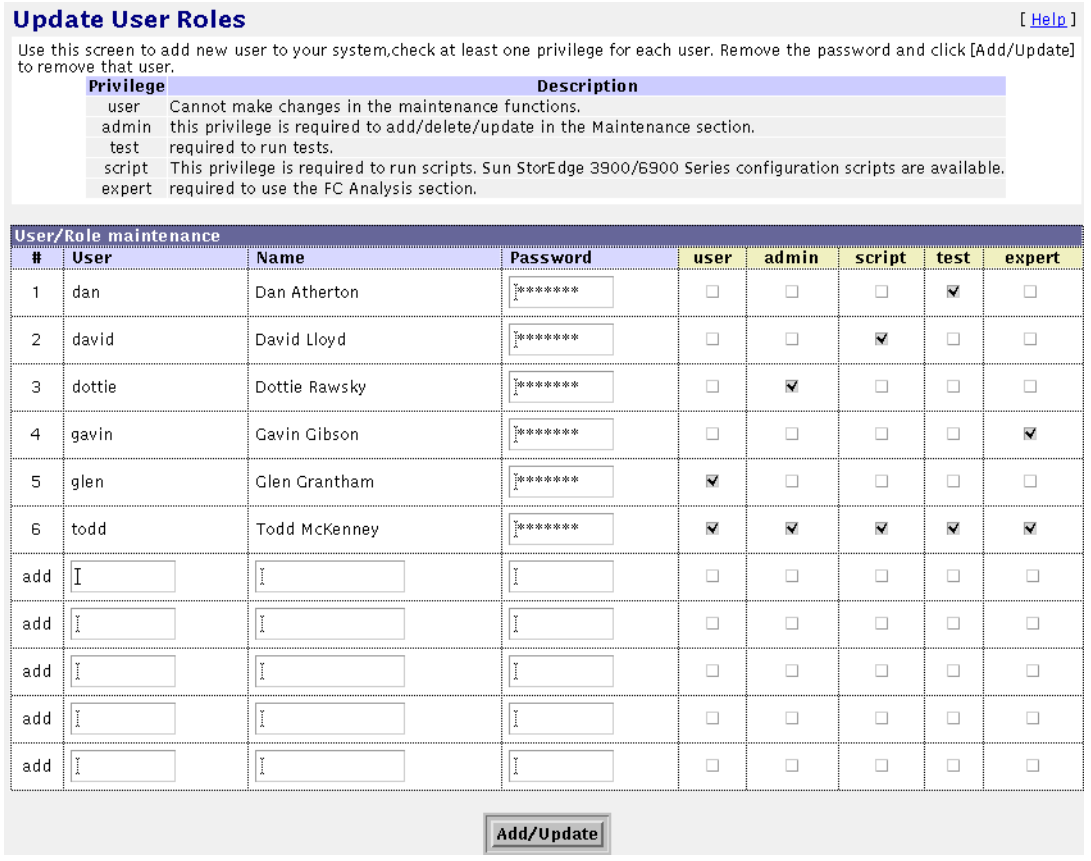
---

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

   The security password is changed.

Update User Roles

The Storage Automated Diagnostic Environment administrator can assign permission privileges for the categories listed in TABLE 7-1. In addition to assigning privileges, the administrator can add a new user, maintain passwords, and update or remove existing users.



Update User Roles [Help]

Use this screen to add new user to your system,check at least one privilege for each user. Remove the password and click [Add/Update] to remove that user.

Privilege	Description
user	Cannot make changes in the maintenance functions.
admin	this privilege is required to add/delete/update in the Maintenance section.
test	required to run tests.
script	This privilege is required to run scripts. Sun StorEdge 3900/6900 Series configuration scripts are available.
expert	required to use the FC Analysis section.

User/Role maintenance

#	User	Name	Password	user	admin	script	test	expert
1	dan	Dan Atherton	*******	☐	☐	☐	☑	☐
2	david	David Lloyd	*******	☐	☐	☑	☐	☐
3	dottie	Dottie Rawsky	*******	☐	☑	☐	☐	☐
4	gavin	Gavin Gibson	*******	☐	☐	☐	☐	☑
5	glen	Glen Grantham	*******	☑	☐	☐	☐	☐
6	todd	Todd McKenney	*******	☑	☑	☑	☑	☑
add				☐	☐	☐	☐	☐
add				☐	☐	☐	☐	☐
add				☐	☐	☐	☐	☐
add				☐	☐	☐	☐	☐
add				☐	☐	☐	☐	☐

Add/Update

TABLE 7-1 User Privileges

Privilege	Description
user	Cannot make changes in the maintenance functions
admin	Required to add, delete, or update in the Maintenance section
test	Required to run tests
script	Required to run scripts.
expert	Required to use the FC Analysis section.

Note – To remove a user, the administrator must delete the encrypted password and click Add/Update.

Clear Login

The Clear Login screen, which requires authorization, enables the user to login as a different user without having to exit from the browser.

Note – You must press Cancel to the “Question Authorization Failed Retry?” question and reload the browser to return to the login screen.

