



Storage Automated Diagnostic Environment 2.3 Getting Started Guide

Device Edition

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Preface

The *Storage Automated Diagnostic Environment 2.3 Getting Started Guide* describes the Storage Automated Diagnostic Environment 2.3 software and, where applicable, refers the user to online help topics. This guide instructs the user how to install and configure the software, and lists the basic installation steps that are required prior to starting the software.

The following products are supported by the device edition of the Storage Automated Diagnostic Environment software:

- Sun StorEdge™ T3, T3+, 6020, and 6120 array
- Sun StorEdge A5000 and A5200 array
- Sun StorEdge A3500FC array
- Sun StorEdge D2 array
- Sun StorEdge 3510 Fibre Channel array
- Sun StorEdge 9900 series
- 1-Gbit and 2-Gbit Sun StorEdge network FC switch-8 and switch-16 switch
- 1-Gbit and 2-Gbit Brocade Silkworm switch
- 2-Gbit McData switch
- Inrange switch
- 1-Gbit and 2-Gbit Sun StorEdge Fibre Channel network adapter (HBA)
- Internal Fibre Channel disk
- Fibre Channel tape
- Sun Fire™ V880 server

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 information about the Storage Automated Diagnostic Environment.

Chapter 2 contains detailed installation information for the Storage Automated Diagnostic Environment software.

Chapter 3 contains detailed configuration information for the Storage Automated Diagnostic Environment software. In addition, it contains information about upgrading and removing the software, and starting the software. Finally, because the Sun™ Management Center provider requires special installation and configuration, this information is also included in this chapter.

Using UNIX Commands

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

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- 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 <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized Command-line variable; replace with a real name or value	Read Chapter 2 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

Shell Prompts

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

Product Abbreviations Used in Software

The following table contains a list of the trademarked Sun product names and the abbreviations used in the Storage Automated Diagnostic Environment.

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
Sun StorEdge 6020 and 6120 array	Sun 6120
Sun StorEdge D2 array	D2 Array
Internal Fibre Channel Disk	FC-Disk
Sun StorEdge 3510 Fibre Channel array	3510
Sun StorEdge 9900 series	9900
Fibre Channel Tape	FC-Tape
Sun StorEdge network 2 Gbit FC Switch 16	Sun-2 Gbit Switch
Sun StorEdge 1 Gbit network FC switch-8 and switch-16 switch	Sun Switch
Brocade Silkworm switch	Brocade Switch
Sun Fire 880 FC-AL Disk	V880-Disk
Virtualization Engine	VE

Related Sun Documentation

TABLE P-1 Related Sun Documentation

Product	Title	Part Number
Sun StorEdge T3+ array	• <i>Sun StorEdge T3+ Array Installation and Configuration Manual</i>	816-4769
	• <i>Sun StorEdge T3 and T3+ Array Administrator's Guide</i>	816-0776
Sun StorEdge 6120 Array	• <i>Start Here Installation and Document Reference</i>	817-0198
	• <i>Important Safety Information for Sun Hardware Systems</i>	816-7190
	• <i>Sun StorEdge 6120 Array Installation Guide</i>	817-0199
	• <i>Sun StorEdge 6020 and 6120 Array System Manual</i>	817-0200
	• <i>Sun StorEdge 6120 Array Release Notes</i>	817-0201
	• <i>Sun StorEdge 6120 Array Troubleshooting Guide</i>	817-0828
Sun StorEdge Host Adapter	• <i>Sun StorEdge PCI FC-100 Host Adapter Installation Manual</i>	805-3682
	• <i>Sun StorEdge SBus FC-100 Host Adapter Installation and Service Manual</i>	802-7572
		806-5857
	• <i>Sun StorEdge PCI Dual FC Host Adapter Product Notes</i>	806-4199
	• <i>Sun StorEdge PCI Dual Fibre Channel Host Adapter Installation Guide</i>	816-5000
	• <i>Sun StorEdge 2G FC PCI Single Channel Network Adapter Product Notes</i>	816-4999
	• <i>Sun StorEdge 2G FC PCI Single Channel Network Adapter Installation Guide</i>	816-5002
	• <i>Sun StorEdge 2G FC PCI Dual Channel Network Adapter Product Notes</i>	816-5001
	816-5001	
Sun StorEdge A5000 array	• <i>Sun StorEdge StorTools User's Guide</i>	806-1946
	• <i>Sun StorEdge StorTools Release Notes</i>	806-1947
	• <i>Sun StorEdge A5000 Product Notes</i>	805-1018
	• <i>Sun StorEdge A5000 Configuration Guide</i>	805-0264
	• <i>Sun StorEdge A5000 Installation and Documentation Guide</i>	805-1903
Sun StorEdge A3500/A3500FC array	• <i>Sun StorEdge A3500/A3500FC Hardware Configuration Guide</i>	805-4981
	• <i>Sun StorEdge A3500/A3500FC Controller Module Guide</i>	805-4980
	• <i>Sun StorEdge A3500/A3500FC Task Map</i>	805-4982
Sun StorEdge D2 array	• <i>Sun StorEdge D2 Array Installation, Operation and Service Manual</i>	816-2578
	• <i>Sun StorEdge D2 Array Release Notes</i>	816-1718
	• <i>Sun StorEdge D2 Array Cabinet Installation Guide</i>	816-1696

TABLE P-1 Related Sun Documentation

Product	Title	Part Number
Sun Fire V880 Disk Server	• <i>Sun Fire 880 Server Service Manual</i>	806-6597
	• <i>Sun Fire 880 Server Rackmounting Guide</i>	806-6594
	• <i>Sun Fire 880 Server Owner's Guide</i>	806-6592
	• <i>Sun Fire 880 Server Product Notes</i>	806-6593
Sun StorEdge network FC switch-8 and switch-16	• <i>Sun StorEdge Network FC Switch-8 and Switch-16 Field Troubleshooting Guide, SAN 3.1 Release</i>	816-1701
Sun StorEdge SAN 4.0 (1 Gb switches)	• <i>Sun StorEdge SAN 4.0 Release Guide to Documentation</i>	816-4470
	• <i>Sun StorEdge SAN 4.0 Release Installation Guide</i>	816-4469
	• <i>Sun StorEdge SAN 4.0 Release Configuration Guide</i>	806-5513
	• <i>Sun StorEdge Network 2 Gb FC Switch-16 FRU Installation</i>	816-5285
	• <i>Sun StorEdge SAN 4.0 Release Notes</i>	816-4472
Sun StorEdge SAN 4.1 (2 Gb switches)	• <i>Sun StorEdge SAN Foundation 2 Gb FC Switch-8 and Switch-16 Guide to Documentation</i>	817-0061
	• <i>Sun StorEdge SAN Foundation Installation Guide (Version 4.1)</i>	817-0056
	• <i>Sun StorEdge SAN Foundation Configuration Guide (Version 4.1)</i>	817-0057
	• <i>Sun StorEdge Network Brocade Silksworm Switch Guide to Documentation</i>	817-0062
	• <i>Sun StorEdge Network 2 Gb McData Intrepid 3200, 3800, 6064, and 12000 Director Guide to Documentation</i>	817-0063
	• <i>Sun StorEdge SAN Foundation Release Notes (Version 4.1)</i>	817-0071
RAID Manager 6.22	• <i>RAID Manager 6.22 User's Guide</i>	806-0478
	• <i>RAID Manager 6.22 Release Notes Addendum</i>	806-3721

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Related Brocade Documentation

The following Brocade documentation is available on the Brocade web site.

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

Accessing the Brocade Documentation

1. **Go to** <http://www.brocade.com>.
2. **Click the Partnerships link.**
3. **Under Brocade Partner Network, click Log In.**
4. **Enter your user ID and your password.**

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Please include the part number (*817-3283*) of the document in the subject line of your email.

Introduction

This chapter is intended for system administrators and requires some knowledge of UNIX (Solaris).

This chapter includes the following main topics:

- “Overview of the Storage Automated Diagnostic Environment” on page 1
- “Commands Used for Monitoring” on page 14

Overview of the Storage Automated Diagnostic Environment

The following sections describe the overall Storage Automated Diagnostic Environment, including the following topics:

- Use of daemons and crons
- Probing techniques used to monitor devices
- Notification Providers
- Event generation structure

What Is the Storage Automated Diagnostic Environment?

Storage Automated Diagnostic Environment 2.3 is a distributed application used to monitor and diagnose problems with Sun storage products, Sun-supported switches and Sun virtualization products. The primary functions of the Storage Automated Diagnostic Environment software are:

- Device health monitoring
- Event generation
- Topology discovery and presentation
- Diagnostics
- Revision checking
- Device and FRU reporting.

The Storage Automated Diagnostic Environment depends on agents installed in-band (on the data path) and out-of-band (Ethernet) to perform its monitoring. Installing the Storage Automated Diagnostic Environment package on a server adds a `cron` entry to the server and a Storage Automated Diagnostic Environment-specific HTTP service.

The `cron` utility wakes up the Storage Automated Diagnostic Environment agent periodically (the frequency is tunable) to probe devices and monitor log files. A configuration file maintained in the Storage Automated Diagnostic Environment browser user interface (BUI) is used to maintain the list of devices that the agent(s) should monitor. One instance of these agents is configured as the *master agent*. All other instances are reported by agents, that are configured as slave agents, through alerts and events to the master agent for further processing. Events are generated with Event Advisor content, such as recommended actions, to help facilitate isolation to a single FRU.

Master Agent

The main function of the master agent is to expose the monitoring database (including configuration, instrumentation reports, events, health, and topology) through a browser user interface (BUI) and to send all messages to event consumers (called Notification Providers in the BUI). The master BUI centralizes all configuration functions for both master and slave agents. There is no need to point a browser to a slave server to configure a slave agent. Events can be sent as local email to administrators of the site or as alerts and events back to Sun using remote notification providers.

Alternate Master

An *alternate master* is a slave that, on every run of the `cron`, verifies that the master is still alive and, if the master does not respond, takes over some of the responsibilities of the master. All slaves, including the alternate master, have a copy of the complete configuration. This configuration describes where all the agents are located. This information enables the alternate master to call the slaves and temporarily redirect the flow of events from the master to the alternate master.

Since the master is responsible for sending events and email messages, one of the main functions of the alternate master is to alert the administrator that the master server is no longer operational. The alternate master does not try to become the master; it will, however, remember which agent is the real master and will relinquish its role as temporary master once communication with the real master is regained. This architecture is meant to deal with temporary loss of the master agent. If the master agent is removed from the site, a different server should be made the permanent master (by running `ras_install` again).

Note – You must manually change a master’s status when it becomes an alternate master by entering the IP address of the new master in the `DATA/MASTER` file.

Installation Lifecycle

A typical Storage Automated Diagnostic Environment installation consists of the following steps:

1. Install the software on a set of servers.

One server is the master agent (usually because it is already a management station or because it has access to email and is registered with the name-server and easily accessible). The master agent is the agent that provides the user interface. It is called 'master' even when there is no slave present. Each instance of an agent, either master or slave, can monitor devices.

Devices can be monitored in-band (usually by slave agents installed on the appropriate server) or out-of-band (from any agent). When log files are available (as in the case of Sun StorEdge T3, T3+, 6020, and 6120 arrays and Sun StorEdge 3510 Fibre Channel arrays), it is usually best to install an agent on the server where these log files are replicated and monitor the devices out-of-band from this agent. This configuration enables the same agent to see log file information and to probe the device and correlate the information found.

See “Installation” on page 17 for the following:

- “Installation and Post-Installation Checklist” on page 18
- “Host Requirements” on page 20
- “Installation Tips” on page 21
- “Installing the Software” on page 22

2. Initialize the configuration.

- a. Access the Storage Automated Diagnostic Environment by pointing a browser to the host which includes the proper port number. The Storage Automated Diagnostic Environment port numbers are 7654 (non-secure) and 7443 (secure).

The initial configuration consists of the following steps:

- Entering site information
 - Discovering devices
 - Adding storage devices manually to the software configuration
 - Adding local email addresses for event reception
 - Adding notification providers for transmission of events to Sun
- b. Check your configuration using the Review Configuration feature. This feature is in the BUI’s Administration--> General Maintenance section.
 - c. The initial login is always `username=<ras>`, `password=<agent>`. After the initial login, you can change the password with the software’s Root Password feature using the Storage Automated Diagnostic Environment BUI.
 - d. In addition, you can set up users, assign roles and permissions, and customize window options using the User Roles feature. Both of these features are in the BUI’s Administration--> System Utilities section.

3. Discover devices.

The Storage Automated Diagnostic Environment monitors the devices included in its configuration file (`/opt/SUNWstade/DATA/rasagent.conf`). Devices can be added to this file using ‘Add Device’, ‘Discover Devices’ or the `ras_admin(1M)` CLI command (`/opt/SUNWstade/bin/ras_admin`). ‘Add Device’ is straightforward and usually involves entering the device’s IP address. Before the Storage Automated Diagnostic Environment can add a device to its configuration, it must be able to access and identify the device. Identification usually means finding the WorldWide Name (WWN) of the device along with the enclosure-ID. Device discovery can be automated using the `/etc/deviceIP.conf` file.

The `/etc/deviceIP.conf` file has a syntax similar to `/etc/hosts` and is maintained by the system administrator. It contains a list of all devices that should be monitored by Storage Automated Diagnostic Environment software.

Both the CLI (`ras_admin(1M) discover_deviceIP`) and the BUI can be used to discover devices based on information from the `/etc/deviceIP.conf` file.