Sun StorEdge™ 3900 and 6900 Series Configuration

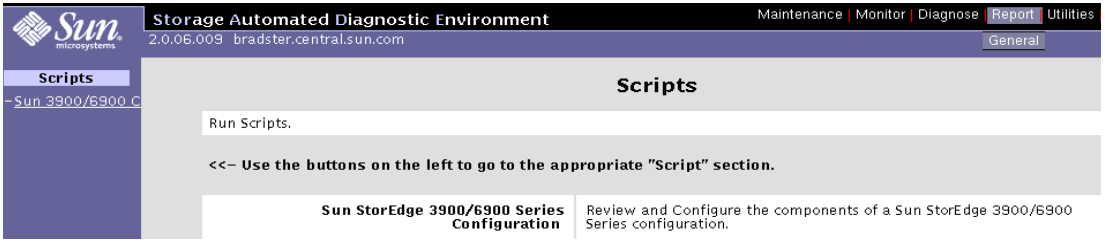
The hardware components for the Sun StorEdge 3900 and 6900 series include the Storage Service Processor, customer management connection, Sun StorEdge T3+ arrays, Fibre Channel switches, and a Sun StorEdge expansion cabinet. In addition, the Sun StorEdge 6900 series has a virtualization engine. These components can be displayed, configured, verified, and managed using the Sun StorEdge Configuration functionality.

The configuration options for the various components of the Sun StorEdge 3900 and 6900 series are defined in the following pages. For more information on the SUNWsefcg utility and how to use the options, please refer to the *Sun StorEdge 3900 and 6900 Series Reference Manual*.

Note – To utilize the Sun StorEdge 3900 and 6900 series configuration functionality, the machine must be registered in the Storage Automated Diagnostic Environment as a Sun StorEdge 3900 and 6900 series solution.

▼ To Access the Sun StorEdge 3900 and 6900 Series Configuration Window

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



2. **Click the Sun StorEdge 3900 and 6900 Series Configuration link.**

The Sun StorEdge 3900 and 6900 Series Configuration window is displayed.

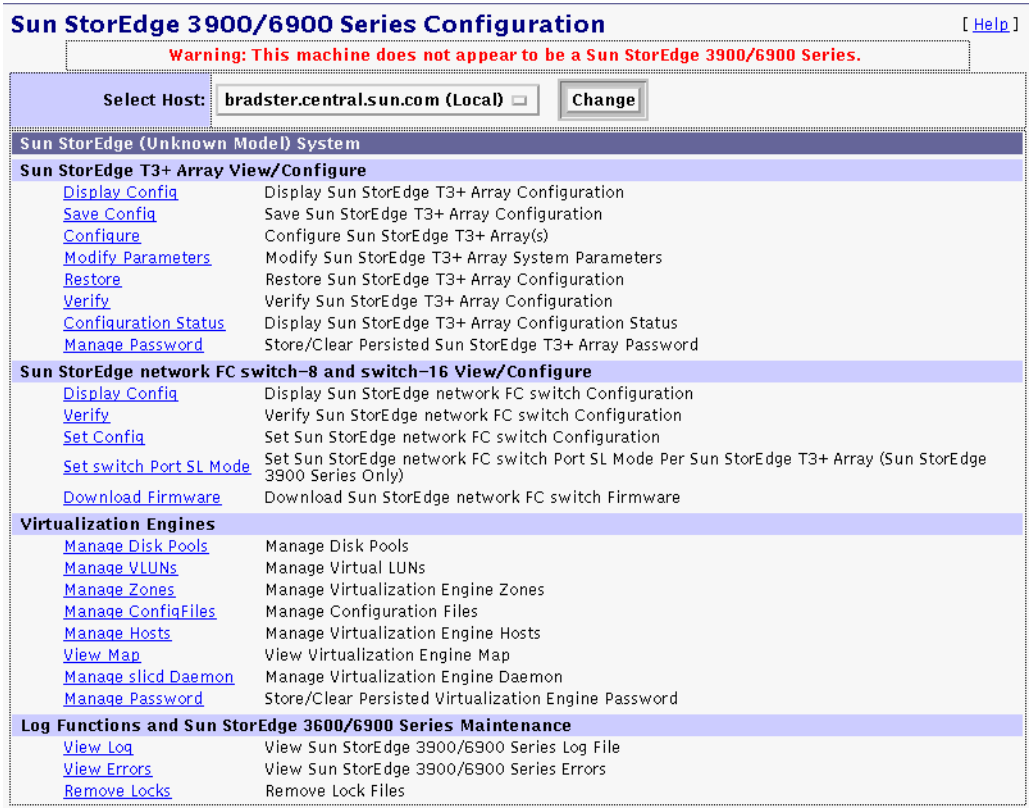


FIGURE 7-2 Sun StorEdge 3900 and 6900 Series Configuration

Sun StorEdge 3900 and 6900 Series Configuration Options

Sun StorEdge T3+ Array View / Configure

The Sun StorEdge T3+ array menu presents the following options:

TABLE 7-2 Sun StorEdge T3+ Array Configuration Options

Display Config	Reads and displays configuration information for the specified Sun StorEdge T3+ array partner group. It includes output from the following Sun StorEdge T3+ array commands: • `version` • `sys list` • `vol list` • `vol stat` • `port list` • `port listmap`
Save Config	Updates the Sun StorEdge T3+ array snapshot file after reading the array configuration. This information is saved to be reused if needed.
Configure	Steps you through a series of submenus that enable you to reconfigure Sun StorEdge T3+ arrays. After successful update of the configuration, the information is saved to the snapshot file. Supported RAID types include: • RAID 1 • RAID 5 • RAID 1 + RAID 5 In the RAID 1 + RAID 5 mixed-RAID types, each Sun StorEdge T3+ array has one RAID 1 volume consisting of three physical drives and a RAID 5 device consisting of five physical drives, plus a spare.
Modify Parameters	Modifies a Sun StorEdge T3+ array's system parameters.
Restore	Restores the Sun StorEdge T3+ array configuration with the static saved configuration from the snapshot file. This is a function that can be used in the event you lose a LUN or you must replace a Sun StorEdge T3+ array.
Verify	Checks and verifies that the current Sun StorEdge T3+ array configuration is the same as the most recently-saved version of the configuration in the snapshot file.
Configuration Status	Displays the Sun StorEdge T3+ array(s) that are being configured.
Manage Password	Store or clears a persistent Sun StorEdge T3+ array telnet password.

/etc/syslog.conf

```
# messages to syslogd on another host
#*.info @stradic
# *.warn @192.29.207.216
# *.warn @192.29.207.241
# *.warn @192.29.207.242
# *.warn @192.29.207.208

# messages sent as SNMP traps
# *.warn | snmp_trap tomm
```

FIGURE 7-3 Example #1 of a Sun StorEdge T3+ Array Configuration

/etc//hosts

```
# Internet host table
#
# 127.0.0.1 localhost
# 10.4.46.224 isa-224 loghost
```

FIGURE 7-4 Example #2 of a Sun StorEdge T3+ Array Configuration

Example Host Configuration

```
# /etc/syslog.conf

local7.notice /var/adm/messages.t3
```

```
# touch /var/adm/messages.t3
```

```
# ps -ef | grep syslog
```

```
# kill -HUP (pid)
```

```
# edit /etc/fcswitch.conf

# Sample configuration file for Qlogic Switches
#
# Enter switch IP address and name
# Note: The name is optional
#
# 10.0.0.1 switch1
# 10.0.0.2 switch2
# 10.4.46.229 isa-229
# 10.4.46.230 isa-230
# 10.4.46.231 isa-231
# 10.4.46.232 isa-232
# 10.4.46.233 isa-233
# 10.4.46.234 isa-234
```

Sun StorEdge Network FC Switch-8 and Switch-16 Switch View / Configure

The Switch menu presents the following options:

TABLE 7-3 Sun StorEdge Network FC Switch-8 and Switch-16 Configuration Options

Display Config	Displays the specified switch's configuration, including the following: • IP address configuration • Number of ports • Version information • Port status and type • Zones
Verify	Verifies that the configuration of the specified switch matches the predefined static configuration for that switch, based on the cabinet type (Sun StorEdge 3900 series or Sun StorEdge 6900 series).
Set Config	Configures the specified switch to a predefined static configuration, based on cabinet type and location (top or bottom switch for Sun StorEdge 6900 series).
Set Switch Port SL Mode	Sets the switch SL mode for a Sun StorEdge T3+ array (the StorEdge 3900 Series only).
Download Firmware	Downloads the flash code to the Sun StorEdge network FC switch-8 or switch-16 switch and resets it. The flash code is automatically loaded from the appropriate file from the `/usr/opt/SUNWsmgr/flash` directory.

Virtualization Engines

The virtualization engines configuration menu presents the following options:

TABLE 7-4 Virtualization Engine Configuration Options

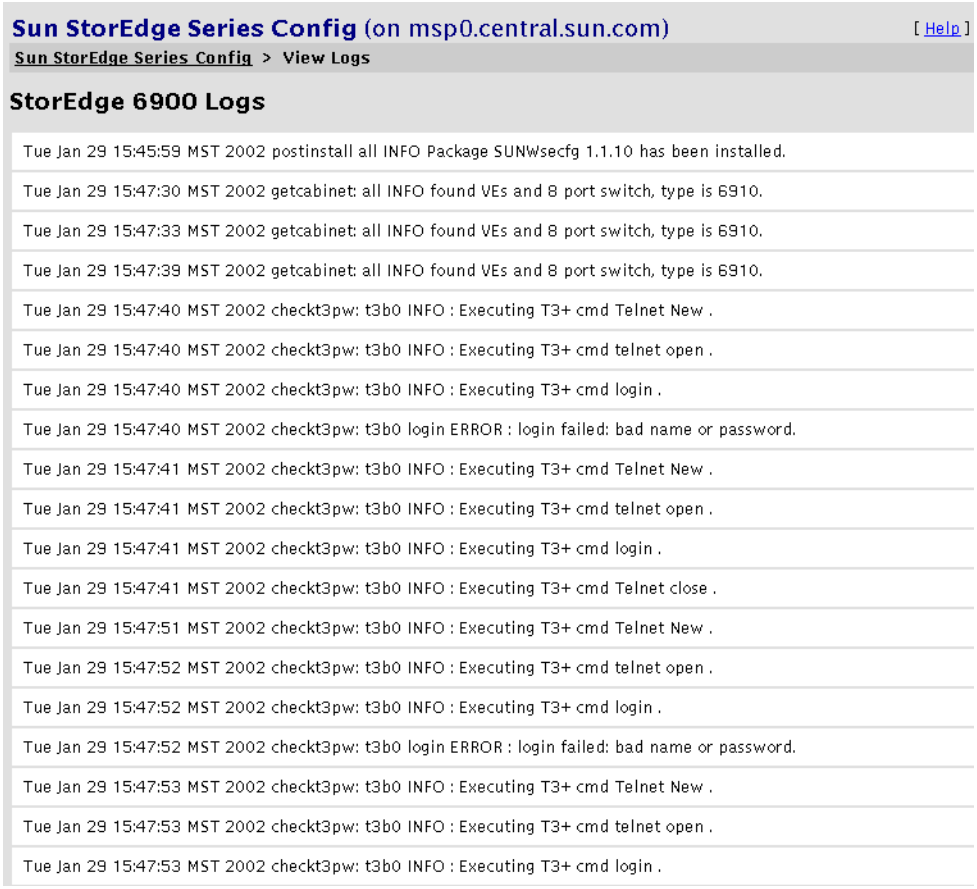
Manage Disk Pools	Enables you to create and remove disk pools that map to physical LUNs on the specified Sun StorEdge T3+ array. These are the physical LUNs that can be used to creat VLUNs. The options on the submenus include: • Create Disk Pools • Remove Disk Pools
Manage VLUNs	Enables you to create and remove VLUNs. The options on the submenus include: • Create VLUNs • Remove VLUNs
Manage Zones	Presents the following options: • Create virtualization engine zones • Add components to virtualization engine zones • Delete components from virtualization engine zones • Remove virtualization engine zones
Manage Config Files	Presents the following options: • View virtualization engine map • Save virtualization engine map • Restore virtualization engine map • Verify virtualization engine map
Manage Hosts	Manages the virtualization engine host
View Map	Displays the current configuration of the specified virtualization engine
Manage slicd Daemon	Manages the virtualization engine daemon
Manage Password	Stores or clears the virtualization engine telnet password

Log Functions and Sun StorEdge 3900 and 6900 Series Maintenance

You can review the content of the Sun StorEdge 3900 and 6900 Series Configuration log files. Log entries are displayed from the end of the file going back; the most recent entries are displayed last.

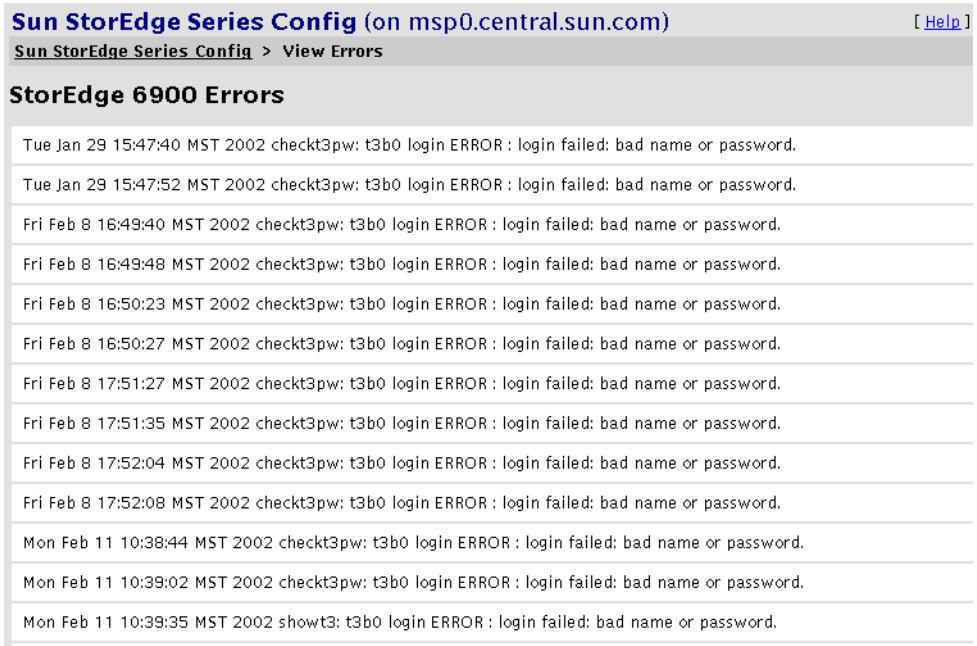
View Log

The View Log option enables you to look at all the logs containing messages about the configuration actions taken.



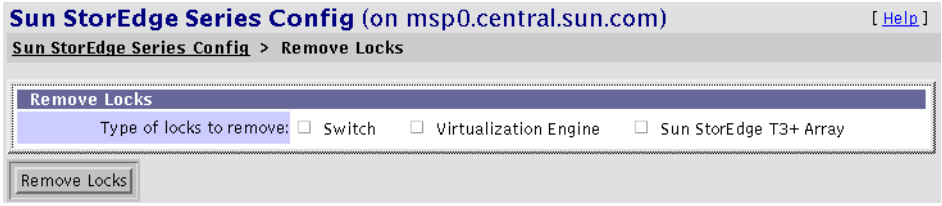
View Errors

The View Errors option enables you to look at all the errors that have occurred on a given host. The errors are sorted by date, the most recent are displayed last.



Remove Locks

Using the Remove Locks functionality, you can remove lock files on the Sun StorEdge network FC switch-8 and switch-16 switch, the virtualization engines, and / or the Sun StorEdge T3+ array.