4. Discover topology.

Discovering a topology is slightly more complicated than the other steps. To do a complete topology discovery, every agent (master and slave) must discover their section of the SAN, both in-band and out-of-band, merge this information into a single topology and send this topology to the master agent for further aggregation. The master agent merges all received topologies with its own topology to create a single Storage Automated Diagnostic Environment 'MASTER' topology.

The topology created by the Storage Automated Diagnostic Environment is primarily a physical topology. It includes enclosure information, partner-group information, in-band path information, and the World Wide Name (WWN). It will be saved as the current SAN snapshot and will be used in all SAN-related operations until a new SAN topology snapshot is created by the customer. This is available from Admin ->Topo.Maintenance -> Topology Snapshot.

5. Start the agents.

When the Storage Automated Diagnostic Environment package is installed and `ras_install` has completed, the agents for each device may not be running. Agents are started from the BUI, usually after device discovery and notification provider initialization. Starting agents really means that the Storage Automated Diagnostic Environment agents are now active (master and slaves). This function is available from Administration->General Maintenance->Start Agents initialization.

6. Set up local email notification.

When a device alert occurs, the Storage Automated Diagnostic Environment software notifies the site administrator using email. Event email messages include Event Advisor information containing additional information and recommended actions.

Note – The local email notification can also be affected by the configuration options in System Utilities. The email can be proxied in cases where the Master system is not configured to do so.

See the Storage Automated Diagnostic Environment online help for the following information:

- Local Notification (email/Scripts)
- Add an Email or Pager Notification Address

7. Set up Remote Notification Providers.

When an event is generated, the Storage Automated Diagnostic Environment software can send information about that event back to a database at Sun for further analysis to determine reliability, availability and serviceability of Sun storage products. Notification, through these providers, at this time, to any Sun employee, only occurs through the SSRR provider. See the online help for details about remote notification providers..

8. Monitor the devices.

To get a broad view of the problem, the site administrator or Sun personnel can review the email information in context. This can be done by:

- Viewing the device itself (Monitor->Devices)
- Displaying the topology (Monitor->Topology)
- Analyzing the device's event log (Monitor ->Event Log)

9. Isolate any problems.

For many alarms, information regarding the probable cause and recommended action can be accessed from the Alarm view. This information should allow the user to isolate the source of the problem. In cases where the problem is still undetermined, diagnostic tests should be executed.

Diagnostics can be executed from the CLI or from the BUI. The Storage Automated Diagnostic Environment BUI enables users to execute tests remotely using the slave agents. This feature allows the user to start and control tests from one centralized BUI on the master server even when the actual diagnostic test is running on a slave server.

Once the problem is fixed, clear the health of the device in the Storage Automated Diagnostic Environment BUI, recreate a topology if new storage devices were added, and go back to Step 5.

See the Storage Automated Diagnostic Environment online help for the following information:

- Diagnostics

Monitoring Strategy

The monitoring is performed by master and slave agents installed on a set of servers. These servers are selected for the following reasons:

- The server has access to storage devices in-band (for example, the Sun StorEdge A5x00 array).
- The server has access to log files such as `/var/adm/messages` or storage device log files, such as `/var/adm/messages.t3`.
- The server has out-of-band access to storage devices that can be monitored out-of-band (for example, Sun StorEdge storage arrays and Sun switches).
- Multiple servers are used to distribute the monitoring load. For example, not all Sun StorEdge storage arrays need to be monitored from the same agent. In many instances, Sun StorEdge storage arrays will be installed in groups and will replicate their log files (`messages.t3`) to more than one server. In this case, it is best to install a slave agent on each server to have access to the log file and the corresponding arrays from the same agent.

Monitoring Cycle

Agent execution is controlled by the `cron` daemon on each server. The main steps of a monitoring cycle are as follows.

1. Verify that the agent is alone. If the previous run of the agent has not finished, allow it to finish. Only one instance of the monitoring agent (`/opt/SUNWstade/bin/rasagent`) should be running at any one time.
2. Load and execute all appropriate device modules used to generate instrumentation reports and generate health-related events.

Instrumentation reports are generated by probing the device for all relevant information and saving this information in a report stored in `/var/opt/SUNWstade/DATA`. These reports are compared from one run of the agent to the next to generate health-related events.

Events are also created by relaying information found in log files. For example, all errors and warnings found in `/var/adm/messages.t3` will be translated into a LogEvent event without further analysis. Most events are generated because a rule or policy in the software concluded that a problem exists, but if the storage array indicates issues in the `syslog` file, an event is immediately generated.

See the Storage Automated Diagnostic Environment online help for the following information:

- Monitoring Devices Using the Event Log
3. Send these events to the master agent if the events were generated by a slave, or, send the events to all interested parties if the agent is the master agent. The master agent is responsible for generating its own events and collecting events from the slaves. Events can also be aggregated on the master before dissemination.

See the Storage Automated Diagnostic Environment online help for the following information:

- Optimization and Fault Symptom Analysis
4. Store Instrumentation reports for future comparison.
Event logs are accessible from the BUI under Monitor->Logs. The Storage Automated Diagnostic Environment software updates the state database with the necessary statistics. Some events require that a certain threshold be attained before an event is generated. For example, having the CRC count of a switch port going up by one is not sufficient to trigger an event, since a certain threshold is required.

The Storage Automated Diagnostic Environment supports email thresholds that can be used to prevent the generation of multiple emails about the same component of the same device. By keeping track of how many events were already sent in a specified timeframe, redundant email alerts can be prevented. Other Providers (non-email) do not support this feature.

5. Send the events and/or alarms to the interested parties.
Events are sent only to those recipients that have been set up for notification. The types of events can be filtered, so that only pertinent events are sent to individuals.

Note – The Email Provider and the Sun Network Storage Command Center (NSCC, by way of the Net Connect Provider) receives notification of all events.

See the Storage Automated Diagnostic Environment online help for the following information:

- Local Notification (Email/Scripts)
- Add an Email or Pager Notification Address
- Event Filters

Event Lifecycle

Most of the Storage Automated Diagnostic Environment events are based on health transitions. When, for example, the state of a device goes from 'online' to 'offline', a health transition occurs. It is the transition from 'offline' to 'online' that generates an event, not the actual value 'offline'. If the state alone was used to generate events, the same events would be generated all the time. Transitions cannot be used when monitoring log files, so LogEvents can be very repetitive. This problem is minimized by attaching thresholds to entries in the log files.

Thresholds ensure that a minimum number (up to eight) of log file entries within a certain time period occur before an event is generated. The Storage Automated Diagnostic Environment also includes an *event maximums* database that keeps track of the number of events generated about the same subject in the same 8-hour timeframe. This database is used to stop the generation of repetitive events when there is no other way to do it. For example, if the port of a switch was toggling between offline and online every few minutes, the event maximums database would ensure that this toggling is reported only once every 8 hours instead of every 5 minutes.

See the Storage Automated Diagnostic Environment online help for the following information:

- Configuration Options
- Email and Event Maximums
- Thresholds List

Event Rules

Events are usually generated using the following rules:

1. The first time a device is monitored, a discovery event is generated. It is not actionable and it is used to set a monitoring baseline, primarily for NSCC. This event describes, in detail, the components of the storage device. Every week after discovery, an audit event is generated. It has the same content as the discovery event.
2. A LogEvent can be generated when specific information is found in host or storage log files. This information is usually associated with storage devices and sent to all users. These events can be made actionable based on thresholds, and then sent using the Net Connect provider.
3. Events are generated when the software detects a change in the content of the instrumentation report, probes the device, and compares the report to the last instrumentation report (which is usually only minutes old). StateChangeEvent and TopologyEvent categories represent most of the events that are generated.

See the Storage Automated Diagnostic Environment online help for the following information:

- Event Advisor

4. When possible, the Storage Automated Diagnostic Environment master agent combines events to generate aggregated events.

Note: Aggregated events, as well as events that require action by service personnel (known as *actionable events*) might also be referred to as *alarms*.

See the Storage Automated Diagnostic Environment online help for the following information:

- Optimization and Fault Symptom Analysis

Product Footprint

The Storage Automated Diagnostic Environment software was designed to have a very small footprint and to be invisible when not in use. It includes a `cron` program and an on-demand `http` service used for browser, slave, and master communication.

The Storage Automated Diagnostic Environment software includes a `cron` program that runs every five minutes. Every time the program starts, it verifies with the Storage Automated Diagnostic Environment configuration file whether it is time to execute the agents.

The real agent frequency can be changed from agent to agent through the BUI. If, for example, the agent frequency was changed to 30 minutes, the will abort 5 times out of 6. This agent (`/opt/SUNWstade/bin/rasagent`) runs on both master and slave agents, and is a Perl program that can grow to approximately 15 Mb of memory. The Storage Automated Diagnostic Environment package does not include Perl, so Perl (version 5.005 or higher) must be present on the server for the Storage Automated Diagnostic Environment to work. When running, the agent stores device-specific information in the `/var/opt/SUNWstade/DATA` directory. Its process size is not affected by the number of devices being monitored; once the monitoring of a device is completed, instrumentation data is stored on the disk and erased from memory.

See the Storage Automated Diagnostic Environment online help for the following information:

- Monitoring Frequencies
- Maintain Hosts

The `cron` agent is used only to probe devices and generate events and does not provide access to the Storage Automated Diagnostic Environment BUI. Access is provided by an HTTP service, usually installed on port 7654 and 7443 (secure). This program, called `/opt/SUNWstade/rashttp`, is started from `inetd` and will stay in memory for as long as a user requires the BUI. `Rashttp` has a timeout period (default is 30 seconds), after which it exits. This minimizes the number of processes present on the servers. This HTTP service is also a Perl program, and its footprint is similar to the `cron` agent. It is used to answer HTTP requests coming from browsers or from slaves. Master and slaves use HTTP to share configuration information, topology information, and new events.

Security Options

The Storage Automated Diagnostic Environment package can be installed with security enabled by executing `ras_install` and answering 'Yes' to the security question. This means that SSL (Secure Socket Layer) is used for transmission of information between the master agent and the browser and between the master agent and the slave agents. The Storage Automated Diagnostic Environment package includes a default certificate that expires in 2008 (located in the `/opt/SUNWstade/System/certificate.pem` directory). It uses the highest grade encryption (RC4 with 128-bit secret key). When secure mode is used, the URL used to access the master agent is `https://<hostname>:7443>`. The non-secure URL is `http://<hostname>:7654`. Site-specific certificates can be created with the open SSL utility (part of the public domain OpenSSL product).

For additional security, the Storage Automated Diagnostic Environment software supports multiple logins. These logins can be added using the 'root' login, along with specific capabilities (user, admin, script, diag, or expert). This enables different users to log in with their own login and password, and have a restricted set of functions available in the BUI.

See the Storage Automated Diagnostic Environment online help for the following information:

- User Roles

Notification Providers

The Storage Automated Diagnostic Environment software supports a variety of Notification Providers. These providers must be activated manually, which can be done using the BUI or the `ras_admin(1M)` CLI. Information is sent to the providers each time the agent completes a cycle.

Note – Slave agents send events to the master and the master sends events to the providers.

Local Email Notification

The Email Provider is used primarily to send event information to local or remote administrators. Multiple email addresses can be entered using the BUI, and event filters can be applied to these addresses. When email messages are generated, they are aggregated by event severity and by email address. This means that one email can contain more than one event, but these events must be the same severity level. Along with the main event information, the email includes Service Advisor information (information, probable cause, and recommended action). Events also include an EventCode that can be used as a lookup key into the Event Advisor database (also available from the Storage Automated Diagnostic Environment BUI).

See the Storage Automated Diagnostic Environment online help for the following information:

- Email Provider

NSCC Provider

The NSCC Provider uses email to send event information from the Storage Automated Diagnostic Environment to a database back at Sun. This database is called the NSCC and is used by Sun engineering to evaluate Reliability, Availability and Serviceability of Sun storage products.

Net Connect Provider

The NetConnect module relies on the SHUTTLE file (`/opt/SUNWstade/DATA/SHUTTLE`) to communicate with the Net Connect product. There are two SHUTTLE files, SHUTTLE1 and SHUTTLE3, to separate actionable events from non-actionable. When available, the `ncsend` program is also executed (`package_base/SUNWnc/bin/ncsend`). All events are sent to NetConnect. NSCC uses NetConnect to populate its database with events coming from clients.

See the Storage Automated Diagnostic Environment online help for the following information:

- Net Connect Provider

SunMC Provider

Activating the SunMC module enables the Storage Automated Diagnostic Environment software to send topology and alert information to a SunMC agent. These alerts are visible from the SunMC console. A special `rasagent` module must be installed on the SunMC agent to receive these alerts. This module is included with the Storage Automated Diagnostic Environment package (`/opt/SUNWstade/System/SunMC/SUNWesraa.tar.gz`).

See the Storage Automated Diagnostic Environment online help for the following information:

- SunMC Provider
- SunMC Provider Best Practices

SNMP Traps

SNMP traps can be sent for actionable events and can be received by any management application that can receive traps.

See the Storage Automated Diagnostic Environment online help for the following information:

- SNMP Trap Provider

Site Map

The Site Map page shows all available functions. This page is generated dynamically and can change based on the edition of the Storage Automated Diagnostic Environment software and the capabilities of the user who logged in the application. For example, a user without permission to run diagnostics tests will not see help information about diagnostics.