Note – Use the Remove Locks function only if you know the device *is not* in use, but the Sun StorEdge 3900 and 6900 Series Configuration shows that the device *is* in use.

CHAPTER 8

Storage Automated Diagnostic Environment Help

This chapter explains the GUI online help and the command-line utilities help associated with the Storage Automated Diagnostic Environment.

Site Map

The following site map shows the Storage Automated Diagnostic Environment and its functionality at a glance. Online Help is available for each topic.

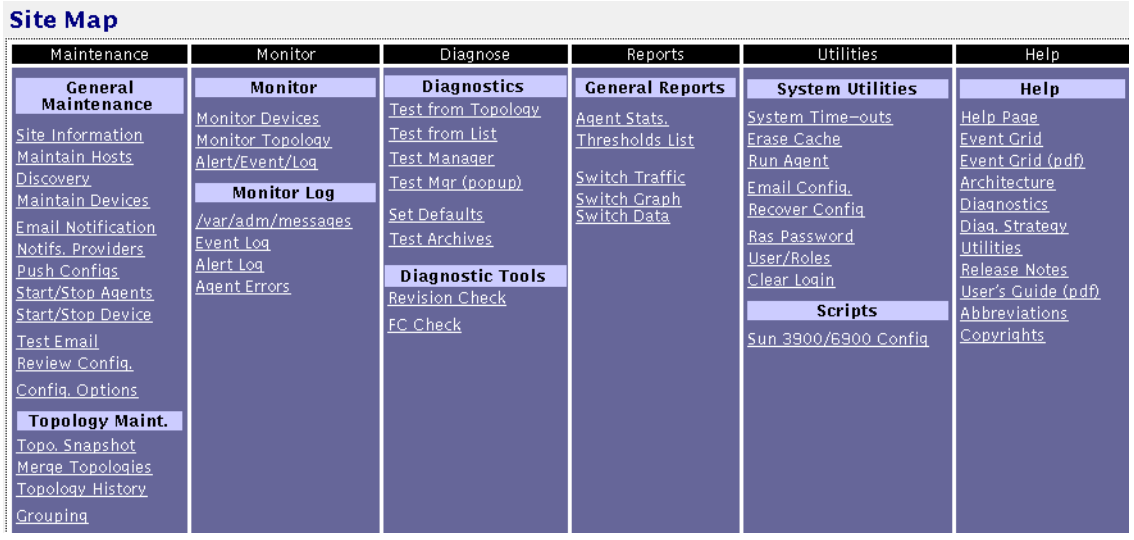
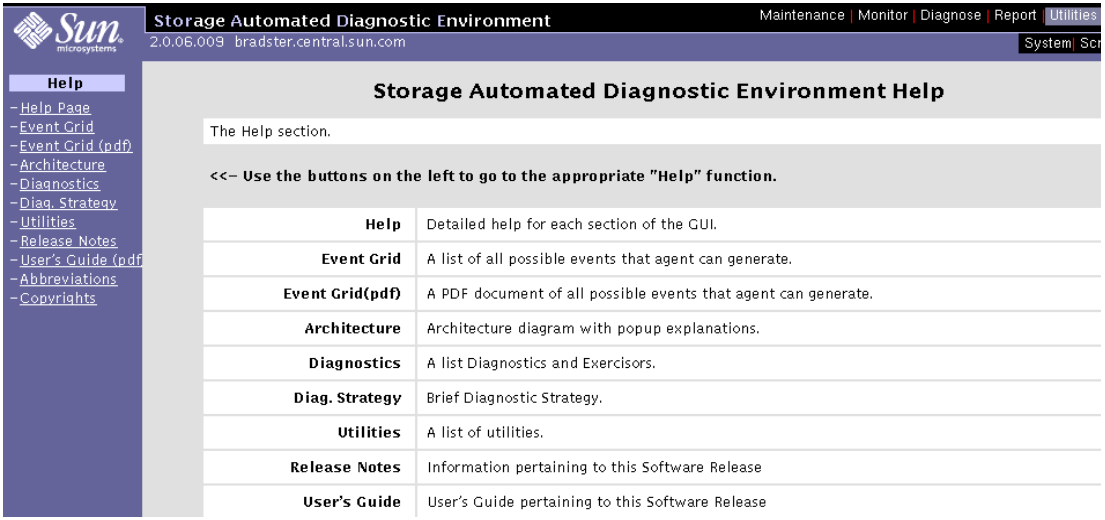


FIGURE 8-1 Storage Automated Diagnostic Environment Site Map

▼ To Access the Online Help

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



2. **Click the Help Page link on the Help menu in the left frame.**

   The Storage Automated Diagnostic Environment Help window is displayed.