Commands Used for Monitoring

This section describes the commands and techniques used to monitor the storage devices supported by Storage Automated Diagnostic Environment.

Sun StorEdge 3510 Fibre Channel Array

This agent uses the CLI command `/opt/SUNWstade/bin/sccli show(1M) <option>`. This command works both in-band and out-of-band. The Storage Automated Diagnostic Environment software uses the same API interface for the in-band and out-of-band cases. This command extracts enclosure information and the content of the Sun StorEdge 3510 Fibre Channel Array message log.

Note – The Sun StorEdge 3510 Fibre Channel Array has an internal setting called *periodic drive check*. This setting affects the time it takes the Storage Automated Diagnostic Environment software to report an alert, since the Sun StorEdge 3510 FC Array does not report a problem until the next periodic drive check.

Use the Sun StorEdge 3510 FC Array Management Software to enable the default value (which is set to *disabled* in the Storage Automated Diagnostic Environment software). The new value should be between 30 seconds and five minutes.

Sun StorEdge A3500FC Array

This agent uses the commands of the `rm6` package (for example, `healthck(1M)`, `lad(1M)`, and `rdacutil(1M)`). These commands function in-band.

Sun StorEdge A5x00 Array

The `luxadm(1M)` command is used to monitor the Sun StorEdge A5x00 array. Before installing the Storage Automated Diagnostic Environment to monitor the Sun StorEdge A5x00 array, make sure that the latest `luxadm` patches are installed.

See the Storage Automated Diagnostic Environment online help for the following information:

- Revision Maintenance

Brocade Switch

The Storage Automated Diagnostic Environment uses the `snmp` library (`snmpget(1M)`, `snmpwalk(1M)`) to extract information from Brocade switches out-of-band.

Sun StorEdge D2 Array

`luxadm(1M)`, along with other in-band CLI commands (`disk_inquiry(1M)`, `rdbuf(1M)`, `identify(1M)`, and `vpd(1M)`) are used to monitor the Sun StorEdge D2 Array.

Host

The Host agent uses `luxadm` to read the LUN and HBA status. It also uses UNIX commands (`df(1M)`, `showrev(1M)`, `pkginfo(1M)`) to extract host information.

MCData Switch

The Storage Automated Diagnostic Environment uses `snmp(1M)` for McData switches.

Sun StorEdge Switch

For 1-Gbyte switches, the Storage Automated Diagnostic Environment uses the `sanbox(1M)` CLI command. For the more recent 2-Gbyte switches, `snmp(1M)` is used.

Sun StorEdge T3 and T3+ Array

The Storage Automated Diagnostic Environment uses HTTP queries to extract properties from the T3 arrays (also called tokens). Sun StorEdge T3 arrays come with a web server, which can be used to monitor the status of the array. The T3 tokens content is similar to the output of the `fru stat`, `fru list`, and `vol stat telnet` commands. The content of the `messages.t3` and `messages.6120` log file is also used. Warning (W:), Errors (E:) and important notices are monitored by the Storage Automated Diagnostic Environment software.

Sun StorEdge 6120 Array

Uses the same technique as the Sun StorEdge T3 and T3+ Array.

Fibre Channel Tape Devices

`luxadm(1M)` is used to monitor Fibre Channel tape devices.

V880 Disk

The Storage Automated Diagnostic Environment uses the `luxadm(1M)` command to monitor V880 Disk in-band.

Sun StorEdge 99xx (HDS)

The Storage Automated Diagnostic Environment uses `snmp(1M)` to monitor the Sun StorEdge 99xx series.

Inrange Switch

The Storage Automated Diagnostic Environment uses `snmp(1M)` to monitor Inrange switches.

Message Files

A separate module monitors the `/var/adm/message` file. This module saves the 'seek' value of the end of the file and reads the new entries in the files. When these new entries are deemed important from a storage point of view, LogEvents are generated. HBA drivers write to this log file.

Note – Mirrored log files from some devices can be monitored through the Storage Automated Diagnostic Environment using the Maintain hosts function.

Installation

This chapter presents instructions for installing the device edition of the Storage Automated Diagnostic Environment software on your system.

This chapter includes the following main topics:

- “Installation and Post-Installation Checklist” on page 18
- “Host Requirements” on page 20
- “Installation Tips” on page 21
- “Installing the Software” on page 22
- “Starting the Software” on page 26
- “Basic Setup Steps” on page 28

Installation and Post-Installation Checklist

Install the SunMC package before you install the Storage Automated Diagnostic Environment package and the SUNWesraa package. Use the information found in TABLE 1 to make sure you perform all of the steps necessary for a successful installation.

Caution – If a slave is configured behind a firewall with a non-routable IP address, `ras_install` will always fail, because the master cannot establish communications back to the client.

TABLE 1 Installation and Post-Installation Checklist

	Step	Action
<input type="checkbox"/>	1	Download the latest compressed SUNWstade package from SunSolve. Note: You must have root access to install SUNWstade.
<input type="checkbox"/>	2	Move the SUNWstade package to a temporary working directory; for example: <code># cp SUNWstade.xxx.tar.Z /tmp</code>
<input type="checkbox"/>	3	Uncompress and untar the SUNWstade package. <code># cd /tmp</code> <code># zcat SUNWstade.xxx.tar.z tar xvf -</code> <code>x.xxx</code> is the version number
<input type="checkbox"/>	4	Install the SUNWstade package using the <code>pkgadd -d .</code> command: <code># pkgadd -d .</code>
<input type="checkbox"/>	5	Locate potential patches on the SunSolve web site, and download them and install using the <code>patchadd</code> command. As superuser, use the <code>patchadd (1M)</code> command. See “Installing Patches” on page 34.
<input type="checkbox"/>	6	Once you have completely and successfully installed the SUNWstade package, execute the <code>ras_install</code> installation script. <code># cd /opt/SUNWstade/bin</code> <code># ./ras_install</code>

TABLE 1 Installation and Post-Installation Checklist (Continued)

<input type="checkbox"/>	7	<p>Access the GUI on the host where the master was installed. Use the server name and port 7654 (unsecure) or port 7443 (secure) from a browser to set up the rest of the configuration:</p> <p>http://<hostname>:7654 or https://<hostname>:7443</p>
<input type="checkbox"/>	8	<p>Log in to the Storage Automated Diagnostic Environment.</p> <p>Default username = ras Default password = agent</p>
<input type="checkbox"/>	9	<p>Set the site information parameters. Note that fields with an asterisk (*) are mandatory. See “Site Information” in the online help.</p>
<input type="checkbox"/>	10	<p>Configure the Sun StorEdge storage array and the host to mirror the syslog. See “Setting Up Sun StorEdge Array Message Monitoring” in the online help.</p>
<input type="checkbox"/>	11	<p>Using the Update Host functionality, set the categories to monitor. See “Maintaining Hosts” in the online help.</p>
<input type="checkbox"/>	12	<p>Using Device Discovery, request the Storage Automated Diagnostic Environment to probe the environments for the desired device types. See “Discovering Devices” in the online help.</p>
<input type="checkbox"/>	13	<p>If configuring email notification, customize the generation of email using the General Maintenance: Email Notification: Add Notification functionality. See “Customizing Email Notifications” in the online help.</p>
<input type="checkbox"/>	14	<p>Send a test email and a short message to verify the master instance of the Storage Automated Diagnostic Environment’s mailing capability.</p>
<input type="checkbox"/>	15	<p>Create a topology snapshot using the Maintenance: Topology Maintenance functionality. See “Creating a Topology Snapshot” in the online help.</p>
<input type="checkbox"/>	16	<p>Review the configuration to ensure that the Storage Automated Diagnostic Environment is not missing required configuration information necessary for proper monitoring. See “Reviewing the Configuration” in the online help.</p>

Host Requirements

The `SUNWstade` package is installed on a device host. Servers running in the Solaris operating environment (Solaris 8 4/01 or newer) and Sun StorEdge devices are supported. Solaris 8 and 9 might require multiple patches. Make sure you have the most recent packages and patches.

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 Sun StorEdge storage array message log, to which Sun StorEdge storage array device logs are sent. The name of the file appears in the Sun StorEdge storage array message log configuration window for each host.
- The host has Ethernet connectivity to the Sun StorEdge storage arrays or all switches, including the Sun StorEdge Network FC Switch-8 and Switch-16 switches, Brocade switches, InRange switches, and McData switch, over TCP/IP.
- For SAN data path monitoring, the host has access to the data path of the devices being monitored.
- The host can run a browser to complete and maintain the monitored configuration.
- If the Solaris 8 4/01 operating environment is installed, and support for in-band data path is being used on this server, the host must have the `SUNWsan` package installed, along with the latest `luxadm` patch.



Caution – All communicating agents *must* be executing the same version and patch level of the Storage Automated Diagnostic Environment. The agent will produce a warning if the version and patch levels do not match.

Installation Tips

- You should be familiar with UNIX commands and Sun's disk array products before attempting to use this product.
- System administrators should be knowledgeable about security risks associated with installing a web server. Take the appropriate action to protect access to the unsecure SUNWstade port 7654 and the secure SUNWstade port 7443.
- You must use `/opt/SUNWstade` as the package base directory.
- When installing a new patch to SUNWstade, stop the agents before installing the update and run `ras_install` after installing the update
- For Sun StorEdge™ arrays and Sun StorEdge™ Network FC switches connected in a non-Solaris environment, the package must be installed on a Solaris server and configured to monitor the devices through the management path.
- Brocade Silksworm switch configurations using segmented loop (SL) zones can be monitored and diagnosed, but the topology views will not show connections between devices.
- `switchtest(1M)` and `linktest(1M)` may not provide diagnostics for Fibre Channel links between downlevel HBAs and/or downlevel switches, as well as Fibre Channel links between switches and virtualization engines. This is a result of the current lack of support for the fabric ECHO test command in these products.
- If you use Netscape 6.2.X with SSL enabled, you must point the browser to `https://hostname` *without* the port number.
- Subnet Discovery is the preferred method of discovery. A subnet discovery mechanism discovers Sun StorEdge array storage and switch devices for a particular subnet.
- After `pkgadd`, run `/opt/SUNWstade/bin/ras_install` to set up `inetd` services and `crons`. The installation script asks a few basic questions that you must answer, such as "Are you installing a Master or a Slave Agent?" and "Do you want to turn on https security?"

Refer to "To Verify the Installation" on page 25 for more information.

- After installing SUNWstade, set the environment variables `PATH` and `MANPATH` to include SUNWstade directories `/opt/SUNWstade/bin` and `/opt/SUNWstade/man`.

Installing the Software

This section contains the following procedures:

- “To Install the Software” on page 22
- “To Verify the Installation” on page 25

▼ To Install the Software

- Use the `pkgadd(1M)` command and answer the prompts as shown in FIGURE 1.

Note – The `ras_install` script scans every installation to determine if localizations have been installed. If localizations have been installed, they are selectable. English is always the default language.

```
# pkgadd -d .

The following packages are available:
  1  SUNWstade Storage Automated Diagnostic Environment

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

(various copyright 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/Diags/bin/linktest
/opt/SUNWstade/System/cron_started
/opt/SUNWstade/bin/rasagent
/opt/SUNWstade/bin/writeNetConnect <attribute change only>
/opt/SUNWstade/htdocs/index.html
/usr/lib/libqsw.so
/usr/lib/libsanbox.so
/usr/lib/sparcv9/libsanbox.so
[ verifying class <none> ]
## Executing postinstall script.

(Continued on following page)
```

(Continued from previous page)

```
-----  
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 Agent? (Enter M=master or S=slave, E=Empty Master)  
[M/S/E]: (Default=M)
```

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

```
*** Master Install ***
```

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

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

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

```
** cron installed.
```

```
- Resetting the inetd services to see the new rashttp service.  
- Testing access to the webserver, (this will timeout after 30 secs) ...
```

```
*** ping '<local domain>' succeeded!  
... attempting to contact agent service ...
```

```
*** Contacted agent service.
```

```
SUNWstade installed properly!
```

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

FIGURE 1 Sample SUNWstade Installation

▼ To Verify the Installation

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

```
# pkginfo -l SUNWstade
```

Starting the Software

After you have executed `ras_install`, you can launch the Storage Automated Diagnostic Environment browser user interface (BUI) from a web browser.

The Storage Automated Diagnostic Environment BUI 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.

▼ To Start the Storage Automated Diagnostic Environment BUI

- 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:**
 - Default login: `ras`
 - Default password: `agent`

The Storage Automated Diagnostic Environment main window is displayed.

Console | Version | 2.3.a6.y01 Search | SiteMap | Log Out | Help

Storage Automated Diagnostic Environment Last Monitoring: 10-14 11:00:11 Current Alarms: 0 2 7 0

Alarms | Monitor | Diagnose | Manage | Service | Report | Administration | Documentation

Select from the above tabs.

Home [Help]

Configuration Summary		Alarm Summary [Alarms Devices]				
Site Info:		Device				
Installation:	1 host, 6 devices	Sun Server		1		
Notification:	None	McData switch			1	
Local Email:	0	Sun Switch		1		
Last Event:	2003-10-14 10:30:07	Sun T3			1	
		Sun V880 Disk			1	

Basic Installation Steps [Basic Steps in popup]

Review Site Info → Review Hosts → Discover Devices → Setup Emails → Setup Notifications → Create Topology → Review Config. → Start Agents

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FIGURE 2 Storage Automated Diagnostic Environment Main Window

The Master Configuration window opens automatically the first time you initiate the BUI.