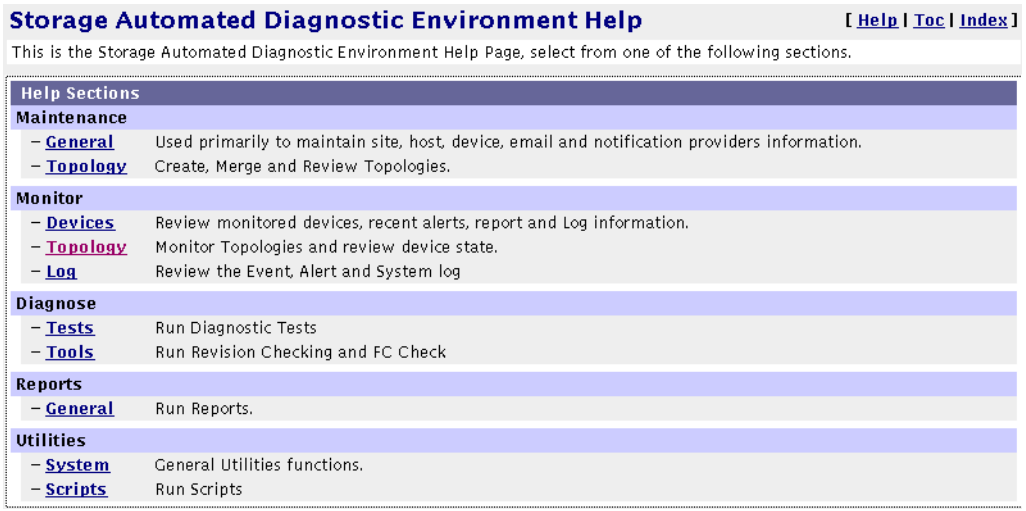


FIGURE 8-2 Storage Automated Diagnostic Environment GUI Online Help

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

Storage Automated Diagnostic Environment Event Grid

The Event Grid shows all the actionable and non-actionable events Storage Automated Diagnostic Environment can generate.

▼ To Customize an Event Report

1. **Click the Event Grid link on the Help menu.**
2. **Select the criteria from the Storage Automated Diagnostic Environment event grid, like the one shown in** FIGURE 8-3**.**

Event Grid [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. (EventGrid)

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

+ Cat	Comp.	EventType	Sev.	Action	Description
a3500fc	enclosure	Audit			[Info] Auditing a new a3500fc with ID:a3500fc.da106_004
a3500fc	ib	Comm_Established			Communication regained with A3500fc called DPL4
a3500fc	ib	Comm_Lost		Y	[Info/Action] Lost communication with A3500FC called DPL4
a3500fc	a3500fctest	DiagnosticTest–			a3500fctest (diag240) on a3500fc.da106_004 failed
a3500fc	enclosure	Discovery			[Info] Discovered a new a3500fc with ID:a3500fc.da106_004
a3500fc	controller	InsertComponent			[Info] Component 'controller.b:XX' was added to da106_004 'a3500fc.da106_004
a3500fc	disk	InsertComponent			[Info] Component 'disk.1:SEAGATE.LT02926900' was added to da106_004 'a3500fc.da106_004'
a3500fc	enclosure	LocationChange			Location of a3500fc called DPL4 was changed
a3500fc	controller	RemoveComponent		Y	[Info/Action] Component 'controller.b:XX' was removed from da106_004 'a3500fc.da106_004
a3500fc	disk	RemoveComponent		Y	[Info/Action] Component 'disk.1:SEAGATE.LT02926900' was removed from da106_004 'a3500fc.da106_004'
a3500fc	disk	StateChange+			disk.0 (SEAGATE.LT04183900) in A3500FC 'da106_004' (a3500fc.da106_004) is now Available (status–state changed from 'Degraded' to 'Optimal')
a3500fc	controller	StateChange–		Y	[Info/Action] controller.a (Symbios.1T93200466) in A3500FC 'da106_004' (a3500fc.da106_004) is now Not–Available (status–state changed from 'Active' to 'Error')
a3500fc	disk	StateChange–		Y	[Info/Action] disk.0 (SEAGATE.LT04183900) in A3500FC 'da106_004' (a3500fc.da106_004) is now Not–Available (status–state changed from 'Optimal' to 'Degraded')

FIGURE 8-3 Storage Automated Diagnostic Environment Event Grid

3. **For more diagnostic information, click the Info/Action link from the Description field.**

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

Note – The Storage Automated Diagnostic Environment Event Grid is intended to be used interactively, but it is also printable. Before printing the Event Grid, run the page with the ReportFormat checkbox enabled; to see all the details about each event. Otherwise, you must click the **[details]** link to see details, one event at a time.

Storage Automated Diagnostic Environment Architecture

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

   The Storage Automated Diagnostic Environment Architecture Diagram, as shown in FIGURE 8-4, is displayed.