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.

Basic Setup Steps

After you have installed the Storage Automated Diagnostic Environment package, but before you begin to use any of the Device Edition software functionality, you must perform the following basic setup steps. All of the basic setup steps are explained in detail in the Storage Automated Diagnostic Environment online help.

- Set up site information.
- Review the hosts.
- Discover the devices.
- Set up local and remote notification using email.
- Add email notification addresses.
- Create a topology.
- Review the configuration.
- Start the agents.

Most of these functions can also be performed using CLI commands for convenience and automation purposes.

Configuration

This chapter presents instructions for configuring and starting the device edition of the Storage Automated Diagnostic Environment software (SUNWstade) on your system. It also explains the steps required if you are using the SunMC provider.

This chapter includes the following main topics:

- “Configuring the Software” on page 30
- “Upgrading or Removing the Software” on page 35
- “Using the SunMC Provider” on page 37

Configuring the Software

After you have successfully installed the Storage Automated Diagnostic Environment, but before you launch it, there are several steps you must follow.

These steps include editing the configuration files and manually running `ras_install`.

Configuration Files

`/opt/SUNWstade/DATA/rasagent.conf`

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

`/etc/hosts`

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.

`/etc/deviceIP.conf`

Device discovery can be automated using the `/etc/deviceIP.conf` file.

The `/etc/deviceIP.conf` file has a syntax similar to `/etc/hosts` and is maintained by the system administrator. It contains a list of all devices that should be monitored by Storage Automated Diagnostic Environment software.

Both the CLI (`ras_admin(1M) discover_deviceIP`) and the BUI can be used to discover devices based on information from the `/etc/deviceIP.conf` file.

Running the `ras_install` Script



Caution – If a slave is configured behind a firewall with a non-routable IP address, `ras_install` will always fail, because the master cannot establish communications back to the client.

Using the instructions below, you should run the `ras_install` script in the following circumstances:

- After the initial execution and setup of `pkgadd -d`.
- When you need to modify the `cron`.
- When you install a patch.
- When you need to change the master or slave title of a host agent.
- To enable a secure port.

▼ To Start the Software on the Master

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,
E=Empty Master) [M/S/E]: (Default=M)
```

3. Specify whether you want to turn on the security feature.

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

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

The `ras_install` script, with the master option selected, 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 BUI 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 BUI on that port.

4. Specify whether you want a `cron(1M)` entry added to the `cron` facility.

```
? 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
```

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

You can adjust the monitoring frequency if necessary, and periodically enable or disable the `cron` in order to execute the `rasagent` program. To adjust the monitoring frequency, see “Maintaining Hosts” in the Online Help.

See also:

- Disable the `cron` from the BUI

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 (the master) 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.



Caution – All communicating master and slave agents *must* be executing the same version and patch level of the Storage Automated Diagnostic Environment. The agent produces a warning if the version and patch do not match.

Note – To install a slave agent, you must know the IP address or host name of the host that is 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` 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. Type the IP address or the host name 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.

3. Indicate whether you want to turn on the security feature.

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

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



Caution – All communicating master and slave agents *must* be executing the same version and patch level of the Storage Automated Diagnostic Environment. If all of the Storage Service Processors are utilizing a down-level revision, and the data host is utilizing a newer revision, one of the Storage Service Processors must be configured as a master of all the Storage Service Processor slaves, with the data host as a master. This prevents the data host from communicating with the down-level revision, but provides monitoring and diagnostics for the data host connection.

Installing Patches

See the SunSolve or PatchPro web site for the most recent patches.

Note – When installing a patch to the Storage Automated Diagnostic Environment, stop the agents before installing the patch (see “Starting and Stopping Agents” in the Online Help). Then, run `ras_install` after installing the update.

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

```
# cd /tmp
# uncompress XXXXXX-XX.tar.Z
# tar xvf XXXXXX-XX.tar

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


3. Re-run `ras_install` using the instructions in “To Start the Software on the Master” on page 31.

Upgrading or Removing the Software

This section contains the following subsections:

- “To Upgrade the Software” on page 35
- “To Remove the Software” on page 36

▼ To Upgrade the Software

Download all patches from the SunSolve web site to the host prior to beginning an upgrade.

Note – When installing a new version of, or a patch to, the Storage Automated Diagnostic Environment, stop the agents before installing the update (see “Starting and Stopping Agents” in the Online Help). Then, run `ras_install` after you have installed the update.

1. Remove any Storage Automated Diagnostic Environment patches.
2. Remove the existing `SUNWstade` installation using the following command from the `/opt/SUNWstade/` directory:

```
# pkgrm SUNWstade
```



Caution – Do not remove `/var/opt/SUNWstade/` or `/opt/SUNWstade/` files.

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

3. Reinstall the upgraded package using the following command:

```
# pkgadd -d .
```

4. Run `ras_install` to enable the cron and to configure the agent as master or slave.

Note – Upgrade the master first.

▼ To Remove the Software

1. Remove the initial installation using the following command:

```
# pkgrm SUNWstade
```

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

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

Using the SunMC Provider

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

The Sun Management Console, also known as *SunMC*, is one of the Storage Automated Diagnostic Environment's providers. Once activated, the SunMC module receives information about monitored devices and displays alarms in the SunMC console.

SunMC supports the following devices:

- Sun StorEdge storage arrays
- Sun StorEdge 1 GB and 2 GB switches
- Sun StorEdge Solution racks
- Other—Sun StorEdge 3500FC, Sun StorEdge A5x00 array, Sun StorEdge D2 array

SunMC *does not* currently support the following devices:

- Data Services Platform (DSP)
- Brocade or McData switches
- Virtualization engine

If you are consolidating multiple servers, you must also install the `SUNWesras` package. A brief description of the two packages follows.

- `SUNWesraa`—The `SUNWesraa` software is a SunMC attachment that decodes the HTTP-encoded messages from the Storage Automated Diagnostic Environment software into data that is manageable by SunMC. The `SUNWesraa` software is designed for the SunMC agent environment and *must* be installed on a host that has the SunMC agent installed. The `SUNWesraa` software receives data from the Storage Automated Diagnostic Environment software and forwards the data to SunMC.
- `SUNWesras`—The `SUNWesras` software aggregates multiple SUNMC agents running the `SUNWesraa` (`rasagent`) package. It is optionally installed on the SunMC server host. The `SUNWesras` software is designed for the SunMC agent environment to perform group operations within SunMC.

Note – Each server on which storage is monitored must have the `SUNWesraa` package installed. If you are consolidating servers, you must install the `SUNWesras` package *only once* on the SunMC server host.

Best Practices

- Install the required `SUNWesraa` package, the optional `SUNWesras` package, and a local SunMC agent on the same server as the Storage Automated Diagnostic Environment software.
- You must perform the steps *in the correct order* for the SunMC provider to work. The steps are explained in detail in the following sections.
- All of the steps in this section must occur *before* you add devices to the Storage Automated Diagnostic Environment software. Otherwise, topology information will not be sent to SunMC. Information about adding devices is documented in the Storage Automated Diagnostic Environment online help.

▼ To Install the Sun Management Console

1. **Install the SunMC package.**
2. **Install the Storage Automated Diagnostic Environment software and execute `ras_install` on the SunMC server host.**
3. **Install the latest patch that contains the `SUNWesraa` package (a package is required for each monitoring server) and the optional `SUNWesras` package (optional for group configurations).**

▼ To Configure the Sun Management Console

1. **Configure the Storage Automated Diagnostic Environment to send a topology to the SunMC server host.**
2. **Snap the topology using the Storage Automated Diagnostic Environment. Refer to the Create a Topology Snapshot section of the online help.**
3. **Load the SunMC `rasagent` module onto the SunMC server host.**
4. **Configure the `rasagent` module to point to the Storage Automated Diagnostic Environment.**
5. **Configure the Storage Automated Diagnostic Environment SunMC Provider to point to the SunMC server host.**

Note – If they are already running, stop the SunMC agents, and repeat the steps above.



Caution – Do not configure the SunMC software, or any other software, directly onto the Storage Service Processor. If, for some reason, software was directly installed onto the Storage Service Processor, uninstall it, as it is not part of the SP image.

The Service Processor does not use the SunMC provider. Instead, install the SUNWstade package on a non-Service Processor host that has out-of-band access to Sun.

▼ To Install the Storage Automated Diagnostic Environment Software for SunMC



Caution – If you are already running the rasagent module, uninstall it, then reinstall it on the SunMC server.

1. Use the `pkgadd(1M)` command and answer the prompts as shown “To Verify the Installation” on page 25.

2. Configure the Storage Automated Diagnostic Environment software on the SunMC server host as follows.

```
# /opt/SUNWstade/bin/ras_install

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

? Are you installing a Master or a Slave Agent? (Enter M=master or S=slave,
E=Empty Master) [M/S/E]: (Default=M) M

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

*** Master Install ***

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

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

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

** cron installed.

- Resetting the inetd services to see the new rashttp service.
- Testing access to the webserver, (this will timeout after 30 secs) ...
*** ping '<local domain>' succeeded!
... attempting to contact agent service ...

*** Contacted agent service.

SUNWstade installed properly!

To complete the configuration, point your browser to:

http://HostIPAddress:7654 (Unsecure)
https://HostIPAddress:7443 (Secure)

Use the browser only after the package has been installed on all Master
and Slave hosts.
```

Note – *HostIPAddress* is the IP address of the SunMC server.

Installing the SUNWesras and SUNWesraa Packages

The SUNWesraa and SUNWesras packages are automatically installed with the Storage Automated Diagnostic Environment patch in the `/opt/SUNWstade/System/SunMC` directory.

▼ To Configure the Storage Automated Diagnostic Environment for SunMC

1. Point your browser to one of the following URLs:

`http://HostIPAddress:7654` (Unsecure)
`https://HostIPAddress:7443` (Secure)

Note – *HostIPAddress* is the IP address of the SunMC server.

This opens the Storage Automated Diagnostic Environment software on the SunMC server host.

2. Using the Storage Automated Diagnostic Environment BUI, activate SunMC:

- a. Click the Administration tab.
- b. Click General Maintenance.
- c. Click Remote Notification Providers.
- d. Click SunMC.
- e. Select the Active check box.
- f. Type the IP address of the SunMC Server Host.
- g. Specify the Heartbeat Frequency (in hours).
- h. Click Update.

3. Using the Storage Automated Diagnostic Environment BUI, create a topology snapshot:

- a. Click the Administration tab.
- b. Click Topology Maintenance.
- c. Click Topology Snapshot.
- d. Click Create Selected Topologies.

This forces the Storage Automated Diagnostic Environment to send a new topology to the SunMC.

4. Force the Storage Automated Diagnostic Environment software to send the topology to SunMC:

- a. Click the Administration tab.
- b. Click System Utilities.
- c. Click Run Agent.
- d. Click Run.

If the `cron` is already running, an error message is displayed.

5. If the `cron` is already running, do the following:

- a. Execute the `rasagent` CLI command on the SunMC Server Host:

```
# cd /opt/SUNWstade/bin
# ./rasagent -d2
```

- b. Watch for the SunMC provider to report that it sent topology.

6. Open the SunMC console, refresh the console view, and make sure the components you created in the topology snapshot are displayed.

Note – Some of the components will be displayed as “other.” “Other” components include internal disk drives and Sun StorEdge A5x00, Sun StorEdge A3500FC, and Sun StorEdge D2 arrays.

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

▼ To Configure the SunMC Server Host

1. Open the SunMC console.
2. Click the SunMC Server Host icon.
3. Click the Modules tab.
4. Select `rasagent` from the Available Modules list.
5. Click Load.
6. Type the SunMC server IP address in the `rasagent` Provider IP text box.
7. Select Remove Saved Topology.
If you do not do this, SunMC will report on the previously saved topology.
8. Click OK.
9. Click the Module Browser tab.
10. Click the Hardware icon.
11. Confirm that the `rasagent` icon is displayed in the Hardware subtree.
12. Double-click the `rasagent` icon to display the subtree folders of components.

Stopping the SunMC Agents and the SunMC Console

If the `rasagent` icon is not displayed in the SunMC Hardware subtree, you must stop the SunMC agents, the SunMC console, and the system database.

▼ To Stop SunMC

1. Using the Storage Automated Diagnostic Environment BUI, deactivate SunMC, if it is currently active:
 - a. Click the Administration tab.
 - b. Click General Maintenance.
 - c. Click Remote Notification Providers.
 - d. Click SunMC.
 - e. Deselect the Active check box.
 - f. Click Update.

2. Change to the SUNWsymon directory.

```
# cd /opt/SUNWsymon/sbin
```

3. Check to see if SunMC agents are running.

```
# ps -ef | grep sym
```

4. If the SunMC agents are running, stop them. Type:

```
# es-stop -c  
# es-stop -A
```

5. Install the latest patch that contains the SUNWesraa package (required for each monitoring server) and optional SUNWesras package on the SunMC server host.

```
# cd /opt/SUNWstade/System/SunMC
```

6. Locate, unzip, and add the SUNWesraa package.

```
# gunzip SUNWesraa.tar.gz  
# tar -xvf SUNWesraa.tar  
# pkgadd -d . SUNWesraa
```

7. Start the SunMC agents, console, and system database.

```
# cd /opt/SUNWsymon/sbin  
# es-start -A  
# es-start -c
```

8. Repeat the procedure “To Configure the SunMC Server Host” on page 43.

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