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

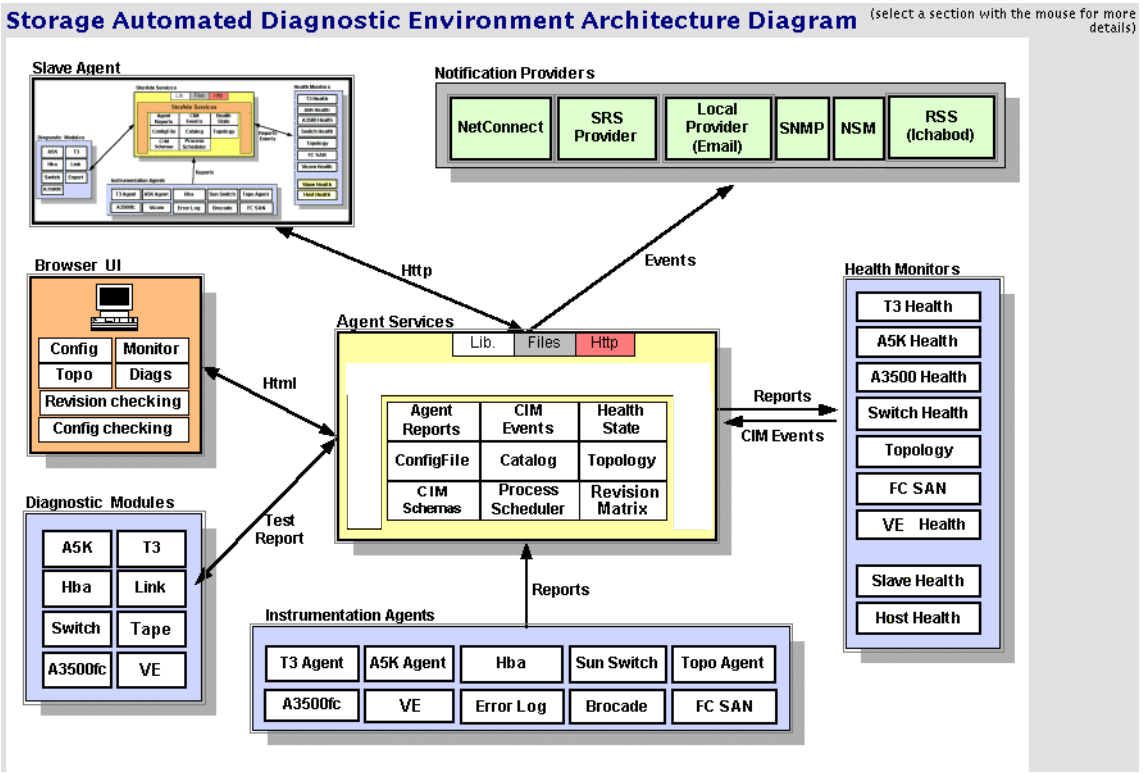


FIGURE 8-4 Storage Automated Diagnostic Environment Architecture Diagram

TABLE 8-1 Storage Automated Diagnostic Environment Component Definitions

Slave Agent	Each Slave Agent includes the same functionality as the Master Agent: • Tests • Instrumentation • Event Generation 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. • NSM—The Network Storage Manager (NSM) provider sends events to the NSM console. • NetConnect—A common information model (CIM) provider that requests information, converts the information to the appropriate format, and relays it to NetConnect. • SRS—The Sun Remote Services (SRS) provider accepts and sends information in xml format. • SNMP Traps—Enables the Storage Automated Diagnostic Environment to send traps for all actionable events that occur during monitoring to external management systems. • RSS—Uses modem technology with Unix-to-Unix Communication Protocol (UUCP). RSS software is required on the host and must be configured accordingly. • *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: • A database of current instrumentation reports • All CIM schemas (mof files) required to generate events • The current configuration of all agents • Topology functions • The current state of each storage device • A database of diagnostic processes • 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. 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.

Utilities

The explanations of the various diagnostics tests associated with the Storage Automated Diagnostic Environment, shown in FIGURE 8-5, are available from the command line. These utilities also have man(1M) pages.

Storage Automated Diagnostic Environment Diagnostics Tests

The Storage Automated Diagnostic Environment diagnostics tests are defined in TABLE 8-2 and are located in `/opt/SUNWstade/Diags/bin`. Refer to the man pages for more detail.

Storage Automated Diagnostic Environment Diagnostics / Exercisors

All diagnostics are located in /opt/SUNWstade/Diags/bin, refer to the man pages for more details.

Diagnostic	Description
a3500fctest	In-band diagnostic for Sun StorEdge A3500FC LUNs attached via the host data-path.
a5ksestest	In-band diagnostic for Sun StorEdge A5000 Enclosures attached via the host data-path.
a5ktest	In-band diagnostic for Sun StorEdge A5000 disk drives attached via the host data-path.
fctapetest	In-band diagnostic for FC tape drives attached via the host data-path.
ifptest	Sun StorEdge QLC 2100 HBA diagnostic for HBAs using the ifp driver
qlctest	Sun StorEdge QLC 2200 HBA diagnostic for HBAs using the qlc driver.
socaltest	Sun StorEdge Soc+ HBA diagnostic for HBAs using the socal driver.
linktest	The linktest is designed to test two end points of a FC link segment and assist the user in FRU isolation of the link segement. This test is typically run when the FCAL topology indicates a link problem. i.e. A red link.
switchtest	Out-of-band diagnostic for testing ports on Sun StorEdge Network FC switch-8 and switch-16.
t3test	In-band diagnostic for Sun StorEdge T3 and T3+ LUNs attached via the host data-path.
t3ofdg	Out-of-band diagnostic for Sun StorEdge T3 and T3+ LUNs attached via the an enet connection. t3ofdg will test all of the FRUs within the T3 enclosure
t3volverify	Out-of-band diagnostic for Sun StorEdge T3 and T3+ LUNs attached via the an enet connection. t3volverify will execute the volume verify function on the selected T3.
vediag	Out-of-band diagnostic for Virtualization Engine (VE) attached via the an enet connection. Instantiates and monitors diagnostics on the virtualization engine.
veluntest	In-band diagnostic for Virtualization Engine VE attached storage. Verifies the functionality of the in-band virtualization engine Sun StorEdge 3900/6900 Series LUN(s).
Exercisors	
dex	In-band exercisor for all disk drives attached via the host data-path.
lbf	In-band exercisor for FC loops(media) utilizied by the host Sun StorEdge HBAs soc+ and QLC 2200.

FIGURE 8-5 Storage Automated Diagnostic Environment Commands

Diagnostics Utilities

TABLE 8-2 Storage Automated Diagnostic Environment Diagnostic Commands

`a3500fctest`(1M)	Verifies the functionality of the Sun StorEdge A3500FC array using the two subtests provided
`a5ksestest`(1M)	Provides configuration verification, fault isolation, and repair validation of Sun StorEdge A5200 array
`a5ktest`(1M)	Verifies the functionality of the Sun StorEdge A5200 array
`brocadetest`(1M)	Verifies the functionality of the Brocade Silkworm switch ports
`fctapetest`(1M)	Tests the Fibre Channel tape drive
`ifptest`(1M)	Tests the functionality of the Sun StorEdge PCI FC-100 host adapter board.
`qlctest`(1M)	Tests the functions of the Sun StorEdge PCI Dual Fibre Channel host adapter board.
`socaltest`(1M)	Validates and performs fault isolation on the Sun StorEdge SBus FC-100 host adapter board.
`linktest`(1M)	Tests two end points of a Fibre Channel link segment and assists in FRU isolation of the link segment. This test is typically run when the FCAL topology indicates a problem.
`switchtest`(1M)	Diagnoses the Sun StorEdge network FC switch-8 and switch-16 switches
`t3test`(1M)	Verifies the functionality of the Sun StorEdge T3 and T3+ array
`t3ofdg`(1M)	Tests all of the FRUs within the Sun StorEdge T3 and T3+ array enclosure. The `t3ofdg` is an out-of-band diagnostic test for Sun StorEdge T3 and T3+ array LUNs attached through an Ethernet connection.
`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+ array.
`vediag`(1M)	Out-of-band diagnostic for the virtualization engine attached through an Ethernet connection. Instantiates and monitors diagnostics on the virtualization engine.
`veluntest`(1M)	In-band diagnostic for virtualization engine attached storage. Verifies the functionality of the in-band virtualization engine LUN(s).

Storage Automated Diagnostic Environment Agent Utilities

The Storage Automated Diagnostic Environment Agent utilities that are defined in TABLE 8-3 are located in the `/opt/SUNWstade/bin` directory. Refer to the man pages for more detail.

Storage Automated Diagnostic Environment utilities

All utilities are located in /opt/SUNWstade, see the man pages for more details

Program	Description
bin/checkcron	If executed from the command line, this executable program verifies that the executable program "rasagent" is entered in the crontab(1M) file. **Note:** You must be root to run this program.
bin/clearcache	If executed from the command line, this executable program will remove the instrumentation information for all the configured devices from the CACHE. This is typically used during testing purposes so that a DiscoveryEvent can be forced to occur upon the next execution of the Storage Automated Diagnostic Environment Agent.
disk_inquiry	Used by Storage Automated Diagnostic Environment to discover devices on the data-path that are using SCSI commands.
bin/ras_install	This program will set-up the HTTP service, add a cron and register with the master Storage Automated Diagnostic Environment Agent in the case of a slave install. It must be run manually upon completing the 'pkgadd'. This program can be executed anytime after the initial execution and setup when a modification to the cron is desired or to change the Master/Slave title of a Host agent. Refer to the User's Guide before making changes.
bin/rasagent	This is the executable program that calls the modules for the different Network Storage Devices supported by this monitoring agent. It is executed automatically by cron or can be run manually from the command line. Keep in mid however, if run from the command line, rasagent will first check that another process for rasagent is not already running.
bin/save_password	Utility used by the system administrator to change the password to Storage Automated Diagnostic Environment's graphical user interface. Changing the password can also be performed in the GUI itself. However this utility would be used from the command line when the administrator forgot the password. Usage: save_password <password>
bin/sanbox	Utility used by Storage Automated Diagnostic Environment to gather Fibre Channel Switch information.
bin/testt3	Verify that the tokens of a specific T3 are working. T3 token files **elemprop.html** and **sysprop.html** must be available for the Storage Automated Diagnostic Environment probing capabilities to work properly. Running this utility from the command will require that the IP Address of the T3 being probed is known. Usage: testt3 <ip_address>

FIGURE 8-6 Storage Automated Diagnostic Environment Agent Commands

TABLE 8-3 provides descriptions for commands available for the Storage Automated Diagnostic Environment Agent functions.

TABLE 8-3 Storage Automated Diagnostic Environment Agent Commands

`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_install`(1M)	Sets up the HTTP service, adds a `cron`, and registers with the master agent during a slave install. It must be run manually upon executing the `pkgadd` command.
`sanbox`(1M)	Displays Fibre Channel switch information
`save_password`(1M)	Changes the password to the Storage Automated Diagnostic Environment GUI. This function can also be performed in the GUI itself. `save_password` is usually used if the system administrator forgets the password.
`testt3`(1M)	Retrieves tokens from a Sun StorEdge T3 and T3+ array. It verifies whether the IP address used is correct and whether the IP address points to a Sun StorEdge T3 and T3+ array that can provide tokens.

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